Impact of accounting process characteristics on accounting outsourcing - Comparison of users and non-users of cloud-based accounting information systems

Abstract

Prior literature informs us that a company's decision to outsource a business process depends on process characteristics such as how frequently the process is performed or how specific the assets required by the process are. In this article, we compare the effects of accounting process characteristics on outsourcing decisions across users of traditional and cloud-based accounting information systems (AIS). By focusing on outsourcing of accounting processes among small and medium sized enterprises, we investigate the effect of five business process characteristics (frequency, human asset specificity, uncertainty, information intensity, and need for customer contact) on the outsourcing decision. Our results reveal that process frequency has a weaker negative effect on the outsourcing decision among users of cloud-based AIS. This appears to contribute to users of cloud-based AIS outsourcing a larger variety of accounting processes. Compared to traditional AIS, the inherent properties of cloud-based AIS such as ubiquitous access, scalability, and integration seem to encourage users of cloud-based AIS to also outsource processes that are frequently performed.

Keywords: outsourcing, accounting, cloud-based accounting information systems, transaction cost economics, small and medium-sized enterprises

1 INTRODUCTION

During the last few decades, the business process outsourcing (BPO) market has expanded rapidly as more and more companies outsource a wider range of business functions to professional service providers (Asatiani et al., 2019; Lacity et al., 2016). The rationale for outsourcing processes within these functions is simple: it is often cheaper to acquire (*buy*) services from a professional from the market than it is to develop and maintain the required competence to do (*make*) them in-house (Fill and Visser, 2000). This make-or-buy decision lies at the core of the substantial body of literature on outsourcing, in which one of the main questions has been whether the business process characteristics influence this decision.

The increasing BPO trend can be partially attributed to the increased use of cloud-based information systems that facilitate outsourcing by reducing transaction costs associated with setting up an outsourcing relationship (Clemons et al., 1993; Gurbaxani and Whang, 1991; Han and Mithas, 2013). A key mechanism through which the use of cloud-based information systems enables outsourcing is that it allows the business process groups to be disaggregated into smaller processes[1] that can transcend organizational or geographic boundaries (Apte and Mason, 1995; Quinn, 1992), which, in turn, allows the processes to be organized more efficiently between the outsourcer and the outsourcing service provider. This increases flexibility in how the delivery of processes can be organized, thus enabling companies to both reduce costs and concentrate on core processes (Apte and Mason, 1995; Jacobides, 2005; Kedia and Mukherjee, 2009; Mithas and Whitaker, 2007). However, disaggregation can also complicate outsourcing decisions. Instead of

[1] When referring to functions, processes and tasks, we rely on the APQC-categorization of business processes (see www.apqc.org). Throughout the paper, we refer to APQC level 1 (category) when we state a business function such as accounting, to APQC level 2 (process group) when we state process group such as payroll, to APQC level 3 (process) when we state process such as payroll calculation. We acknowledge that each process is further disaggregated into activities and tasks but those are left outside the scope of our study.

merely choosing whether to outsource a business process, companies that practice disaggregation need to make many process-level micro-decisions. This disaggregation of business processes is especially prevalent in accounting. In today's accounting outsourcing market, a company can decide to outsource only payroll tax calculation and retain control over the other payroll-related processes, such as payments and reporting to government agencies. Therefore, to achieve the most efficient work arrangement, the company would need to carefully consider which parts of the process group to outsource.

The recent emergence of cloud-based AIS as a business process platform also provides new opportunities for how accounting outsourcing can be organized and can, therefore, influence how companies make outsourcing decisions. Research has shown that cloud-based AIS can provide companies multiple benefits over the more traditional information systems, including easy access to affordable information systems that feature enhanced data processing capabilities, improved accessibility, and real-time collaboration functionalities (Armbrust et al., 2010; Asatiani and Penttinen, 2019; Iyer and Henderson, 2010; Mell and Grance, 2011; Oliveira et al., 2014). Deployment of cloud-based AIS also influences accounting configurations by providing a platform where the client company and the accounting firm can simultaneously work on the data and the process, thus allowing new ways of organizing the work in an outsourcing relationship. The flexibility and potential affordability of cloud-based outsourcing services make these specifically attractive to small and medium-sized enterprises (SMEs) that have limited resources and expertise (Rohde, 2004) and, therefore, cannot afford to build these services on their own (Sultan, 2011).

Motivated by the trend towards more outsourcing and increasing deployment of cloud-based AIS (Jivan and Tornbohm, 2013; Marriot et al., 2014), we seek to better understand the behavioral differences between users of cloud-based AIS (referred to as cloud users hereafter) and users of

traditional information systems (referred to as non-cloud users hereafter) by answering the two following interrelated research questions: *What is the impact of accounting process characteristics on the outsourcing of accounting? How does this impact differ among cloud users and non-cloud users?*

The existing literature (for a review, see Lacity *et al.*, (2016)) offers a plethora of process characteristics that potentially affect the choice problems associated with accounting outsourcing. For this study, we selected five process characteristics discussed in prior literature, which we deemed most relevant for our study: *frequency*, *human asset specificity*, and *uncertainty* introduced in transaction cost economics (TCE) (Williamson, 1985), and *information-intensity* and *the need for customer contact* introduced in the global service disaggregation framework (Apte & Mason, 1995). Our selection criteria concerning these process characteristics were four-fold. First, we aimed to ensure their explanatory power over the business process outsourcing decision. To do this, we sought theoretically sound process characteristics that had been found in earlier literature to have an impact on the outsourcing decision. Second, related to our context of accounting, we wanted to include process characteristics that would differentiate accounting processes on level 3 in the APQC categorization (see footnote above). Thus, we found the global service disaggregation framework to be the most suitable choice for this, as it focuses specifically on disaggregation of information-intensive services. Third, as our objective was to study differences between cloud users and non-cloud users, we sought process characteristics that would resonate with the properties of cloud-based AIS. Here, we considered issues such as scalability (frequency), information intensity, and reachability (customer contact). Finally, to keep the research instrument manageable, the number of process characteristics to be included needed to stay small.

Our findings show that while frequently conducted accounting processes are less likely to be outsourced regardless of the kind of AIS used, this negative effect of process frequency is weaker in the cloud context. This analysis offers a potential explanation for users of cloud-based AIS outsourcing a larger variety of accounting processes. In the final sections of this paper, we provide interpretations for our results and extend the discussion on the process characteristics and role of cloud-based AIS in accounting outsourcing.

2 DEVELOPMENT OF THEORETICAL FRAMEWORK

Cloud-based AIS offer ubiquitous and on-demand network access to a shared pool of computing resources, on a pay-per-use basis (Garrison et al., 2015; Mell and Grance, 2011; Prasad et al., 2014; Prasad and Green, 2015). Compared to the traditional, locally managed AIS, cloud-based AIS provide better opportunities to scale up or down a service according to customer needs, offer improved access to the desired software and hardware, require little capital investment, allow superior cost control (Asatiani, 2015; Marston et al., 2011), and provide potential for enhanced collaboration with the supply chain partners (Oliveira et al., 2014; Son et al., 2011). While providing many benefits to their users, we note that cloud-based AIS have some disadvantages. Cloud AIS solutions provided through public cloud require at least part of data to be hosted by a third party. This presents potential security (Newman, 2018) and privacy risks (Ali et al., 2015). Moving data to cloud AIS also raises concerns of losing control over how data is handled and where it is hosted (Schneider and Sunyaev, 2016). There are also potential economic and performance risks (Asatiani, 2015; Schneider and Sunyaev, 2016), particularly in the event where the selected cloud service provider goes out of business. Cloud-based AIS also tend to offer limited customizability compared to self-hosted systems (Dhar, 2012; Schneider and Sunyaev, 2016).

Collectively, these features of cloud-based AIS let us believe that they might impact how accounting outsourcing is done, i.e. that cloud users might outsource accounting processes differently compared to non-cloud users.

To probe how cloud users and non-cloud users differ in the way they outsource accounting processes, we build our theoretical framework and associated hypotheses in two steps. First, based on earlier literature on outsourcing of information intensive business processes, we establish that, overall, five process characteristics impact the make-or-buy decision in companies (a-set of hypotheses). Second, we focus on the accessibility feature of cloud-based AIS and use the five process characteristics to uncover potential differences between cloud users and non-cloud users (b-set of hypotheses).

2.1 Process characteristics

Transaction cost economics highlights the role of transaction costs in the decision whether to produce something internally or to acquire it from the open market (the so-called 'make-or-buy' decision). According to TCE, any interaction between a firm and the market consists of a series of transactions (e.g. search of suppliers, negotiating contracts) (Williamson, 1981). While the decision-makers within firms would always strive to conduct the transactions that are in their firm's best interests, their ability to do so is limited. Williamson (1981) explained these limitations through the concepts of bounded rationality of the decision-makers (i.e. not being able to acquire and process all the information needed to make a rational decision), and opportunistic behavior of the suppliers on the market (i.e. deliberately misinforming client firms for personal gain). Therefore, according to TCE, conducting market transactions is associated with costs, which influence the decision to make-or-buy. Although TCE has been mainly applied in organizational

studies, it has become one of the fundamental theories used in research related to IS/IT outsourcing, too (Dibbern et al., 2004; Lacity et al., 2011b). In TCE, three inherent characteristics of transactions are presented and theorized to have an influence on the decision to make-or-buy: frequency, asset specificity, and uncertainty. Next, we proceed to hypotheses development by explaining how each of these process characteristics relate to accounting outsourcing and discussing how the impacts of these characteristics differ across cloud users and non-cloud users.

2.1.1 Frequency

Frequency refers to the recurrence of the process—in other words, how often the accounting process is carried out (Alaghehband et al., 2011; Everaert et al., 2008). It has received less attention compared to the other two TCE constructs, both from Williamson (1979, 1981) and other researchers (Macher and Richman, 2008). Typically, business functions cover a wide variety of process groups and processes, some of which are performed on a continuous, daily basis, while others are done monthly or annually. TCE posits that frequently performed processes are more likely to be carried out in-house but low-frequency processes are more likely to be outsourced because maintaining assets to perform these processes is not viable due to idle time of the assets (Williamson, 1985). Therefore, similarly as in Everaert et al. (2008), we hypothesize:

H1a: Low frequency of a process is associated with a higher level of outsourcing.

2.1.2 Human asset specificity

Asset specificity refers to the degree to which the assets used for completing a process are specific to that process or whether they can be redeployed to other processes when not required by the process. The traditional argument of TCE posits that highly asset-specific processes are less likely to be outsourced because assets acquired for specific processes are less transferable to the third party and a company with such assets has already sufficient scale to perform them in-house

(Williamson, 1979). In addition, TCE argues that by outsourcing highly asset-specific processes, the firm may become more dependent on the market and expose itself to transaction risk (e.g. fear of opportunistic behavior from the markets). There are three types of asset specificity: *site, physical,* and *human* (Williamson, 1979). Accounting process groups consist of information intensive processes that are often intangible by nature (Kettinger et al. 1997). Thus, asset specificity emerging from geographical location and physical material bear relatively little meaning in the context of accounting outsourcing and, therefore, we focus on human asset specificity.

Concerning the role of asset specificity in general and human asset specificity in particular, the findings provided by recent reviews are mixed: some of the reviewed studies had found a positive effect between asset specificity and outsourcing while others had found asset specificity to be negatively associated with outsourcing (Lacity et al., 2011b, 2010; Schneider and Sunyaev, 2016). Two main reasons are given to support the claim that a high degree of high human asset specificity associated with a process would make the process a more likely candidate for outsourcing (De Vita et al., 2010; Ellram et al., 2008).

First, according to TCE, the potential harm of outsourcing processes that require highly specific assets stems primarily from the risk of opportunistic behavior from the market. However, outsourcing has become very common and markets for outsourcing have been established in many areas of business (Lacity and Willcocks, 1995). This has led to a higher level of competition among outsourcing service providers, thus alleviating the risk of opportunistic behavior from the market. Therefore, today, we would expect a lower propensity of opportunistic behavior due to the market pressure on the outsourcing service providers.

Second, the markets have shifted towards a service-based economy (Vargo and Lusch, 2004), where information-intensive services are provided by a larger number of small companies. Such environment favors agile companies with superior business models and innovation capacity. Therefore, outsourcing accounting processes that require highly specific human assets, becomes increasingly attractive. The staff working on highly specific processes often require capital investments in acquiring, training and maintaining competencies. This could result in taking resources away from critical core processes and reduce organization's agility. As a result, on-demand outsourcing services that require low initial investments present a solution for outsourcing highly human asset specific processes. Ellram, et al. (2008) found that companies eagerly outsourced non-core highly human asset specific processes, as these companies considered that the perceived benefits gained through outsourcing outweigh its potential drawbacks. The authors explain this by the perception that non-core processes do not tend to include critical strategic information and have no direct impact on the core business. Based on our discussion above, we posit:

H2a: High human asset specificity of a process is associated with a higher level of outsourcing.

2.1.3 Uncertainty

Uncertainty refers to a random event that cannot be calculated or anticipated by the company (Williamson, 1985). While TCE assumes that humans make rational contracts, their rationality is bounded and, therefore, only a subset of possible risks can be considered in an outsourcing contract. In this sense all contracts are incomplete and thus contain some degree of uncertainty (Williamson, 1979). Uncertainty is of two types: behavioral and environmental (Weed and Mitchell, 1980). Behavioral uncertainty associated with a business process refers to the difficulty

of foreseeing the actions taken by the counter-party. As an example, the outsourcer might experience behavioral uncertainty over the outsourcing service provider's intentional or unintentional behavior with potential negative consequences to the outsourcer. Environmental uncertainty, on the other hand, refers to the exogenous disturbances (Williamson 1985) related to a business process that result in ex-ante uncertainty and ex-post surprises to the outsourcer. In outsourcing, these disturbances may come, for example, in the form of legislative changes associated with the business process. Due to difficulties associated with measuring uncertainty, typically, uncertainty has been operationalized in different studies and models as a perceived uncertainty (Aubert et al., 1998; Benlian et al., 2009; Ellram et al., 2008; Everaert et al., 2008). We follow these studies and operationalize uncertainty as the perceived inability to predict the outcome of the outsourced process and the lack of confidence experienced by the client companies in the decision-making situation.

TCE argues that companies are reluctant to outsource and, thus, prefer to conduct processes in-house when there is uncertainty about partner intentions, or when external disturbances arise. In setting up our hypothesis, we follow this argument of TCE, which states that higher uncertainty of the process would discourage firms from outsourcing. Thus, we hypothesize:

H3a: Low uncertainty of a process is associated with a higher level of outsourcing.

2.1.4 Information intensity

In its origin, the concept of *information intensity* pertained to the proportion of an organization's value chain that is information-based (Porter and Millar, 1985). Later, the concept was operationalized on the product (Palmer and Griffith, 1998) and activity levels (Apte and Mason, 1995) to demarcate a clear distinction between products and activities that mainly require knowledge rather than physical efforts to complete them. In the outsourcing literature, information

intensity is defined as the ratio of time spent in dealing with information in an activity to the total time spent in that activity (Apte and Mason, 1995). Prior literature on service disaggregation has shown that high information intensity makes an activity more amenable to disaggregation and outsourcing because a highly information intensive activity has a higher potential to be codified, standardized, and modularized (Mithas and Whitaker, 2007). These properties pave the way for a smoother transfer of the activity to the outsourcing service provider. While factors such as a high level of structuredness of information (or the lack of it) may increase (or decrease) disaggregation potential of an activity, we posit that, overall, information intensity appears to be positively related to disaggregation potential (Mithas and Whitaker, 2007). Moreover, the specific domain of accounting represents a group of activities with a somewhat predictable information structure that tends to be relatively standardized to comply with the accounting regulatory system. Following the theory of service disaggregation (Apte and Mason, 1995; Mithas and Whitaker, 2007), we claim that information-intensive processes are better suited for outsourcing:

H4a: High information intensity of a process is associated with a higher level of outsourcing.

2.1.5 Need for customer contact

Need for customer contact refers to the amount of time that the outsourcing service provider spends in communicating with the customer to produce the service (Apte and Mason, 1995; Chase, 1981). The need for customer contact is triggered by both the need for information exchange and for in-person contact to build mutual trust (Balakrishnan et al., 2008). It is very common that the customer company and the outsourcing service provider are geographically separated in an outsourcing relationship. This physical separation and a high need for frequent in-person contact may sometimes conflict. Indeed, findings from previous studies suggest that services with a high

need for customer contact are less suited for outsourcing (Apte and Mason, 1995; Mithas and Whitaker, 2007), and are consequently less likely to be outsourced. In our context of accounting outsourcing, need for customer contact refers to the need for the accountant to be in interaction with the client company. We hypothesize:

H5a: Low need for customer contact of a process is associated with a higher level of outsourcing.

2.2 Cloud-based AIS and accounting outsourcing

Modern IT-enabled accounting outsourcing is conducted by using either locally managed or cloud-based AIS. There are several differences between locally managed and cloud-based AIS that are potentially relevant in accounting outsourcing decisions. Cloud-based AIS are often hosted by third-party vendors who provide simultaneous, ubiquitous *access* to multiple parties working on an accounting process (Grabski et al., 2011). In case of cloud-based AIS this often includes access to both transactional and analytical data, as well as various applications, such as dashboards. Typically, cloud-based AIS are able to integrate all critical information required for accounting processes within the same system (Penttinen et al., 2018), and scale the system according to the needs of the client company (Benlian and Hess, 2011; Chen and Wu, 2012; Schneider and Sunyaev, 2016), ensuring continuity of the service. Thus, different parties accessing the cloud-based AIS (such as client company, accountant, and auditor) have an opportunity to work simultaneously on the accounting process in real time, in a transparent fashion. Table 1 provides a comparison of cloud-based AIS to traditional AIS.

Table 1. Properties of cloud-based AIS[2]

Property	Cloud-based AIS	Traditional workstation AIS	References
On-demand service	Client company can provision computing capabilities such as network storage as needed, adding to the scalability of AIS.	Client company is restricted to the product features that are pre-determined in the initial contract/license. Additional functionalities and updates may be available but typically an upgrade to a different version of software is required.	Benlian and Hess (2011); Chen and Wu (2012); Mell and Grance (2011); Schneider and Sunyaev (2016)
Availability over network	AIS is available over the network and accessed through standard mechanisms that promote access and use over heterogenous client platforms (such as mobile phones, tablets, and laptops).	AIS is only available through the workstations where installed.	
Provisioning	AIS provider's computing resources are pooled to serve multiple client companies using a multi-tenant model.	Client company takes responsibility of ensuring adequate computing resources to use the AIS on in-house workstations.	
Rapid elasticity	AIS provider's capabilities are elastically provisioned and released, e.g. updates to the AIS are often provided automatically.	Client company makes decisions on updates and additional features.	
Measured service	Resource usage can be monitored, controlled and reported, providing transparency for both the AIS provider and client company.	Client company may set up practices to monitor efficient use of traditional AIS.	

By building on the abovementioned features, cloud-based AIS have provided companies with broader outsourcing options and new opportunities to rethink and reconfigure the accounting processes. Cloud-based AIS facilitate the efficient reallocation of disaggregated processes between the external accountant and the client company in several ways. First, cloud-based AIS improve system availability in terms of on-demand access to software and hardware, as well as in terms of

[2] We acknowledge that some traditional workstation AIS may exhibit features similar to cloud-based AIS (e.g. remote online access in a hosted client-server architecture). In our context, however, we consider all five properties as necessary conditions to defining cloud-based AIS, i.e. we define cloud-based AIS as systems that exhibit all the five listed features. Examples of such systems are Xero and QuickBooks Online. Such a tight definition allows us to draw clear boundaries between traditional and cloud-based AIS.

device location and platform independence (Leavitt, 2009; Marston et al., 2011; Talukder, Zimmerman, & Prahalad, 2010). Second, cloud-based AIS offer flexibility through easier implementation, and scalability of systems according to the requirements of the service (Leavitt, 2009; Talukder et al., 2010). Third, in terms of integration of applications and data, cloud-based AIS allow users to gather all the needed functionality and information to perform business processes within one shared platform, thus impacting the way the accounting process is organized (Leavitt, 2009; Marston et al., 2011). Such an integration of supply chain partners into a single, cloud-based AIS offer possibilities of improved collaboration between the partners. Furthermore, the enhanced collaboration features of cloud-based AIS, such as online communication tools, shared workspaces, and real-time data access, hold a promise of improved business agility and speedier decision-making (Fremdt et al., 2013).

2.2.1 Effect of process characteristics for cloud users

Overall, based on our presentation of the properties of cloud-based AIS compared to traditional AIS, we claim that the impact of each process characteristic is weaker for cloud users than for non-cloud users. Put differently, we claim that these process characteristics play a less restrictive role in outsourcing accounting in cloud users than among non-cloud users. Earlier research on the effects of these process characteristics on business process outsourcing is inconclusive in the context of cloud-based information systems. However, it has been found that certain features of cloud computing might mitigate the negative transaction effects of outsourcing (Schneider and Sunyaev, 2016). Next, we turn to explaining the mechanisms that would lead us to propose the less restrictive role of these process characteristics in the context of cloud-based AIS.

The enhanced accessibility of cloud-based AIS essentially offers client companies the ability to verify what has been entered into the system and, for example, which transaction documents have

been processed and which ones are still pending. This type of accessibility increases the level of transparency in the outsourced accounting process in general (lowering the risks related environmental uncertainty) and the actions taken by the accountant (lowering the risks related behavioral uncertainty), thus alleviating the market risks and risks of opportunistic behavior associated with outsourcing. All this would let us suggest a weaker effect of *uncertainty* and *human asset specificity* in outsourcing among cloud users.

Cloud-based AIS provide the opportunity of off-premise access to authorized parties, such as clients, accountants, and third parties (such as auditors) (Marston et al., 2011). Improved accessibility is achieved through easy to use web-based user interfaces (as opposed to FTP or remote desktop connection) (Gupta et al., 2013; Marston et al., 2011), improved performance (Trigueros-Preciado et al., 2013), and lower overhead cost (Chou, 2015; Gupta et al., 2013; Oliveira et al., 2014). This off-premise access would decrease the effect of the *need for customer contact* in business process outsourcing.

A cloud-based AIS offers a shared work space where the client firm and the accounting firm can access the data and the accounting process in real-time, thereby enabling more flexibility in the routines associated with customer contact. For example, by being able to monitor and measure the status and process of the outsourced function independent of time and location, both parties can enact upon the processes requiring attention in a more responsive manner, resulting in an increased amount of information that can be exchanged instantly over the cloud-based AIS. This shared work space enables the outsourcer to easily exchange both structured and unstructured information with the accountant. This shared work space reduces the effect of *information intensity*, *need for customer contact*, and *frequency*.

Based on above, we posit:

H1b: The effect of frequency is weaker for cloud users than non-cloud users.

H2b: The effect of asset specificity is weaker for cloud users than non-cloud users.

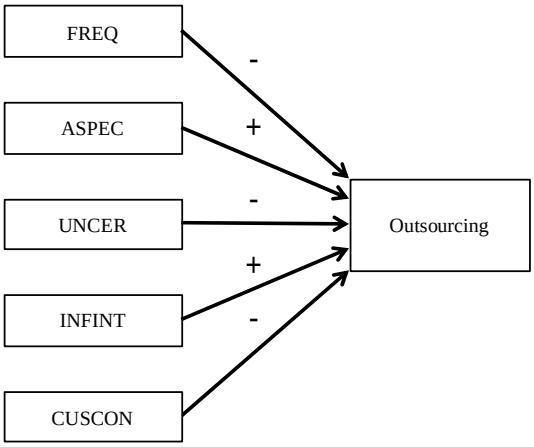
H3b: The effect of uncertainty is weaker for cloud users than non-cloud users.

H4b: The effect of information intensity is weaker for cloud users than non-cloud users.

H5b: The effect of need for customer contact is weaker for cloud users than non-cloud users.

Table 2 two summarizes all hypotheses of the study.

Table 2. Process characteristics and hypotheses summary



Process characteristics	Code	Description	Hypotheses
Frequency	FREQ	Frequency with which a task is performed.	H1a: Low frequency of a task is associated with a higher level of outsourcing. H1b: The effect of frequency of a task is weaker for cloud users than non-cloud users.
Human asset specificity	ASPEC	Need for specific human assets to perform a task.	H2a: High human asset specificity of a task is associated with a higher level of outsourcing. H2b: The effect of asset specificity is weaker for cloud users than non-cloud users.
Uncertainty	UNCER	Inability to predict an outcome of a task and severity of consequences in case of failure.	H3a: Low uncertainty of a task is associated with a higher level of outsourcing. H3b: The effect of uncertainty of a task is weaker for cloud users than non-cloud users.
Information intensity	INFINT	Amount of information needed in order to successfully perform a task.	H4a: High information intensity of a task is associated with a higher level of outsourcing. H4b: The effect of information intensity of a task is weaker for cloud users than non-cloud users.
Customer contact	CUSCON	Need for contact between a customer and a third party, for successful accomplishment of a task.	H5a: Low need for customer contact of a task is associated with a higher level of outsourcing. H5b: The effect of need for customer contact of a task is weaker for cloud users than non-cloud users.

3 METHOD

We collected data on outsourcing of accounting processes. The accounting function is highly suitable for this type of study for four reasons. First, all companies are required to perform accounting processes and, therefore, all companies need to decide whether to retain accounting in-house or outsource the accounting function or some parts of it. The market of outsourcing service providers is also well established and accounting outsourcing is a common practice. Second, there

are several relatively experienced cloud-based AIS providers on the accounting software market. These providers offer cloud-based AIS that allow for ubiquitous and real-time access to the system for all parties involved in accounting (e.g. a client, a BPO partner, and auditors). Third, the accounting function is well suited for disaggregation as it can be broken down into distinct processes. Fourth, the accounting function offers a well-defined, documented, and standardized environment to study.

We collected data from Finland, where accounting outsourcing is a €900 million industry, with approximately 4,300 service providers on the market (Association of Finnish Accounting Firms, 2016). Accounting is highly regulated and standardized across all industries in Finland. There are currently more than 150 distinct AIS products on the Finnish market. Among these systems, there is a new, emerging breed of cloud-based AIS, which enjoys a substantial user base.

We targeted Finnish small and medium-sized enterprises with two surveys asking about outsourcing 22 specific accounting processes (see Appendix II and Appendix III for the list of processes). The list of the 22 processes is widely used in the accounting industry in Finland. This reduces potential bias caused by item misinterpretation, as all the study informants can be expected to be familiar with the processes. However, measuring the five process characteristics for each of the 22 processes within a single survey would have been problematic for two reasons. First, rating scales in surveys essentially measure informants' attitudes or perceptions. These perceptions may have been influenced by the possible decision to outsource the process, leading to an endogeneity problem (Antonakis et al., 2014). Second, even if each process characteristic were to be measured with a single item, measuring all five characteristics of every process would have increased the survey length, thus possibly leading to bias due to survey fatigue (Podsakoff et al., 2012). To avoid these two issues, we used an alternative, more objective data source for the process characteristics.

To establish the scores for each of the 22 processes on each of the five process characteristics, we conducted a Delphi study consisting of three rounds where industry experts rated each of the 22 processes on the five process characteristics described earlier on the five-point scale (from 1 to 5).

The two datasets (expert ratings and survey) were combined as a single dataset where the unit of analysis was a decision to outsource an accounting process, and the decisions were further nested in firms (see Figure 1 for an overview). Although combining larger datasets with expert panel ratings is not common, it is not entirely unprecedented. Therefore, we considered such combination justified.

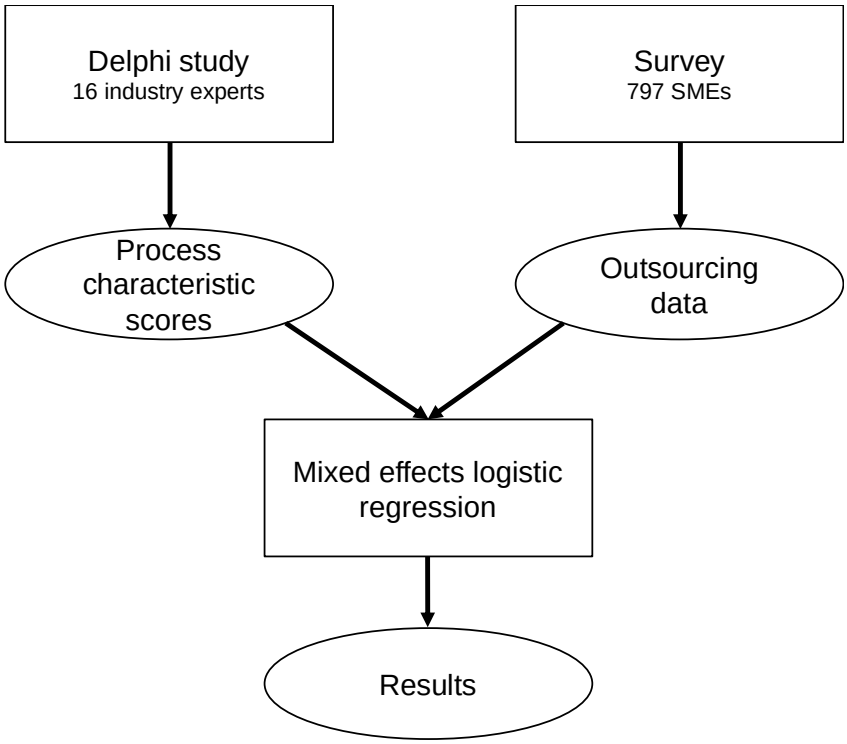


Figure 1. Research design

3.1 Delphi study

To evaluate process characteristics for each of the 22 processes, we organized a Delphi panel consisting of 16 accounting experts based in Finland. Delphi offers flexible, iterative process to

collect and analyze expert judgments in a series of questionnaires (Skulmoski and Hartman, 2007) and is an ideal approach to achieving convergence of opinion among experts on a particular issue (Hsu and Sandford, 2007). Anonymity and controlled feedback provided by Delphi encourages panel participants to refine and clarify their views without undue social pressure (Rowe and Wright, 1999). Next, we describe expert selection process and three rounds of the study.

3.1.1 Selection of panel participants

Identifying and recruiting appropriate participants for a Delphi panel is crucial. The participants should be highly knowledgeable and competent within the specialized area related to the issue under investigation (Hsu and Sandford, 2007). To form a panel of knowledgeable individuals working in the accounting field, we contacted accounting experts representing AIS developers, accounting service providers, client companies, professional association, and academia (see Table 3). We ensured that each participant had either extensive experience with or in-depth theoretical knowledge of the subject by checking publicly available information (e.g. resumes, academic and industry publications, LinkedIn profiles) and through personal discussions.

Table 3. Delphi panel participants

#	Description	Organization
1	Service manager	Large accounting information system developer
2	Application consultant	Large accounting information system developer
3	Consultant with a long CFO experience in large companies	Entrepreneur/Consultant
4	CFO	Large government-owned procurement company
5	Owner/CEO	Mid-sized accounting company
6	Team leader	Mid-sized accounting company
7	Experienced accountant	Mid-sized accounting company
8	Director, shared service centers & robotics	Mid-sized consulting company
9	Owner/CEO	Small accounting company
10	Owner/Partner	Small accounting company
11	CEO	Subsidiary of a large international accounting and audit company
12	Professor of accounting	Large university
13	Professor of accounting	Large university
14	Professor of accounting	Large university
15	Board member	Professional association for accountants
16	Board member	Professional association for accountants

3.1.2 Delphi process

Our Delphi study included three rounds. The number of rounds was set in advance to avoid survey fatigue and artificial consensus that can be encountered in lengthy Delphi processes (von der Gracht, 2012). Previous studies also found that three rounds are typically sufficient to identify points of consensus (Fan and Cheng, 2006). To measure whether consensus was reached, we used a mix of basic statistics (mean, median and standard deviation) and analysis of text comments and interview notes after each round.

For the first round, we interviewed each panel participant face-to-face or via Skype in cases where face-to-face meeting was not possible. During the interview, we asked the participants to briefly describe their work and how it related to accounting process. We also explained the purpose of the study, discussed the 22 processes with the participants to ensure they were familiar with them, and explained the process characteristics (see Appendix I). We conducted the first round

face-to-face to be able to provide verbal explanations in order to minimize discrepancies in understanding of the process characteristics across the participants. After a brief interview, we provided the participant with an electronic questionnaire where the participants evaluated each of the 22 processes on the five process characteristics (22 x 5 = 110 items in total) on a five-point rating scale. While the respondents answered the questionnaire independently, they had the opportunity to ask clarifying questions before, during, and after the process. After collecting responses from all 16 participants, we summarized the responses by calculating descriptive statistics. We marked the specific questionnaire items where 50% or more respondents reached agreement on a particular value.

In the second round, we distributed the questionnaires to the participants by email as an attachment. The questionnaires included a reminder of the description of each process characteristic, the anonymous evaluations of each item from the 16 participants, and highlighted items with the agreement level of 50% or higher. Participants were invited to revise their scores and/or provide comments arguing their decision. We received responses from all 16 participants after the second round. Based on agreement (50% or higher), descriptive statistics (mean, median and standard deviation), and the comments by the participants, we compiled a list with proposed consensus values for all 110 items.

In the last round, we sent the third questionnaire to the participants. In this questionnaire, participants were again presented with a reminder of the description of each process characteristic, and the 110 items to evaluate. Each item included a proposed consensus, generated as a result of the second round. The participants were asked to agree with the consensus or provide an alternative value with additional arguments.

After the third round, we received 14 responses (see Figure 3 for a summary of the process). We summarized the new values provided by the participants, as well as the comments. Based on these, we re-evaluated the proposed consensus, resulting in a final process characteristic measurements table. The results of the Delphi study provided in Appendix III were used as independent variables in our model (see Table 2). In the table, a score "one" refers to a low level and a score "five" to a high level; for example, a rating of "five" on frequency means that the process is conducted frequently; similarly, a rating of "one" on customer contact means that the process does not require the accountant to be in contact with the customer.

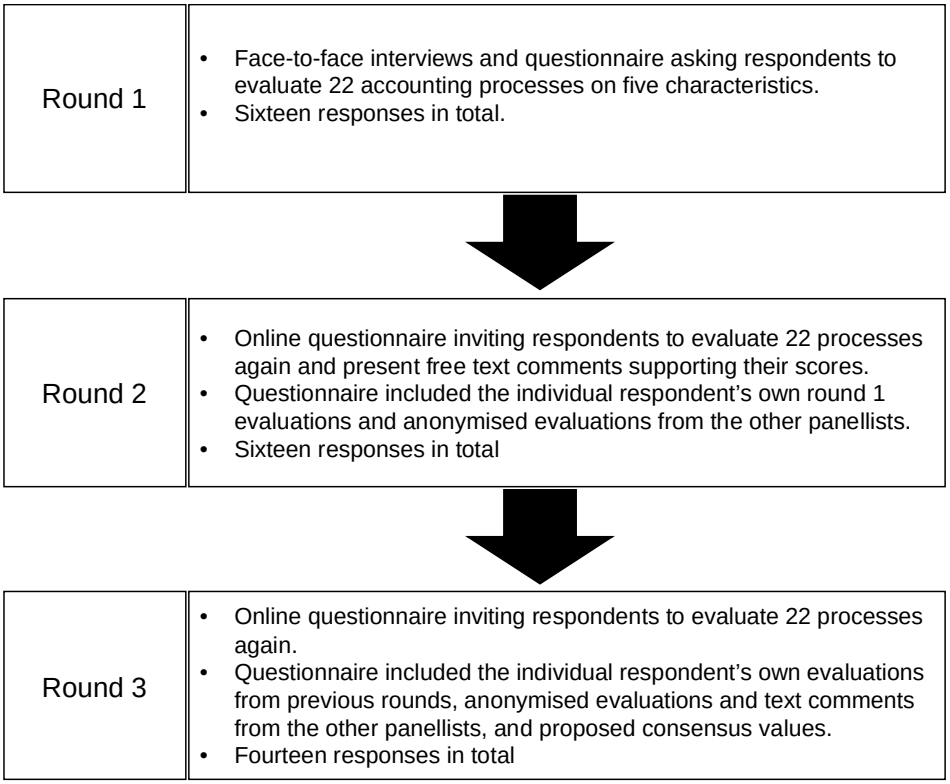


Figure 3 Summary of the Delphi study

3.2 Survey study

3.2.1 Data

To measure the impact of the process characteristics on a company's decision to outsource accounting processes, we collated data from SMEs[3] operating in Finland by using two surveys conducted in 2013 and 2016. The first survey was conducted in collaboration with OP-Pohjola, a large retail bank, and the Confederation of Finnish Industries. The second survey was conducted in collaboration with the Federation of Finnish Enterprises, which has around 116,000 members. In both cases, participants were invited to take part in the survey through email. A representative of the collaborating organization sent an invitation by e-mail containing a web-link to the survey to their members/customers. In total, 14,388 invitations were sent, 9,388 in the first survey, and 5,000 in the second. We received 848 complete responses from the 2013 survey, and 461 responses from the 2016 survey, making the response rates 9% and 9.2% respectively. To focus on the outsourcing decisions in the analysis, we limited the sample to those 797 companies that had outsourced at least one accounting process.

Given that our final sample was small compared to the initial sampling frame, survey non-response is a potential concern that needs to be addressed. Non-response can decrease the quality of any piece of research through two mechanisms: by decreasing the sample size or through non-response bias if the non-respondents differ from the respondents in a systematic way (Rogelberg and Stanton, 2007). Because the number of companies in the initial sampling frame was large, the final number of responses was more than adequate. With respect to possible non-response bias, we compared early and late respondents (Armstrong and Overton, 1977) on all study variables using

[3] We used the European Commission's definition of SMEs, which states that an SME is a company with no more than 250 employees and annual turnover of less than €50 million (European Commision, 2003).

t-tests adjusted for multiple comparisons. No evidence for non-response bias in the form of statistically significant differences was found.

In the survey questionnaire (see Appendix II), the informants were presented with a list of 22 accounting processes, from which the informants were requested to indicate which of the processes the company had outsourced. We also asked the respondents to indicate whether they use cloud-based AIS to manage their accounting work and to provide the names of the information systems they use and the size of the company in terms of personnel. Because each company provided data about 22 processes, the total number of observations for our main analyses was 22 x 797 = 17,534. Because of this very large number of observations, we use the more conservative $p < .01$ level for statistical significance (Lin et al., 2013).

3.2.2 Analysis method

Table 4 provides descriptive statistics and correlations of the data. The externally-rated process characteristics are uncorrelated with firm characteristics (Size, Cloud) because the same ratings were used for all firms and thus there was no between-firm variation in the process characteristics. The use of cloud services and company size are correlated fairly strongly and positively.

Table 4. Descriptive statistics and correlations

	Mean	SD	Correlations					
			Outsourced	Cloud	FREQ	INFINT	CUSCON	ASPEC
Outsourced	0.379	0.485						
Firm level variables								
Cloud	0.315	0.465	0.126					
Size	3.381	1.995	0.092	0.313				
Process level variables								
FREQ	2.909	1.125	-0.257					
INFINT	2.682	0.972	0.264		-0.567			
CUSCON	2.273	1.213	-0.162		-0.182	0.575		
ASPEC	2.318	1.293	0.367		-0.355	0.840	0.321	
UNCER	2.455	0.782	0.303		-0.470	0.848	0.444	0.846

Note: All correlations are statistically significant at $p < 0.01$

We analyzed the data 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. We included the five process characteristics as fixed effects and included a firm-level random intercept. In other words, we modeled the decision to outsource as depending on the process characteristics but allowed each firm to have a unique, general propensity to outsource any of the processes. Estimation was performed with the maximum likelihood estimator using the Laplace approximation of the likelihood function. The pseudo R^2 values were calculated with the formulas proposed by Nakagawa and Schielzeth (2013).

To test the hypotheses H1b-H5b, we estimated all models with two subsamples, one consisting of cloud users and the other consisting of companies that outsourced business processes only through more traditional means. We used *z*-tests to analyze the statistical significance of the differences of the regression estimates between cloud users and non-cloud users.

4 RESULTS

Table 5 shows the estimation results. To facilitate interpretation, we plotted the predicted probabilities of outsourcing over each of the process characteristics for cloud users and non-cloud

users holding other covariates at their means. On the outset, we make two observations. First, we observe a level difference between cloud users and non-cloud users as indicated also by the regression intercept in Table 5. Based on this observation we can conclude that in our sample cloud users on average outsourced more than non-cloud users. While the effect plots demonstrate similar patterns from both groups, there are some notable differences that could offer important clues to explain the level difference. Second, we note that larger SMEs outsource more processes. To interpret this finding, we argue that larger SMEs benefit more from adopting cloud-based AIS as they process a greater volume of transactions. We also argue that larger companies may have more elaborate outsourcing strategies that aim to leverage better information systems to improve accounting processes, while smaller companies simply seek cost reductions and external expertise.

Consistent with H1a, *frequency* of process (FREQ) is negatively associated with outsourcing. This suggests that companies are less likely to outsource frequently performed processes. For cloud users, the effect of *frequency* was significantly lower compared to the non-cloud users, supporting H1b. We argue that this difference is caused by the improved availability and accessibility of the data that cloud systems provide, which allow cloud users to reduce possible lag-time risks associated with the outsourcing of frequent processes. As a result, the frequency of a process has a weaker negative effect on the decision to outsource.

Table 5. Mixed effects logistic regression results

	All firms	Non-cloud users	Cloud users	Difference: Cloud users vs. Non-cloud users
	H1a-H5a	H1b-H5b		
(Intercept)	-0.86** (0.07)	-1.18** (0.09)	-0.2* (0.12)	0.89**
FREQ	-0.46** (0.03)	-0.57** (0.04)	-0.25** (0.05)	0.32**
ASPEC	1.16** (0.05)	1.15** (0.07)	1.10** (0.09)	-0.05
UNCER	0.27** (0.05)	0.35** (0.06)	0.18 (0.08)	-0.18
INFINT	0.23** (0.06)	0.24* (0.08)	0.22 (0.11)	-0.02
CUSCON	-1.37** (0.04)	-1.32** (0.04)	-1.42** (0.06)	-0.10
Size	0.32** (0.07)	0.17 (0.08)	0.23 (0.12)	0.06
AIC	14,997.73	9,567.20	5,294.77	
BIC	15,059.90	9,626.34	5,347.71	
Log Likelihood	-7,490.86	-4,775.60	-2,639.39	
Num. obs.	17,534	12,012	5,522	
Num. groups: Firm	797	546	251	
Var: Firm (Intercept)	3.05	3.20	2.49	
R^2 marginal	0.33	0.33	0.33	
R^2 conditional	0.62	0.62	0.62	

Independent variables are standardized over the full sample; dependent variable is outsourcing.
Standard errors in parentheses.
* p <.01, ** p <.001.

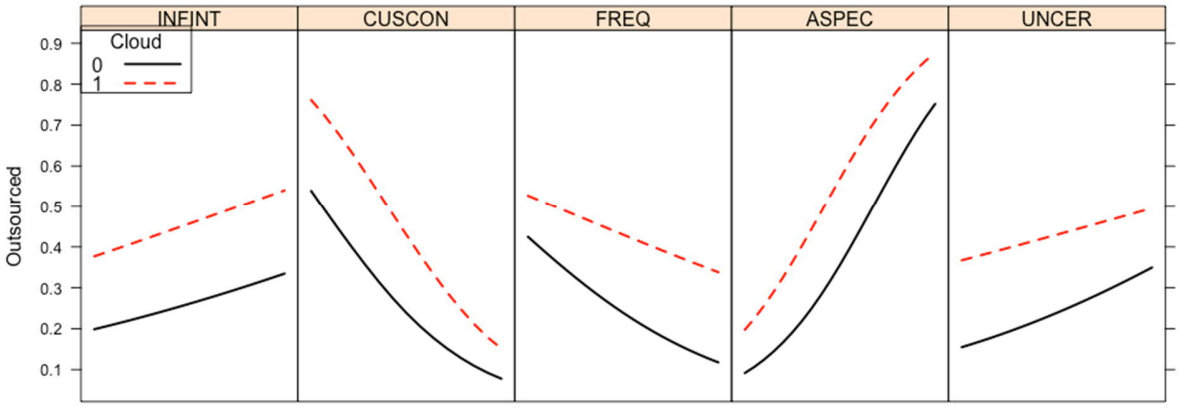


Figure 3 Marginal prediction plots

Our results show a statistically significant positive relationship between *human asset specificity* (ASPEC) and outsourcing. This finding goes against TCE, but follows our theorizing and thus supports H2a. This finding suggests that the processes that require more specific assets are more prone to outsourcing. Such an effect of asset specificity can be explained by specific expertise required by some individual processes that is perhaps not available in-house, thus driving companies to outsource them. The fact that this finding goes against the TCE predictions becomes less surprising when we consider that TCE was introduced to explain outsourcing more than 30 years ago when the outsourcing was much less common and hence the potential for opportunistic behavior from the market was a greater threat than what is currently experienced in the highly competitive accounting outsourcing markets. We do acknowledge that this effect may be sensitive to the context of accounting and SMEs: a company with a small customer base might want to concentrate on core processes and to outsource all supporting processes that require highly specific assets, but these dynamics could be different for both larger companies and for core business processes.

H3a is not supported by the results. On the contrary, our data indicates a positive relationship between the uncertainty (UNCER) related to process accomplishment and the decision to outsource. This is opposite to the original hypothesis, where higher uncertainty would discourage outsourcing. The logic to this finding could be the following: small customer companies want to outsource the risk to their accountants, whom they perceive as experts in the field. In this case, outsourcing might have features of insurance, where the risk is mitigated to third parties.

The findings indicate a statistically significant, positive relationship between *information intensity* (INFINT) and outsourcing, which supports H4a. This means that the SMEs using cloud-based AIS included in our sample have decided to outsource those accounting processes that are

information intensive more than the ones that are less information intensive. This result supports the original proposal by Apte and Mason (1995). High information intensity of an accounting process makes it a good candidate for outsourcing because such a process can be more easily isolated from other activities.

There is a negative relationship between *need for customer contact* (CUSCON) and outsourcing, suggesting that processes that require intensive contact between parties are less eligible for outsourcing as predicted by our theorizing. This result thus supports H5a. Again, this intuitive finding is in line with existing research on information-intensive service disaggregation (Apte and Mason 1995). Table 6 provides a summary of the results of the proposed hypotheses.

The effect of size, used as a control variable, and not included in Figure 3 was fairly strong; In the smallest size category (1-5 persons), the probability of outsourcing a process was about 40%, which increased to about 60% for the largest size category (151-250) people.

Table 6. Summary of findings

Hypothesis	Supported?
H1a: Low frequency of a process is associated with a higher level of outsourcing	Yes
H1b: The effect of frequency is weaker for cloud users than non-cloud users	Yes
H2a: High human asset specificity of a process is associated with a higher level of outsourcing	Yes
H2b: The effect of asset specificity is weaker for cloud users than non-cloud users	No
H3a: Low uncertainty of a process is associated with a higher level of outsourcing	No
H3b: The effect of uncertainty is weaker for cloud users than non-cloud users	No
H4a: High information intensity of a process is associated with a higher level of outsourcing	Yes
H4b: The effect of information intensity is weaker for cloud users than non-cloud users	No
H5a: Low need for customer contact of a process is associated with a higher level of outsourcing	Yes
H5b: The effect of need for customer contact is weaker for cloud users than non-cloud users	No

Frequency was the only process characteristic that had a significantly weaker effect for cloud users (H1b supported). This finding leads us to propose that while adopting cloud-based AIS has a significant effect on outsourcing patterns of a client company (i.e. outsourcing more processes), this effect can only partially be explained by process characteristics. In other words, it appears that

increased accessibility and transparency of cloud-based AIS may allow companies to outsource more frequent and time-sensitive tasks, but cloud-based AIS do not reduce the restricting effect of other process characteristics (e.g. uncertainty or information intensity). This lack of effects on other process characteristics than frequency can also be partly explained by the specific context of SMEs as they are involved with relatively simple outsourcing arrangements, where introducing improvements such as cloud-based AIS might have only a marginal impact on the outsourcing decision. There may also be process characteristics outside the five tested in our empirical study that may explain the difference between users of cloud-based AIS and traditional AIS. These could include, for example, switching costs, process complexity, and process interdependence (Lacity et al., 2011a).

5 DISCUSSION AND CONCLUSION

In this article, we set out to examine the differences in the ways outsourcing of accounting processes are conducted among users and non-users of cloud-based AIS. We posed two interrelated research questions: *What is the impact of accounting process characteristics on the outsourcing of accounting? How does this impact differ among cloud users and non-cloud users?* To address these questions, we conducted an empirical study and identified differences in the way accounting process characteristics affect the decision to outsource a particular accounting process.

5.1 Implications for research

We find that cloud users and non-cloud users exhibit different outsourcing patterns manifested as a level difference between these two groups, meaning that, overall, cloud users outsource more accounting processes than non-cloud users. Our empirical study sheds light on the reasons behind this level difference as we observe that for cloud users, frequency of the accounting process has a

significantly smaller (negative) influence on the outsourcing decision. Therefore, we argue that frequency plays a less restrictive role in the outsourcing decision for users of cloud-based AIS. One potential explanation for this finding is that cloud-based AIS make it easier to disseminate digital information and design optimal arrangements to organize work processes in an efficient way. For example, by having a collaboration platform in the form of a cloud-based AIS, companies can more efficiently disaggregate and (re)allocate the accounting processes between the client company and the accountant. As a result, cloud-based AIS enable more flexibility and transparency in the outsourcing arrangement. With these arrangements, organizations using cloud services can achieve higher levels of efficiency by connecting to third-party providers (such as auditors) from the market to use the data and processes in a real-time, transparent environment. Our findings suggest that, going forward into the future where cloud systems are likely to become even more prevalent, researchers using TCE to explain outsourcing decision need to consider their contextual nature.

Drawing on these observations, our research contributes to the literature on business process outsourcing and cloud computing. We advance the discourse on cloud computing beyond the mere technology adoption (Alshamaila et al., 2013; Gupta et al., 2013; Lewandowski et al., 2013; Oliveira et al., 2014) and IT sourcing issues (Benlian and Hess, 2010; Schneider and Sunyaev, 2016) by highlighting the auxiliary impact of using cloud-based information systems on decision-making concerning business process outsourcing. One of the core features of cloud-based systems is improved accessibility (Gupta et al., 2013; Lin and Chen, 2012). Cloud-based systems enable both outsourcers and service providers to easily access the system in which business process is performed. This evolution from locally installed traditional systems that split a business process between the two parties, has had consequences on outsourcing decision making. The improved

accessibility seems to lead to higher levels of outsourcing among cloud users. This could be attributed to the increased transparency between client firms and accounting firms, which mitigates negative effects of fear of opportunistic behavior. Accessibility of systems, combined with data integration across the parties could also facilitate improvements in the business process itself in terms of speed, required skills, and modularity of the processes. Our findings regarding the weaker effect of the frequency attribute on outsourcing decisions supports these assumptions, as client firms find it more compelling to outsource even the most frequently performed processes to accounting firms.

5.2 Implications for practice

From a managerial point of view, our results are interesting for accounting firms, software vendors, and client firms considering outsourcing their accounting processes.

5.2.1 Accounting firms

Interestingly, cloud users outsourced more accounting processes than non-cloud users. While it is, typically, the client company that decides which kind of system to use, this decision is often discussed between the accountant and the client company. Those accountants that seek to increase their revenue might consider putting more emphasis on cloud-based AIS when they seek new clients and when they renegotiate renewal of the contracts for information systems with existing clients.

Our results suggest that companies seek to outsource highly uncertain accounting processes and processes that require highly specific human assets. We interpret these results as an attempt by the client company to outsource the risks associated with accounting processes to accountants who they perceived as more highly qualified. This observation has two implications for accountants.

First, accountants must be ready to mitigate the risks and have the expertise to deal with more complex processes than before. Second, they need to rethink their value proposition, perhaps offering their services in a more insurance-like mode, thus proposing to take the full responsibility for the accounting processes that trouble client companies the most. Overall, accountants would need to expand their focus to offer a wider range of services accommodating both routine, everyday tasks as well as processes that require higher levels of human asset specificity. These could include knowledge of the nuances of the field (e.g. upcoming tax regulations and their implications) and the capability to process and analyze large amounts of data.

5.2.2 Software vendors

For accounting software vendors, our findings provide some clues for further development of AIS and for how to offer them to the market. Our analysis reveals that, overall, companies seem to outsource processes that are highly information intensive, require relatively highly specific human assets, exhibit higher levels of uncertainty, need a lower level of customer contact, and are conducted less frequently. Accounting software vendors need to develop systems that facilitate the outsourcing of this types of accounting processes. For example, concerning information intensity, it is very important for accounting software vendors to be able to link different sources of information and to structure the data into easily workable uniform formats and ensure high levels of information processing capacity.

Our results reveal that the level difference between non-cloud users and cloud users can be partially explained through the relatively weaker restrictive effect of frequency, meaning that compared to non-cloud users, cloud users outsource more frequently conducted processes. Therefore, we claim that accounting software vendors that offer cloud-based AIS need to ensure

that their software can handle volume and enable fast and transparent processing of frequently performed accounting processes.

5.2.3 Outsourcers

All companies need to do accounting. Further, all companies need to decide whether to outsource those processes or keep them in-house. Our study offers an analysis on the effects of five distinct accounting process characteristics on this decision to accounting outsource. Companies pondering their options may use our study to review their accounting processes or even as a benchmark to improve their understanding on what types of accounting processes companies belonging to their peer group have decided to outsource.

Our analysis reveals that cloud users outsource more accounting processes. Companies could study the inherent properties of their system landscape and study whether the fit between their current systems and the outsourcing configuration is an optimal one. Also, those companies employing traditional, locally managed AIS may consider updating their systems and evaluate the impact of these system updates on their outsourcing decisions.

5.3 Further research and limitations

We see three main limitations in our study. First, our findings regarding uncertainty were contradictory to earlier research. Outsourcing highly uncertain processes 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, while our study design (including a Delphi study conducted among accounting experts) provided us with reliable evaluations on the five process characteristics, it also limited us to using these five selected characteristics; adding more process characteristics would have resulted in problems in managing

the Delphi study. This limitation is resonated in the fact that the effect of four out of the five characteristics were found to be insignificant. Further research could expand the set of characteristics to be studied (see e.g. reviews Lacity et al. (2016) and Lacity et al. (2011a)). Third, the results show the capability of cloud-based AIS to reorganize the work between the client company and the outsourcing provider in novel ways. Efficient disaggregation of business functions and process groups into processes is one example of such reorganization. Partial support of our hypothesis showed that cloud services could reduce the importance of some factors affecting a decision to outsource. We suggest that more qualitative work should be done in this field to explore the role of cloud-based AIS in managers' decision-making processes and the interaction of the system with the characteristics of the decision.

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We want to note that a pre-study based on a limited set of data and without a proper Delphi study was presented at the Hawaii International Conference on System Sciences (HICSS) 2014 (Asatiani et al., 2014) and we wish to thank the participants of the Service Science, Management, and Engineering (SSME) track session for their encouraging comments. We are grateful to the Federation of Finnish Enterprises, OP-Pohjola, and the Confederation of Finnish Industries for providing access to respondents. We also thank the experts for their invaluable input to our Delphi study. Finally, we want to thank the Editors and two anonymous reviewers at the International Journal of Accounting Information Systems for their constructive feedback which helped us improve the paper significantly. Naturally, all remaining errors are ours.

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APPENDICES

Appendix I: Process characteristics - origin and operationalization

Process characteristics	Origin and description	Operationalization
Information intensity	Information intensity of an activity is defined as the ratio of time spent in dealing with information in the activity to the total time spent in the activity (Apte & Mason 1995)	On scale from one to five, evaluate how information intensive the process is, i.e. how much information from various sources is required to complete the process. (1-less information; 5-more information)
Need for customer contact	The degree of customer contact is defined as the ratio of time during which a customer is in direct contact with the service facility to the total time required for the creation of the service (Apte & Mason 1995)	On scale from one to five, evaluate how much interaction (e.g. face-toface meetings, e-mails, chat-messages, calls and text messages) between the accountant (either accounting firm accountant or internal accountant) and the business unit is required to complete the process. (1-less interaction; 5- more interaction)
Frequency	Frequency refers to the volume of transactions (Williamson 1985) that range from recurrent to occasional transactions.	On scale from one to five, evaluate how often the process is done. (1-rarely, 5-often)
Human asset specificity	Human asset specificity refers to the non-redeployable, transaction-specific human assets that are specialized and unique to a process (Williamson 1985)	On scale from one to five, assess whether the completion of the process requires specific assets. A specific asset in this case, means persons with specialized knowledge, which cannot be easily transferred to other processes outside the domain of accounting. (1-not required; 5-required)
Uncertainty	Uncertainty stems from behavioral uncertainty and exogenous disturbances that result in ex-ante uncertainty and ex-post surprises (Williamson 1985)	On scale from one to five, evaluate how much uncertainty is associated with the completion of the process. Uncertainty can stem from uncertainty related to inputs (such as information, accountant work, or information systems processing) and outputs (such as documents, invoices, payments, or updated databases). Cautiousness of the accountant when performing the process is also an indicator of uncertainty. (1-low level of uncertainty, 5-high level of uncertainty)
		Guidelines for evaluation: • Each process should be seen as an activity in which inputs (such as information, accountant work, or

		information systems processing) are processed into outputs (such as government reports, invoices, payments, or updated databases). • Most accounting processes are information intensive; however, some processes are more information intensive than others. The processes should be assessed in comparison to each other. • The evaluation should be done with an average Finnish SME in mind (in terms of turnover, number of transaction documents etc.).

Appendix II: Survey items used in the analysis

1. What industry is your company operating in?

_____

2. What is the size of your company in terms of employees on payroll?

- o 1-5
- o 6-10
- o 11-15
- o 16-20
- o 21-25
- o 26-30
- o 31-35
- o 36-40
- o 46-50
- o 51-75
- o 75-100
- o 101-150
- o 151-250
- o 250+
- o Private trader
- o I do not know

3. What is your approximate turnover (as reported to National Board of Patent and Registration)?

- o €0 – €100 000
- o €100 001 – €200 000
- o €200 001 – €300 000
- o €300 001 – €400 000
- o 400 001 – €500 000
- o €500 001 – €1 000 000
- o €1 000 001 – €2 000 000
- o €2 000 001 – €5 000 000
- o €5 000 001 - €8 000 000
- o €8 000 001 - €10 000 000
- o €10 000 001 - €20 000 000
- o €20 000 001 - €50 000 000
- o €50 000 000+
- o I do not know

4. Do use cloud-based accounting information systems?

- o Yes
- o No
- o I do not know

5. What information systems do you use in order to manage your accounting (provide names of systems)?

_____

6. If you are outsourcing your accounting partially, please mark the processes that are outsourced/kept in-house accordingly.

Client register maintenance
- O In-house O Outsourced

Product register maintenance
- O In-house O Outsourced

Sending sales invoices
- O In-house O Outsourced

Handling of sales invoices
- O In-house O Outsourced

Sending note of complaint
- O In-house O Outsourced

Sales ledger maintenance
- O In-house O Outsourced

Supplier register maintenance
- O In-house O Outsourced

Receiving purchase invoices
- O In-house O Outsourced

Handling purchase invoices
- O In-house O Outsourced

Handling purchase, travel and other costs
- O In-house O Outsourced

Purchases ledger maintenance
- O In-house O Outsourced

Personnel register maintenance
- O In-house O Outsourced

Basic payroll data maintenance
- O In-house O Outsourced

Payroll calculations
- O In-house O Outsourced

Preparation of balance sheet and income statement
- O In-house O Outsourced

Preparation and sending of VAT
- O In-house O Outsourced

Preparation and sending of annual salary reports
- O In-house O Outsourced

Preparation and sending of annual pension insurance reports
- O In-house O Outsourced

Periodic VAT payments
- O In-house O Outsourced

Salary payments
- O In-house O Outsourced

Payments for purchases, travel and other expenses

- ○ In-house ○ Outsourced

Monthly payroll tax payments

- ○ In-house ○ Outsourced

Appendix III: Results of Delphi study

#	Accounting process	Frequency	Asset specificity	Uncertainty	Information intensity	Customer contact
P1	Client register maintenance	2	1	2	2	3
P2	Product register maintenance	2	1	2	3	4
P3	Sending sales invoices	4	1	2	1	1
P4	Handling of sales invoices	4	3	3	4	4
P5	Sending note of complaint	3	2	2	2	2
P6	Sales ledger maintenance	4	2	1	2	2
P7	Supplier register maintenance	2	2	2	3	3
P8	Receiving purchase invoices	5	1	1	1	1
P9	Handling purchase invoices	4	3	3	3	3
P10	Handling purchase, travel and other costs	4	3	3	3	4
P11	Purchases ledger maintenance	4	2	2	2	2
P12	Personnel register maintenance	2	2	3	3	4
P13	Basic payroll data maintenance	2	3	3	3	3
P14	Payroll calculations	3	5	4	4	3
P15	Preparation of balance sheet and income statement	1	5	4	5	4
P16	Preparation and sending of VAT	3	4	3	3	1
P17	Preparation and sending of annual salary reports	1	4	3	4	1
P18	Preparation and sending of annual pension insurance reports	1	3	3	3	1
P19	Periodic VAT payments	3	1	2	2	1
P20	Salary payments	3	1	2	2	1
P21	Payments for purchases, travel and other expenses	4	1	2	2	1
P22	Monthly payroll tax payments	3	1	2	2	1