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Value Creation of Cloud Computing in E-businesses

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Authors:

Emil Hermansson and Willem Rabsztyn

Supervisors:

Diamanto Politis and Craig Mitchell

Examiner:

Caroline Wigren-Kristoferson

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Abstract

Cloud computing is a new technology which has changed business and society drastically, making it possible to create products and communication aids that were previously unheard of. Without it, services such as Facebook or Google Apps would probably not exist as we know them today. This thesis explores how cloud computing affects the value propositions of e-businesses, using data collected from multiple case companies selected mainly within the Skåne province of Sweden. Companies that create cloud services and infrastructure, as well as companies that use such services, have been selected. The foundation for the analysis is the model measuring value creation in e-businesses designed by Amit and Zott (2001), which establishes four dimensions in which such businesses create value. In addition, the authors assess the incentives of the case firms to integrate cloud-computing services into their business models. One important conclusion is that partnerships and specialisation have become important aspects of value creation in this field.

Keywords

Cloud computing, scalability, cost reduction, collaboration tools, security, SaaS, PaaS, IaaS, value creation, e-value creation, e-businesses, and the value chain.

1. Introduction

According to Schumpeter (1934), innovation is the source of new opportunities in business. In recent decades the continuous technical innovations enabling computing power to increase drastically have significantly changed our everyday lives and our way of doing business. Knowledge has become easier than ever to access and to instantly share through the Internet. Information technology (IT) is in this sense becoming a more important part of almost every business (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011).

One IT innovation that has successively emerged during recent years is cloud computing. In contrast with traditional computing, cloud computing emphasizes the sharing of physical resources among many users, and the scaling of resources to fit individual needs. The new possibilities this technology offers have radically changed the way IT works and revolutionized the industry. Marston et al. (2011, p.176) describe the development as '*a fundamental change in the way information technology (IT) services are invented, developed, deployed, scaled, updated, maintained and paid for.*'

In traditional computing, each business connected to the Internet would buy their own server equipment, incurring high infrastructure investments only payable by large corporations. Cloud computing, on the other hand, is characterised by low-level setup, fast scalability and very measured levels of services (Marston et al., 2011). By utilizing the innovations of cloud computing, companies can improve their businesses, or as Porter (1985, p.149) puts it: '*Dramatic reductions in the cost of obtaining, processing and transmitting information are changing the way we do business*'. The impact of cloud computing is exemplified by social networking businesses such as Facebook, which would exist in a completely different form without it. Similarly, Google would not be able to process billions of highly advanced search queries without the features it offers. The development of cloud computing is definitely the future.

1.1 Research purpose

In previous economic literature, research has investigated the effects of cloud computing upon businesses in general (Li, Wang, Wu, Li, & Wang, 2011; Mac an Bhaird & Lynn, 2015; Marston et al., 2011). However, there is insufficient material about the value created specifically by cloud computing for e-businesses, and the various levels of deployment models and utilisations of this state-of-the-art technology have yet to be explored. The purpose of this research is therefore to explore how cloud computing affects value creation in e-businesses. By also studying the reasons for implementing cloud computing, valuable insights can be gained into what different actors perceive as value. Furthermore, the thesis aims to provide entrepreneurs, policy makers, and the broader public with better tools for decision-making within the fields of e-business and cloud-computing integration processes, in the hope that this can contribute towards innovating society and the world at large.

1.2 Research question

In order to fulfil the purpose of the research the following research question will be used: 'How does cloud computing affect value creation in e-businesses?'

1.3 Thesis structure

Following the Introduction, a review of the relevant literature and theoretical concepts is provided in Chapter 2. The methodology of the case study design is described in Chapter 3, while results are presented in Chapter 4 and discussed in Chapter 5. Conclusions are outlined in Chapter 6.

1.4 Definitions

For the purposes of this thesis, e-businesses are defined as companies that work with 'business conducted over the Internet' (Amit & Zott, 2001, p. 493). The term 'cloud computing' is used in accordance with the five fundamental characteristics of the National Institute of Standards and Technology (NIST) (2011) definition, as described in Chapter 2.2.4. Together these criteria make up what is defined as 'cloud computing in e-businesses'.

2. Literature review

The following sections review the current literature on cloud computing and value creation in e-businesses. The review starts with a short historical introduction to the main concepts behind current research in these areas and then introduces cloud computing and the different approaches towards its application. The chapter closes with a presentation of the model for value creation in e-business used to conduct the research.

2.1 A historical approach to value creation

This chapter outlines various stages in the evolution of the value-creation model, starting with the fundamental contribution by Schumpeter (1934). It goes on to define cloud computing and then implements and discusses the cloud-computing dimensions in Porter's value-creation models. Value creation in Amit and Zott's (2001) e-business model is also explored and elaborated upon.

2.1.1 Schumpeterian innovation

Many businesses thrive on innovation, and almost all modern businesses exist because of it. Schumpeter (1934) was a pioneer in theorizing economic developments and new value creation through processes of innovation. He identified technological development as the main driver of change. New products and services will always be created in a competitive innovative marketplace. Today, as more and more businesses use cloud computing and its related innovations, important changes are occurring in the marketplace, and in the history of value creation through cloud computing, Schumpeter's theory (1934) occupies a key position.

2.1.2 Products, resource-based view, and value creation

In the field of value creation within businesses, products and resources often represent two sides of the same coin (Birger Wernerfelt, 1984). The creation of most of this value requires a number of resources. These resources are not necessarily used for one specific type or amount of value only, but can be used again for several products or services (Birger Wernerfelt, 1984). By defining the properties of a firm's activities in several product markets, it is possible to specify the minimum necessary resource commitment a firm should make to render their value. Alternately, a firm's resource profile can serve to identify optimal product-market activities (Andrews, 1987).

Resources may be defined as the tangible and intangible assets of a company and they can represent a strength or a weakness. Intangible resources include trade contracts, in-house knowledge of technologies or markets, specific skills of employees, branding, and intellectual property, while tangible resources are generally related to materials, machinery, or company real estate.

These tangible and intangible company assets provide the basis for the resource-based view, and are also a primary basis for the competitive-advantages theory. Wernerfelt (1984) investigated the circumstances under which a resource will lead to high returns over long periods of time and identified several categories (machine capacity, customer loyalty, production experience, and technological leads) that can create competitive advantages, stating, *'What a firm wants is to create a situation where the firm's own resource position directly or indirectly makes it more difficult for others to catch up'* (B. Wernerfelt, 1984, p. 173). Achieving this goal involves establishing an advantage before another firm can reach the same position with regard to the necessary resources. Cloud computing could give modern e-businesses exactly this type of lead over firms who still utilise traditional computing. This expectation is further elaborated and discussed later in this thesis. The resource-based view is one of the fundaments of the Amit and Zott (2011) model for value creation in e-business presented in Chapter 2.5.

2.1.3 Value chain and competitive advantage

Porter (1985) created a theory called the value chain, which made it possible to describe and divide firms according to their strategically important activities. This tool also made it possible to analyse each link in the value chain in terms of impact on overall cost and value creation. The value chain is adopted broadly in strategy development and as a decision-making tool.

Porter (1985) described the value chain as a *'system of interdependent activities which are connected by linkages. Linkages exist if the way in which one activity is performed affects the cost or effectiveness of other activities'* (Porter, 1985, p. 150). The linkages show how a single activity affects other activities, and they are therefore an important source of competitive advantage and added value.

2.2 Cloud computing

2.2.1 Technological developments

In the sections that follow, cloud computing is introduced, defined, and conceptualized. Current research serves to compare its different aspects and provides a foundation for further analysis. As cloud computing is interpreted in different ways by different scholars, a definition is selected for application in this thesis. In addition, the characteristics, service models, and deployment models of cloud computing are presented. Such aspects are very important for subsequent analyses as they imply different possible uses for the business in terms of value creation upon implementation. These implications are discussed further in relation to the model of value creation in e-business.

2.2.2 Virtualisation

The first steps of virtualisation occurred in the mainframe computers of the 1960s and 1970s. Initially, it was used as a means of logically dividing mainframes to permit applications to operate simultaneously, because systems in those days could only run one program at a time (Graziano, 2011). Virtualisation meant the high financial costs an organisation had to bear when investing in a system which was only capable of single-programme processing could be somewhat abated. With the adoption of Windows- and Linux-based systems in the 1990s and the development of quicker, cheaper computing systems, applications moved away from mainframes to *client-server-based* applications (Oracle, 2011), until the early 2000s when corporate-data centres increased in size and maintenance costs started to rise. As a result, 10-15 percent of computing resource capacity was lost out of inefficacy and to avoid conflicting systems (Graziano, 2011). To solve inefficiencies and system overcapacity, virtualisation evolved into what we know today as cloud computing.

2.2.3 Defining cloud computing

Cloud computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the datacentres that provide those services. The services themselves have long been referred to as *software as a service* (SaaS). The datacentre hardware and software form what is referred to in this thesis as the ‘cloud’.

The definition of cloud computing has been adopted from the NIST, within the U.S. Department of Commerce:

'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.' (NIST, 2011, p. 6).

The NIST (2011) definition is widely used in academic resources to define the building blocks and characteristics of cloud computing (Dillon, Wu, & Chang, 2010; Marston et al., 2011; Wang, Ren, & Lou, 2010). These building blocks are discussed later in this thesis in relation to the value-creation model.

2.2.4 Characteristics of cloud computing

Cloud computing can be broken down into five fundamental characteristics. First, users of cloud computing can unilaterally make use of computing resources without any interaction with a human. This is called *on-demand self-service*, which means for example that the user does not need to email a support technician at the service provider to increase or decrease the capacity of his or her service (NIST, 2011).

A second characteristic of cloud computing is *broad network access*, meaning wide availability of computing resources over a network which can be accessed through different kinds of devices (desktops, tablets, smartphones, etc.) (NIST, 2011). A cloud-computing service can therefore not be accessed by just one device or platform. Furthermore, cloud-computing resources are pooled on abstracted physical locations to serve multiple users. This is called *resource pooling*. As a result, servers also build on a multi-tenant model, which means users get their own virtual instance (NIST, 2011). 'Virtual' in this case refers to the concept of virtualisation outlined in Section 2.2.2, which means that users do not get an own physical server, but rather a part of the server or servers' computational resources (Buyya et al., 2009).

Cloud computing services are also perceived as having unlimited resources and capabilities which can be elastically provisioned and released to match demand. The NIST (2011) calls this capacity for rapid up- or downscaling of resources *rapid elasticity***.** However, with resources being perceived as unlimited and therefore needing to be huge, small- and medium-sized datacentres cannot be included in cloud computing, even though they might support rapidly elastic virtual servers (Michael Armbrust et al., 2010). The rapid-elasticity characteristic of cloud computing can also be referred to as *instant scalability* (Bhaird & Lynn, 2015). Thanks to advanced monitoring applications, computing resource usage can be monitored, controlled, and reported, thus providing transparency for both the cloud-computing resource provider and the consumer of the service utilized. This is called *measured service*, whereby a cloud system controls and optimises the computing resources (NIST, 2011).

2.2.5 Cloud-computing service models

In cloud computing, several pre-selected service models exist. The NIST (2011) uses SaaS, *platform as a service* (PaaS), and *infrastructure as a service* (IaaS) categories to differentiate between them. Digital applications which are accessible through various devices and a diversity of interfaces are called SaaS. Within SaaS, the consumer does not manage or control the underlying cloud infrastructure, but instead interacts only with the applications. This requires less technical skills. Services such as Google Apps, Dropbox, or Salesforce are good examples of SaaS. Most SaaS businesses run from the browser or require an app installation on a mobile device. The SaaS market is the largest of the three service models and it is still growing rapidly, with diverse new ventures popping up all over the world.

One layer deeper in the cloud-computing framework lies PaaS, whereby consumer-created or acquired applications can be deployed onto cloud infrastructure. The provider has control over the deployed applications and possibly the configurations for the application hosting environment. With the PaaS service model, the providers manage operating systems, virtualisation, servers, storage, network, and the software which is creating the application layer for the PaaS to connect with the applications provided by the consumer.
Infrastructure as a service is the service level of cloud computing which is closest to traditional IT. Consumers are given access to provision processing, storage, networks, and other fundamental computing resources where they are able to deploy and run a range of layers of software from operating systems to applications. By contrast with the SaaS and PaaS service models, IaaS consumers are responsible for managing applications, data, runtime, and middleware, while the providers must manage virtualisation, servers, storage, and networking. Nowadays many IaaS providers offer additional services such as databases, messaging queues, and other services which can be cross sold using the IaaS infrastructure. Examples of

such companies are Google App Engine, Amazon Web Services, Microsoft Azure, Cisco Metapod, and many more.

Figure 1 illustrates the various deployment levels of cloud computing. Depending on the level of service, the vendor has different responsibilities within the service model.

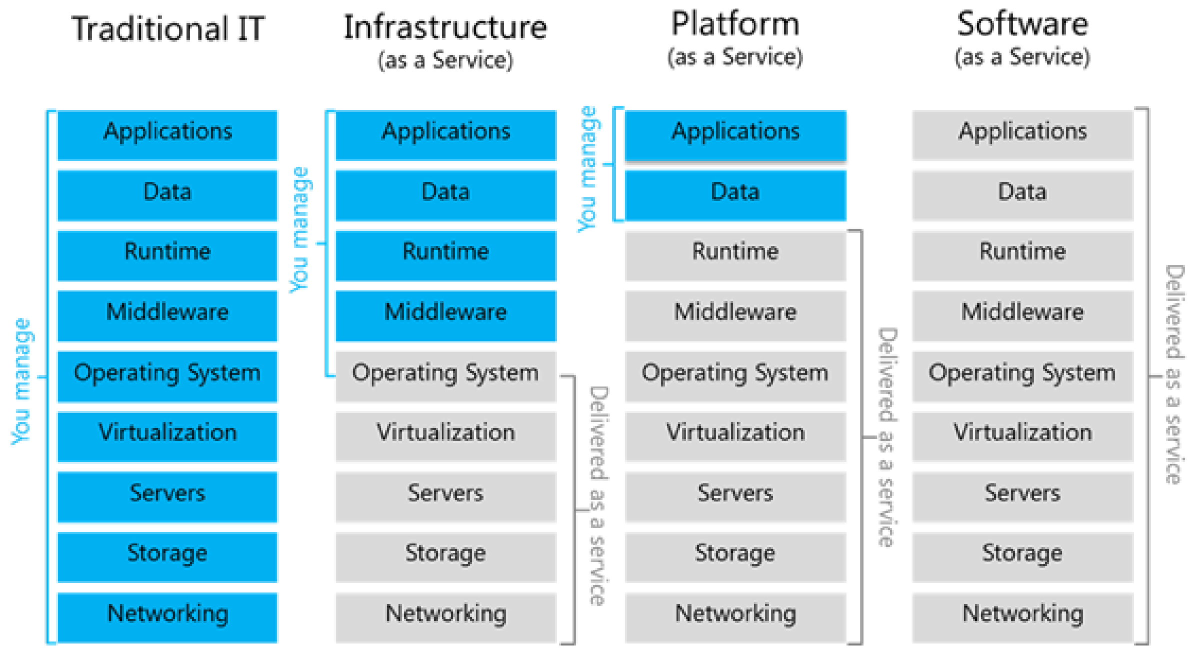

Figure 1. Deployment levels of cloud computing, adopted from Chou (2011)

2.2.6 Deployment levels of cloud computing

Cloud computing is deployed according to several models. The NIST (2011) defines four different configurations. In a *private cloud* configuration the cloud infrastructure is used exclusively by a single organisation comprising multiple consumers. Private clouds are referred to as internal datacentres within organisations, and they are not available to the public (M Armbrust, Fox, Griffith, Joseph, & RH, 2009). The publicly available *community cloud* is provisioned on a middle deployment level. In this model, cloud infrastructure is supplied for exclusive use by a specific community of consumers from organisations that have shared concerns.

The *public cloud* is provisioned for open use by the general public. A business, academic, or government organisation—or a combination of these—can own, manage, and operate the infrastructure. It exists on the cloud-provider's premises. As with the IaaS service model, Microsoft Azure, Amazon Web services, and the Google App Engine serve as examples of dominant providers in the public-cloud marketplace. The fourth level of deployment within cloud computing is the *hybrid cloud*. This cloud infrastructure comprises two or more distinct cloud infrastructures (private, community, or public) that remain separate, but are linked by standardized or proprietary technology allowing data and application portability.

In Figure 2 the different characteristics, service models, and deployment models of cloud computing are summarised.

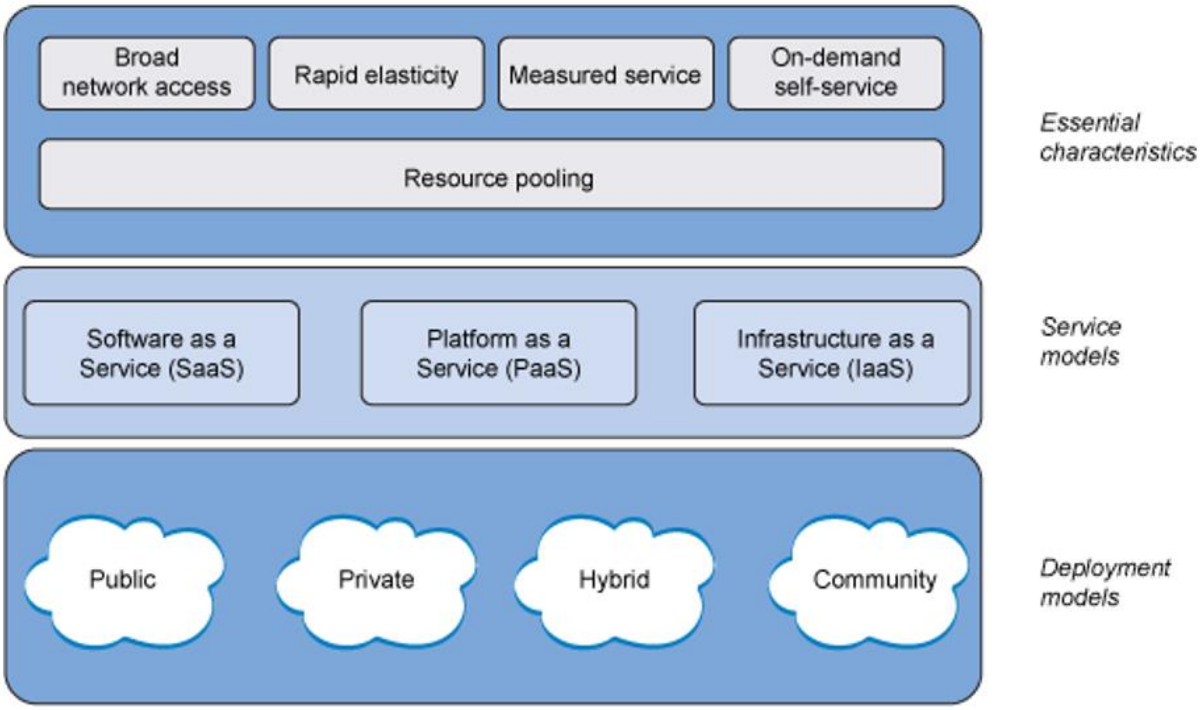

Figure 2. Summary of cloud computing, adopted from NIST (2011)

2.2.7 Incentives to utilize cloud computing

The advantages of SaaS to both end users and providers are well known. End users reap great advantages because they can access the service 'anytime, anywhere'. End users can share data and collaborate more easily and keep their data stored safely in the infrastructure. (M. Armbrust et al., 2009). Service providers enjoy simplified software installation and maintenance and centralized control over versioning.

Marston et al. (2011) researched the effects of cloud computing on businesses and the reasons why firms utilize such services. They identified a set of key advantages that can work as incentives.

One of the main advantages was that cloud computing *'dramatically lowers the cost of entry for smaller firms trying to benefit compute-intensive business analytics that were hitherto available only to the largest of corporations.'* (Marston et al., 2011, p. 178). Secondly, without any financial investments, cloud computing can provide almost immediate access to hardware resources (Marston et al., 2011). This can make the financial threshold of utilising a certain technology a lot lower. Third, the cloud is becoming a more flexible infrastructure that can be provided and shared in several ways by different end-users. This flexible environment provides an infrastructure where the load can be balanced and distributed among different systems. In this way, cloud service providers can operate more efficiently.

Cloud computing has characteristics of scalability which make it easier for companies to scale their services down or up. Since another characteristic of cloud computing is that computing resources are managed through software (NIST, 2011), resources can quickly be deployed on a higher or lower scale. Cloud computing also makes it possible to analyse bigger sets of data in shorter periods of time. This creates new opportunities for several sets of software on the higher deployment levels of cloud computing (Marston et al., 2011).

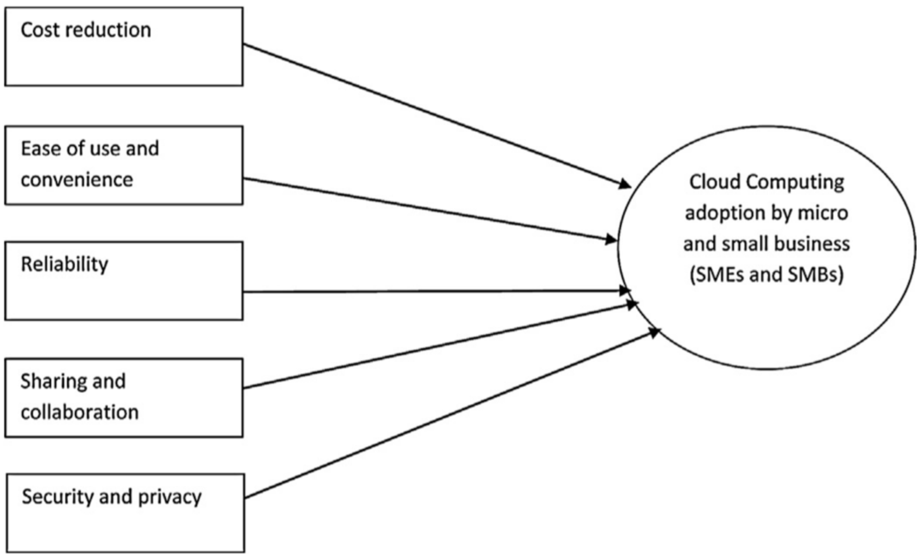

Figure 3. Incentives to use cloud computing, adopted from Gupta et al. (2013)

2.2.8 Effects of cloud computing on the value chain

Schumpeter's (1934) observation that innovation is the source of opportunities for new value is well suited to the fast growth and emergence of cloud computing during the so-called

‘Internet era’ of the past decade. This research explores what kind of new values cloud computing is adding to modern businesses.

Porter (1985) makes the claim that *‘information technology can alter a company’s costs in any part of the value chain’* (Porter, 1985, p. 156). Cloud computing can significantly affect the costs in the value chain of businesses and create competitive advantages as a result.

According to Mohammed, Altmann, and Hwang (2010), value chains nowadays feature more advanced networking capabilities, adaptability to external changes, accessibility to virtual company structures, and more dynamic management capabilities. This makes them more complex but it also means they can include more actors and match the evolution of modern businesses.

In many modern businesses in different industries, value creation processes are flexible, dynamic, multi-dimensional, and non-linear, crossing horizontal and vertical industry domains. However, Porter’s value chain is to considered linear and fixed (Allee & Kong, 2003; Pil & Holweg, 2006).

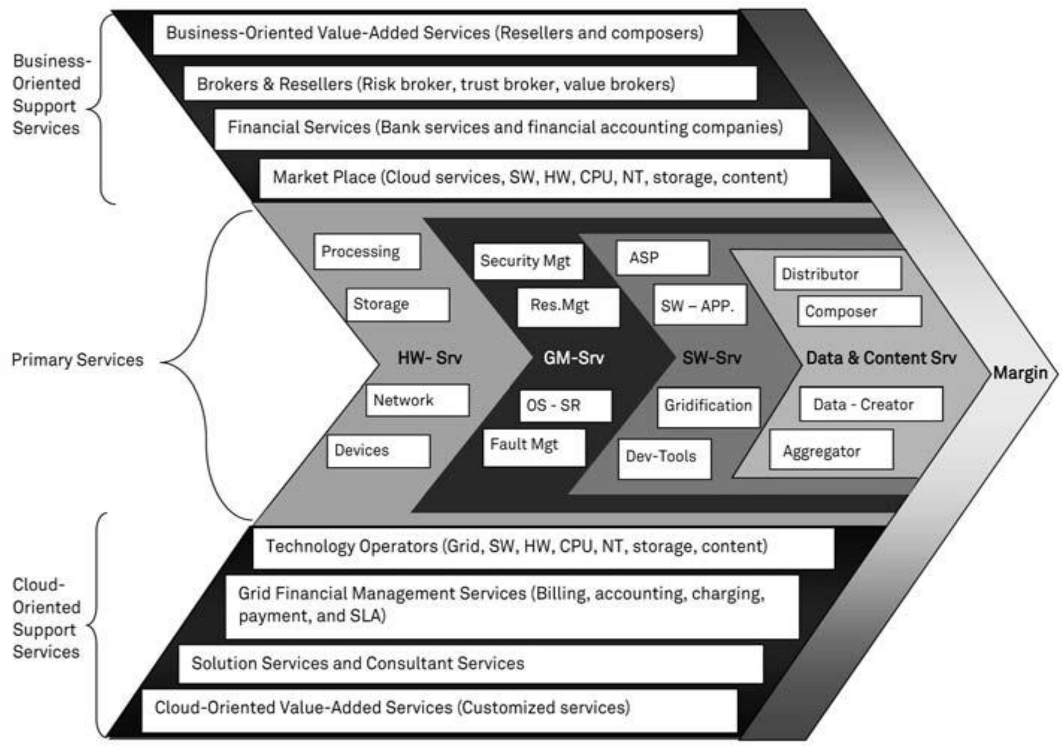

Figure 4. Value chain of cloud computing, adopted from Mohammed, Altmann, and Hwang (2010)

The research conducted by Mohammed, Altmann, and Hwang (2010) builds upon the foundations of the classic Porter model, value networks, and value grids. Their model breaks down activities, or services, into three main virtual layers based upon the cloud. Sub-layers divide services within the virtual layers, and each layer border represents a profit and knowledge margin.

This value-chain model provides an extensive interpretation of cloud computing in modern businesses. The main steps outlined in the primary-services section are hardware services (HW-srv), which include networking, processing, storage, and other physical device services, and grid-middleware services (GM-srv), which comprehend resource management services, security, privacy, fault management, grid execution, and operating systems services. The GM-srv category is viewed as the fundamental layer of cloud computing.

The sub-layer dedicated to software services (SW-Srv) includes software applications, gridification services, developing tools, and application support services offered by Application Service Providers (ASP). Finally, the data and content services (Data & Content-Srv) sub-layer features the following content: data creation, aggregation, and distribution services (Mohammed et al., 2010).

This value-chain model facilitates research on the resources and value creation of modern ventures. Figure 5 illustrates a simplified version of the cloud-computing value chain that also includes the different development levels.

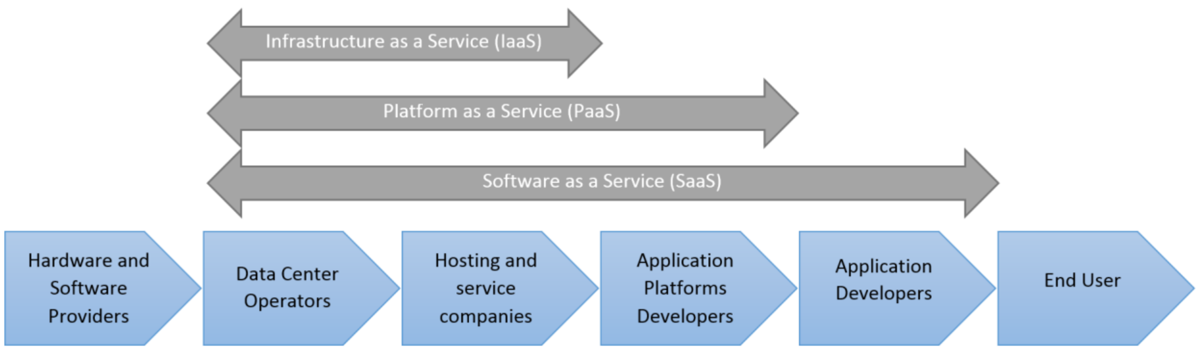

Figure 5. Simplified model of the cloud-computing value chain

Research by Mohammed, Altmann, and Hwang (2010) was important for this thesis because it creates outlines of cloud computing in a value-chain perspective. Porter's classic value-chain perspective was also used as a foundation for value creation in an e-business model, as described in the next section. By combining Porter's historical value-chain perspective with

Mohammed, Altmann, and Hwang's (2010) researsch this thesis aimed to develop a more current framework that was compatible with cloud computing. Adopting the framework in the research analysis made it possible to examine more closely how cloud computing is adding value to modern e-business ventures. To apply the value-chain perspectives, Section 2.5.1 introduces the concept of value creation in the e-business model.

2.5 A model of value creation in e-business

2.5.1 Introduction to the value creation in the e-business model

In this thesis Amit and Zott's (2001) model for value creation in e-business was used as a basis for the necessary interviews and analyses. Their study was one of the first to properly connect older theories such as value-chain frameworks (Porter, 1985), transaction-cost economics (Williamson, 1975), the theory of creative destruction (Schumpeter, 1942), the resource-based view of the firm (e.g., Barney, 1991), and strategic-network theory (e.g., Dyer and Singh, 1998) to make a model of value creation that applies specifically to e-businesses.

However, this model was constructed 15 years ago and much research has since been conducted on the subject. More recent findings were therefore also taken into consideration when building the final framework to explore the role of cloud computing in e-business value creation. The newer theory includes fresh perspectives on the value chain (e.g., Mohammed et al., 2010), and switching costs (Farrell & Klemperer, 2007) as well as more specific phenomena such as two-sided network effects (Eisenmann, Parker, & Van Alstyne, 2006).

Using a value-chain perspective to analyse cloud computing is also appropriate because of the many different stakeholders involved in the service (i.e., users, hosting companies, and software developers) who take different parts in the value chain and achieve value creation in different ways. This is further explained in Section 2.5.6 and by the findings of Haile and Altmann (2012).

According to Amit and Zott (2001), the four main categories for the sources of value creation in e-businesses are efficiency, complementarities, lock-in, and novelty, as shown in Figure 6. In Section 2.5.2 these sources are discussed in relation to cloud computing and different perspectives.

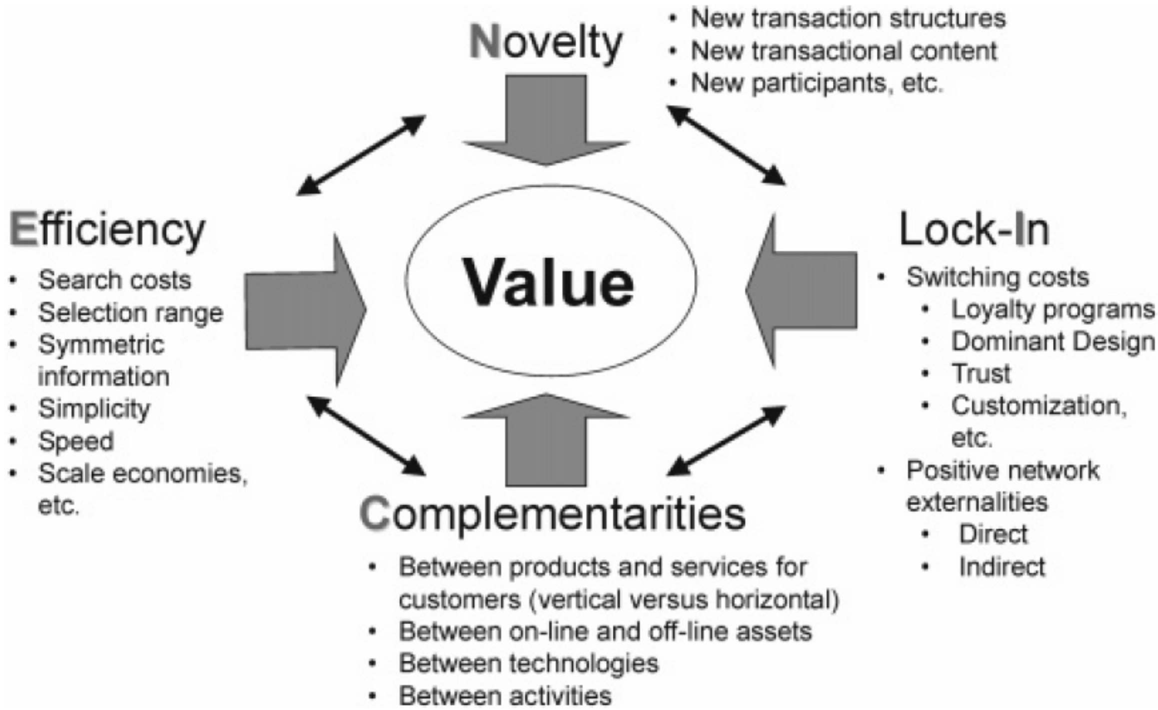

Figure 6. Sources of value creation in e-business, adopted from Amit and Zott (2001)

2.5.2 Efficiency

The model by Amit and Zott (2001) suggests that efficiency in terms of e-business value creation relates to transaction efficiency. When the business model enables lower cost per transaction this equals an increase in transaction efficiency. This increase could occur, for example, when the business model allows for a greater provision of information than before and by doing so decreases the information asymmetries in the transaction, thereby lowering the transaction cost. Improved information might also lower the search cost for customers, or in other words the cost of searching the market for the correct products.

Transaction efficiency also increases when virtual markets are used to allow a greater selection at a lower cost than in traditional business. In terms of e-business this efficiency can reduce costs by decreasing faults in transactions, helping keep better track of supplies, and encouraging bulk purchases. Virtual markets are the settings where business transactions are conducted online via open networks (Amit & Zott, 2001).

2.5.3 Complementarities

Complementarities refers to the situation where a combination of products together provides greater value than the summed value of separate products. This is in accordance with the resource-based view discussed in the literature review. Complementarities can be divided into the vertical or horizontal complementarities provided by partners. Vertical complementarities refer to after-sales services such as support, while horizontal complementarities involve the bundling of products such as a printer and the USB cable to connect it to the computer. Complementarities can also lead to higher efficiency, as search costs can be reduced when products are bundled together (Amit & Zott, 2001).

2.5.4 Lock-in

From a cloud-computing perspective, lock-in can provide interesting benefits. The potential for value creation often depends on customers' motivation to become returning customers and the incentives of strategic partners to maintain and improve the partnership. Lock-in therefore involves keeping customers and strategic partners close to the business and not letting them defect to competitors. Examples of this concept could be a strong brand name and buyer-seller trust (Amit & Zott, 2001).

The costs associated with switching from one product to another are named switching costs. When these costs are high they can lock customers in as soon as they make their first purchase (Farrell & Klemperer, 2007). Customer learning is another lock-in effect. When customers learn how to use a specific system, software, or similar, they become less likely to switch to another, as they then have to repeat the learning process from scratch, which implies costs in terms of the time required to learn the new system (Amit & Zott, 2001).

Another source of lock-in is network effects. Networks effects arise when an individual user benefits from other users adopting the same product or service, and when old users benefit from new users in the network (Amit & Zott, 2001; Farrell & Klemperer, 2007; Katz & Shapiro, 1994). Examples of this could be telephone services. If no-one else had a telephone, it would not be a very useful gadget for a new user, but the more people have telephones, the better value it represents for all users. From a game-theory perspective, network effects correspond to economies of scale (Farrell & Klemperer, 2007).

Network effects could also be considered a part of two-sided networks. The economic concept of two-sided networks refers to platforms uniting two distinct groups of users that both benefit from the number of users on the other side of the platform. An example could be websites that provide job advertisements. On such websites, one side of the platform is allocated to employers searching for workers, while the opposite side provides for workers seeking employment. Both groups benefit from an increase in size of the opposite group, which implies that the platform, too, is subject to network effects. For example, the more employers there are, the more job advertisements will be available for the workers to choose from, and this increase in choice implies greater value creation. Similarly, the employers benefit if more workers see their advertisements, because it means they can find a better match, and this, too, suggests increased value creation (Eisenmann et al., 2006).

Furthermore, networks can be affected by a positive feedback loop—in computing, for example—whereby a system gets better the more customers use it. Additional lock-in effects are personalization and customization, for instance when a user puts effort into personalizing a product with one supplier and is then faced with a switching cost because the personalisation or customization has made it difficult if not impossible to transfer to a new supplier without financial outlay (Amit & Zott, 2001).

2.5.5 Novelty

E-business can also create value by introducing new ways of conducting transactions. One way to do this is by giving parties who were not previously able to complete transactions the ability to do so. An example is eBay and the creation of auctions for low-cost items online. The transaction cost of conducting these transactions by regular auction would have been too high. Reducing such costs through e-business introduces a novelty effect. Moreover, novelty is related to complementarities, as e-businesses can make new combinations of products available to customers (Amit & Zott, 2001).

2.5.6 Other types of value creation in e-business

Another source of value creation is co-creation. Co-creation can be described as value creation that does not take place only within a single company, but among many actors within a networked market (Nenonen & Storbacka, 2010). Nenonen and Storbacka (2010) claim that firms face great challenges when they need to manage value creation in the form of co-creation in a network. Nenonen and Storbacka (2010)'s furthermore accept Amit and Zott's (2001) value creation in e-business model as one of many business models available. The view that e-business networks and relationships are more important to the value creation process is also supported by Mohammed, Altmann, and Hwang (2010).

The approach adopted in this thesis is that co-creation can be linked to Amit and Zott's (2001) findings on complementarities. These findings describe complementarities as a combination of products that together provides a greater value than the summed value of all the products alone, and indicate that such combinations are the result of partnerships. In the research at hand these complementarities and partnerships are likened to the co-creation and networking approach, where the collaboration of many actors in a network produces value greater than the sum of the single values.

Both concepts are relatable to the theory of the value chain (Porter, 1985) where many companies together contribute value creation to the final product. The value chain can be seen as co-creation among many actors in a networked market (Nenonen & Storbacka, 2010) and as complementarities (Amit & Zott, 2001), whereby products and services together complement each other. After reviewing the literature dedicated to the value chain perspective and the model for value creation in e-business, the idea that value creation in e-businesses is more networked was accepted and used to extend the e-business value-creation model for the analysis at hand (Mohammed et al., 2010; Nenonen & Storbacka, 2010). Another interesting perspective on value creation in e-business was identified in research by Haile and Altmann (2012) on platform value for stakeholders. Haile and Altmann’s research focuses on service platforms made up of two-sided markets, as mentioned earlier in Eisenmann et al., (2006). These service platforms are of great relevance for this thesis because they build on cloud computing—as exemplified in Haile and Altmann's (2012) SaaS, PaaS and IaaS platforms. They reinforce the current literature regarding value creation in e-business (e.g., Amit & Zott, 2001) and add four parameters to explain the net value of service platforms in terms of value creation for each stakeholder. These parameters are quality of service, service variety, installed base (i.e., user base), and cost (Haile & Altmann, 2012). Given that such service platforms are built using cloud computing, this aspect was also of relevance. Haile and Altmann's study provided insights into how value creation is split between different parts of the value chain, for example between users, advertisers, and platform owners. The conclusion was that the value-creation effect on the case companies differed considerably depending on where the cloud-computing service platform was located within the value chain.

3. Methodology

This chapter begins by introducing the thesis research design and the sampling method used. A description of the data collection process is followed by a discussion of its advantages and limitations.

3.1 Research strategy

To answer the research question, a study of cloud-computing e-businesses was conducted. From an epistemological standpoint, the study adopted an *interpretive* approach. Such an approach made it possible to focus on understanding rather than explaining cloud computing in the case companies. Interpretivism contrasts with *positivism,* which tests hypotheses to arrive at laws (Bell & Bryman, 2011). Furthermore, in ontological terms the research followed the assumptions of *constructionism*, meaning it was treated as a constantly changing flow constructed socially through interactions between people. In constructionist learning theory this process could be expressed as ‘masculinity’. Different people might perceive masculinity differently and it might also vary depending on the interaction that constructs it or the time and place the interaction occurs (Bell & Bryman, 2011).

Cloud computing is also constructed socially, even though—as is clearly defined in the literature review—it might still be perceived differently by different people and organisations. Furthermore, value (as in value creation) could also be seen as being socially constructed and dependent on how actors perceive it in different situations. The research therefore focused on interviewing different actors within the cloud-computing value chain to understand how value is created from cloud computing in e-businesses. This also implied an *inductive* research approach, as the findings were designed to generate new theory, rather than to test existing theory (Bell & Bryman, 2011).

3.2 Research design

A comparative case study design was chosen for the research. This type of design features elements of a regular case study design as well as of a comparative design. The comparative design allows the cases to be analysed using the same kind of methods. It therefore provides a basis for comparison and allows better understanding of the phenomenon being investigated (Bell & Bryman, 2011). The multiple case study design can furthermore increase the robustness and generalizability of the research compared to the single case study, as the empirical foundation will be wider (Eisenhardt & Graebner, 2007). Moreover, a comparative case study allows researchers to make observations about the phenomenon in its real context, rather than using, for example, laboratory experiments (Eisenhardt & Graebner, 2007). This approach connects to the constructionist idea that a construction may differ according to the place where it occurs.

Because the aim of the current study was to explain how cloud computing affects value creation in e-businesses today and not over time, a longitudinal research design was not considered suitable. One limitation of this decision is that the study cannot explain or identify any differences that occur or might occur over time. Furthermore, the units of analysis in the study are the case companies, as they form the units of value creation that use cloud computing and can therefore help to answer the research question: *‘How does cloud computing affect value creation in e-businesses?’*

3.3 Data collection

Sampling and data sources

Compared with a single case study, studying multiple cases increases the complexity of the sampling, and cases should therefore be chosen for their usefulness in terms of theory building in relation to the other cases. Sampling in multiple case studies can benefit from a diverse range. A study that uses *‘polar types’* (Eisenhardt & Graebner, 2007, p. 27) is one that uses samples which are extremes of one another. This can generate better data contrasts and allow researchers to identify constructs and relationships more easily (Eisenhardt & Graebner, 2007).

The sampling of cases for this study has followed a similar approach, the aim being to find contrasting case companies. Figure 7 provides an overview of the differences between the six case companies in relation to the value chain of cloud computing presented in the literature review. By choosing case companies that contrast with each other in the value chain of cloud computing, the multiple case-study design is expected to provide a better foundation for theory building. The case companies contrast in terms of size (employees and turnover), profitability, role in the cloud-computing value chain, and line of business.

To select the case companies, a list of already-known potential candidates was made. In addition, the database of Retriever Business (Retriever Sverige AB, n.d.) was used to make another list of firms with locations around Lund and Malmö. To exclude inactive companies, filter criteria establishing whether the businesses operated within the IT sector and had a turnover of at least two million SEK were applied. From the combined lists, companies seen to contrast each other were then chosen and contacted.

Figure 7 presents a short summary of the companies' areas of contribution.

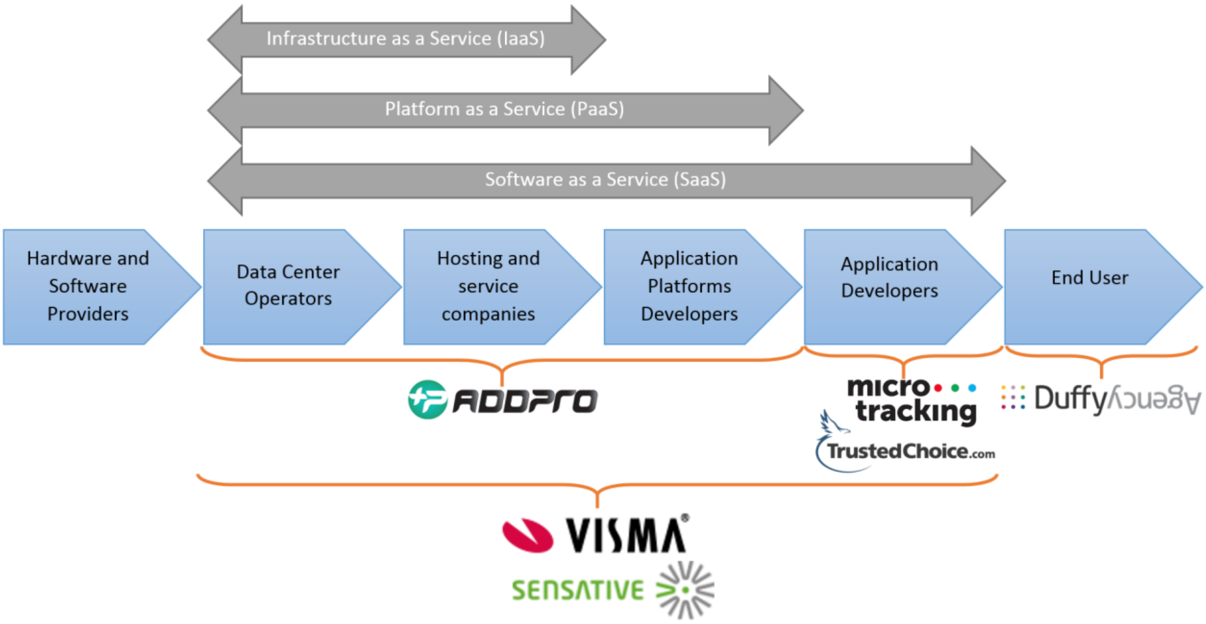

Figure 7. Positions of case companies in the simplified cloud-computing value chain.

Visma.net – The Visma Company Group has delivered accounting and business systems for corporations since 1996, before the advent of cloud computing, and this case therefore provided valuable insights into how the group's transition towards cloud-based systems has affected value creation, as it could more easily be compared to the pre-cloud computing age. Furthermore, Visma.net's activities range from hosting to the end-user in the cloud-computing value chain—the so called SaaS approach—which can provide contrast to the other cases.

Sensative – Sensative is active in the same part of the value chain as Visma.net. However, Sensative contrasts with Visma.net by combining its software with a physical item, namely the Strips, its main product. This difference is important, as earlier research has identified the computer-software sector as an area with great potential for change due to cloud computing

(Mac an Bhaird & Lynn, 2015). Sensative also contrasts with the other case companies in size, as it is a small start-up.

AddPro – AddPro was of considerable relevance in the case study as it delivers both hosting and cloud-computing services to its customers. This offered a perspective of the early stages of the cloud-computing value chain. Furthermore, AddPro distinguished itself from the other cases owing to its relatively large size. AddPro also extended permission to interview its CEO, thereby allowing for a more strategic perspective, and according to Bell and Bryman (2011) this viewpoint can contrast with perspectives on the lower levels of the organisation.

Trustedchoice.com – This company contrasted with the other cases by being based in the US. Furthermore, Trustedchoice.com provided the opportunity to study a firm built entirely on cloud computing and using only PaaS to develop its application.

Microtracking – Microtracking uses the same approach to cloud computing as Trustedchoice.com, namely PaaS. However, Microtracking does contrast with Trustedchoice.com substantially by also developing physical products and being start-up sized.

Duffy Agency – This case provided a contrasting perspective in the value creation of cloud computing by making it possible to study how the actual full cloud-computing product, SaaS, can create value for the everyday operations of the end-user. None of the other cases had this perspective, which was also important for understanding the full value creation of cloud computing.

Furthermore, to meet the demands of a comparative case-study design, data were collected from a large variety of sources besides the interviews. These sources included company marketing brochures, product manuals, YouTube product-demonstration videos, photos from office environments, websites of the companies and their partners, and more.

Data collection method

Data were collected using semi-structured interviews with an employee closely linked to the company’s cloud-computing activities. The advantage of semi-structured interviews is that they give the option of using both open and closed questions. Open questions make it possible to explore new areas of limited knowledge and also give respondents the chance to answers questions in their own terms. Additionally, open questions do not include any answer prompts and by taping the respondents' replies their understanding of the issues can later be analysed (Bell & Bryman, 2011). Recording respondents' motives for using cloud computing in this way was relevant to understanding how e-businesses create value with cloud computing. Closed questions, on the other hand, are quick and easy to process, making it simple to compare respondents' answers, and they have the further advantage of being readily understood (Bell & Bryman 2011).

A first round of interviews ranging from 50 minutes to one hour and 50 minutes each was conducted in each case-company environment except for that of Case 4, which was based in the United States of America and could not be visited due to the time limitations of the study. A second round of follow-up interviews was then conducted by phone or email. In total, more than 11 hours of interview material were collected as primary data. The interview guide can be found in Appendix 1. The interview guide features general open questions which interviewees could answer in their own words. Interviewees were then probed with questions addressing value creation in the different parts of the business model and their earlier answers were also further explored. The probing involved both open questions as well as specific questions relating to their particular business.

The time horizon of the study was cross-sectional, as all the case companies were studied at the same—or almost the same—point in time. Moreover, the level of analysis in the study was defined by the organisations used as case companies.

Data analysis

The process of analysing the data began during the interview phase as the interviews were being recorded. The recordings were later transcribed and different themes were highlighted. Initially this was done by open coding, with the researchers identifying codes within the interviews without any restrictions. The codes were then grouped together according to different themes. The themes could consist of different part such as are categorised together as of their relation. Furthermore, the themes were analysed by connecting them to current concepts from the literature review. The cases were also compared using a cross-case analysis to show similarities and dissimilarities between themes.

4. Findings and analysis

In this section the empirical findings are presented. While being presented the findings are analysed using the framework for value creation in e-business by Amit and Zott (2001). This structural choice of keeping findings and analysis together is made to keep each case more unified, making it easier for the reader to follow. In table 1, a short background summary of each case company is presented.

Table 1- Overview of case companies

Name	Type	Turnover (2014)	Employees	Interviewee
Visma.net	Unit within enterprise	180MSEK Visma software AB; which includes Visma.net	Visma Group has 7000 employees	Cloud Sales Manager - Nina Lemic
AddPro AB	Company group	250M SEK	150	CEO – Nicklas Persson
Microtracking AB	Consultancy Company	90K SEK	Variable	Co-founder (sales)
Trustedchoice.com	Insurance agent marketplace	Costs 100M+ USD in project budget	Undisclosed	Chief Product Officer – Martin Hill
Sensative AB	Research based start-up	300K SEK	13 people involved, mostly students, no payed employees	Co-founder – Anders Hedberg
Duffy Agency AB	Consultancy company	3M SEK	8	Chief operations - Grant Adams

4.1 Case 1: Visma.net – Nina Lemic

4.1.1 Information about the firm and the interviewee

Visma.net is the division of the Visma group which is focussing on developing cloud based business solutions. Visma AB was founded in Oslo 1996 and has since a long time been developing software solutions for business. The Visma.net was launched first in 2012 as a *'world-leading SaaS solution for small and medium sized businesses'* (Visma.com, n.d.). An interview has been conducted with Nina Lemic who works as a cloud sales manager for Visma.net, within Visma Software AB.

The Visma group has 7000 employees, more than a 100 different offices in several countries and their headquarters are located in Oslo. Visma.net offers cloud based business solutions for medium and small businesses. Their main market is the Nordics and the Netherlands. One important development within value creation in Visma is creating mobility and more self-service for their customers. They call it *'Appificiation'* according to Lemic (2016). With this strategy, their services will fit better with a moving world of travelling customers. Cloud computing is an important resource for this strategy.

For Visma.net, one of their key resources is their organization structure. According to Lemic (2016), the development department of Visma.net operates with a matrix organization. They work in small projects which provides lots of flexibility. The matrix structure is also important as the developers are located in many different European cities. Furthermore, the Visma Group has a strategy of acquiring healthy companies. Those companies are kept with their present functioning even after acquisitions, instead of being merged with others. By this approach to acquisitions, the acquired business units within the Visma Group maintain their entrepreneurial spirit.

4.1.2 Use of cloud computing

Visma.net uses cloud computing and deliver their services as SaaS. As explained by Lemic (2016) the main advantages of using the cloud based services, compared to on premises services, is the cost profile, mobility and scalability. Lemic (2016) considers security and privacy essential in modern systems and thefore not as an additional reason to use cloud computing.

4.1.3 Incentives to use cloud computing

Appification is an important trend for Visma.net, they develop their services upon the philosophy that their delivered functionality should be available from anywhere. Ease of use is therefore the most important incentive for them to use cloud computing technology within their products. Collaborative features and possibilities of sharing within the services are also considered important in the services that Visma.net offers. Security is also very important for Visma.net's clients, since they are businesses. Lemic (2016) sees security as something that also comes with the infrastructure they buy from their partners.

4.1.4 Value creation analysis

Efficiency

Efficiency enchantments in Visma.net's cloud based services refers greatly to the processing of information. This includes increased speed in supplying data for decision making. One example could be that companies that uses Visma.net, can provide their employees with Visma apps connected to their business system to simplify everyday tasks. One example is the accounting app, *Vismanet Express*, which enables employees on the field to register their expenses transactions directly when they occur. The employee do not need to bring the receipt of an expense to the office and give it to a specific accountant. Instead, using the app, the employee can take a photo of the receipt, which then directly get added in the accounting system, waiting for approval from the manager. The manager then has her own app, *Vismanet Expense*, and can then, also on the field, approve the expense. In terms of efficiency this means that the speed of accounting greatly increases and that costs relating to employment of accountants can be reduced. This does not imply any decreased information asymmetries between buyers and sellers, as the activity is fully conducted inside the organization, but still an increase in speed of the information. More easily put, as the accounting is done faster, the information provided managers will be more up to date and hence they can improve their decision making. This also is connected to cloud computing characteristic number two, broad network access, as users can access the service from many different devices; computers, tablets, smartphones. (Lemic, 2016)

The Visma.net platform is fully scalable as of its base in the cloud. This feature be connected to the number one characteristic of cloud computing, On-demand self-service, as Visma.net allows the user to manage the capacity of the service with just *'a few clicks'* (Visma.net, n.d.). This also increases the transaction efficiency of the transaction as Visma.net and its customers don’t manually need to interact with each other. The service also relates to cloud computing characteristic number four, rapid elasticity, as users can quickly upgrade their service and as Visma.net (n.d.) puts it: *‘Whether your business has five or five thousand employees, Visma.net will cover your needs and support efficient service’.*

Complementarities

It is important to emphasize that Visma.net is just a product and service developer. A fundamental part of their business model includes their network of reselling partner firms. Those firms work locally with customers spread all around the Nordics to support the end users with the Visma.net product among others. The partner firms do have a wider product portfolio where Visma.net can be bundled with products from other developers, providing greater value than the sum of each of the products alone. This could for example be, translation services, human resources services and accounting services which the Amesto group offers. Amesto is a partner to Visma.net (Amesto Group, n.d.). The partner’s services such as support and configurations are also complementarities to Visma.net. According to Lemic (2016) the importance of this partnerships are very high, so in order to maintain good relations with the partners, Visma.net keeps two employees working on the field to support their partners.

Lock-in

Even though the payment model of Visma.net allows for a more ‘cloud computing-like‘ pace, where the payments are done monthly instead of yearly as for the older on-premises services, Visma does still require customers to sign up for at least a 12-months-contract at the start of the service. This creates switching costs by a lock-in effect for the customer of 12 months, as the customer would still need to pay for the contract period even though they decide to move to a competitor. Furthermore, the customer of Visma.net is subject to switching costs in terms of customer learning as when the customer get familiar with the system, a switch to competitors system might create a slowdown in productivity as the interface and activities within the systems will differ. Furthermore, as the historical data that is used for decision making are accumulated in the system, it can create a switching cost in terms of decreased performance in decisions making in case a migration of historical data to a competitors’ system cannot easily be done.

Novelty

Visma.net offers novelty in the payment model as it offers its customers to pay monthly instead of yearly. This enables the business model to spread to new customer segments where the customers otherwise couldn’t afford investing in the full yearly fee. Besides, novelty is created by using cloud computing to let new parties interact, which is the case in Visma where the employee and manager connect directly and decreasing the need for accountants.

4.2 Case 2: Sensative AB - Anders Hedberg

4.2.1 Information about the firm and interviewee

Anders Hedberg is a serial-entrepreneur who is and has been involved in various number of start-ups and technical related projects. Within this case, Anders Hedberg is the co-founder of Sensitive AB which developed an Internet of Things system that separates the sensors from applications. Sensative aims to create a variety of sensors and connect these sensors with a different applications. So far Sensitive AB has created a hidden sensor mounted in windows and doors. The sensors are called Strips.

Important resources & partners to create the value for Sensative AB are:

- Research projects and pilots, to create the technology and to separate sensors and applications. Because traditionally you get an application with a sensor;
- Hardware providers to provide technology in the sensors;
- Gateway providers; typically, sensors are made in china. Gateways have radar protocols to talk to the sensor devices and these gateways connect the data to the cloud;
- Virtualization (cloud computing) of small Linux machines running services to provide the sensor data to applications. They use a virtualized array of own servers and the Amazon cloud to provide the computing power.

Sensative sell their products mostly to real estate companies which wants to monitor their buildings remotely. Those companies usually use their own servers and software to connect with the sensors.

4.2.2 Incentives to use cloud computing

Hedberg (2016) was requested to comment on the five themes of incentives for using cloud computing:

Cost reduction

Sensative AB utilize cloud computing infrastructure to lower their costs. Since cloud computing has the property of being very scalable, it is also very useful in Sensitive's cost reduction as they can run big applications on low scale and quickly scale up when demand. Cloud computing also allows for cost reduction as Sensative can, when needed, use huge computational resources for temporary operations. Those are then paid by hour, which allow

Sensative to access these expensive resources only when needed, without large upfront investments. Financially Hedberg (2016) says: *'It's much easier to acquire cloud computing servers'*.

Ease of use

Another very important incentive to use cloud computing for Sensative AB is ease of use. Hedberg (2016) said *'If I would set up physical servers it should take a day or two. In amazon it would take an hour'*. Thereby cloud computing requires a lot lower level of *'You don't need to know about how it works'* (Hedberg, 2016).

Reliability

Sensative AB is using servers from Lund University as infrastructure to develop their products. However, these servers are just positioned in a rack at the office and are considered as old and not so up to date. Therefore, reliability is also a factor which is important for Sensative AB, especially when they are going to launch their services commercially.

Security comes naturally with cloud computing according to Hedberg (2016).
Collaboration and sharing is the least important feature for Sensative AB.

4.2.3 Value creation analysis

Efficiency

As Sensative is still a small start-up, they do not have a strong brand name that can gain users trust. One way to the lower transaction costs is by lowering the information asymmetries. A strategy is therefore to affiliate themselves with Lund University, as the product is based on research from there. This gives trust to the Sensative products such as the strips and thereby lower the transaction cost in terms of uncertainty, increasing the transaction efficiency. Furthermore, their product is easier to install than many competitors' products as it is wireless, which then also adds efficiency in terms of simplicity.

Complementarities

Sensative uses partners to create value for the customers. By using an established radio technology called Z-Wave, the strips work with several different vendors of smart home gateways. By selling the Sensative strips through retailers which also sells other Z-Wave certified products, the customer can then decrease its search costs as they don’t need to visit multiply stores. The information asymmetry also decreases by having a certification by Z-wave that their product is compatible with the Z-wave technology, as customers may have a higher level of trust towards the established Z-wave brand.

Lock-in

When users start to use the Sensative product they will be acquiring customer learning about the product. If they want to switch to a competitors’ product, they will have to redo the learning, which thereby incur a switching cost and lock-in effect. As customers uses the Sensative Strip products with good experiences, it also creates a lock-in effect in the form of a trust towards the brand and which implies they are more likely to stay with their product in new purchases.

Novelty

The novelty of the Sensative strips are their size and positioning. By enabling the strips to be placed inside the window frame, the novelty is the strips’ invisibility towards the user.

4.3 Case 3: AddPro – Nicklas Persson

4.3.1 Information about the firm and the interviewee

AddPro is a Cloud IT integrator founded in 2000 by four companions. With a diversity in backgrounds in the Swedish IT industry Nicklas Persson, Robert Hansson, Magnus Norling and Klas Ljunggren founded AddPro. Today AddPro employs more than 150 persons specialized in a wide-range of technical competences. They have offices in five different locations, partly because of acquisitions of other companies. In 2015 they had 250M SEK in revenue. Their main target market is Sweden and target group is middle size companies to large corporations. They also have customers from the government sector.

AddPro offers high scale IT solutions, infrastructure solutions in data centres, commodity solutions, and related integrations of it. AddPro offers highly skilled consultants, and managed services for storage solutions, computing solutions, database solutions and more. One of the key factors for their success was that they started to offer a security layer in 2005. This was excellent timing for the company which also grow fast in 2009 – 2015 as of an increased demand in the security market. Their knowledge in security has also been important to attract governmental customers.

AddPro considers all their vendors as important resources and partners for the company. They have hardware cooperation with HP, Dell and IBM, Cetrix, and Microsoft. AddPro established their first cloud services in 2005, but quickly realized this was too early. The problem was that the network connections was too slow to keep up with the delivery of cloud services from their own datacentres. It was first later in 2008-09 that the cloud services started to grow, in parallel with their security layer services.

By utilizing cloud computing, AddPro is also able to cut maintenance costs as they can standardize operations for their customers, providing economics of scale. This has cost reductions as a result. *'Cloud computing makes business more manageable and more profitable'* (Persson, 2016).

4.3.2 Use of cloud computing

When ordering the reasons to use cloud computing, AddPro uses cloud computing mostly because its cost effectiveness. Other important reasons for using cloud computing are that cloud computing is easy to manage and provides scalability.

4.3.3 Incentives to use cloud computing

Nowadays there is no need for AddPro to invest a lot of money in hardware. When AddPro uses cloud services from partners, they pay the fees monthly, and it's easy to expand their platforms. All the proposed incentives to use cloud computing makes sense for AddPro. The last AddPro referred of is the access from everywhere. This incentive is also very important for them but since a lot of services are running in private clouds in big companies, this feature of accessibility is less important for AddPro then for other businesses that use cloud computing. The Security is not a driver for AddPro to use cloud computing. Since they are offering high level security anyway.

Persson (2016) suggests that one of the reason that cloud computing is much more successful nowadays is that the communication capacity is different from in 2005. Communication is cheaper and faster nowadays, and everybody is connected with several devices.

4.3.4 Value creation analysis

Efficiency

AddPro does value creation in terms of transaction efficiency by lowering the search costs for their customers. By working with partners providing complementarities to AddPro's services, AddPro can help its customers to combine the best portfolio of products to fit their needs and lower the costs of searching for alternatives for the customer. By acting as an intermediator between the customer and partner (e.g. Microsoft, IBM, Citrix), AddPro can also decrease the information asymmetries between the transaction parties by sharing their knowledge of the partner's products and services to make the transaction more efficient. AddPro is also subject to economics of scale and network effects, as human cognitive product knowledge accumulates with every transaction and could be duplicated as long as there is time available for the employees in the company (Amit & Zott, 2001). Network effects, as the knowledge, accumulates with every customer and gives economics of scales as it can create value for every new transaction without any additional cost.

Complementarities

One core component of AddPro's business model is the ability to bundle products together with partners. This includes hardware and software bundling with partners such as Dell, Microsoft, VMware, Citrix, IBM and more which are large players in the hardware and software field. After analysing the customers' needs, AddPro tailors a digital infrastructure solution, in which the customer adds their applications such as ERP systems, CRM systems and other niche systems. Persson (2016) describes this infrastructure as a *'German Autobahn'* which AddPro is fully committed to keep free of traffic jam by ensuring the highest possible speed, security and reliability for the customer. By bundling the hardware, software and AddPro's expert consultants, the total value created for the customer is then greater than the sum of each products individual value.

Lock-in

According to Persson (2016) AddPro does usually work with service contracts towards their customers, which allows the customer relationship to be built on a daily basis. Those contracts are on average 24 months which then creates a lock-in effect in terms of a contractual switching cost for the customer if they like to switch to a competitor before the contract ends (Amit & Zott, 2001).

Novelty

AddPro adds Novelty in their business model by enabling their customers to choose from a great variation of infrastructure arrangements. The customer can choose whether they like to buy servers themselves, either hosting them on their own premises or in AddPro's datacentres, or rent the servers from AddPro as a service. Furthermore, AddPro can also offer the customers to use large cloud computing platforms such as Microsoft Azure. Additionally, AddPro has an early focus on security which enables AddPro to work with large corporations and governments.

4.4 Case 4: Trustedchoice.com - Martin Hill

4.4.1 Information about the firm and the interviewee

Trustedchoice.com is a firm in the US insurance industry that is offering a two-sided network for insurance agents matching with individuals and families. The interviewee, Martin Hill, ran Trustedchoice.com from 2011 to 2013 as the chief product officer. He had full responsibility for the design, development and deployment, support and maintenance of their systems.

Historically the US insurance industry was run by insurance agents which was arranging insurances between consumers and insurance companies. As the internet developed, large insurance companies started to build their own websites to sell their insurances directly to the consumers, which resulted in competing with approximately 40.000 insurance agents in the US. According to Hill (2016) this made the insurance agents lose 3.5B USD due to the activity of the insurance companies selling direct to the consumers.

The Independent Insurance Agents & Brokers of America (IIABA) decided to give the insurance agents a better position in the market by developing a marketplace for insurances, while emphasizing the benefit from an insurance agent in the value proposition. Insurance agents tends have better knowledge locally about what people want and are therefore able to offer a customized service, where big insurance companies have no personalization feature. Consumers can search in all kinds of insurances (car insurances, home insurances, recreational insurances, business insurances, etc) through the marketplace, Trustedchoice.com. In addition, Trustedchoice.com also offers an overview of what kind of options consumers have. Secondly the marketpalce can offer a quote in real-time based on their preferences and location. The challenge in this system was to build a system to match all the preferences to the agent of their needs, with a quote.

Martin Hill and his team developed a huge software platform that had two key portals. One industry portal where all the agents could sign up. The system had to store the data, and process all the data. And a consumer portal, where a consumer could register, filter preferences, get a quote, and match with a relevant agent.

4.4.2 Use of cloud computing

The whole platform runs on several cloud computing services from the cloud service provider Rackspace. This cloud service provider offered the best services for a very competitive price with a long-term agreement (Hill, 2016).

4.4.3 Incentives to use cloud computing

While building the system the team had two options. Building the system in a physical location or a 99% cloud computing based solution. They did a cost analysis where they concluded the physical solution would have been three times more expensive the cloud based solution. Furthermore, the physical solution would have taken three times more time then the cloud based solution. Hill (2016) argued the following about the following reasons why cloud computing would be more cost beneficial:

- Shorter development & deployment cycles. Hill (2016) states that *'A physical solution is harder to implement then a cloud based solution'.*
- Lower costs for support and maintenance.
- Scalability, no need for redundant capacity. You only claim just as much resources as you need.
- Forecasting becomes a lot cheaper since you don't need to forecast the resources you will probably need in the future. Whereas earlier, you had to spend money on something what might happen in the future. With quick scalability properties of cloud computing you don't have to do that anymore.
- With respect to security, there are also many cost savings; through cloud computing everything stays up to date. The hosting company is responsible for updating and improving the systems constantly, so it will not be out of date. Compared to previous (physical) solutions it would be very hard and expensive to accomplish the same level of security and accuracy.
- When comparing servers in a server room to cloud computing, managing and configuring the servers takes a major amount of the time. Furthermore, there is more room for human error which also could be very expensive.

The cost diffraction was huge. And therefore their first and main incentive was to use cloud computing to have lower costs. Another argument Hill (2016) brings up is that *'you are able to better to scale your costs then physical servers'.* Another incentive for using cloud computing is for Hill (2016) that cloud computing has benefits considering time-to-market.

Considering the speed of movement which is higher compared to older technology and the release momentum cloud computing providers bring with it. Security is also an important incentive to use cloud computing according to Hill (2016). Hill (2016) believes cloud computing solutions are typically more secure than previous (physical) solutions.

4.4.4 Value creation analysis

Efficiency

Trustedchoice.com does value creation by increased efficiency in many aspects. Firstly, Trustedchoice.com does significantly lower the search costs for customers by their automated data-driven system that connects them with the best match of more than 30-40 thousand insurance agents all around the US. Furthermore, Trustedchoice.com allows increased selection range by their huge database of insurance agents. As Trustedchoice.com is fully based in cloud computing, it also allows for the characteristic of rapid elasticity and economics of scale. As the platform's initial fixed costs are large but then scales instantly and the marginal cost of computing resources by cloud computing is close to zero, the platform, once running, can serve a huge amount of users, with the economics of scale aspect.

The economics of scale also affects Trustedchoice.com though their cloud computing hosting provider. According to Hill (2016) one example of this could be the security aspect of cloud computing. The alternative for Trustedchoice.com would be to run their own datacentres instead of buying cloud computing services from Rackspace. As Rackspace hosts a much greater amount of computing in their cloud, the marginal cost of security will be much lower for them than for Trustedchoice.com alone, as for example maintenance, security updates and guardian services can be applied on a greater amount of servers simultaneously. This enables Rackspace to provide lower cost for computing resources which also affects Trustedchoice.com by lowering their costs and thereby increases efficiency.

The search costs is further reduced by enabling customers to use filters when viewing the search results. This filters includes free parking, online services, multilanguage, weekend opening hours among others that increases the search efficiency for the user. Trustedchoice.com is also subject to network effects which will be further discussed in the Lock-in section, but worth mentioning here as it also provides increased transaction efficiency by economics of scale.

Complementarities

The most important partners in terms of complementarities for Trustedchoice.com are the insurance agents, as without them the platform wouldn't provide any value to the consumers. But together, value creation increases as consumers faster can find the insurance agent that fit their needs than they would otherwise, by for example calling and searching online.

Lock-in

There are some lock-in effects connected to Trustedchoice.com. As Trustedchoice.com can count as a typical two-sided network the platform is also subject to networks effects. One side of the platform consists of consumers searching for insurances while the other side consists of insurance agents looking for consumers. This implies that both sides are depending on the number of users of the others side in their value creation. The more insurance agents available to the consumers, the better match they can get and the more consumers searching for insurance agents the more business they can attract. The lock-in aspect is included in the network effect. The more users the platform can attract, the more dependent on platform those users will be. This implies that the both types of users (insurance agents and consumers) will be more motivated to conduct in repeating transactions with the platform the more it grows, that is the lock-in effect.

Novelty

The novelty of Trustedchoice.com is great as it creates a new transaction structure for insurances. Before the Trustedchoice.com launch, Hill (2016) suggested that customers either bought their insurances directly from the insurance company online or from the local insurance agent which they found the traditional way (phone, friends, advertisements). However, the problems with buying directly from the insurance company are that the company didn't provide personalization to best fit the customer, neither could support the customer when it comes to claims. The problem with finding agents the traditional way is that the search cost is much higher than using internet. The novelty in the idea then is to enable the (new) participants to connect though a new transaction structure (the internet platform, Trustedchoice.com), which increases value for both the insurance agents and the customers. This as customers get value creation from the personalization of the insurance product as, for example, the insurance agent can select insurances from many different insurance companies to best fit the customer.

4.5 Case 5: Microtracking AB - Niklas Hild

4.5.1 Information about the firm and the interviewee

After ten years of planning, MicroTracking AB was founded in 2011. The interview was conducted with one of the co-founders of Microtracking, Niklas Hild, He has background in sales and IT. Hild describes himself as an extremely curious person which is able to see patterns and predict what is coming. He also has a very entrepreneurial drive. Hild previously worked intensively with VMdata, SWEdoor, and Volvo trucks (Hild, 2016).

The main value proposition of Microtracking is supplying real-time business intelligence by the use of several data capture tools, such as; sensors, barcode readers, RFID tags, image recognition etc. Microtracking don't develop new technology from the ground. Instead they build theirs upon existing technology while connecting all the dots, working with open technology and world wide standards. Hild (2016) says: *'Cloud computing for us is getting the right information, to the right people in the right time'.* Microtracking acts on accurate information in real time while utilizing the powers of cloud computing.

The customers of Microtracking do have a complex businesses, a lot of products and stores or both. Microtracking's solutions help the customers collect their information to one place, since the typical customers have a lot of data but in different places. Global companies can often be hard to convince about cloud computing solutions at first hand. However, when the clients find out that relatively "old" solutions are significantly more expensive, they come back and want to have cloud computing delivered as well for their systems (Hild, 2016).

4.5.2 Use of cloud computing

Microtracking offers all layers of cloud computing (SaaS, PaaS, IaaS). The end product is mostly connected to simple (mobile) applications which is SaaS.

4.5.3 Incentives to use cloud computing

Microtracking sees costs reduction as number one incentive to utilize cloud computing in their business model. Cloud computing offers low upstart costs by reducing the need for infrastructure investments. Also the maintenance costs for Microtracking are lower with cloud computer compared to when using own physical servers. Other cost implications are that the cloud service provider mostly takes care of the security and privacy of the data (Hild, 2016).

The feature of scalability in cloud computing further provides cost control as the costs are easy and accurate to estimate in advance. This is important when Microtracking launches new projects with customers and requires the possibility of a quick increase in computing in the project. As cloud computing is quick to setup, Microtracking is also allowed to get started very fast with new customers. They identify the problem and get started directly. If things for some reason do not work out, cloud computing is also very quick and cheap to shut down, with no long contractual agreements (Hild, 2016).

4.5.4 Value creation analysis

Efficiency

As suggested, Microtracking's value proposition consists of supplying real-time business intelligence by the use of different tracking methods such as RFID tags. In terms of efficiency, this is of great interest, as one way to reduce transaction costs is to reduce *'information asymmetries between buyers and sellers through the supply of up-to-date and comprehensive information'* (Amit & Zott, 2001, p. 503). Microtracking's products are working to provide such information which then lower the transaction costs. In the interview Hild (2016) provides an example of this by a project he worked with for the board of fishery in Sweden. In the project, Hild (2016) developed a system for tracking fish through the supply chain using Microtracking cloud technology. In the system, the packages of fish were marked with a 2d barcode which consumers in the supermarkets or restaurants could scan with the smartphone camera. Doing so would then provide them comprehensive information about the fish and its origin. This information included who sold the fish to the store/restaurant, who bought the fish from the fisherman, a link to the ship and fisherman who caught the fish and more.

According to Hild (2016), this provided a value for the consumer which they confirmed by a test in a supermarket store. In the test, two types of frozen fish packages where sold beside each other in the supermarket with the only difference that one was 5 SEK more expensive and had a label suggesting: *'this is traceable fish, scan here and see where it comes from!'* (Hild, 2016). The outcome was that the traceable fish still sold 75 % more, which clearly exemplifies the value creation in lowering information asymmetries (Hild, 2016).

The transaction efficiency of Microtracking technology can be further exemplified with their SmartShelf technology. The technology builds on using radio-frequency identification technology, (RFID technology) to track the products at store shelves. Using the technology, the shelves get directly connected to a Microtracking server and transfer data about the inventory of each goods. This allows management in the store or warehouse to track the inventory in real-time and optimizing ordering decisions. The data are then available through the Microtracking system on any PC, Tablet or mobile device in accordance with the users' needs. This also creates value for the business which can streamline their inventory management (Amit & Zott, 2001).

Another aspect of the Microtracking products that Hild (2016) empathizes is the ease of use. He suggests that *'Making things complicated, anyone can do. But making something simple is one hell of a job'* (Hild, 2016). The implication is that services at Microtracking are designed to be as easy to use as possible, which then increases transaction efficiency in terms of simplicity. Furthermore, when Microtracking earns new customers, the focus is simplicity in the customer's perspective, meaning Microtracking will work on enabling its technology in the platforms and gadgets that the customer already has. This also has implications in terms of costs for adopting Microtracking technology. *'Asking customers to buy 10 thousand hand-held computers, then the case is off. They won't take that investment'* (Hild, 2016).

Complementarities

With most solutions that Microtracking offers, they sell a Service Level Agreement (SLA) to keep a long-term relationship with the client. Bundling the applications, the sensors and the SLA means that a client does not have to look for other services with the objective they want to acquire. This lowers the search costs for the client (Amit & Zott, 2001). Furthermore, Microtracking has partnered up with manufacturers of the RFID tags, as well as cloud computing providers. Besides, when customers already uses a specific business software as SAP or Microsoft solutions, their integration to this systems provide bundling options.

Lock-in

Microtracking's value creation includes lock-in effects. One example is the switching costs of customer learning. As soon as the customer learn how to use the Microtracking products and software there will be a cost associated with switching to a competitor which has other software and products. Another aspect is the customization and personalization of the products. As already suggested, when Microtracking earn customers, they focus on the customers' platforms and software and tailor the Microtracking technology to integrate well. This integrations are often custom made for each customer and the Microtracking software, which means increased switching costs if the user would like to change to a competing product. This as the customer then probably would need to purchase similar integrations again, but for a new system. Furthermore could the optimization of product stock and similar operations build on variations data which have been accumulated in the system over time. If this data could not be easily exported to a new system, this will also add a switch costs, thereby keeping the customer locked-in.

Novelty

As suggested, novelty is often related to the efficiency aspect of the value creation. For example are the reduced information asymmetries in the fish market is novel in its decrease of transaction costs.

4.6 Case 6: Duffy Agency – Grant Adams

4.6.1 Information about the firm and the interviewee

The Duffy Agency consults companies with the development of their brand strategies. The Duffy agency has seven people working in Malmö and four employees working in Boston. The interviewee is Grant Adams, whom is responsible for managing the operations and the technological infrastructure at the Duffy Agency.

The Duffy Agency is focusing on mid-size companies, usually B2B companies. The company does not have too many clients in Sweden, but mostly international clients. Therefore, they also consider their competition on an international scale.

4.6.2 Use of cloud computing

The Duffy Agency mostly utilizes SaaS. They use Basecamp, which is a SaaS based project management tool, to interact and collaborate with their clients. To collaborate within the company they utilize Google Docs. CloudHQ is used to perform in backups of other cloud services, and they created their own Brandbase service utilizing PaaS. Brandbase is an online portal for students used to upload documents and collaborate.

4.6.3 Incentives to use cloud computing

Collaboration and sharing is one of the most important incentives for the Duffy Agency to use cloud computing. Before they had their own fileservers which were often hard to use from out-of-office locations. Utilizing SaaS services in the cloud made it a lot easier, to collaborate and share progress within the company. Thereby it is easier to have one system compared to previous systems the company used. Access to files is easily given to clients with cloud based services. Overall, according to Adams (2016) the *'Cloud services made it easier to communicate'*.

While asking Adams (2016) to rank the incentives to use cloud computing, he ordered them as following:

1. Sharing and collaboration
2. Easy of use
3. Reliability
4. Security
5. Cost reduction

4.6.4 Value creation analysis

Efficiency

The value creation in Duffy Agency includes increase in transaction efficiency due to a decrease in search costs. This as Adams (2016) suggests that the agency works with partners to supply services not available in the own firm, which then can limit search costs for customers looking for a bundle of products. Duffy Agency does offer a service called *'Moso Growth Program'* (Duffy Agency, n.d.). This programme includes many different services with a partly performance based payment model, which also includes working together with the customers and sharing information by smart online collaboration tools, such as Basecamp. This can decrease the information asymmetries between the Duffy Agency and its customers, as they get a better picture of what they are paying for and thereby an increased transaction efficiency.

Complementarities

As suggested, Duffy Agency does also work with different partners that supply complementarities to the firm. Examples of this that was suggested by Adams (2016) are web design and graphical services which they buy from partners ,when needed by their customers, thereby also reducing search costs for their customers, who don't have to search for separate suppliers themselves.

Lock-in

By engaging customers in the Moso Growth Program, Duffy Agency creates a lock-in effect. This as the Moso Growth Program is a long term programme where the performance are evaluated on a long term basis, *'typically within a three-year time frame'* (Duffy Agency, n.d.) When a customer has started the programme, there will be a switching cost associated with switching to a new digital marketing agency as the choice of strategy will have to be re-evaluated, thereby creating a lock-in effect. Furthermore, customers that have been with the agency for a longer term can experience switching costs in terms of trust as they know what they get from the Duffy Agency, but not from competitors.

Novelty

Novelty in Duffy Agency connects to the strategies they develop for their customers. According to Adams (2016) is an important target of the Duffy Agency to be a leader in this field, thereby working with novel ideas.

5. Discussion

5.1 Value creation in e-business through cloud computing

The analysis showed that cloud computing can help businesses in their value-creation processes. The degree to which this occurs differed greatly between the different companies, and this difference could logically be attributed to the methodological approach of sampling diverse cases. A cross-case comparison of the cloud-computing themes identified in the case companies is summarized in Table 2.

Table 2. Cross-case comparison of cloud-computing themes identified in the case companies

Themes	VISMA	SENSATIVE	ADDPRO	TrustedChoice.com	micro tracking	Duffy Agency
Customization	✓*		✓	✓	✓	
Network effects	✓*	✓*	✓*	✓		
Cost reduction	✓*	✓*	✓	✓	✓	✓
Security & privacy			✓	✓		
Sharing & collaboration	✓				✓*	✓
Ease of use	✓	✓*		✓*	✓	✓
Reliability		✓*	✓*	✓	✓	✓
Pay by use	✓		✓*	✓	✓	
Partnerships	✓	✓	✓	✓	✓	✓

Note. All themes refer to value-creation specificity in cloud computing. ✓ = strong, ✓ = partly*

Furthermore, Amit and Zott's (2001) model for value creation in an e-business model was used to answer the research question. From the findings and analysis it became clear that the model suitably described the value creation generated by many of the characteristics of cloud computing.

In terms of efficiency, examples revealed how features such as on-demand self-service led to simpler transactions and reduced distribution costs. At Visma.net, customers can perform actions using their software from any location at any time. This allows the software to be more intelligent, thereby reducing the amount of human interaction. For example, users can upgrade their Visma application and their platform with just a few clicks.

As regards complementarities, the study also showed that cloud computing can act as a value creator by allowing the necessary computer resources to be easily acquired through broad network access and resource pooling. This ease of access allows the partner—the cloud provider—to focus on its core activities and enjoy economics of scale, thus reducing costs for the e-business, increasing security in its computer resources, and generating value for both parties. An example is AddPro, which connects businesses with cloud and software partners for their value creation.

In terms of lock-in effects, the study showed that rapid elasticity generated by cloud computing can improve the lock-in effects of websites subjected to network effects. In the case of Trustedchoice.com, by using cloud computing and its feature of rapid elasticity the company was able to take full advantage of the network effects of its two-sided network, thereby achieving greater value creation. This outcome was possible because rapid elasticity ensures that computing resources will not become a limiting factor for user growth, in contrast with an own datacentre, which would be much more time-consuming to upgrade.

Where novelty was concerned, the characteristic of measured service allowed for broader product development, as it enabled e-businesses with strict financial limits to access excellent computing resources for short periods of time—such as an hour or less—at a low cost compared to the outlay required to invest in the necessary infrastructure. This meant new participants could take part in transactions previously only available to large corporations.

5.2 Framework

Amit and Zott's (2001) e-business framework for the assessment of value creation in e-businesses mainly emphasises the transactions that occur between the firm and its suppliers, partners and customers, rather than the activities within the firm. It is worth recalling that the model was developed in the early 2000s as a framework to explain new sources of value creation in e-businesses, comparing them to non-e (that is, non-digital) businesses. This study examined sample companies which already use electronic business practices and cloud computing to increase value creation, without forming any comparisons with non e-businesses. One possible limitation of the study therefore concerns the fit between the model and the sample selection, which could have been more specific. On the other hand, the model did allow a certain scope for improvement.

The study also showed that the incentives for using cloud computing could vary greatly between firms, an outcome which is in line with current research. One explanation could be that cloud computing is still a new phenomenon and users do not yet fully understand its potential or use it in the most efficient way.

5.3 Incentives for using cloud computing

For the interviews, several companies using cloud computing on different levels and in different ways were approached. AddPro, for example, delivers cloud computing as an infrastructure with a security layer offering a degree of lock-in. The Duffy Agency’s use of SaaS cloud computing, on the other hand, has changed the way the firm collaborates and accesses information.

It also became evident that companies using cloud computing on different levels (SaaS, IaaS, and PaaS) had different motivations. Within the scope of our cases, companies using SaaS tended to use cloud computing more for collaboration and sharing. For companies using cloud computing at infrastructure level, cost benefits were a more important consideration. This was seen at Sensative, AddPro, Visma, and Microtracking. Cloud computing is an industry changer; it creates openings for businesses to create new levels of value in more cost-beneficial ways. In the sample companies examined it accounted for considerable novelty in a broad range of industries.

5.4 Partnerships

One interesting finding of the interviews that is not specifically developed in the literature was the importance of partnerships within cloud computing. Partnerships allow companies to focus on their core businesses and leave other parts of the value chain to partners. This type of relationship was exemplified by AddPro, which offers its customers the use of cloud-computing services provided by Azure, even though AddPro itself provides hosting services at its own datacentres. Moreover, as suggested, instead of developing the full business solutions in-house, AddPro instead relies on partners for 95 percent of a solution and then tailors the remaining five percent to the customers' needs itself. The same approach was seen at Visma.net, which in contrast to AddPro develops the software, but then—similar to AddPro—uses partners to sell and customize its services for the end user. Support arrangements were also found in Microtracking, Trustedchoice.com, and Sensative, where the companies buy cloud computing services from partners instead of hosting their own servers. However, it should be noted that Sensative does host its own servers for testing purposes and for customers requiring own hosting. Duffy Agency also uses the cloud-computing services of partners such as Google apps and similar, which fully supply it with SaaS.

The implications of these findings can be related to the literature review, as partnerships are included in Amit and Zott's (2001) model for value creation in e-business as well as in the value chain framework (Mohammed et al., 2010; Porter, 1985). However, in the Amit and Zott (2001) model, partnerships relate to combinations of products which when sold together provide greater value than the sum of the value of each product alone. An example of this is an online car-selling platform that also allows the user to buy insurance for the car (Amit & Zott, 2001). The findings suggest that the products are not being bundled together, but instead integrated, in order to create value. Hence, products often cannot be bought separately, that is to say, Microtracking or Sensitive's software, Google apps (Duffy Agency), Trustedchoice.com, or Visma.net cannot be bought separately from their cloud hosting, but the car from the online car firm and the insurance from the insurance company can still be bought separately. This is more in line with studies on co-creation in networks by Nenonen and Storbacka (2010) and the view expressed by Mohammed et al., (2010) regarding the value networks where value chains increase in complexity.

Partnerships are of relevance to the research question, which addresses the way cloud computing affects value creation in e-businesses. As suggested by the framework for value creation in e-business, and empirically by Hill (2016), separation of responsibility in the value-chain cloud leads to increased transaction efficiency, thereby increasing value creation. Hill (2016) connects this increase to cost reduction, which the findings of this thesis also identify as a major theme in cloud-computing value creation. This significance could be explained by economics of scale, given that by introducing cloud computing and separation in the value chain via partnerships, companies can achieve greater economies of scale by focusing on their core businesses. Findings by Hill (2016) on maintenance work and the safeguarding of servers in hosting support this finding. Maintenance work includes updating and making back-ups of servers. Safeguarding can mean a technician watching the servers and changing physical drives that break down. Updating the servers and watching them will be done in the same manner regardless of whether two or 50 servers are running. The marginal cost for maintenance as the number of servers increases is therefore very small, allowing for economics of scale which can provide value in the form of cost reduction to all parties in the value chain.

5.5 Similarities between firms

The two main similarities identified in the case companies' use of cloud computing concerned the cost-reduction and partnership themes described in Table 2. These two themes were identified in every case. As described in Section 5.4 on partnerships, this could be explained by aspects of specialization and economics of scale. Cloud computing allows for the different participants in the value chain to specialize their businesses, thereby allowing for economics of scale which imply reductions of cost. The partnership approach is also explained by specialization, as firms become more dependent on others to deliver their products or service, thereby forming partnerships to ensure proper delivery.

5.6 Differences between firms

The sample companies made different use of network effects for value creation, depending on their different business models. As the name of the theory suggests, value from network effects is created when users benefit from other users in a network. This web potential is not limited to cloud computing, although cloud computing can be used to boost the effect, as shown earlier in the case of TrustedChoise.com, which does indeed benefit from cloud computing and its network effects. The company's business model needs users (both insurance sellers and buyers) to create value, in comparison to the other case companies, where the networks effects were less significant. For example, the value of services for customers at Duffy Agency, Microtracking, or Visma does not depend as much on the number of other customers these companies have (i.e., Visma's cloud-based business solutions create value for even a single customer, while value at TrustedChoice.com depends on whether there is a wide selection of both buyers and sellers).

Security and privacy were further themes where the case companies had different views. Some interviewees argued that their own self-hosted systems were very safe and that cloud computing did not create any value in these areas. Another argument was that using cloud computing would mean relying on a partner to provide the cloud service, and that the case company in question would therefore not retain full control of potentially sensitive data.

TrustedChoice.com, on the other hand, argued that economics of scale are what make security and privacy in cloud computing affordable. This is because the company responsible for the cloud-computing service can specialise in security and privacy more than the company utilizing the cloud computing to deliver its own services.

6. Conclusions

6.1 Key findings

In addressing the research question *'How does cloud computing affect value creation in e-businesses?'* the findings of this study revealed different aspects for consideration, many of which have not been defined yet in the current literature. The general conclusion is that the effect of cloud computing on value creation in e-business is very positive. As stated by the interviewees, cloud computing tends to increase value creation in businesses by reducing costs through the specialization of companies, partnerships, and economics of scale.

Furthermore, the study shows that the motivation to use cloud computing can vary greatly among different firms, which is in line with current research. This variance could be because the range of possibilities cloud computing can offer is not being fully developed in many firms, and its full potential is therefore not being realized. The motivations provided interesting clues as to what the case companies perceived as valuable, or value creating, in cloud computing.

Furthermore, the study showed that in particular it is cost reduction through economies of scale that creates value in cloud computing, though the relevance of other aspects such as security was also recognised. In practical terms the study therefore encourages more companies and especially start-ups to develop cloud computing to its fullest potential. It also confirms the increased importance of networks in value creation in e-business through cloud computing, as suggested by Mohammed et al. (2010) and Nenonen and Storbacka (2010).

6.2 Implications for future research

The current framework for value creation in e-business by Amit and Zott (2001) tends to focus on the transactions that occur between the firm and its suppliers, partners, and customers, rather than on activities within the firm. This restricted scope limits the opportunities to analyse companies which use cloud computing to support their internal activities rather than in transactions with external parties. Further research could therefore explore the creation of value through a firm's internal activities rather than through the transformation from non-e-business to e-business, as a similar exploration process could better match the way e-businesses develop in digital phases.

7. Bibliography

Adams, G. (2016). Interview Grant Adams.

Allee, V., & Kong, E. (2003). The future of knowledge: increasing prosperity through value networks. *Knowledge and Process Management*, *10*(2), 137–138. http://doi.org/10.1002/kpm.169

Amesto Group. (n.d.). The Amesto Group - Amesto Group. Retrieved from http://www.amesto.com/

Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, *22*(6–7), 493–520. http://doi.org/10.1002/smj.187

Andrews, K. R. (1987). Chapter2: The concept of corporate strategy. In *The concept of corporate strategy* (pp. 13–34).

Armbrust, M., Fox, A., Griffith, R., Joseph, A., & RH. (2009). Above the clouds: A Berkeley view of cloud computing. *University of California, Berkeley, Tech. Rep. UCB* , 07–013. http://doi.org/10.1145/1721654.1721672

Armbrust, M., Stoica, I., Zaharia, M., Fox, A., Griffith, R., Joseph, A. D., … Rabkin, A. (2010). A view of cloud computing. *Communications of the ACM*, *53*(4), 50. http://doi.org/10.1145/1721654.1721672

Bell, E., & Bryman, A. (2011). *Business Research Methods* (3rd ed.). New York: Oxford University Press.

Bhaird, C., & Lynn, T. (2015). Seeding the cloud: financial bootstrapping in the computer software sector. *Venture Capital*, *17*(1–2), 151–170. http://doi.org/10.1080/13691066.2015.1021030

Buyya, R., Buyya, R., Yeo, C. S., Yeo, C. S., Venugopal, S., Venugopal, S., … Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation Computer Systems*, *25*(6), 599–616. http://doi.org/10.1016/j.future.2008.12.001

Chou, D. C. (2011). Rise of the Cloud Ecosystems. Retrieved May 2, 2016, from https://blogs.msdn.microsoft.com/dachou/2011/03/16/rise-of-the-cloud-ecosystems/

Dillon, T., Wu, C. W. C., & Chang, E. (2010). Cloud Computing: Issues and Challenges. *Advanced Information Networking and Applications (AINA), 2010 24th IEEE International Conference on*, 27–33. http://doi.org/10.1109/AINA.2010.187

Duffy Agency. (n.d.). Services. Retrieved May 1, 2016, from http://duffy.agency/digital-marketing-services/

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building From Cases - Opportunities And Challenges , *50*(1), 25–32. http://doi.org/10.2307/20159839

Eisenmann, T., Parker, G., & Van Alstyne, M. W. (2006). Strategies for two-sided markets. *Harvard Business Review*. http://doi.org/10.1007/s00199-006-0114-6

Farrell, J., & Klemperer, P. (2007). Chapter 31 Coordination and Lock-In: Competition with Switching Costs and Network Effects. *Handbook of Industrial Organization*, *3*(6), 1967–2072. http://doi.org/10.1016/S1573-448X(06)03031-7

Graziano, C. (2011). A performance analysis of Xen and KVM hypervisors for hosting the

Xen Worlds Project. *Master's Thesis*. Retrieved from http://lib.dr.iastate.edu/etd/12215/

Gupta, P., Seetharaman, A., & Raj, J. R. (2013). The usage and adoption of cloud computing by small and medium businesses. *International Journal of Information Management*, *33*(5), 861–874. http://doi.org/10.1016/j.ijinfomgt.2013.07.001

Haile, N., & Altmann, J. (2012). Value creation in IT service platforms through two-sided network effects. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* (Vol. 7714 LNCS, pp. 139–153). http://doi.org/10.1007/978-3-642-35194-5_11

Hild, N. (2016). Interview Niklas Hild.

Hill, M. (2016). Interview Martin Hill.

Katz, M., & Shapiro, C. (1994). Systems Competition and Network Effects. *Journal of Economic Perspectives*, *8*(2), 93–115.

Lemic, N. (2016). Interview Nina Lemic.

Li, Q., Wang, C., Wu, J., Li, J., & Wang, Z.-Y. Z. (2011). Towards the business–information technology alignment in cloud computing environment: an approach based on collaboration points and agents. *International Journal of Computer Integrated Manufacturing*, *24*(11), 1038–1057. http://doi.org/10.1080/0951192X.2011.592994

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing - The business perspective. *Decision Support Systems*, *51*(1), 176–189. http://doi.org/10.1016/j.dss.2010.12.006

Mohammed, A., Altmann, J., & Hwang, J. (2010). Cloud Computing Value Chains: Understanding Businesses and Value Creation in the Cloud. *Economic Models and Algorithms for Distributed Systems SE - 11*, 187–208. http://doi.org/10.1007/978-3-7643-8899-7_11

Nenonen, S., & Storbacka, K. (2010). Business model design: conceptualizing networked value co-creation. *International Journal of Quality and Service Sciences*, *2*(1), 43–59. http://doi.org/10.1108/17566691011026595

NIST. (2011). The NIST Definition of Cloud Computing, Recommendations of the National Institute of Standards and Technology. *National Institute of Standards and Technology, Information Technology Laboratory*. http://doi.org/10.1136/emj.2010.096966

Oracle. (2011). Introduction to Virtualization. Retrieved from https://docs.oracle.com/cd/E26996_01/E18549/html/VMUSG1010.html

Persson, N. (2016). Interview Nicklas Persson.

Pil, F. K., & Holweg, M. (2006). Evolving From Value Chain to Value Grid. *MIT Sloan Management Review*, *47*(4), 72–80.

Porter, M. E. (1985). How information gives you a competitive advantage. *Harvard Business Review*, (July-August), 149–174.

Retriever Sverige AB. (n.d.). Retriever Business. Retrieved March 2, 2016, from https://web.retriever-info.com/services/businessinfo.html

Schumpeter, J. (1934). The Theory of Economic Development. *Joseph Alois Schumpeter*, 61–116.

Visma.com. (n.d.). The history of Visma. Retrieved April 4, 2016, from http://www.visma.com/about-visma/history/

Visma.net. (n.d.). Vad är Visma.net? Retrieved from https://www.visma.net/sv/Varfor-Vismanet/en-losning/en-losning/

Wang, C., Wang, Q., Ren, K., & Lou, W. (2010). Privacy-preserving public auditing for data storage security in cloud computing. In *Proceedings - IEEE INFOCOM*. http://doi.org/10.1109/INFCOM.2010.5462173

Wernerfelt, B. (1984). A Resource based view of the firm. *Strategic Management Journal*, *5*(2), 171–180. http://doi.org/10.1002/smj.4250050207