Cloud Computing - Factors that affect an adoption of cloud computing in traditional Swedish banks

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Abstract

Cloud computing, a current IT trend, is becoming more integrated in companies’ strategies and also increasingly important for firms. Thus, many organizations have or are considering implementing cloud services. Banks, however, tend to not adopt cloud computing at the same pace as other industries. Therefore, it is of interest to increase the understanding of which factors that obstruct or foster an adoption of cloud computing in the banking industry in Sweden. These factors have been examined from a bank and external perspective, through interviews with IT personnel from the four big banks in Sweden, external IT consultants, authorities (Finansinspektionen and Datainspektionen) and Svenska Bankföreningen. The empirical findings have been analyzed in accordance with Tornatzky and Fleischer’s (1990) TOE framework - technology, organization and external task environment. There were eleven key factors found in this study, which are the following: 1) Integration, Lack of competence, Sensitive information, Heritage, Employee resistance, Miscommunication, Size and structure, Common heritage, Standard agreements, New actors and Regulations. 2) All the factors, except New actors, were shown to obstruct and delay an adoption of cloud computing for traditional banks in Sweden. 3) It was found that all these key factors interlink with each other in some sense.

Keywords: Cloud Computing, Cloud Service, Cloud, TOE, TOE Framework, Bank, Banking Industry, Banking Sector, Implementation, Adoption, Molntjänster, Moln, Bankindustrin
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Stockholm, May 2015,

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Emma Lundberg                  Caroline Åkesson
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<th>Description</th>
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<tbody>
<tr>
<td>EDI</td>
<td>Electronic Data Interchange</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IT Architect</td>
<td>An employee with knowledge about the interaction of different IT systems within an organization. Is involved in strategic development of IT systems and has an overall picture of the organization’s IT structure</td>
</tr>
<tr>
<td>Mainframe</td>
<td>This thesis refers to old mainframes. A large computer with a lot of capacity often placed in data centers. Mainframes can have many connections with different systems and perform different kind of tasks at ones</td>
</tr>
<tr>
<td>NIST</td>
<td>The National Institute of Standards and Technology</td>
</tr>
<tr>
<td>PUL</td>
<td>Personuppgiftslagen (The Personal Data Act)</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>Time-to-market</td>
<td>The time it takes from an idea to the launch of a service or product</td>
</tr>
<tr>
<td>TOE</td>
<td>Technology, Organization, External task environment - TOE framework</td>
</tr>
<tr>
<td>SaaS</td>
<td>System as a Service</td>
</tr>
<tr>
<td>PaaS</td>
<td>Platform as a Service</td>
</tr>
<tr>
<td>IaaS</td>
<td>Infrastructure as a Service</td>
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1. Introduction

In this section, the background of the problem in which the thesis is based on will be presented, as well as the research question and purpose. Lastly, the delimitations and the disposition of the thesis will be presented.

1.1 Background

The trend of cloud computing is becoming more and more integrated in companies’ organizational strategies (Bojanova & Voas, 2013). Just a few years ago the term cloud computing did not exist, today however, it is one of the “hottest” and most important IT trends. According to annual trend reports by the IT research and advisory firm Gartner, Inc., cloud computing has been part of the top ten IT trends during the past four years and is becoming increasingly important for firms (Kassner, 2014). This trend is part of a digitalization phenomenon and what for some may be referred to the fourth industrial revolution - industry 4.0 (Donovan, 2013), where everyday life is integrated with digital technology and more specifically the internet (McKinsey Global Institute, 2014). The digitalization era and the development of new technology have made us more mobile, using internet in everything we do and demanding more online services, with a 24/7 accessibility of our internet based services (Hanson, 2007).

The cloud refers to a virtual space where data are stored and shared. Cloud computing makes it possible for companies to outsource IT services and IT systems (Frankk, 2012). The main advantage of using cloud computing is that the firm can avoid spending money on expensive in-house IT solutions (Nkhoma & Dang, 2013). Other benefits are that the accessibility of information and productivity can be improved (Al-Masah & Al-Sharafi, 2013). The phenomenon of cloud computing offers many opportunities and advantages for firms and their industries. Conversely there are also challenges with implementing a cloud computing service. The biggest worries of cloud computing seem to be security and privacy (Strickland, 2008), since there is a risk that the knowledge of where the data are stored and who has access to the information on the cloud is lost (Rajaraman, 2014). The adoption
process of new technological innovation, such as cloud computing, requires an organizational change that can bring uncertainty into the organization.

As the increase of globalization and digitalization is becoming more obvious so does the need for industries to adapt to this phenomenon of cloud computing. One industry that encounters problems with this implementation is the finance sector, specifically the banking industry. The banking industry is a sensitive industry, which is tied to many regulations and provisions, where there are doubts on how cloud services currently can be incorporated into the traditional banking structure (PWC, 2014). Traditional banks in Sweden are complex organizations, involved in many different areas as full-service banks. The banks are highly dependent on and make use of a lot of IT solutions (Heidmann, 2010) and together with the growing digitalization new solutions are needed for banks to adapt to their clients, global trends, regulations and the on-going digitalization (Lindroth, 2014). The use of online banking, among others, is growing every day. In Sweden 85 percent of the population paid their bills online at least once a month 2014 and 93 percent used their internet bank sporadically (Findahl, 2014). This indicates that banks are already involved in the ongoing digitalization change, however, due to the risks of cloud computing and the fact that banks operate in a sensitive industry, there is a greater caution to introducing cloud computing and many banks choose not to adapt to this fully (IT Architect Bank C, 2015-03-10).

The European Union (EU) encourage firms in all sectors to adopt cloud computing in order to increase productivity in the society (European Commission, 2015), yet banks tend to not adopt the cloud at the same pace as other industries (Flinders, 2014). Although there are other industries that do not use cloud computing, the opportunity to do so is easier for most other industries, with a few exceptions as healthcare, military and certain public organizations (Burns, 2013).

New cloud based actors have started to appear in the industry due to the trend of cloud computing, which puts pressure on the traditional banks to stay competitive (Accenture, 2012). Innovation is considered to be a competitive advantage (Damanpour & Schneider, 2006), thus being able to adapt to innovation is crucial in order to stay competitive within a market. Cloud computing can be seen as a technological innovation as it delivers services in a new way (Marston et al., 2011). According to this, adopting cloud computing should lead to effectiveness and a competitive advantage for firms (Marston et al., 2011; Damanpour & Schneider, 2006).

Since banks make use of a lot of IT and are involved in ongoing digitalization changes it becomes contradictory that they do not embrace the cloud computing phenomenon and
follow this step in the digitalization change in the same pace as the industry might require. Hence, it becomes interesting to study the following research question:

What factors affect an adoption of cloud computing in the banking industry in Sweden and how would they affect a decision to implement cloud computing?

1.2 Purpose
The purpose of this thesis is to develop an understanding of which factors that obstruct or foster an adoption of cloud computing in the banking industry in Sweden. Our ambition is to contribute to the research on adoption of technological innovation within organizations, in a new setting, being traditional banks in Sweden, further to contribute to the research on cloud computing.

1.3 Delimitation
The study of this thesis is delimited to the finance sector and more specifically the banking industry in Sweden and the four traditional full-service banks Nordea, Swedbank, Handelsbanken and SEB. Traditional banks in Sweden were chosen as they have similar organizational settings. There is a firm level focus of the study rather than individual, due to the newness of the phenomenon within the industry.

1.4 Disposition
This thesis has focused on the phenomenon cloud computing as a new innovation technology; within the banking industry in Sweden and what factors that are affecting potential implementations of cloud services. Chapter one of this thesis is the introductory section, which introduces the background of the problem that the thesis is focusing on, including the purpose, research question and delimitations. In chapter two the phenomenon is described together with the theoretical framework, which the study is based on. Chapter three explains the used methodology and how data have been collected and analyzed. In chapter four the result from the study is presented, analyzed and discussed together with the theoretical framework. Lastly, chapter five summarizes the outcome of the thesis, including implications, limitations and suggestions for further research.
2. Literature Review

In this section, the cloud computing concept, the TOE framework and previous research will be presented in order to understand important connections and discussions further on in the thesis. Lastly, an analysis of the choice of framework and a theoretical summary will be presented.

2.1 Cloud Computing

Cloud computing uses cloud as a metaphor for internet connected services. There are plenty of definitions of what cloud computing is (Marston et al., 2011:177), but the definition made by The National Institute of Standards and Technology (NIST) has become one of the most used ones. The NIST definition is the following:

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. (Mell & Grance, 2011:2)

NIST has within the cloud definition composed deployment models, characteristics and service models to explain cloud computing. NIST describes the different ways of providing clouds as four deployment models: Private cloud - where a provider helps the firm to implement a unique cloud designed especially for this firm and usually managed by the IT department at the organization or with help from the provider. Implementations of private clouds are often more costly and time consuming than other cloud models, but they are, however, considered more secure. Public cloud - the most common type, which is offered to the general public via the internet. Community cloud - where organizations with common goals and assignments share the same cloud. Hybrid cloud - where an organization combines two or three of the models mentioned above (Edvardsson & Frydlinger, 2013).
NIST has pointed out five characteristics that are required for a service to be considered as a cloud service. One of these characteristics is on-demand as a self-service - when a service is available at all times through self-service capabilities. Whenever a bank needs to access the purchased service this can be done. The service is also required to offer a broad network access - which means that the service can be accessed over a network through a variety of different devices for example mobile phones, tablets, or computers. Another characteristic of a cloud service is the resource pooling - which describes the fact that the provider of the service uses computer resources that can be pooled and shared with a whole customer base. It is not necessary for consumers to know the underlying structure and the exact location of resources that the providers have to be able to use their computing services; however the consolidation of resources can be assigned in accordance with the customers’ demands. The cloud computing service offers rapid elasticity - which allows resources to occur immediately when demanded and the resources seems to be unlimited in space from a consumer’s point of view. The elasticity makes the provider provide only the exact amount of space that the customers use. This makes it possible for a customer to only pay for the exact operational cost and also to rapidly receive more space when needed. The last characteristic is the measured service - automatically optimizing of resource usage with use of measurement capabilities. Cloud computing services can monitor, measure and report the actual used amount of the service (Mell & Grance, 2011; Edvardsson & Frydlinger, 2013).

The three versions of cloud service models are SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). SaaS implies that a program can be accessed through the cloud providers’ cloud infrastructure and the customer can access the service through for example a webpage or software, rather than installing the program locally in a datacenter or computer. PaaS means that the customer can access a cloud infrastructure with applications that they can modify to some extent. IaaS gives the customer the capability to adapt and build systems and applications, thus the customers have control over their own infrastructure (Mell & Grance, 2011).

2.2 Technology, Organization & External Task Environment (TOE) Framework
In order to understand how banks adopt new technology, as cloud computing, one has to understand which factors that affect the process of adopting technological innovations. Louis Tornatzky and Mitchell Fleischer (1990) have developed a framework on the technological innovation decision-making process. This framework explains technology, organization and
external task environment impacts on the decision-making process when implementing new technological innovations. Figure 1 illustrates the framework. These three parts consider both inherent and motivational factors for an adoption of new technological innovation (Borgman et al., 2013). Each part of the TOE framework affects technological innovation decision-making by itself; however these can also be interlinked with each other. One factor within external task environment may for example affect the communication process within the organization and so on. Hence, the locations of the arrows in figure 1 illustrate how the parts can be related to each other and to the technological innovation decision-making. The three parts of the framework are explained later on in this chapter.

![Figure 1](image)

**Figure 1** Based on Tornatzky and Fleischer’s (1990) The Context of Technological Innovation

### 2.2.1 Technology

Within the technology part of the TOE framework, all technological attributes affecting the firm, both internal and external, are included. This part mentions that the current technology used in a firm has an impact on the decision to adopt new technology. One aspect in the technology part is thus *availability*. Availability refers to that the firm’s current technology should fit with the considered new technology for an implementation to occur and therefore this new technology should be able to replace or integrate with the existing technology.
Another aspect is characteristics, which means that technological innovations have different characteristics and all characteristics are not suitable within all industries. Thus, the characteristic needs to be relevant for the particular industry before choosing to adopt the new technology.

2.2.2 Organization

The organization part of the framework deals with the internal context of the organization, which concerns the inner life of the organization. As such this part of the framework firstly consists of formal and informal linking structures, describing how employees and departments within the organization are structured and linked to each other. Further, firms with a hierarchal structure are less associated with a regular adoption of innovations, as usually only the top management of the organization knows about the organization’s purpose, results, tasks and current situation, which makes this structure centralized and specialized, leading to less influence from other parts of the organization, where the need of the technological innovation might originate from (Eriksson-Zetterquist, Kalling & Styhre, 2012).

Another aspect of the organization part of the framework is communication processes. Communication within the firm has an effect on the decision-making regarding implementing new technology. By informally exchanging information regarding new technology, the firm can receive new knowledge for the decision process. Within complex organizations communication becomes vital and organizations with large complexity are often associated with communication difficulties, where control over information easily can be lost (Hatch, 2002). Misunderstandings in communication can also lead to misinterpretation of an organizational change, as an implementation of a new technological innovation and thus develop resistance (Alvesson & Svenningsson, 2007).

The third aspect is the size of the organization, which explains that the decision-making process can be affected by how big or small the firm is. Larger organizations in general encounter more structural complexity, as size has a crucial impact on complexity (Hatch, 2002). The last aspect in the organization part is slack. According to the model larger firms have more resources and are therefore more likely to adopt new technology (Tornatzky & Fleischer, 1990).

When changes within organizations occur, or is about to occur, the organization often faces resistance. Traditionally resistance comes from uncertainty among employees, where threat of unemployment, new working conditions, new roles etcetera are typical factors
resulting in employee resistance. Thus the focus of resistance to organizational change in traditional organizational theory often lies on dissatisfied employees (Alvesson & Svenningsson, 2007). There is, however, little focus from organizational change theory on external factors as resistance; these could for example be legal ones, as laws and regulations, which are brought up in the external task environment part of the framework.

The organization part of the framework explains that the process of adopting and implementing technological innovations can be affected differently, depending on how the inner context is structured and organized.

2.2.3 External Task Environment
While the organization part of the framework deals with the internal context of the organization, the external task environment part deals with the external context of the organization. As such this part of the framework firstly consists of industry characteristics and market structure. Some industries are more eager to adopt new technology, while others are less eager, depending on the technological significance as a competitive advantage. Further, the external task environment affects the decision-making due to variations and growth in market and firms within the same industry have a tendency to share the same problems and opportunities. If there, however, are differences between firms in the same industry and they do not share the same problems and opportunities, it is probably due to organizational or firm-specific market attributes, for example revenue.

Another aspect of the external task environment part is the customer-supplier relation, the customers might have a large bargaining power for what technology the firm should have and will then have an influence on the decision-making process for the firm. Firms can also access and get help from outside experts with the decision-making of adopting and implementing new technology, which in the framework is referred to as technology support infrastructure.

Lastly government regulation aspects affect the decision-making process. Restrictions in an industry have an impact on the decision-making process and give no choice but to follow (Tornatzky & Fleischer, 1990). Edvardsson and Frydlinger (2013) also discuss that legal systems and the connected risks have a great importance for customers when taking decisions regarding cloud services. They bring up legal complexity and conflicts as two obstacles; it can for example be complicated when different countries’ legal systems are in conflict with each other. According to Tornatzky and Fleischer (1990) the banking industry is
one industry among others that has been negatively affected in their adoption of new technology due to being a heavily regulated industry.

Besides the financial laws and regulations, that the banks need to comply with, there are also regulations regarding use and integrity of personal information. The main restriction in Sweden is PUL, which mentions that the one outsourcing, for example to a cloud provider, is still responsible that the regulations are followed (Personuppgiftslagen 1998:204). Thus, the only responsibility for the cloud provider would be to follow the agreement between themselves and the bank (Datainspektionen, 2015). In FFFS 2014:5 the 3rd chapter - IT operations, it is stated that the company is responsible to secure and clarify who is responsible for what parts of the company’s IT operations, this so that authorities, as Finansinspektionen, can investigate without any difficulties (Finansinspektionens författningssamling 2014:5).

2.3 Analysis of the Choice of TOE Framework

The choice of the TOE framework as the theory in this study was based on its applicability on the purpose of this study in comparison to other theories in the area of technological adoption. The TOE framework has been applied in numerous previous researches on adoption of technological innovation, such as E-business, E-commerce and EDI (Oliveira & Martins, 2011). The TOE framework has also been useful in a few studies in the specific context of cloud computing, particularly with a focus on small and medium enterprises (SMEs) (Alshamaila, Papagiannidis & Li, 2013; LI, Zhao & Yu, 2015), however in other contexts as well (Borgman et al., 2013; Tweneboah-Koduah, Endicott-Popovsky & Tsetse, 2014). Furthermore, no significant previous research has been done on cloud computing and the finance sector based on the TOE framework.

Two theories within the field of technological adoption that were considered, but deliberately not chosen after consideration, were the Technology Acceptance Model (TAM) by Fred Davis (1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003). TAM was not considered due to its view on technology acceptance at an individual level (Davis, 1989) and furthermore the TAM has received criticism of being uncomprehensive since leaving out variables that could affect the adoption (Bagozzi, 2007). As this study aims to find all factors affecting a decision of implementation at a firm level the TAM was not chosen. Moreover, the UTAUT was excluded as it also views the individual level of technological adoption (Venkatesh et al., 2003) and not applicable to our study. Besides TOE, the Diffusion On Innovation (DOI) by Rogers (2003) views the
technology adoption on a firm level. The DOI theory was, however, chosen to not be included in the study as it is more focused on the different degrees of individuals’ willingness of adopting innovations and how the adoption is affected over time through different social contexts, both at individual and firm level to understand different adoptions (Rogers, 2003:11-38). Further the DOI theory does not involve the environmental context, which is important in this study as it can reveal key factors from the external environment. The TOE framework on the other hand is suitable as it can capture factors affecting the adoption from technology, organization and external task environment and thus it can be “a useful analytical tool to distinguish between the inherent qualities of an innovation and the motivations, capabilities and broader environmental context of the adopting organization.” (Rui, 2007:7).

2.4 Theoretical Summary
The theoretical framework will help us to gain a deeper understanding of the factors that affect an implementation of cloud computing in the banking industry in Sweden. Cloud computing as a concept is quite new, however, a current trend, hence a clear definition of cloud computing is needed and will help to get a better understanding of the phenomenon and provide a coherency throughout the thesis. The TOE framework, illustrated in figure 1, by Tornatzky and Fleischer (1990), will be used as a structured guide to find the relevant factors and to further understand how these factors should be analyzed and thus fulfill the purpose of this thesis and answer the research question. The framework was considered, rather than similar technology innovation theories, as it focuses on the firm level instead of individual level and omits industry and firm-size boundaries (Oliveira & Martins, 2011; Borgman et al., 2013). This is a comprehensive framework, as it considers how the banks whole context impacts the adoption and implementation of new technological innovations, as cloud computing (Borgman et al., 2013), which will help us consider all relevant factors for this study without overlooking any important factors. The comprehensiveness of the TOE framework could in some cases be an issue as they only touch upon the factors, however as this study aims to identify important factors this could be beneficial.
3. Methodology

This section intends to explain the choice of method used to answer the proposed research question. The first part of the chapter describes the chosen research design. The second part presents the applied research strategy. The third part of the chapter discusses the data collection and connection to theory and lastly some criticism of the choice of method.

3.1 Qualitative Study

In this study a qualitative method has been chosen to receive empirical evidence to the thesis’s purpose, which is to develop an understanding of which factors that obstruct or foster an adoption of cloud computing in the banking industry in Sweden. With a qualitative approach it is possible to reveal the underlying attitudes within the phenomenon of cloud computing in the banking industry and thus a deeper understanding of the underlying factors can been made.

The study was conducted by face-to-face interviews with one person in the IT departments at each of the four big full-service banks in Sweden: Nordea, Handelsbanken, Swedbank and SEB. These respondents gave us an internal view on cloud computing in the banking industry. Further, interviews with experts in the area of cloud computing strategy and implementation took place to get a better understanding from an external perspective on the process of adopting cloud computing. These were consultants from IBM, Knowit and Accenture - three multinational management and IT consultancy firms. Lastly information from authorities (Finansinspektionen and Datainspektionen) and another neutral external actor (Svenska Bankföreningen) was gathered, in the stated order through a telephone interview, e-mail contact and a face-to-face interview.
3.2 Research Strategy

The collected data are built on a theory-based study, as it intends to apply the empirical result with the theory of the thesis - the TOE framework. The study is therefore based on an abductive approach. This approach is used when one starts with the theory and use data to further develop the theory (Hörte, 2010). The intention was not to further develop the theory, however, it was expected to get a better understanding and perhaps strengthen the existing theory. Since, the phenomenon of cloud computing is not well studied within the banking industry in Sweden, this study is exploratory.

The chosen research strategy consists of a multiple case study to answer the purpose of this thesis. The case study aims to look at the banking industry in Sweden. In this multiple case study there are two units: banks and external actors. Within the bank unit there are four respondents working in different banks - Nordea, Swedbank, Handelsbanken and SEB and within the external actor unit there are three respondents working in consulting firms - IBM, Knowit and Accenture, two respondents from authorities - Finansinspektionen and Datainspektionen and one respondent from a neutral external actor in the industry - Svenska Bankföreningen (see table 1 for interview schedule). By viewing the banking industry from an internal and an external point it will be easier to find factors and also understand why these factors would influence the implementation of cloud computing, as the surroundings impact on banks can be taken into consideration.

The representatives for each bank are active IT personnel. The external actors that work in consultancy firms have experience from implementing cloud computing in banks and also work with implementation of cloud computing in other sectors. The respondents from the authorities gave an indication what the regulations and laws say and lastly the respondent from Svenska Bankföreningen has given a neutral view on the banking sector. By using a multiple case study the different factors which affect the adoption can be found simultaneously and tendencies in the banking sector could be found. We therefore believed that a lot of information about these factors and how they might influence each other could be found through a multiple case study. When wanting to study a contemporary phenomenon in its actual environment a case study is suitable (Yin, 2009). In this thesis the phenomenon of cloud computing adoption in banks is studied and a multiple case study is therefore appropriate.
3.3 Data Collection

3.3.1 Sample Selection
To find suitable respondents for each case, that were highly involved in the studied process and relevant for the study, a search was done on the business social network platform LinkedIn. The search words were “cloud computing” and often in combination with one of the four banks. Only promising respondents were contacted, whom were located in Stockholm as their headquarters are positioned there. Via LinkedIn the consultants at Accenture and Knowit and also the IT personnel at Nordea were found. In total 20 people were contacted via e-mail and asked to help with the study. Some of the contacted persons were unable to help, however, most of them could refer to other people more suitable, which led to a snowball sampling. The respondents found through the snowball sampling were the consultant at IBM, the IT personnel at Swedbank, SEB and Handelsbanken and also the external actor from Svenska Bankföreningen. The two authorities (Finansinspektionen and Datainspektionen) have been found through their contact services at their homepages.

The respondents from the banks and consultancy firms all have knowledge about technological implementations in banks and have therefore the right knowledge to be able to answer the questions. However, since the respondents have different experiences from technological implementations they occasionally had less knowledge in some areas and thus less to say in some of the questions.

3.3.2 Secondary Data
The secondary data have been gathered from scientific articles, trend analysis reports and industry advisory reports, research publications, master theses and also subject related literature. Further, companies’ webpages and firms’ financial statements and also public statements from Datainspektionen have been used as secondary data.

3.3.3 Primary Data
This study's primary data have been gathered through the eleven interviews that have been conducted with the four big banks, three multinational management and IT consultancy firms, two experts from authorities and an external actor. Through these interviews that have taken place either face-to-face, via telephone or e-mail (see table 1 for interview schedule), a large amount of empirical data have been gathered within a narrow timeframe, which has
encouraged a more precise information gathering directly from the involved actors, hence minimized the risk of data loss.

All the face-to-face interviews were executed in Swedish (as all respondents were Swedish speaking) and were semi-structured, as they were provided with topics and a few questions before the interviews (in Swedish). The interviews were, however, kept open and the questions were adjusted to the respondents’ previous answers. Also, before each interview the respondents received information about the purpose of the thesis (in Swedish). The face-to-face interview respondents were told that the interview would take approximately one hour. Through semi-structured interviews we were able to get a deeper understanding of the factors affecting an implementation of cloud computing from a few persons involvement in this process. Semi-structured interviews give an opportunity for the respondents to develop their thoughts and ideas without distraction on the interview questions (Saunders, Lewis & Thornhill, 2009), which helped get open answers for this study. Thus, the semi-structured interview method was considered to be suitable to give the respondents an opportunity for deepen and developed answers on the subject. For all of the face-to-face interviews, we were invited to the respondents’ offices, which helped to avoid a potential environmental uncertainty to affect the interviews (Bryman & Bell, 2005). The interviews have been recorded, with permission from the respondents and later transcribed. By recording the interviews the focus could be on the interview and a better documentation occurred. When telephone interviews have been conducted there was only one interviewer participating to avoid confusion for the respondent during the interview.

Respondents were chosen to be anonymous for this study, so that the focus could be on the context, rather than on specific companies. It is still, however, interesting to see differences between each respondent’s answers to get an overall picture and a better understanding in the banking industry. Therefore, the respondents in the banks have received either the pseudonym A, B, C or D and the respondents from the consultancy firms are referred to as 1, 2 or 3. The other external actors will however not be given a pseudonym, yet the respondent will be anonymous. Below, table 1 shows the respondents working area, interview type, time of interview and time span of interview.
Table 1 Interview schedule including respondents and information about interview

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Area/occupation</th>
<th>Interview type</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Banks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent Bank A</td>
<td>IT architecture</td>
<td>Face-to-face</td>
<td>2015-04-01</td>
<td>1 hour</td>
</tr>
<tr>
<td>Respondent Bank B</td>
<td>IT consultant</td>
<td>Face-to-face</td>
<td>2015-04-20</td>
<td>2 hours</td>
</tr>
<tr>
<td>Respondent Bank C</td>
<td>IT architecture</td>
<td>E-mail</td>
<td>2015-03-10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Face-to-face</td>
<td>2015-04-09</td>
<td>1 hour</td>
</tr>
<tr>
<td>Respondent Bank D</td>
<td>IT architecture</td>
<td>Face-to-face</td>
<td>2015-04-20</td>
<td>1 hour</td>
</tr>
<tr>
<td><strong>External actors</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Respondent Consultancy 1</td>
<td>IT consultant</td>
<td>Face-to-face</td>
<td>2015-03-26</td>
<td>1 hour</td>
</tr>
<tr>
<td>Respondent Consultancy 2</td>
<td>IT consultant</td>
<td>Telephone</td>
<td>2015-03-10</td>
<td>15 min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Face-to-face</td>
<td>2015-03-31</td>
<td>1.5 hour</td>
</tr>
<tr>
<td>Respondent Consultancy 3</td>
<td>IT consultant</td>
<td>Face-to-face</td>
<td>2015-03-27</td>
<td>1 hour</td>
</tr>
<tr>
<td>Finansinspektionen</td>
<td>IT risk analysis</td>
<td>Telephone</td>
<td>2015-04-23</td>
<td>15 min</td>
</tr>
<tr>
<td>Datainspektionen</td>
<td>IT risk analysis</td>
<td>E-mail</td>
<td>2015-04-09</td>
<td>-</td>
</tr>
<tr>
<td>Svenska Bankföreningen</td>
<td>Banking infrastructure</td>
<td>Face-to-face</td>
<td>2015-04-27</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

3.3.4 Interview Guide

The theoretical framework facilitated the design for the interview guide that was used during the interviews. Thus the interview questions were mainly derived from the TOE framework, which ensured to ask relevant interview questions that would answer the research question. Furthermore, two versions of the interview guide were constructed; one for the respondents from banks and one for the external actors respondents (see Appendix 1 and Appendix 2). The main reason for creating two versions was that the respondents would give different perspectives since they have different experiences. The two versions include both internal and external factors; this has been illustrated in table 2 below. Table 2 is divided by the TOE framework’s factors and when an interview question (nine questions in total) and the respondent’s answer, has touched a factor the number of the interview question has been stated (see Appendix 1 and Appendix 2 for full list of interview question).
### Table 2 Interview guide synthesis with TOE framework

<table>
<thead>
<tr>
<th>Factor in TOE</th>
<th>Bank (Appendix 1) no.</th>
<th>External actors (Appendix 2) no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>1, 2, 6</td>
<td>1, 2, 9</td>
</tr>
<tr>
<td>Characteristic</td>
<td>1, 2, 3, 4, 6, 9</td>
<td>1, 2, 3, 7, 9</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal and Informal Linking Structures</td>
<td>1, 2, 4, 6, 9</td>
<td>4, 7, 8</td>
</tr>
<tr>
<td>Communication Processes</td>
<td>1, 4, 5</td>
<td>4</td>
</tr>
<tr>
<td>Size &amp; Slack</td>
<td>6, 7 and secondary data</td>
<td>5</td>
</tr>
<tr>
<td><strong>External Task Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Characteristics and Market Structure</td>
<td>2, 6, 7, 9</td>
<td>5, 7, 8, 9</td>
</tr>
<tr>
<td>Technology Support Infrastructure</td>
<td>4, 5</td>
<td>7, 8</td>
</tr>
<tr>
<td>Government Regulation</td>
<td>2, 4, 8</td>
<td>6, 8 and secondary data</td>
</tr>
</tbody>
</table>

Due to the small variation between the two interview guides it has been easier to understand the material and make conclusions. The interview guide has been used to stay on track with the thesis purpose and thus not to miss any important factor. When something has been unclear or particularly interesting further questions have been incorporated. The interview guide has been conducted in accordance with the study’s purpose and research question and thus focused on factors affecting an adoption of cloud computing. In the end of all interviews the respondents were always asked if there was anything they wanted to add besides the questions in the interview guides, this in order to capture all possible factors.

### 3.4 Processing of Empirical Findings and Analysis

After each interview the data have been transcribed as mentioned above (except the telephone interview with respondent at Consultancy 2 and the e-mail interview with Datainspektionen). The chosen categories in this study have been made in accordance with the TOE framework; technology, organization and external task environmental context of the banks, where no changes have been made in the categorization, except with the aspects size and slack that were merged into one category. The material has later been read through and separated in line with the category where the factor fit. After that, a summary of the respondents’ answers was made for each category’s factor. The analysis has occurred simultaneously since this allowed work to be concept based.
3.5 Criticism of the Choice of Method

3.5.1 Reliability and Validity

The reliability, which implies the authenticity and possibility to replicate the study (Bryman & Bell, 2005), should be strong since the study is limited to four banks; however, all banks are in the progress of investigating the studied phenomenon, which means that if the study was to be done again the banks would probably be in a different phase. There is also always a risk that the interviewers affect the respondents’ answers when conducting the interviews. The risk of letting our own background influence the interpretation of the interview is also high and might decrease the reliability of the result and analysis (Ghauri & Grønhaug, 2010). As a multiple case study of four specific banks was done, the generalizability of the study can be considered low, since other organizations and industries might have different experiences.

The validity, which shows that the study measures what is actually intended to be measured (Bryman & Bell, 2005), may be strong in this thesis as persons who are involved in the process of implementing new technological innovation were interviewed. It may also be strengthened as external experts on cloud computing have been contacted to increase the objectivity of the study and give an external view to cover the whole TOE framework. The fact that all respondents are active within the same industry will also have a positive impact on the validity of the study. With active within the same industry we mean that the respondents have knowledge from the same industry as all have experience from the banking sector. Due to the low generalizability of the study, however, the validity will decrease if applied in a broader perspective with other banks or firms within this industry, or even other industries (Ghauri & Grønhaug, 2010).
4. Analysis of Empirical Findings

In this section the results of the multiple-case study will be presented. This study is based on information from two perspectives on an implementation of cloud computing in the banking industry, an internal perspective from four banks and an external perspective from consultants and other experts on the topic. The results from these perspectives will be presented and analyzed in this chapter. Lastly a summary of the findings is given.

4.1 Bank Perspective

4.1.1 What is Cloud?

Previous research shows that there are several definitions of cloud computing (Marston et al., 2011:177), which all respondents from the banks agreed on; the cloud is an unclear concept, involving many different definitions. They all found it necessary to sort out the definition problem within the organization. The respondent from Bank A described that they have an ongoing cloud investigation, where they work hard to sort out the problem concerning how the cloud should be defined within the organization, before they can make use of it. The respondent from Bank D described how they have recently finished a first investigation concerning a cloud definition and that they have developed guidelines and instructions on how the personnel should make use of the cloud, in order to avoid misinterpretations. Both respondent C and D stated that the cloud is just a new term for something that to some degree has existed for a long time. Some motives, for making use of a cloud, that the banks mentioned were accessibility, flexibility, up and down scaling advantages and cost benefits, where you pay only for what you use. They all also agreed that it is a service, which can be structured in many ways, as a private, public, hybrid or sometimes as a community cloud, which is in line with how NIST describes different ways of providing clouds - as four deployment models (public, private, hybrid and community) (Mell & Grance, 2011).
4.1.2 Technology

4.1.2.1 Availability

When the respondents were asked if they use cloud computing today, respondent C and D expressed that they do to some extent. Respondent C stated that they have a strategy for a private cloud that they themselves have built for internal use, which is the first step in their cloud strategy. Respondent D mentioned that they have a cloud-based HR-system since a few months back. The description of cloud computing used in this study states that implementations of private clouds often are more expensive and time consuming than other types (Edvardsson & Frydlinger, 2013). At the same time all respondents in this unit mentioned that they would probably consider the use of a private cloud first as this is considered more secure, although they also mentioned that a motive for using cloud computing are the cost benefits, which can be considered contradictable to the characteristics’ of a private cloud, however, there might still be cost benefits compared to retaining their current systems.

The respondent from Bank D stated that it is always problematic to integrate one system with another. Respondent D did although not believe that there is such a huge difference between an integration of a cloud service as with traditional services. If, however, there would be a variation it might be somewhat easier to integrate a cloud service than the traditional one. This is due to that cloud services have clear defined interfaces, which standard systems often lack. The respondent at Bank A found it important to think about integration when implementing an internal cloud solution and to have a futuristic approach, so that the cloud solution could be adapted later on. Respondent B and C also expressed a need for a futuristic approach, to avoid getting stuck with services that could make it difficult to abort or change the cloud provider if needed. This indicates a carefulness, which could hinder or slowdown an adoption of cloud computing, however it is at the same time a way of acting precautious, making a future implementation smoother.

All the respondents talked about the problem with mainframe systems in one way or another. An integration of cloud computing would be able to, according to respondent A, replace the current technology that is based on complex and time demanding administration, as you can get access to the cloud immediately. This is highly demanded from an internal perspective, however; on the other hand the respondent stated that it is a huge transformation for old large firms that have a lot of internal delivery processes. Respondent C stated that they often rely on their old mainframe systems, which could be hard to integrate with new IT
solutions due to a lack of personnel that have the right competence for these systems. Respondent D did, however, not believe it would be more difficult to integrate a cloud service with a mainframe, than it would be with any other newer system. Another obstacle with the integration of cloud computing is to give a valid motive to why an implementation is needed according to respondent C. Respondent C explained that if you today have something that is functioning, as the mainframe systems do, it is difficult to motivate a change to another IT technology due to cost issues. In the Bank that respondent C represents, however, there is an ongoing simplification with the purpose to investigate what the old systems are integrated with today, to be able to replace them. The respondent in Bank B agreed and stated that it is harder for banks to adopt cloud services as they are currently using something that is working. The transformation from your own servers to a cloud service is rather complex, due to complex connections between the systems. You need to transfer a little bit at a time, which becomes expensive and there is often a lack of understanding how they are connected. In accordance with the TOE framework (Tornatzky & Fleischer, 1990), the respondents from the banks expressed the importance of cloud services being able to replace or integrate with the existing technology. The integration with the old mainframes seems to be tough, this together with the fact that they are still functioning could hinder the decision of an adoption of cloud computing.

The TOE framework states that there is a need to consider integration or replacement of the current technology, hence the integration and replacing part is something to consider when for example implementing cloud computing, however not a necessary factor that affects the implementation as such. Regarding the old IT systems - mainframes - it could be that these systems would be hard to integrate and thus become a hinder for banks to implement to new technological innovation. As the cloud definition states there are, however, different deployment models and one of these could be suitable. Furthermore, the benefits that would come with a replacement of the mainframe systems might outweigh the negative aspects of trying to integrate a cloud system with the old systems.

4.1.2.2 Characteristics

According to the TOE framework, technological innovations have different characteristics and all characteristics are not suitable for all industries and need to be relevant for the particular industry before choosing to adopt the new technology (Tornatzky & Fleischer, 1990). All banks brought up test platforms and R&D as probable areas to be moved to the
cloud in a near future, as these are often areas that are not containing personal information, related to the customer or sensitive in other ways.

Another feasible area was HR, to move HR- and personnel systems to the cloud is something respondent B and D both mentioned. Bank D already has a cloud based HR-system since a few months back, as mentioned, where they keep track of their employees, however with no salary information included on the cloud, this is still stored locally, due to privacy concerns. Respondent C on the other hand believed that HR together with customer information should be stored locally; they consider only general information, which is not personal should be on the cloud. Respondent B however believed this to be a non-critical area and described how an internal intranet, where the personnel for example can book and rent vacation cottages, will not affect the core business and that would be no customer dropout if the system would be down for a few days.

Respondent, B, C and D all mentioned that information which is available for everyone, such as stocks, funds, security papers, exchange rates and similar, is something they access or could access through providers on the cloud without any specified risks. All respondents consider customer information to be sensitive, which will take time before being allocated to the cloud. Non-critical systems that do not interfere with the core business or affect customers can, however, be transferred soon. The issue of control and security of the data as a characteristic of the cloud affects what the banks consider moving out to the cloud, hence could make cloud computing less suitable for the banking industry, as the TOE framework explains all characteristics are not suitable within all industries (Tornatzky & Fleischer, 1990).

All respondents from the banks described the importance of carefully investigating what you put on the cloud and how the contracts with the providers are structured before an implementation. Respondent A especially brings up the importance of having control over the data and questioning who will own the data, who can do changes in it and what will happen if the provider for example goes bankrupt. This could indicate a fear of relying on a third party, which might hinder a decision of adoption of cloud computing.

4.1.3 Organizational

4.1.3.1 Formal and Informal Linking Structure
As mentioned earlier all four banks have old IT systems, with still working mainframes and an organizational structure with a heritage (the context which the firm operates in) that they
have to take into account in every decision. Respondent A explained that issues, such as integration among others, with these old systems from the 1960s lead to that most firms tend to keep these old systems, as integrating or replacing them would be too complicated. Respondent C also described the traditional structure with old IT systems and explained how this leads to a lack of control over certain things, hence making them hesitate in certain moves.

Respondent C emphasized the importance of how the firm is organized and structured, including decision-making processes. As these types of implementations often concern large decisions, which are connected to the structure of a traditional bank, it affects implementations and decisions as this a lot. Respondent B agreed and explained how a cloud computing implementation would affect the structure of the organization, as there would be changes among the personnel, data centers and systems etcetera. The TOE framework explains that firms with a centralized structure, as these banks have, often are less associated with a regular adoption of innovations (Tornatzky & Fleischer, 1990), thus it seems like the structure of the banks could have an impact on the implementation decision, as an implementation would require a lot of structural changes as well. It is agreed that in the case of a cloud implementation an organizational change will happen and respondent C explained that there are mixed emotions among the personnel regarding this. Respondent C continued explaining that employees working with infrastructure might be worried as they may lose their jobs if cloud computing is implemented. On the other hand the core business is positive, as they see a faster and better business. Respondent B, however, does not encounter any reluctance from the personnel in the case of a cloud implementation, although there is a fear of challenges that needs to be considered, but the personnel working with these types of questions do see the potential with the cloud. Traditionally resistance comes from uncertainty among employees, where threat of unemployment, new working conditions, new roles etcetera are typical factors resulting in employee resistance as stated in the theory (Alvesson & Svenningsson, 2007). This could therefore indicate that a factor that affects the implementation of cloud is the personnel.

There was not much said about the way decisions are taken, during the interviews, although respondent B and C did discuss it shortly. Respondent B explained that they have a governance structure, where depending on the risks and costs of the matter, the higher up in the structure you would have to go for an approval and this applies for all decisions. Respondent C explained that earlier the process of getting something approved to proceed was via your own boss or your boss’s boss, however, now it is more complex and you might
have to go to the CEO to get something approved. This sometimes makes employees “lazy” and they thus stick to the old usual systems, as the process of getting a new suggestion tested or approved is too complicated. It thus indicates that the banks structure affects the implementation. As the various banks have complex hierarchy structures, it would fit with the framework. The TOE framework states, as mentioned, that firms with a centralized structure are less associated with a regular adoption of innovations (Tornatzky & Fleischer, 1990). This could, however, also be due to that the top management in banks does not understand the need for cloud computing, as they do not have the same competence as personnel at IT departments and thus have difficulties giving directions for the implementation.

4.1.3.2 Communication Process

The respondent from Bank A explained that they are currently three people investigating cloud computing and will do so for the upcoming six months. Their investigation will occur through interviews with all the relevant stakeholders in the bank. What the outcome of the investigation will be used for is, however, not yet clear. The respondent from Bank C mentioned that they had conducted an investigation that took place during the last two or three years. The investigation led to a purpose and what requirements cloud services would have internally. The respondent from Bank D explained that they had also recently finished an internal investigation with directions and guidelines for the usage of cloud computing services. These guidelines answered the questions of where and how to consume cloud computing services, which areas that would be feasible for cloud solutions and also how they would secure, manage and govern cloud services. This was, however, just a first draft that will need further work. The respondent from Bank B mentioned that they are currently discussing the strategic direction of cloud computing and in a near future they will put together a working group that will work further with these questions.

Furthermore, all respondents from each bank are communicating with different stakeholders within the bank to gather different opinions about cloud services. Moreover, statements from external advisors for example lawyers, authorities and consultants had been taken into consideration during discussions. According to the TOE framework it is good to exchange information with different stakeholders to help with the decision-making, however, the greater the number who are involved in the process, the more difficult to make a decision, the risk of losing information becomes larger and harder to control then (Tornatzky & Fleischer, 1990).
Bank A’s respondent believed that a lot of effort was put on interpretation and therefore the communication for sorting out definitions is important before an involvement with a cloud provider can occur, which both Bank C’s and D’s respondent touched upon when they mentioned that the terminology was an issue. The cloud computing terminology needs to be clear and the whole organization needs to refer to the same thing, for an implementation to function smoothly. According to the respondent from Bank C some services could internally be defined as a cloud service, but are not today. The respondent at Bank C stated that they have used cloud services since 2000, however, they did not call it a cloud service. The risk of misinterpretation becomes greater with larger complex organizations (Alvesson & Svenningsson, 2007), which can be a reason for why confusion regarding a cloud definition occurs.

All the respondents found it important to have a clear communication process in order to avoid personnel misunderstanding the guidelines that the organization supports. Without guidelines or policies both respondent C and A believed that it was a risk that the personnel signs agreements or uses cloud services without the organization's knowledge, which is easily done because the agreements or uncomplicated to sign. Thus, it is important to keep the personnel informed about how the organization perceives and understands cloud computing.

In general it seems as the banks are investigating and trying to interpret the cloud, which is time consuming, mainly because of the complexity of the organization. Complex and large organizations have more difficulties with communication (Hatch, 2002), which can be a reason for why it is time consuming and hard for the banks to interpret the cloud and thus hinder an adoption.

4.1.3.3 Size and Slack

All the respondents brought up the size of the bank they were representative for, in terms of being a large organization. The respondents also mentioned that the bank they represented has operations in multiple countries. Further, all respondents expressed a slow process of taking decisions in general, due to size of the organization and a lot of stakeholders involved. Respondent C stated that due to their size (international and many business units), they are rather stiff and slow to changes. This implies that the size could be a factor that affects the decision to implement a cloud service. A description, including type of bank, size, country of operations and revenue of all four banks’ is presented below.
**Handelsbanken:** Handelsbanken provides universal banking with offices all over Sweden, Great Britain, Denmark, Finland, Norway and the Netherlands. Handelsbanken was founded 1871 and has around 12 000 employees today with operations in 25 countries worldwide and had a revenue of 38 314 billion SEK 2014 (Handelsbanken, 2015; Handelsbanken, 2014:4).

**Swedbank:** Swedbank has roots from 1820 as Sparbanken, but got the name Swedbank 2008. Swedbank has home markets in Sweden, Estonia, Latvia and Lithuania and also has offices in Norway, Finland, Denmark, USA, China, Luxembourg and South Africa. The Swedbank group consists of almost 15 000 employees worldwide and had a revenue of 39 304 billion SEK 2014 (Swedbank, 2015; Swedbank, 2014:14).

**SEB:** SEB provides universal banking in Sweden, Estonia, Latvia and Lithuania, but has operations in many other countries as well, as Norway, Denmark, Finland and Germany and has offices in New York, London, Shanghai, Beijing, Hong Kong and Singapore. SEB was founded 1856 but got the name SEB 1972. Today, SEB has around 16 000 employees worldwide and had a revenue of 46 936 billion SEK 2014 (SEB, 2015; SEB, 2014).

**Nordea:** Nordea was established in 2001 through a merger with four Nordic banks and provides corporate and institutional banking as well as retail banking and private banking, with almost 30 000 employees worldwide today and had a revenue of 10 224 billion Euros 2014, almost 95 000 billion SEK (exchange rate 2015-05-12) (Nordea, 2015; Nordea 2014).

All four banks are large multinational organizations with over 10 000 employees. According to the TOE framework larger firms with many resources, as these banks, are more likely to adopt new technology (Tornatzky & Fleischer, 1990), however, as mentioned by the respondents and discussed in previous sections this is not confirmed as they experience complexity and resistance, which is similar to what Hatch (2002) mentions, that larger organizations in general encounter more structural complexity, as size has a crucial impact on complexity.
4.1.4 External Task Environment

4.1.4.1 Industry Characteristic and Market Structure

Respondent A explained that there is an increased rate of innovation now, such as cloud computing, internally they often talk about time-to-market as a key concept, where a new product or service might just be up to date for a short period of time and if you are not among the first, there might not be a market left for you. This is also an important parameter for their industry according to respondent A. The TOE framework explains that firms in the same industry often are similar, who share the same problems and opportunities (Tornatzky & Fleischer, 1990). If one firm implements a new technological innovation the others should follow, to stay competitive, if it is seen to be a competitive advantage.

All respondents agreed on many similar characteristics of the banking industry, such as an uncertainty within the industry, many financial regulations, tough safety demands, high demand of availability, has to go fast etcetera and respondent B explained that maybe only the military sector and the pharmaceutical industry have higher demands in these matters.

As mentioned earlier, all the banks have mainframes that affect their decisions for an implementation and integration of new systems; this is typical for old traditional banks. Furthermore, respondent D stated that the conservatism within the banking industry also affects this decision. Moreover, all respondents agreed that there are new actors appearing on the market. Respondent A explained that these do not have the same heritage or legacy system to consider, as the traditional banks. Respondent A continued to explain that there are probably a lot of firms who are eager to build something new and to do it correct from scratch and there are some who are completely cloud based. Respondent A also stated that it is hard for them to think in an offensive way in that sense, but they do see that the competition comes from this area. Respondent A also believed that these new actors will be able to keep a fast pace within their own development, as they do not have this heritage to administrate.

Respondent C continued explaining that new actors have it much easier than them, as they might not be affected by certain regulations until a year later or so, since they are not yet considered a bank. Today respondent C, however, does not see these new actors as a threat to them, rather more as possibilities and is trying to understand how they can make use of them and maybe cooperate with them instead.

An issue with the new actors that all respondents mentioned was that they, the traditional banks, have the heritage, which the new actors do not have to take into account. As mentioned it is common that firms within the same industry face the same challenges and
opportunities (Tornatzky & Fleischer, 1990), however the new actors who might not be a bank yet, although active within the same industry could have different firm specific market attributes as these traditional banks, as they might not have to consider the same regulations yet, hence not facing the same challenges. It is important to remain competitive although there are new actors; hence they should or maybe have to also adopt the cloud if the new actors do. At the same time respondent B mentioned that not having the same heritage makes them less established and there might be distrust among the customers towards these new actors and trust and stability are important factors in the banking industry, which would then give the traditional banks a competitive advantages towards these new, unestablished actors. Respondent D further explained that being a new actor does not have to be an advantage, it depends on how you meet the customers.

All respondents described that an implementation of a cloud service would take time. Respondent A, however, believed that they cannot stand aside and watch while everyone else is moving forward in the development, they have to act as well. This is an important factor in order to stay competitive, fostering an adoption of cloud computing. Respondent A continued explaining that no one wants to be first, as the one who is will be reviewed a lot and after that others will follow. This could indicate that banks are fast followers rather than first movers, even though it might reduce the potential of a competitive advantage. If one starts with an implementation and it shows to be cost efficient, others will have to follow, because that is what it is all about, more efficient IT, respondent A emphasized. Hence, respondent A explained that they do try to learn more, understand and interpret, since it is important. Respondent C also explained that for them to implement a cloud service would take several years, just because of the complex infrastructure and new actors do it within a few days, but questions how they can compete with these actors and how they should work in the future. Respondent C also believed that the cloud creates a demand to cooperate with other providers and that the banks can share many servers at the provider in the future, as they might have the same demand, for example the structure of a bank account should look the same at Bank A, B and C. Respondent C said that they have had a discussion with other banks on how they can report together, but it did not get anywhere, as politics is involved and the question on how much cooperation there could be between the banks arises. Respondent D thinks that community clouds, where you share a cloud service with other “friends”, within the same community, will become common in the banking industry. Respondent D then also explained that this is something that banks have done for a long time and refers to Bankgirocentralen and Upplysningscentralen, however, in a different structure. Respondent B was yet unsure
about a future cooperation between the banks and believed it to be more important to look at the “low hanging fruits” now; the areas that can be moved out to the cloud easily. Since these banks operate within the same industry and do have similar firm specific market attributes, as size, background, being full service banks etcetera, which affect their ability to develop and adopt new technology (Tornatzky & Fleischer, 1990), it might be a necessity for them to cooperate with each other, by for example using the same community cloud.

4.1.4.2 Technology support infrastructure

Respondent A, B and C stated that they always keep an ongoing discussion with external firms, mostly consultancy firms to stay updated. Respondent C, however, described, that they internally often do the final work themselves. To have a discussion with authorities like Finansinspektionen, was mentioned to be really important according to respondent A. “We cannot do this without having a conversation with them, regarding their view on the matter, so that we do not misunderstand each other” (Respondent A, 2015-04-01). Respondent A, B and C mentioned Finansinspektionen as a big actor, but that they do not get much support in the questions of cloud computing. Respondent D, however, stated that Finansinspektionen does a good job in general; nevertheless, all respondents explained that there was no dialogue with them, or at least not that they knew of and if it was, it was reactive after something had happened. Since the TOE framework mentions that getting external help is something that can help the decision-making (Tornatzky & Fleischer, 1990) it could be that the banks feel insecure about what is required from them and hence the lack of involvement among external experts could affect the implementation.

Furthermore, knowledge gathering from firms in the IT business does occur. The respondent from Bank A mentioned that they gather information about cloud computing from Cloud Sweden, which is an independent competence network within cloud computing in Sweden. Cloud Sweden shares material about how to interpret laws in general within cloud computing. The respondents from Bank A, C and D all mentioned that they have used and have discussions with Gartner, Inc. The motives for using these types of analytic reports are that they want to have insight in what the future looks like.

Respondent A and B mentioned that providers, as for example IBM and Microsoft have contacted them with offers regarding new services or functions. These are, however, almost

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1 “…vi kan ju inte sitta här utan att prata med dom om deras syn på det här och målet, utan vi måste ju prata med dom, så att vi liksom inte missförstår varandra…” (Respondent A, 2015-04-01).
always cloud based, since many big players have embraced the policy of “cloud first”, which implies that these providers will offer services via the cloud before other non-cloud based services. This indicates that the choice of cloud based services could be forced on the bank in order to be time-to-market.

Respondent D mentioned that today there are not a lot of cloud services available that would fit banks. Respondent B confirmed this statement and mentioned that there are plenty of services ready to use, however, the question is which provider that complies with the requirements that banks demand. Furthermore, respondent B mentioned that it is in the provider’s interest to penetrate this segment (banking industry) as early as possible. As an opposite to this statement respondent D did not believe that cloud providers had enough motives to go into the banking industry as it offers a small customer base (not many banks in Sweden). All the respondents shared a concern about the cloud provider, regarding provider stability, to find a careful and serious cloud provider. The respondents also mentioned a need to influence the cloud provider, how much bargaining power could they have towards the provider for example to adapt the services for their needs.

4.1.4.3 Government Regulation

All respondents agreed on that the banking industry is heavily affected by government regulations; nationally, EU-level and internationally, which is a challenge for them. This is common when operating in many countries, since the laws might conflict with each other (Edvardsson & Frydlinger, 2013). Respondent C believed that the legal aspect seen from all possible points of view, to be the biggest problem in an adoption of cloud computing. It is a quite comprehensive job to interpret all regulations, which all respondents agree on. It seems like the respondents put a lot of work to be compliant. Therefore the regulations could have an impact on the choice to implement or not, however, it seems that it is mostly the interpretation of the laws that obstructs and thus makes it time demanding to dare to implement a cloud service. There is a great uncertainty among all the banks and a potential cloud computing implementation needs a thorough interpretation of the regulations affecting.

The law says that it is the customer (the bank) and not the provider that has the responsibility for the personal information being compliant with the regulations (Personuppgiftslagen 1998:204), for example keeping the integrity. The cloud provider only has to follow the contract, hence it is important for the bank to establish a good contract between them and the provider and respondent D explained that due to these regulations,
more lawyers are needed, rather than IT personnel, in order to control the contracts with the providers. Since, authorities, as Finansinspektionen have to be able to investigate the banks operations, it is important for the banks to make sure that the contracts enables the authorities to access the relevant data. Respondent C also explained that the providers usually provide them with standardized contracts, which they almost never can accept, as they do not fulfill their legal requirements. However, also stated that it has become better with the big actors, for example IBM and Microsoft, these actors are starting to be aware of the issues and adjust their contracts. Respondent B explained that they have lawyers that focus on legal challenges with cloud computing. Respondent A continued explaining that these unclear regulations become a problem as there are only a few persons who can interpret them and you have to interpret them to see what you can do and what you cannot do. Respondent A explained that this is not done by the banking and finance sector. This is a concern for the banks and there are many new regulations appearing, which are difficult to keep up with, understanding and interpreting, which creates frustration for all banks, respondent A explained.

As it is unclear and hard to interpret the regulations, respondent A explained that they also look at other banks and respondent C agreed and stated that sometimes you do not want to be first, as you will be reviewed in detail, thus again banks are probably fast followers rather than first movers, which is another argument to why the regulations can affect the implementation.

As it is time demanding to interpret the regulations it sometimes leads to that the implementation of cloud computing is delayed. Respondent C explained that the regulations stopped them from implementing the system Yammer as they had problems getting everything sorted out with PUL. Thus, the interpretation of laws seems to be a key factor for why the implementation of cloud computing in the banking industry is delayed, as the banking industry is heavily regulated (Tornatzky & Fleischer, 1990).

All respondents explained, as mentioned before, that Finansinspektionen is an important and quite controlling authority and they have to fulfill the requirements from Finansinspektionen and other authorities. Respondent C continued that Finansinspektionen reviews their audits every now and then, to check how they behave. If you do something wrong, they will review you even more next time, which creates concerns on moving to the cloud and stresses that they do not help the banks a lot, they are rather reactive. At the same time respondent D explained that they are also doing a good job and that the banks need them.

All the banks stated that it is a challenge with the legal requirements. Respondent B thinks that it differs a lot from other industries, but also stated that they do not see it as an
absolute hinder, “it is a challenge, but no showstopper, so far...” (Respondent B, 2015-04-20), which respondent D also agreed with. Therefore it seems like as long as all providers and contracts are carefully considered and all regulations are followed it should not be a problem to implement cloud computing, however it is very demanding to fulfill all these requirements.

4.2 External Actors

4.2.1 What is Cloud?

Just as previous research shows that there are plenty of definitions of cloud computing (Marston et al., 2011:177), all consultants also stated that cloud computing has many definitions and they all described cloud as a service that can be structured in many different ways. Respondent 1 mentioned that cloud is a hot trend and has been on the top ten-list for the last five years.

When implementing cloud computing, all consultants stated that typically the firm uses subscriptions were the customer can use as much capacity as wished and only pay for the operational costs. The benefits of using a subscription is that the companies do not have to have large data centers internally, which makes it a flexible service, respondent 1 stated. Thus, cloud computing implies that a company buys access to a service and do not need to run it internally. All consultants believed that subscriptions often are delivered from larger cloud providers as Microsoft, Amazon, Oracle etcetera, who have the capacity, since cloud computing is using economies of scale and automation (less human resources involved) to be successful. Cloud computing can, however, be separated as a private, public and hybrid cloud all respondents stated, which are also mentioned in the NIST definition, although in this definition the shared community cloud is also brought up (Mell & Grance, 2011).

Furthermore, cloud services can be divided in infrastructure, platform and software, all consultants explained, in accordance with the NIST definition (Mell & Grance, 2011). The respondent from Svenska Bankföreningen used a definition where cloud computing implies to store, process data and provide the software from a distant provider.

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4.2.2 Technology

4.2.2.1 Availability

All the consultants expressed that integration can occur in different ways depending on what the client wants and needs. The consultants did not see any bigger problem with replacing one system with a cloud solution. They all, however, stated that there might be some systems that would be less appropriate, for example mainframes. Further, respondent 1 stated that there is no other sector that uses mainframe systems to the same extent as banks do. Mainframes are old systems that are hard to work with and there are not many people in the world that understand how it is built up, respondent 1 and 3 described. The mainframes also take a lot of space and are harder to integrate with newer systems, respondent 3 explained. Respondent 1 stated that it would be complicated to try to move these mainframe systems to a cloud based solution; however it would be possible to have a hybrid cloud solution. These mainframes are part of the traditional banks’ heritage and hard to integrate with new technology, leading to integration problems and it becomes a factor that hinders the implementation of new technology as cloud computing for them. However a factor that does not eliminates the possibility to implement new technology, as it would be possible to keep the mainframes and just move some parts.

Respondent 3 stated that it is attractive to just sign an agreement with a cloud provider, without involvement from the slow and expensive IT department. Related to that both respondent 1 and 2 stated that it is not uncommon that employees in banks actually do sign agreements for cloud services without the IT department’s knowledge. Thus, when the IT department finds out they are often forced to integrate the new service, which involves both risks and costs, respondent 2 described. Further, respondent 2 stated that there is a need for the IT departments to work closer to the core operations, for example by having a good decision-making model with evaluation parameters. Since, cloud computing services do not involve huge investments in own infrastructure all consultants pushed on the cost savings, that a replacement of cloud computing would create.

Respondent 2, believes that the complexity will be larger for each time a bank takes a new provider, since a lot of systems need to be integrated with each other, leading to more complex integration.
4.2.2.2 characteristics

There was an agreement among the consultants that banks have already started to use cloud computing. Respondent 3 said that banks do use the cloud but the question is where and how and respondent 2 explained that the banks are already using cloud-based services as Facebook, Twitter, LinkedIn and other social media. The definition of cloud computing in this study states that these types of cloud based services are within the SaaS (Mell & Grance, 2011). All respondents mentioned that the banking and finance sector should implement cloud computing. They, however, believed that it will occur gradually and might take time, especially when it comes to sensitive information, such as customer and personnel information. Respondent 1 explained that the banking industry has to handle a lot of sensitive information and they are keen on that their customers' information is protected. The respondent from Svenska Bankföreningen continued explaining that salary information is an example of sensitive personnel information, which would be a big step to move out to the cloud. Datainspektionen on their website explain the importance and demand of controlling personal information (Datainspektionen, 2015). Respondent 2 also explained that information that requires a high availability might take time to move and the respondent also emphasizes that the banks have to investigate what is most profitable for them to move to the cloud and what is not. As stated in the TOE framework all characteristics are not suitable within all industries (Tornatzky & Fleischer, 1990). According to the external actors it seems like sensitive personnel information would be inappropriate information to put on the cloud, since the control characteristic is lacking to some extent, which would hinder an adoption of cloud computing.

Among the consultants it was, however, clear that information, that might already be on the cloud or that could be moved to the cloud, was insensitive information available to the general public or other non-personal information. Respondent 1 continued with the benefits of scaling up and down, as banks have peaks around the end of the months as invoices are usually paid the last days of the month in Sweden, hence the banks will have a lot of transactions around a few days of the month, where they would need more data storage than other days. Respondent 1 then explained that by having a cloud service the banks could make use of only what they need by scaling up in the end of the month and down again the other days and therefore do not need to administrate a lot of unusable servers. One characteristic that could be suitable for the banking industry could therefore be the flexibility that the cloud computing offers and fostering an adoption of cloud computing. However, the transactions
that occur around the end of the months often concern personal information, which is hard to move to the cloud.

As mentioned, the cloud adoption will occur gradually and the three consultants explained that the general information, such as exchange rates and stock information, together with test platforms and R&D would be among the first steps to move. Respondent 3 said that “firstly you move smaller less important systems and build credence towards that environment and see if it is working” (Respondent 3, 2015-03-27). Respondent 2 explained that general information could be on a public cloud, as most of it is anyways available for the general public, however, for the more sensitive information a private cloud could be suitable. Respondent 2 continued explaining that a private cloud could also make the customer feel more secure about the information and security and fear are often issues with cloud computing. Respondent 3 agreed that a private cloud would probably be suitable to start with.

All consultants explained that there is conservatism within the banking industry in Sweden and both respondent 1 and 3 mentioned that there is a resistance among the banks to let parts of their own systems move to the cloud. As the TOE framework states some characteristics might not be appropriate (Tornatzky & Fleischer, 1990). The external actors seem to believe that cloud computing would suit banks, however maybe not all areas within the banks.

4.2.3 Organizational

4.2.3.1 Formal and informal linking structure

All consultants explained that traditional Swedish banks are conservative and use old mainframes as IT systems, as mentioned earlier. Svenska Bankföreningen continued explaining that banks traditionally have a complex structure, in line with Hatch’s (2002) idea of large firms having complex structures, which indicates that size and structure are crucial factors.

Respondent 2 and 3 explained that there is a fear of unemployment, especially among IT personnel, as some might lose their jobs or be relocated, in the case of a cloud implementation. Respondent 1 continued explaining that besides the resistance from the IT managers, operating staff feel threatened by cloud services, as they are afraid of losing their

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3 “Först tar man det lite mindre viktiga system, så bygger man en tilltro till den miljön och ser man att det funkar” (Respondent 3, 2015-03-27).
jobs, hence trying to find different reasons on why cloud services would be bad for the organization. This indicates that a concern and uncertainty among employees leads to resistance towards an organizational change, as an implementation of a cloud service would imply.

4.2.3.2 Communication process
Respondent 1 and 2 described that operations managers often lack IT competence and also find the cloud concept unclear and thus turns to the IT departments for guidance. Further, IT departments are often reluctant towards cloud computing, as they put out myths about cloud services, which is a factor of why an implementation often is delayed, respondent 2 stated. Still, all consultants mentioned that employees often sign agreements with cloud providers, without the IT department’s knowledge. Respondent 1 stated that the ordinary process of signing agreements in many cases is abandoned, as personnel only turns to IT departments when they really have to, due to their slow work and lack of support. Respondent 1 continued and described that it is possible since the cloud services are preconfigured, however, doing this is a risk and it is important to work together with the whole business. Respondent 1 believed that having a decision-making process in the company would ease an implementation and communication throughout the whole firm. Respondent 2, however, continued explaining that it is rare to see an organization with a structured decision model.

The consultants stated that the communication within banks is complicated and does not work well, which is compliant with the Hatch (2002) idea that larger firms have more difficult with communication as information easily can be lost.

4.2.3.3 Size and slack
Respondent 1 stated that in Sweden there are four to five big banks and that the banking industry in Sweden is driven by these few large actors. Respondent 2 mentioned that banks during the years have made huge investments in their IT and overall banks are good at IT, indicating that they should have sufficient IT resources. Svenska Bankföreningen also mentioned that in Sweden there are just a few large actors and these actors have their business in multiple countries. Svenska Bankföreningen also mentioned that larger banks often have a whole unit just working with laws and compliance.
As the banks are known to be good at IT and have the ability to implement new technology due to previous IT implementations, one could argue that they should thus be implementing cloud computing, as they have the resources and experiences as well.

4.2.4 External Task Environment

4.2.4.1 Industry Characteristic and Market Structure

Typical characteristics, as all consultants and the respondent from Svenska Bankföreningen mentioned before, were the conservatism, complexity, regulations and sensitivity of the banking industry in Sweden. The respondent from Svenska Bankföreningen explained that the banking industry is more complex than many other industries, as banks are a huge part of the society and very important for the whole population. The respondent said that without the banks Sweden would be standing still, thus it is very important that the regulations are correct and fit with both the industry and society, so that banking can be made safe and secure. The respondent believed that this complexity makes it hard for those who deal with the procurement of cloud services within the banks. Respondent 2, however, believed that flexibility and being time-to-market is the most important incentive for using cloud services.

Respondent 1 explained that the banking industry in Sweden is quite special, as there are only about four to five big actors and compared this to Denmark, who has over 100 small banks next to the big actor Danske Bank. These small banks work a lot more with different IT systems, according to respondent 1, however, continued explaining that this is changing in Sweden. New actors are appearing on the market, for example the Spanish bank Santander recently acquiring Swedish GE Money Bank and becoming Santander Consumer Bank in Sweden and the smaller bank IKANO, owned by IKEA. Respondent 1 explained that for these banks it is more natural to use cloud services. The other consultants and the respondent from Svenska Bankföreningen agreed that there are new, different actors appearing on the market. Respondent 2 explained that actors as the Chinese e-commerce firm Alibaba start with financial services, however, does not count as a bank and thus is not under the same regulations as banks. These types of actors can compete with banks and as banks in Sweden have a typical heritage, it can be hard to keep up and compete with these new actors. According to respondent 2 the banks have to become clearer on what services they offer and maybe start to cooperate with new actors. The respondent from Svenska Bankföreningen argued that it might take some time before new actors who offer similar services as banks will become regulated; hence they are more flexible than the traditional banks. At the same time
respondent 2 explained that it could be beneficial for the banks that they offer more security for their customers as an old traditional bank, than new actors do. When looking at the TOE framework it is stated that when there are differences between companies within the same industry, this could be due to firm-specific attributes (Tornatzky & Fleischer, 1990). Since these new actors do not have the same heritage; they can avoid regulations to some extent, as they are not being regulated in the same way as the traditional banks.

As mentioned earlier banks have sensitive information that might conflict with some suitable characteristics of clouds and respondent 2 explained that it is important to manage your IT systems well, as if something goes wrong, for example an online banking system is not operating for a few hours, it will be reported directly in media, hence banks have to be good at managing IT and they are good at it, because they have to. Respondent 2 continued explaining the importance of IT for the banking industry and highlights that banks cannot operate without IT and they have done large IT investments over the years.

Lastly respondent 1 does not see the banking sector as unique, but is sure that banks see it differently, however, the respondent from Svenska Bankföreningen mentioned that there is a bigger responsibility for banks to take, compared to other industries, when it comes to outsourcing, as the respondent sees cloud computing to be comparable with. The TOE framework states that certain industries are keener to implement new technology (Tornatzky & Fleischer, 1990), which would be the case with the banking industry in Sweden as they traditionally use a lot of IT, however, new actors can adopt cloud services faster making the traditional banks late adopters.

4.2.4.2 Technology support infrastructure
Respondent 1 described the role of an IT consultant as to explain possible solutions without forcing them on the client and further stated that banks can get help from consultants to integrate a system, if the bank does not choose to buy a service that is preconfigured. Respondent 2 described that the role of an IT consultant involves helping businesses to understand and create a strategy for a cloud implementation. Respondent 2 further stated that more businesses are asking about cloud solutions and their role as consultants is to push them towards that direction. Respondent 3’s role as a consultant manager is to find out how business systems are built, what problems exist and how to make it better. Respondent 3 mentioned that their role often involves letting the client get rid of fear, uncertainty and doubts that might exist towards the cloud. This complies with the TOE framework, as an
important factor; since firms can access and get help from outside experts with the decision-making of adopting and implementing new technology (Tornatzky & Fleischer, 1990).

The respondent at Finansinspektionen stated that their concern was not to help banks sort out the uncertainty questions towards cloud computing, since Finansinspektionen is a supervisory authority, which means that their responsibility is to ensure the stability in the Swedish financial system. This however is not fully in line with the TOE framework, as this is an external actor that affects the implementation decision, although does not help, support or advise with the decision-making of adopting and implementing new technology. At the same time, the respondent at Finansinspektionen mentioned that they have a responsibility to help actors in the industry to understand their rules and systems, although not their specific technical solutions. The respondent further explained that Finansinspektionen only steps in when the banks business might cause a risk towards the financial stability and for customers and only then they give out regulatory requirements regarding outsourcing and information security etcetera.

The respondent from Svenska Bankföreningen was positive towards a future involvement from their side to help banks interpret IT regulations, since it is a relatively new legal field. The respondent further believed that they could have a dialogue with legislators about banks and their possibilities to purchase secure cloud services, since, their role at Svenska Bankföreningen is to meet legislators on these issues to see how they could help the financial sector to trust, however, this is not yet the situation.

Datainspektionen has previously looked at the use of cloud computing services and has found flaws at both the customer and provider’s sides, mostly there are flaws in agreements and conditions that the providers offer. Datainspektionen has also started to publish information about which laws and regulation that should comply in for example schools, however nothing specific for the financial sector.

4.2.4.3 Government Regulation

Respondent 1 stated that some cloud providers have put a lot of effort in getting a seal of quality from the EU on their services within the public sector. Respondent 1 stated the following “...the EU has condition less accepted that it is as safe to run anything in a Microsoft cloud as within the government offices of Sweden...” (Respondent 1, 2015-03-26).
Respondent 1 further stated that many banks are worried about leaking customer information; however the only law that touches this is PUL (Personuppgiftslagen 1998:204). Respondent 1 does not really see why banks focus on this concern, since there are plenty of businesses that have customer information but still use cloud services. Respondent 3 and Svenska Bankföreningen’s respondent on the other hand stated that banks do have many laws and regulations to follow.

Respondent 2, 3 and the one from Svenska Bankföreningen described that Swedish laws are quite unclear on what they apply, since it is a lot about interpretation. Respondent 2 stated that since the banks are both under the laws of Sweden and the laws of the EU, it seems to be a confusion in the industry if it is enough to just apply to the EU’s regulations. Respondent 3 said, related to this, that when a business has operations in multiple countries some sort of harmony must occur. As Edvardsson and Frydlinger (2013) expresses, it can become complicated when different countries legal systems are in conflict with each other.

The respondent from Finansinspektionen said that they demand that banks have an open access for them at Finansinspektionen to be able to do their supervision according to, among others, the regulation FFFS 2014:5, which implies that banks are required to ensure that accountants and Finansinspektionen have accessibility to the business and can investigate and control. The respondent from Finansinspektionen stated that if business activities are placed on cloud services, their requirements still apply according to the regulation FFFS 2014:5. Further, the respondent stated that they have looked at standardized agreements from some cloud providers, which rarely fulfill these requirements. Hence, a higher expectation would be implied on a bank that chooses to be on a cloud service regarding risk analysis and safety precautions than when doing a traditional IT outsourcing.

The respondent at Svenska Bankföreningen stated that a lot of their work involves working with banks to clear out uncertainty in laws both nationally and internationally. The respondent from Svenska Bankföreningen also stated that Datainspektionen has quite high standards regarding having the risk analysis and safety precautions, since it is often about securing personal data from the banks clients. Furthermore, the respondent explained that due to banks involvement in many countries it is important that the personal information on clients is accessible for authorities.

Datainspektionen as an authority puts up regulations about personal information and states that those who use cloud services as storage for personal information will lose actual control of data. Since, cloud providers often use standard agreements it is important to define the user terms before signing an agreement. Therefore, it is essential that those who have
thoughts on using cloud computing in their business are aware of the demands that PUL states and other laws and regulations (for example the public access to information and secrecy act). The one that uses the cloud service is responsible for the safety of the personal information, even though it is provided from an external part (Datainspektionen, 2015). Datainspektionen recommend that careful consideration towards the riskiness to misuse the personal information, if the personal information is about to leave EU, one should; calculate safety precautions and create an agreement with the provider that is coherent with PUL.

4.3 Summary of Analysis

When conducting the results of the study it was found, in line with the TOE framework, that the technology, organization and external task environment contexts of banks in Sweden involve factors that both obstruct and foster the adoption of technological innovations, as cloud computing. These factors are also in many ways connected with each other. Both the banks and the external actors mentioned factors from all categories affecting the decision to implement cloud computing. After analyzing both perspectives, key factors were found, which are presented in table 3 below.
### Table 3 Key factors in analysis of empirical findings

<table>
<thead>
<tr>
<th>Analytical Framework</th>
<th>Key factors</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology</strong></td>
<td>Integration</td>
<td>Integration with existing systems is important and becomes an issue for the banks as old mainframes are hard to integrate with new technology and there is a lack of personnel who can master these old systems</td>
</tr>
<tr>
<td></td>
<td>Lack of competence</td>
<td>Lack of competence regarding cloud computing leads to personnel using cloud services without IT departments knowledge, which can lead to system integration problems</td>
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<tr>
<td></td>
<td>Sensitive information</td>
<td>Sensitive information cannot be stored on the cloud as there is a lack of control of where the data are stored</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>Heritage</td>
<td>Traditional banks in Sweden have a heritage including complexity, conservatism and old IT systems that they have to take into consideration</td>
</tr>
<tr>
<td></td>
<td>Employee resistance</td>
<td>IT personnel might be afraid of losing their jobs as the need for internal IT decreases, leading to employee resistance</td>
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<tr>
<td></td>
<td>Miscommunication</td>
<td>Miscommunication, due to unclear definitions of cloud computing within the whole organization</td>
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<tr>
<td></td>
<td>Size and structure</td>
<td>Traditional banks in Sweden are often large organizations with complex structures</td>
</tr>
<tr>
<td><strong>External Task Environment</strong></td>
<td>Common heritage</td>
<td>The common heritage of traditional banks in Sweden lead to shared problems and opportunities in the industry</td>
</tr>
<tr>
<td></td>
<td>Standard agreements</td>
<td>Standard agreements from the cloud providers rarely meet the requirements of the banks, which could lead to lack of control when adopting cloud computing</td>
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<tr>
<td></td>
<td>New actors</td>
<td>New actors do not have the same circumstances as the traditional banks, giving them a competitive advantage</td>
</tr>
<tr>
<td></td>
<td>Regulations</td>
<td>Uncertainty regarding interpretation of regulations (unclear and conflicting in different countries), this becomes a huge issue as the banking and finance sector is a heavily regulated industry</td>
</tr>
</tbody>
</table>

All the key factors in table 3 affect the banks’ decision to implement a cloud service or not in one way or another and some of these factors also have causality between each other. The lack of competence, concerning these questions, among employees can be an effect of miscommunication and unclear definitions of cloud computing within the organization. Further lack of competence regarding cloud computing among top management can lead to fully relying on the IT department’s knowledge, which in some cases can become an issue, as implementing cloud services leads to a decreased need for internal IT and the IT personnel
might be afraid of unemployment, hence making resistance and influencing the top management’s decision.

Moreover cloud providers often offer standard agreements that do not live up to the banks requirements and the industry’s regulations, which lead to an uncertainty among the banks. Thus, they cannot put sensitive information on the cloud. Consequently it would be beneficial to have an open dialogue between the banks and the providers so that the banks can set clear demands for the providers to fulfill.

Further, this study has found that traditional banks have a common heritage which includes complexity, conservatism and mainframes that they have to take into account; new actors in the industry, however, do not have the same heritage to consider and are often not yet under the same regulations, giving them a competitive advantage towards the banks with this heritage. This could then be a factor that influences the banks to adopt cloud computing, in order to stay competitive. Further this heritage contains old mainframes that are hard to integrate with new technology, due to its complexity and the lack of personnel who can master these systems. Thus, hindering banks from an adoption of cloud computing.

Traditional banks are heavily regulated and additionally the banks are not sure how to interpret the laws and regulations affecting cloud computing, as they are unclear, thus it would be valuable to receive input and guidelines from the authorities to ease the interpretation.

All of these key factors interlink with each other, just as the arrows in the TOE framework explain. It was important to consider the technology, organization and external task environment contexts of the banks in order to understand the factors behind the decision of cloud implementation.
5. Conclusion

In this section the results from the empirical analysis of the study will be discussed to answer the research question and fulfill the purpose of this thesis. Lastly, implications, limitations and recommendations for further research will be mentioned.

What factors affect an adoption of cloud computing in the banking industry in Sweden and how would they affect a decision to implement cloud computing?

The aim of this study was to develop an understanding of which factors that obstruct or foster an adoption of cloud computing in the banking industry in Sweden, with a theoretical base in Tornatzky and Fleischer’s (1990) TOE framework. From this study we can conclude 1) eleven key factors that affect the decision of an adoption of cloud computing for traditional banks in Sweden, which are the following: Integration, Lack of competence, Sensitive information, Heritage, Employee resistance, Miscommunication, Size and structure, Common heritage, Standard agreements, New actors and Regulations (see table 3 for further explanation). 2) All the factors, except New actors, were shown to obstruct and delay an adoption of cloud computing for traditional banks in Sweden. 3) It was found that all of these key factors interlink with each other in some sense. One factor which affects the decision to adopt cloud computing or not, might lead to another factor doing the same.

Although there appears to be a willingness to adopt cloud services among the banks, there are many factors obstructing and delaying this process.

5.1 Theoretical Implications

With the findings of this study it is clear that the adoption of cloud computing is affected by the technology, organization and external task environment context of the banks. The study took other factors into account as well, by asking the respondents if there was any additional information to add apart from the factors already mentioned. By doing this, factors not included in the TOE framework were considered. Despite this, all answers were covered either by the technology, organization or external task environment context of the banks. This confirms that the TOE framework is comprehensive and helped find relevant factors for this
study. Although all factors were covered by the TOE framework there was a willingness among the bank respondents to act proactive to be prepared for future implementations, however, this futuristic aspect is not considered in the TOE framework. Moreover, different national regulations conflicting with each other were an issue brought up in this study. The TOE framework considers regulatory factors, however, not in a broader geographical context. This study has shown that these geographical factors are also important to consider and could therefore be an indication for an additional dimension of the TOE framework.

The framework has been widely used in previous research in various contexts of understanding the factors behind decision of a new technological innovation, although has no significant research in the context of cloud computing in the finance sector. Therefore we are able to enhance the TOE framework, by putting light on a phenomenon in a new setting.

5.2 Practical Implications
The findings in this study can from a practitioners perspective provide a better understanding of which factors that obstruct or foster an adoption of cloud computing. An understanding of these factors could help the banks open their eyes for what seems to affect adoption of cloud computing and hence act upon this. This study highlights the need for banks and cloud computing providers to start speaking the same language; it would therefore be beneficial to have an open dialogue between the banks and the providers so that the banks can set clear demands for the providers to fulfill.

As traditional banks are heavily regulated and additionally the banks are not sure how to interpret the laws and regulations affecting cloud computing, there is a need for authorities to provide input and guidelines to ease the interpretation and not only focus on what the banks themselves should do, there is a reciprocal responsibility.

Lastly, this can also lead to more knowledgeable and strategic decisions connected to the adoption process of cloud computing.

5.3 Limitations and Further Research
This thesis is limited to viewing the four big full-service banks in Sweden, yet it would be interesting to get the view from smaller banks as well. The smaller banks could contribute with additional perspective and understanding on which factors that affect an adoption as they might not be affected by the same factors as larger banks.
Another limitation is that this study only looked at the IT personnel within the banks. If other departments had been interviewed, a further understanding of the complexity and heritage could have been taken into consideration and maybe have an impact on which factors that seem to affect the adoption.

Since the study’s focus was on the Swedish market, it could be interesting to look at the studied banks in a wider context as they also have operations abroad, thus it could be enriching to see how operations abroad would affect adoption decisions.

Further, propositions of further research could be to look in depth in each one of these eleven factors that were found to understand the specific factor thoroughly and thus understand its individual impact on the implementation as such.

Since the respondents from the banks mentioned that they all were in the beginning of the investigation regarding cloud computing, it would be interesting to follow up and make a similar study when they have concluded their investigations, since this would probably show a different perspective on the matter, as the respondents then would have more insights regarding the implementation decision.
6. References


Appendix 1

Interview guide for banks SWEDISH

Syfte: Vi vill få en djupare förståelse för vilka faktorer som hindrar eller möjliggör en implementering av molntjänster i Sverige. Vi gör detta eftersom vi har fått uppfattningen att det är svårare att göra en implementering/använda sig av molntjänster i bankindustrin, jämfört med andra branscher. Vi vill se om detta stämmer och om det stämmer, hur dessa faktorer påverkar.

Några frågor och ämnen som vi kommer att utgå ifrån på intervjun:

1. Vad innebär molntjänster för dig?
2. Vilka är de främsta motiven till att använda sig av molntjänster anser du?
3. Ser du några nackdelar eller problem med molntjänster?
4. Hur jobbar ni idag med molntjänster?
5. Hur redo är personalen för molntjänster och hur påverkas de?
6. Bankers struktur – komplexa/konservativa organisationer, stämmer detta och i så fall hur påverkar denna molnimplementering?
7. Aktuell IT-trend – nya aktörer, större konkurrens?
8. Reglerad bransch - Vad innebär det för bankerna vid implementering av molntjänster?
9. Olika typer av moln, vad passar bäst för banker, och när?

Stort tack på förhand!
**Interview guide for banks ENGLISH**

**Purpose:** We want to develop an understanding of which factors that obstruct or foster an adoption of cloud computing in the banking industry in Sweden. We are doing this, as we have understood that it is harder for the banking industry to implement/use cloud computing, compared to other industries. We want to see if this is true and if so, how the factors are affecting.

Some questions and topics that the interview will be based on:

1. What does cloud computing mean for you?
2. What are the main motives for cloud computing according to you?
3. Do you see any disadvantages or problems with implementing cloud computing?
4. How do you work with cloud computing today?
5. How is the readiness among personnel and cloud computing and how will the personnel get affected?
6. Banks structure – complex organizations, is this correct and in that case how does the complexity affect the cloud implementation?
7. Current IT trend – new actors, bigger competition?
8. Regulated industry – What does that mean for banks implementation of cloud computing?
9. Different types of cloud, what fits banks best and when should they be used?

Thank you in advance!
Appendix 2

Interview guide for external actors SWEDISH

Syfte: Vi vill få en djupare förståelse för vilka faktorer som hindrar eller möjliggör en implementering av molntjänster i Sverige. Vi gör detta eftersom vi har fått uppfattningen att det är svårare att göra en implementering/använda sig av molntjänster i bankindustrin, jämfört med andra branscher. Vi vill se om detta stämmer och om det stämmer, hur dessa faktorer påverkar.

Några frågor och ämnen som vi kommer att utgå ifrån på intervjun:

1. Vad innebär molntjänster för dig?

2. Vilka är de främsta motiven till att använda sig av molntjänster anser du?

3. Ser du några nackdelar eller problem med molntjänster?

4. Bankers struktur – komplexa/konservativa organisationer, hur påverkar denna molnimplementering?

5. Aktuell IT-trend – nya aktörer, större konkurrens.

6. Reglerad bransch - Vad innebär det för bankerna vid implementering av molntjänster?

7. Olika typer av moln, vad passar bäst för banker, och när?

8. Känner du till några uppenbara skillnader när det kommer till implementering av molntjänster i bankindustrin, jämfört med andra branscher?

9. Varför behöver banker använda sig av molntjänster? Och vad innebär det för dem?

Stort tack på förhand!
Purpose: We want to develop an understanding of which factors that obstruct or foster an adoption of cloud computing in the banking industry in Sweden. We are doing this, as we have understood that it is harder for the banking industry to implement/use cloud computing, compared to other industries. We want to see if this is true and if so, how the factors are affecting.

Some questions and topics that the interview will be based on:

1. What does cloud computing mean for you?
2. What are the main motives for cloud computing according to you?
3. Do you see any disadvantages or problems with implementing cloud computing?
4. Banks structure – complex/conservative organizations, how does this affect the cloud implementation?
5. Current IT trend – new actors, bigger competition?
6. Regulated industry – What does that mean for banks implementation of cloud computing?
7. Different types of cloud, what fits banks best and when should they be used?
8. Do you know of any specific differences when it comes to banks implementation of cloud computing in the banking sector compared to other industries?
9. Why do banks need to use cloud computing? And what does it mean for them?

Thank you in advance!