Organization Effects of Public Cloud

How the Implementation of Public Cloud Affects an Organization with Substantial IT Legacy

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KTH Industrial Engineering and Management
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Organisationseffekter av publikt moln

*Hur implementering av publikt moln påverkar en organisation med betydande IT arv*

av

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Abstract

Migrating from IT legacy systems to Cloud Computing, is a complex task for an organization to undertake since changes of both technical and organizational aspects are required to take advantage of all capabilities that Public Cloud offer. A limited number of studies have been conducted exploring the organizational perspective of the migration process to Public Cloud for larger organization, which are bounded to their IT legacy. This thesis aims to contribute with knowledge to this gap by addressing the following purpose: investigate how the migration to Public Cloud affects an organization with large IT legacy.

Anchored in a case study at an incumbent enterprise, the thesis bridges literature on Cloud Computing, organizational change management and organizational aspects of the migration process. Findings from empirics indicate that the case company is experiencing multiple layers of complexity of change management such as: change management, culture, internal processes, IT legacy and security, are essential to be managed to successfully migrate to Public Cloud. These findings suggest that the challenges are constraining the migration towards Public Cloud and especially the development of the IT environment, and therefore inhibit the essential value-creation processes. Another challenge is the generalized view of security being a great risk which further inhibits the evolvement and process towards Public Cloud.

The thesis presents that although the migration to Public Cloud is primarily of technical concern, the migration process is also a major organizational change management process with large challenges that needs to be considered for a successful migration. Hence, the thesis contributes to
better understanding of how an organization with substantial IT legacy can prepare for the emerging changes of a potential technology shift.

**Keyword:** Cloud Computing, Effects of Public Cloud, Organizational Change Management, IT Legacy, Security
Sammanfattning

Att migrera från ett IT arv med förlegade IT system till molnbaserad datahantering är en komplex uppgift för en organisation eftersom stora förändringar krävs för att utnyttja alla möjligheter som publika molntjänster erbjuder. Ett begränsat antal studier har genomförts som undersöker migrationsprocessens till publikt moln från ett organisationsperspektiv, för större organisation som är begränsad till föråldrad IT infrastruktur. Detta examensarbete syftar till att bidra med kunskap till detta gap genom att uppfylla följande syfte: undersöka hur övergångsprocessen till publikt moln påverkar en organisation med stort IT arv.

Förankrat i en fallstudie hos ett etablerat företag, förenar uppsatsen litteratur om molnbaserad datahantering, organisationsförändringshantering och organisatoriska aspekter av migrationsprocessen. Resultat från studien på företaget visar flera lager av komplexitet i förändringshantering som till exempel: förändringsledning, kultur, interna processer, IT arv och säkerhet, vilka är viktiga områden att kunna hantera för en framgångsrik migrering till Public Cloud.

Detta resultat tyder på att dessa utmaningar begränsar migrationen mot publika moln och utvecklingen av IT miljön som hämmar de väsentliga värdeskapande affärsprocesserna. En annan utmaning är att den allmänna uppfattningen om säkerhet utgör en stor risk som ytterligare hämmar utvecklingen och processen mot publika moln.

Examensarbetet presenterar, att trots övergångsprocessen mot publikt moln är av tekniskt intresse, är migrationsprocessen en viktig organisationsförändringsprocess med stora utmaningar som
måste beaktas för en lyckad transformation. Med detta bidrar avhandlingen till bättre förståelse för hur organisationer med betydande IT arv kan förbereda sig för de framväxande förändringarna av ett potentiellt tekniskt skift.

**Nyckelord:** Datamoln, Effekter av Publikt Moln, Organisationsförändringshantering, IT arv, Säkerhet.
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## Nomenclature

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>IT</td>
<td>Information Technology</td>
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<tr>
<td>DC</td>
<td>Data Center</td>
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<tr>
<td>CSP</td>
<td>Cloud Service Provider</td>
</tr>
<tr>
<td>NIST</td>
<td>The National Institute of Standards and Services</td>
</tr>
<tr>
<td>CSA</td>
<td>Cloud Security Alliance</td>
</tr>
<tr>
<td>CapEx</td>
<td>Capital Expenditures</td>
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<td>OpEx</td>
<td>Operational Expenditures</td>
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<tr>
<td>IaaS</td>
<td>Infrastructure as a Service</td>
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<td>PaaS</td>
<td>Platform as a Service</td>
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<td>SaaS</td>
<td>Software as a Service</td>
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<td>XaaS</td>
<td>Anything as a Service</td>
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<td>SLA</td>
<td>Service Level Agreement</td>
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<td>GDPR</td>
<td>General Data Protection Regulation</td>
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<td>CCRA</td>
<td>Cloud Computing Readiness Assessment</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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</table>
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Folger Forsén and Louise Grewin
1 Introduction

In this chapter, important aspects of Cloud Computing as IT infrastructure are introduced and a brief overview of the theoretical fields that this thesis was based on is presented. The problem formulation, the purpose and the entailing research question are then presented. Furthermore, this chapter outlines the thesis’ scientific contribution followed by the delimitations of the study.

In a connected world where the business environment is characterized by growing competition, globalization and availability to free markets, companies are in increasing need to be fast-adoptable and inclined to change. Furthermore, in this type of tough environment, it is increasingly important to use all resources efficiently and to focus on the main processes adding value to the business (Maresova, Sobeslav and Krejcar, 2016). Therefore, to stay competitive, organizations that are dependent on Information Technology (IT) infrastructure ought to take into consideration on how to be efficiently adaptable to a fast-changing market. Cloud Computing has arisen as one approach that allows for quick response to market changes and as a method to adapt a modern business to rapidly changing business environments (Miyachi, 2018). Indeed, Cloud Computing is often seen as an opportunity for competitive advantage (Rai, Sahoo and Mehfuz, 2015). Cloud Computing has become a broad and popular concept used by the technology and business communities, the public and the academia (Ali, Khan and Vasilakos, 2015; Rai, Sahoo and Mehfuz, 2015; Botta et al., 2016; Bayramusta and Nasir, 2016). Cloud Computing as an expression includes several technology characteristics, services and deployments models (Mell and Grance, 2012). In practical terms, the concept of Cloud Computing covers both the use of a distributed IT system over the Internet along with the supply of IT application on-demand (Jennings and Stadler, 2014; Botta et al., 2016). Contrary to the use of Cloud Computing, IT systems that are physically located and stored at in-house Data Center (DC) of an organization, are called on-premises. With the solution of on-premises, DCs are owned and utilized by a specific company and not shared with others. However, these solutions of DCs do not offer the same capabilities as the concept of Cloud Computing such as; on-demand self-service, broad network access, resource pooling, rapid elasticity and measured services (Mell and Grance, 2012).

Cloud Computing is not only about a technological improvement of DCs, it also represents the way of how IT hardware is designed and used, how IT resources are rapidly provisioned, and how these are purchased (Armburst M. et al, 2010; Bai et al., 2013). The IT hardware in Cloud Computing are designed and used in a more effective way, since the resources are shared among many users which results in a higher utilization. These resources are rapidly provisioned because most of the Cloud services do not require new hardware to be ordered, purchased and installed, but are supplied on demand and delivered through a web browser on the Internet from applied in various forms from a Cloud service provider (CSP). Furthermore, Cloud Computing do not require
any large initial investments, rather, the consumer is required to pay for the resources that have been used (Battleson et al., 2016). This means that with growing pressure on enterprises to introduce new or modified applications (Tidd and Bessant, 2013), developers with innovative ideas for new internet services no longer require the large capital outlays in hardware to deploy services or the human expense to operate it (Armburst M. et al, 2010). Moreover, many organizations in different sectors are already taking advantage of Cloud Computing in their business (Yang et al., 2014) and it is estimated that the global Cloud Computing market will continue to grow, from $182.4 billion in 2018 to $331.2 billion in 2022 (Gartner, 2019). However, the adoption of the Cloud Computing model continues to be dominated by startups, mainly seeking to develop new applications built to benefit from the Cloud’s convenient pricing model and the elasticity of resources (Bai et al., 2013).

Cloud Computing includes several service and deployment models, where the deployment model of Public Cloud has become popular to utilize for companies that want to be adaptable to fast-changing environments. In this model is DC services practiced of remote servers, hosted on the Internet. Public Cloud is attractive due to the practically unlimited computing capacity that is bought when needed, the elasticity, the resource optimization and the payment model (Redhat, 2019). When comparing Public Cloud to the use of organizations’ own DCs that often require overpurchased capital equipment, high maintenance, inefficient processes and inefficient use of resources, Public Cloud could be the answer to many of these issues.

Cloud Computing and especially the deployment model of Public Cloud has a strong value proposition. However, to achieve an ideal solution for organizations with a large IT infrastructure there are many challenges to overcome. To utilize Public Cloud for companies, it is necessary to consider the benefits, but also risks and effects on the organization (Bai et al., 2013). Public Cloud could possess more Cloud specific vulnerabilities than other Cloud models and risks due to the presence of users from different origins simultaneously as the administrative control is managed by a third party. The segregation of numerous tenants and allocated resources is a complex task and therefore requires a higher level of security prerequisite (Ali, Khan and Vasilakos, 2015; Sefraoui, Aissaoui and Eleuldj, 2014).

Any organization that have utilized in-house IT architecture, systems and processes to manage their core business over a long time has an IT legacy. Companies with large IT legacy often conduct their business using standardized systems, adapted to specific tasks. In other words, these companies are using outdated processes of the IT infrastructure compared to the majority companies on the market. The IT legacy requires storage location, processing power, advanced and large IT infrastructure to enable the system to work in a Cloud-based environment (Jamshidi, Ahmad and Pahl, 2013). The IT legacy does not only represent the technical perspective but are
the remains of processes. Therefore, it is argued that an IT legacy is expensive and inefficient for companies when managing IT application upgrades or modifications based on the extensive and time-consuming processes (Tidd and Bessant, 2013). Furthermore, the implementation process of new applications could be very resource-intensive and require large initial investments, which bounds capital. As a result, organizations with IT legacy are not adopted to the market with rapid changes.

The emergence of Cloud Computing has drastically altered expectations of IT infrastructure architecture, software delivery and development models (Zissis and Lekkas, 2012). The key drivers for Cloud Computing are that it exhibits remarkable potential to provide cost efficiency, easy managing, elasticity, flexibility, scalability and provide powerful, unlimited and efficient utilization of resources over the Internet (Jamshidi, Ahmad and Pahl, 2013; Jennings and Stadler, 2014; Rai, Sahoo and Mehfuza, 2015; Maresova, Sobeslav and Krejcar, 2016). Cloud Computing is the technology that could help organizations with the issues of IT legacy (Maresova, Sobeslav and Krejcar, 2016).

The evolution of Cloud Computing has not yet reached the maturity level, although there is quite extensive research on the topic (Jamshidi, Ahmad and Pahl, 2013; Bayramusta and Nasir, 2016; Alharbi, Atkins and Stanier, 2017; Yang et al., 2015; Battleson et al., 2016; Ali, Khan and Vasilakos, 2015). Cloud Computing research in academic journals has mainly focused on the technical perspective of engineering and computer technology. The technical perspective combines several options of systems included in the Cloud Computing offerings, instead of focusing on one Cloud service and one deployment model. These articles indicate and identify the emerging trends, patterns and possibilities of Cloud Computing (Bayramusta and Nasir, 2016). Furthermore, little has been published about other perspectives, such as the organizational risks of the change that Cloud Computing brings to enterprises (Bai et al., 2013; Battleson et al., 2016). Organizational challenges involve some important aspects as governance, security, training, effort estimation, organizational change and transparency (Jamshidi, Ahmad and Pahl, 2013). Some scholars argue that managerial and organizational journals have ignored this topic in general, even though the impact of Cloud Computing on organizations is immense and needs further investigation (Bayramusta and Nasir, 2016; Alharbi, Atkins and Stanier, 2017). Therefore, more thorough studies are needed to examine the challenges as well as the potential of Cloud Computing for organizations with large IT legacy, from multiple perspectives. Future research would also have much to gain from examining the changes desirable for organizations to enable the capabilities offered by Cloud Computing (Battleson et al., 2016; Alharbi, Atkins and Stanier, 2017; Bayramusta and Nasir, 2016). From a technical perspective, it seems that IT legacy is argued to be a stable, robust and reliable artefact that could easily and automatically be adapted to new circumstance that an organization is exposed to, which is simply
not the case when investigating the migration process from an organizational perspective. Identifying more perspectives may help the research of Cloud Computing to reach the maturity level.

1.2 Problem Formulation and Purpose

Migrating business information from old, large IT legacy systems to Cloud Computing, is a complex task based on the amount of problems that could occur for an organization. Required changes will also be needed to manage to be able to take advantage of all capabilities that Public Cloud offer. Focus is often put on the technical perspective of the migration process, with the emphasis of not losing information. With the introduction of Cloud Computing, this migration process gets another dimension. Namely, the IT system is Cloud based and belongs to a Public Cloud which adds to the complexity and puts additional strain, not only on how information is managed and processed but also how the organization and people within adapts to the new system. The outlined problem formulation inhibits the possible development of the utilization of Cloud Computing. To better understand and contribute to further knowledge and the possibility of utilizing Public Cloud in incumbent companies, the purpose of the thesis is to address this problematization by investigating how the migration to Public Cloud affects an organization with large IT legacy.

1.3 Research Questions

To achieve the purpose, the following research question (RQ) are formulated:

**RQ:** From an organizational perspective, how will migration to Public Cloud affect an incumbent organization with large IT legacy?

1.4 Scientific Contribution

A limited number of studies have been conducted exploring multiple perspectives of the migration process to Public Cloud for larger organizations bounded to their IT legacy. Instead, existing studies have thoroughly examined a technical perspective of the Cloud migration process without taking the organizational aspects into consideration. Based on a single case study, this thesis aspires to contribute with knowledge on how large organizations with IT legacy could take advantage of the capabilities resulting from Public Cloud. By adding empirical evidence to the contributed knowledge on the Cloud Computing migration process, a holistic perspective with causal inferences will be provided. By analyzing how Cloud Computing affects an organization from a wider perspective, based on the empirical material collected, the analysis of the findings
makes an analytical contribution and increased knowledge of the phenomenon (Yin, 1994; Blomkvist and Hallin, 2015).

1.5 Delimitations

This thesis was conducted from an organizational perspective including important areas that could give context to the problem formulation, such as IT legacy, security, change management and organizational culture. Furthermore, the thesis was examined on the functional perspective including internal processes and organizational management, where the thesis focused on the deployment model of Public Cloud. However, an in-depth technical study of the migration process was left out of this thesis. The thesis was delimited to a case study at an organization that fits to the problem formulation.

1.6 Disposition

The disposition of the thesis, outlining the chapters and a brief description of its contents in Table 1.

Table 1 – Disposition of the thesis.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description of Chapter</th>
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</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>Outlines the background, problem formulation, purpose and the following research questions.</td>
</tr>
<tr>
<td>2. Literature Review</td>
<td>Includes the literature which gather previous research about Cloud Computing migration.</td>
</tr>
<tr>
<td>3. Method</td>
<td>Explains and motivates the methods used to conduct the research.</td>
</tr>
<tr>
<td>4. Empirical Context</td>
<td>Describes the empirical settings, consisting of a case study.</td>
</tr>
<tr>
<td>5. Findings and Analysis</td>
<td>Presents the findings and analysis from the case study.</td>
</tr>
<tr>
<td>6. Discussion</td>
<td>Further discussion of the empirical findings and analysis.</td>
</tr>
<tr>
<td>7. Conclusion</td>
<td>Presents the conclusion if the research together with the answers to the main research question. Lastly, some suggestions for future research are given.</td>
</tr>
</tbody>
</table>
2. Literature Review

This chapter presents the literature of importance for this thesis. To add depth to the theory constructing the thesis, a review of previous research was conducted where this chapter provides a recollection of findings from the review. The chapter starts with outlining the technical parts of importance to create an understanding of Cloud Computing; essential characteristics, service models, deployment models, IT legacy and the security aspect of Cloud Computing. Further on, this chapter outlines the important parts of the organization change that is required to utilize Cloud Computing, including organizational challenges and management of organizational change. Lastly, organizational aspects of migration to Public Cloud is outlined where possible outcome are presented.

It is prerequisite for enterprises to use all sources efficiently and focus on the main processes adding value to the business in an environment characterized by growing competition (Maresova, Sobeslav and Krejcar, 2016). To stay competitive, scholars have indicated that organizations who are dependent on IT infrastructure need to be adaptable to changes in the market (Battleson et al., 2016; Bayramusta and Nasir, 2016; Chang, Walters and Wills, 2016; Iveroth, 2010; Orlikowski and Scott, 2009; Yang et al., 2015). In recent years, researchers have broadly described the benefits and migration of Cloud Computing from a technical perspective (Jamshidi, Ahmad and Pahl, 2013; Yang et al., 2015; Alharbi, Atkins and Stanier, 2017). These scholars have focused on smaller organizations or new organizations developing new IT infrastructure. These organizations do not have large IT legacies to consider for the technical change, which has resulted in a lack of secondary studies to consolidate the research of Cloud migration. Some scholars argue that managerial and organizational journals have ignored this topic in general, even though the impact of Cloud Computing on organizations is immense and needs further investigation (Bayramusta and Nasir, 2016; Alharbi, Atkins and Stanier, 2017).

It is argued that IT legacy is often seen as a stable, robust and reliable artefact that simply and automatically adapts to new circumstances, which is simply not the case (Chang, Walters and Wills, 2016). Orlikowski and Scott (2009) and Iveroth (2010) argues that research has continually neglected the role that IT plays in organizations and that there is a lack of multiple perspectives and a more balanced view of IT and change. From a sustainability perspective, Chang, Walters and Wills (2016) argues that the evaluation of a Cloud Computing project needs to consider the balance of benefits and risks to the organization in the full context of the environment in which it operates, and not only examine the technical considerations alone.

Consequently, in order to fully understand how large incumbent enterprises are affected on the organizational level when moving to Public Cloud, deeper knowledge in the above outlined
research fields has to be conducted. Therefore, this thesis combines existing research of Cloud Computing in the field of technical definition and organizational perspective when utilizing this technology, with focus put on Public Cloud.

2.1 Cloud Computing

There have been many different attempts to formulate a common definition of Cloud Computing. Bayramusta and Nasir (2016) defines Cloud Computing as a model with the possibility of delivering a range of IT services, remotely through the Internet or a networked IT environment. Maenhaut et al. (2015) describes Cloud Computing as a technology that enables elastic, on-demand resource provisioning, allowing application developers to build highly scalable systems. Other researchers describe Cloud Computing as a kind of internet-based computing, where shared resources and information are available to computers and other devices on-demand (Deshpande, Sharma and Poju, 2019). However, the most commonly accepted and used definition is the one from The National Institute of Standards and Technology (NIST). The NIST defines Cloud Computing as:

“a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (like networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.” (Mell and Grance, 2012).

This definition, together with associated service and deployment models for different Cloud solutions, has emerged as industry consensus of where Cloud Computing is headed. (Redhat, 2019). However, this definition is quite basic and as Cloud Computing have emerged and organizations have more widely accepted the development of Cloud, updating the definition of Cloud could perhaps be beneficial (Miyachi, 2018).

The Cloud Computing era is the outcome of decades of slow but steady development and progression. The Cloud era has evolved from the first computers, centralized mainframe era, personal computer area, distributed client-server era and the enterprise area (Deshpande, Sharma and Poju, 2019). The first known references to the phrase “Cloud Computing” appeared in internal documents of the company Compaq. The term Cloud Computing is one of the most frequently used term in computing today and became popular after it was used by former CEO at Google, Eric Schmidt, in an industry conference 2006 (Rajaraman, 2014).

In the early stages of the IT infrastructure evaluation, consumers had to purchase and consume software and computing powers as products. Today, Cloud Computing has developed to offer software and computing power which are purchased as services on an as-needed basis through
access to commonly used servers (Bayramusta and Nasir, 2016). It is today most common that servers in a Cloud may be accessed by a PC, laptop, tablet, or even a smart phone. Cloud Computing plays a big part of new emerging eras because there is so much computing power available in the Cloud (Rajaraman, 2014), such as IoT, big data, data science (Hashem et al., 2015). Cloud Computing is enabled by virtualization (Gholami et al., 2016).

Virtualization is one of the base technologies applicable to the implementation of Cloud Computing (Hashem et al., 2015). Virtualization provides on-demand network access to a shared pool of configurable computing resources. Machine virtualization allows the computing power of a physical machine to be divided into multiple virtual machines. To enable this, multiple hosting and heterogeneous operating systems runs on the same hardware (Bayramusta and Nasir, 2016). This modern virtualization techniques allows Cloud Computing to transfer virtual machine inputs from one server to another. Moving to another server, enables more space, ability to reallocate storage and computing power which increases the flexibility and scalability of computing operations (Ali, Khan and Vasilakos, 2015; Hashem et al., 2015). Virtualization includes server virtualization, application virtualization, storage virtualization, network virtualization, and service infrastructure virtualization (Bayramusta and Nasir, 2016).

Many scholars argue that the emerge of Cloud Computing is a paradigm shift (Jamshidi, Ahmad and Pahl, 2013; Ali, Khan and Vasilakos, 2015; Battleson et al., 2016; Deshpande, Sharma and Poju, 2019). However, Yang et al. (2014) maintain that Cloud Computing is more like an emerging IT trend since it is not a completely new concept. Furthermore, Cloud Computing has a direct connection to other relevant technologies such as utility computing, and distributed systems.

### 2.1.1 Cloud Characteristics

NITS define five essential characteristics of any Cloud model including on-demand self-service, broad network access, resource pooling and rapid elasticity (Mell and Grance, 2012). However, one other important aspect, especially when adopting Public Cloud, is multitenancy, which is added to this list (Ali, Khan and Vasilakos, 2015; Gholami et al., 2016). Furthermore, when adopting a Cloud Computing model, service models, deployment models and economic models occur, which is also listed (Mell and Grace, 2012; Botta et al., 2016; Kostic, 2018).

**On-Demand Self-Service**

On demand self-service refers to customers who can request and manage the computing capabilities such as server time and network storage, from the Cloud without any human interaction with the CSP (Mell and Grance, 2012). The supply of the services and the associated
resources provided when required, which is usually done through webservices and management interfaces (Ali, Khan and Vasilakos, 2015).

**Broad Network Access**

The capabilities and the customers’ applications and data present on the Cloud is accessible to the customers using the standard mechanisms and protocols. The characteristic further demands that the availability of services should support heterogeneous thin or thick environment (for example, mobile phones, laptops, workstations, tablets) (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015).

**Resource Pooling**

The CSP computing resources are pooled to serve multiple consumers through a multi-tenant model, with different physical and virtual resources, assigned and reassigned according to consumer demand. The customer generally has no control over or knowledge of the exact location of the provided resources but may be able to specify location at a higher level of abstraction such as which country, state, or DC. Examples of resources that are pooling include storage, processing, memory, and network bandwidth (Mell and Grance, 2012; Khan and Vasilakos, 2015).

**Rapid Elasticity**

The capabilities can be rapidly and elastically scaled and released, in some cases automatically, as per consumer’s demands. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015).

**Measured Service**

The scaling of capabilities up and down is performed dynamically in Cloud systems, and the usage of services, such as storage, processing, bandwidth, and active user accounts, is metered at some level of abstraction appropriate to the type of service and reported to the customer and CSP (Ali, Khan and Vasilakos, 2015) This provides transparency for both the provider and consumer of the utilized service (Mell and Grance, 2012). The metering is also useful in the optimization of resource usage automatically (Ali, Khan and Vasilakos, 2015).

**Multi-Tenancy**

The NIST defines the above mentioned five essential characteristics of any Cloud model within Cloud Computing (Mell and Grance, 2012). However, multi-tenancy is another important characteristic of the Cloud Computing although it is not an essential characteristic which is added
by the Cloud Security Alliance (CSA) (Ali, Khan and Vasilakos, 2015). In the Cloud, each service consumer is called a tenant. Multi-tenancy is an ability to use the same instance of a resource at the same time by several tenants that may or may not belong to the same organization (Gholami et al., 2016). From the CSP’s perspective, multi-tenancy maximizes the resource utilization and profit since only one application instance is required to deploy in the Cloud. Thus, from the consumer perspective, each consumer perceives to be the only users of the application (Ali, Khan and Vasilakos, 2015; Gholami et al., 2016). However, as tenants are dedicated to the same instance of an application, there is a risk that one tenant’s quality of service is negatively affected by the other tenants (Gholami et al., 2016). Furthermore, multitenancy is only an aspect in need of consideration in some Cloud deployment models such as Public Cloud.

**Economic Models**

Several scholars argue that Cloud Computing has a great potential of cost savings that it offers to organizations (Schneiderjans and Hales, 2016; Sefraoui, Aissaoui and Eleuldj, 2014; Botta et al., 2016; Kostic, 2018). Schneiderjans and Hales (2016) argue that Cloud Computing allows organizations to reduce Capital Expenditures (CapEx) – expenditures involved in maintaining in-house DCs or other costs derived from fixed assets. Since maintaining own DCs involves high costs and far exceed that of a third-party management company, Botta et al. (2016) explains that Cloud Computing models are attractive since it frees the organization from the need to invest in the infrastructure. Therefore, organizations could instead rent resources according to needs. In this way, an organization only pays for the usage (pay-as-you-go model) which allows the operating expenditures (OpEx) to be decreased. However, Kostic (2018) argues that IT expenses traditionally have IT expenses been considered as a CapEx. With the new economic models of Cloud Computing are organizations shifting their CapEx model to an OpEx model instead.

**2.1.3 Service Models**

The NIST (2012) divides the services provided by the Cloud Computing into three categories, namely: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) (Mell and Grance, 2012). The above models can also be described with the summarizing name: Anything as a service (XaaS) and are defined as any technology delivered over the Internet that used to be delivered on-site (Miyachi, 2018). These models are often compared to each other by illustrating how much and which parts of the IT infrastructure are managed by the CSP, as illustrated in Figure 1.
**Infrastructure as a Service**

The IaaS is described as the underlying layer to the infrastructure, illustrated in Figure 1. IaaS is the service model that requires most management by the user, using virtual machines rather than physical server rooms (Redhat, 2019). The capability provided to the consumer is the supply of hardware infrastructure that offers all computing resources such as processing, storage, networks, and other fundamental computing resources where the consumer can deploy and run arbitrary software, which can include operating systems and applications (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015). The resources are provided in the form of virtualized systems accessible through the Internet (Ali, Khan and Vasilakos, 2015). The consumer does not manage or control the underlying Cloud infrastructure but has control over operating systems, storage, software, deployed applications; to a large degree, scaling their application and provisioning all the services required to run it, and possibly limited control of select networking components or perhaps physical location of the resources at a gross geographical level (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015; Redhat, 2019).

**Platform as a Service**

PaaS usually describes an additional level of services layered on top of an IaaS foundation, (Redhat, 2019), illustrated in Figure 1 as the middle layer of managerial requirements by the user.
The capability provided by the PaaS to the consumer is to deploy the Cloud infrastructure including integrated development environments including using programming languages, libraries, services and tools supported by the provider as well as operating systems, and platform layer resources manage their own applications (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015; Bayramusta and Nasir, 2016). These services effectively provide an additional level of abstraction which takes care of tasks so that a developer or operator do not have to (Redhat, 2019). The PaaS does not provide customers with the control over the underlying Cloud infrastructure, including network, servers, operating systems, or storage with the exception of the applications that are moved to the Cloud and possibly configuration settings for the application-hosting environment (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015).

Software as a Service

SaaS is illustrated in Figure 1 as the top layer, with all involving services managed by the CSP and provide capability to the consumer that offers on-demand use of the provider’s applications software running on the underlying infrastructure to multiple end users. This service is platform-independent, and you don't need to install the software on your PC. Instead, the applications are accessible from various client devices through thin client interfaces accessible via a web browser through the internet (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015). The SaaS does not provide the possibility to create an application or software, but a model to distribute the software through web (Ali, Khan and Vasilakos, 2015). The consumer does not manage or control the underlying Cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, except for limited user specific application configuration settings (Mell and Grance, 2012). Furthermore, SaaS includes software applications which support business related processes such as customer relationship management, supply chain management or enterprise resource planning (Bayramusta and Nasir, 2016).

IaaS, PaaS, and SaaS definitions have during a long time been resilient, and most Cloud Computing providers still use these terms on their marketing materials. But the definition is many years old and the industry has evolved rapidly to include diverse technologies such as containers and serverless computing. Miyachi (2018) explains that these definitions need to be updated but the conventional definitions will be deployed in this study.

2.1.4 Deployment Models

Four different models can be used to deploy a Cloud Computing infrastructure, namely: Private Cloud, Public Cloud, Community Cloud, and Hybrid Cloud (Ali, Khan and Vasilakos, 2015). These deployment models utilize different service models depending on where data is being stored – on-site or in shared DCs managed by third party. This is further illustrated in Figure 2.
Private Cloud

The private Cloud infrastructure is provisioned for exclusive use by a single organization and are not utilized by any other customer comprising multiple consumers within the organization (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015). It may or may not be owned, managed and operated by the organization, a third party, or some combination of them (Mell and Grance, 2012). Similarly, the physical infrastructure of Private Cloud may or may not be located at organization’s geographical site, on-premises or off-premises. The definition of Private Cloud refers to the boundaries of control and trust rather than who employs the infrastructure’s operators or who holds title to the equipment. As Figure 2 illustrates, a Private Cloud often utilizes the service model of IaaS where data is stored in own DC either in-house or by third party (Redhat, 2019).

Public Cloud

The Public Cloud’s physical infrastructure is owned, managed, and operated by a third party such as by a business, academic, government or some combination of them selling Cloud services (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015; Redhat, 2019). However, Public Cloud is open to public and organizations and the resources are shared among all the customers, as Figure 2 illustrates. Public Cloud is most suitable for SaaS but could however also utilize PaaS and the
physical infrastructure is located off-site to the customers and is managed by a third organization (Ali, Khan and Vasilakos, 2015).

**Community Cloud**

The community infrastructure is provisioned for exclusive use by a specific community shared by several organizations and customers (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015). Community Cloud may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them. Generally, the community shares common interests, such as the mission, security requirements, policy, and compliance considerations and it may exist on or off premises (Mell and Grance, 2012; Ali, Khan and Vasilakos, 2015; Redhat, 2019)

**Hybrid Cloud**

The Hybrid Cloud infrastructure is a combination of two or more distinct Cloud infrastructures (Private, Community, or Public) (Mell and Grance, 2012; Khan and Vasilakos, 2015). These types of Clouds remain unique entities but are configured together by standardized or proprietary technology that enables data and application portability. This capability does not necessarily prevent the use of compatible programming languages, libraries, services, and tools from other sources (Mell and Grance, 2012). Hybrid Clouds might be of interest to a customer who wants to own and operate a Cloud infrastructure with a standardized sized for typical loads but reserve the option of renting additional capacity to handle load spikes (Redhat, 2019).

### 2.1.5 IT Legacy

Migration to Cloud Computing is aggravated when an organization has to take their IT legacy into consideration (Gholami et al., 2016). Legacies are conceptualized differently from differently by scholars through the IT development. Sneed (1995) defines IT legacy as information systems that have been in use for many years. Benett (1995) defines IT legacy as large software systems that an organization do not know how to cope with but there are still dynamic to the organization. Brodie and Stonebraker (1995) defines an IT legacy application as any system that significantly resists modification and evolution. Other statements are that IT legacies are those who are not internet-dependent (Stone, 2001) and a package of software and hardware solutions whose languages, standards, codes, and technologies belong to a prior generation or era of innovation (Dedeke, 2012). Furthermore, Jamshidi, Ahmad and Pahl (2013) defines legacy as software developed over the lifetime of an organization using traditional development methods. Lastly, Gholami et al. (2016) describe IT legacies as one of the major components of organizations that represent business services and repository of knowledge of organizations and a massive, long-term
business investment. Hence, it can be concluded that IT legacy IT legacy is an old technological system that is still in use to manage the core business.

Whilst the IT legacy is often outdated (Benett, 1995; Stonebraker, 1995) and in need of development, several scholars agree that many organizations still rely on their legacy systems to support their core business (Jamshidi, Ahmad and Pahl, 2013; Bennett, 1995; Gholami et al., 2016; Rai, Sahoo and Mehfuz, 2015). Gholami et al. (2016) argue that legacies can provide a significant competitive advantage with a positive return and contributing to the organization revenue and growth. Moving the IT legacies to the Cloud raises several issues such as existing infrastructure, maintainability, scalability, security, IT skills, network and support, Service Level Agreement (SLA) and interoperability (Jamshidi, Ahmad and Pahl, 2013; Rai, Sahoo and Mehfuz, 2015; Gholami et al., 2016). Even though crucial IT legacy systems are plagued with issues, these IT legacy processes cannot simply be replaced (Jamshidi, Ahmad and Pahl, 2013).

From the technical point of view, the terms IT legacy and legacy application is often connected with old generations of technologies, standards, protocols and programming languages including outdated indexed database and file systems. A legacy application is often associated with old mainframe applications, with hardware support and operational costs that are responsible for enormous transaction processing and supporting thousands of users and concurrently accessing numerous resources (Gholami et al., 2016). Furthermore, modern software applications developed using the latest technologies and tools available in the marketplace, but currently do not satisfy new business requirements are also considered as legacy (Khadka et al., 2013; Sneed, 2006; Gholami et al., 2016).

Gholami et al. (2016) argue that Legacy applications have often been developed without any considerations of the unique requirements attributed to Cloud environments and cannot easily utilize the Cloud-based environment (Jamshidi, Ahmad and Pahl, 2013). These attributes such as elasticity, multi-tenancy, interoperability, and Cloud platform selection raise new challenges to improve conventional software (Gholami et al., 2016). It is possible to make Legacy applications beneficial from the advantages of Cloud by reengineering development methodologies. These reengineered applications share added flexibility and multi-tenancy (Maenhaut et al., 2015). To avoid new challenges, companies can choose the applications that already fulfill the specific requirements or easily meet the requirements with reengineering, towards making a legacy application Cloud-enabled (Gholami et al., 2016).
2.1.6 Security

Several security related issues are in need for consideration when migration to Cloud. The issues may differ depending on the type of Cloud. However, in general they are; lack of transparency from the CSP, data leakage, system failure, reliability, data governance, user-centric privacy proprietary nature of the solutions provided by a CSP and possibility of security attacks due to the multitenant nature of a CSP’s infrastructure. Organizations should complete a threat assessment before adopting the Cloud solutions (Deshpande, Sharma and Poju, 2019). The threat assessment will be based on the criteria such as threat profile, natural and residual threat, likelihood and impact (Jamshidi, Ahmad and Pahl, 2013; Deshpande, Sharma and Poju, 2019).

There are some regulations that needs to be considered when migration to a Public Cloud. The first is the General Data Protection Regulation (GDPR). GDPR is a regulation that implies data protection and privacy for all individuals' citizens of the European Union. The law applies to all companies within the European Union, regardless of the location, where the data that belongs to citizens within EU has to be processes, stored and subjects inside EU (European Commission, 2019). With other words, it is important for a European consumer of Public Cloud to know where in the world the data is stored since data could be stored on multiple locations, under multiple jurisdictions by CSPs (Sponselee and Vreeman, 2019). Furthermore, once a CSP is selected, a contract between the legacy application owner and the CSP is set. The application owner then needs to specify the scope of expected service provisioning by the CSP prior migrating application components to the infrastructure of a CSP. The negotiation is finalized with producing an SLA (Gholami et al. 2016), which is the second regulation that needs to be considered in a migration process. An SLA serve as a contract between a customer and a CSP to specify the user requirements, quality of service, responsibilities and obligations (Yang et al., 2014). An SLA also specifies the boundary of usage and provision of cloud services (Gholami et al. 2016). Furthermore, as the CSP has both the customer side and infrastructure provider side commitments, employing an appropriate SLA to guarantee the delivery of service with high quality is very important. However, the SLAs are typically highly weighted to suit the service provider. (Yang et al., 2014).

The migration of users’ assets such as large amount of data and applications, in shared environments and outside of the company control escalates the security concerns. The shared environments consist of presence of large numbers of users that are not related to the organizations, users might be trusted by the CSP, but they may not trust to each other (Ali, Khan and Vasilakos, 2015). Moreover, data of large CSP are distributed across national boundaries (Yang et al., 2014). Therefore, there are regulations to handling of data and legal jurisdictions, such as SLA and GDPR.
The CSP may work with their clients’ sensitive data, and consequently should consider legislation related to personal data protection in various countries (Maresova, Sobeslav and Krejcar, 2016). Furthermore, CSP’s that keep the data for users, may without authorization, access users’ sensitive information. Before outsourcing to a third party, a general approach to protect the data confidentiality is to encrypt the data for privacy requirements (Xia et al., 2016). Encryption is the process of converting information or data into a code, for example transform plain text to coded text. This text is called cipher and is transformed by using an algorithm which uses a secret key. A cipher text cannot be interpreted by anyone unless he or she knows the secret key (Rajaraman, 2014). However, some scholars argue that the security measures taken by the CSP are generally transparent to organizations (Ali, Khan and Vasilakos, 2015). Others argue that lack of transparency from the CSP is a security issue (Deshpande, Sharma and Poju, 2019). Moreover, there is little transparency for the individual user in understanding where their data is stored and who might have access to it. However, loss of privacy is not only a problem for organizations; individuals can also be a victim of a Cloud cyber-attack (Bayramusta and Nasir, 2016; Yang et al., 2014).

Public Cloud opens a new paradigm regarding security threat for an IT ecosystem (Deshpande, Sharma and Poju, 2019). The security risks in Public Cloud may differ from the risks of conventional IT infrastructure either in nature or intensity or both (Ali, Khan and Vasilakos, 2015). However, not all scholars agree on that security is a problem within Cloud. Some scholars argue that Public Cloud is reliable and safe and possesses an advantage within security (Sefraoui, Aissaoui and Eleuldj, 2014; Hashem et al., 2015).

2.2 Organizational Change

Scholars argue that technology-driven changes in IT and organizational change is intimately connected, where successful change cannot happen without one another (Iveroth, 2010). The concept of organizational change refers to changes to the way a business function. These changes could be the introduction of major business processes, changes in the organization's structure, or cultural changes within the organization. These changes are typically large-scale within the business as opposed to smaller ones that may occur on a regular basis like modifying smaller processes or hiring new personal (Tidd and Bessant, 2013). Technology triggers change that effect actors and structures where the implemented IT requires complementary organizational changes in order to fit together with the organization. This kind of change is continuous, since implementing new IT requires changes to the organization, where these changes need to be refined and sometimes necessitate additional changes to the organization (Iveroth, 2010). Furthermore, such change is achieved when the employees of an organization have understood the problems of
maintaining in the current problematic environment and have received clear communication about the future end-state (Iveroth, 2010). However, not all changes are successful as extensive evidence suggest that these kinds of large-scale changes do not always work, and in many cases lead to considerable dissatisfaction and disillusionment (Tidd and Bessant, 2013).

There is a stream of research that has investigated the adoption of Cloud Computing with different methods, frameworks and models. For instance, Alharbi, Atkins and Stanier (2017) discuss migration readiness to Cloud Computing for an organization; Cloud Computing Readiness Assessment (CCRA). This framework measures how prepared an organization is for the change to Cloud Computing implementation and provides benefits for an organization considering adopting different Cloud Computing deployment models such as Public Cloud. CCRA also support decision-makers in understanding the organization’s position regarding Cloud Computing and identifies gaps that may inhibit the adaption of Public Cloud. However, other scholars introduce methods to determine an organization’s Cloud readiness. Loebbecke, Thomas and Ullrich (2011) presented the Magic Matrices Method as a Cloud readiness assessment tool. By investigating selected IT services, the method provides an in-depth understanding of the technological side of Cloud migration and with the focus put on the operational level of the organization. However, the strategic level of the decision-making and planning is ignored by this method, which Alharbi, Atkins and Stanier (2017) argue is required for organizations to assess their abilities to achieve the anticipated objectives of Public Cloud.

Some scholars argue that further research is needed to examine the need for large organizations to adapt their processes to take advantages of the capabilities offered by Public Cloud. In other words, it is necessary to examine the organizational readiness for Cloud Computing from different perspectives and not only from a technical standpoint (Battleson et al., 2016; Bayramusta and Nasir, 2016; Chang, Walters and Wills, 2016; Iveroth, 2010; Orlikowski and Scott, 2009; Yang et al., 2015). Therefore, this section examines the organizational perspective of implementing Cloud-based solutions to organizations with large IT legacy. The way organizations are using IT resources and capabilities is constantly shaped by the dynamic environment of digitalization. Furthermore, Cloud Computing technologies are still emerging which will require more training and initiatives from management (Alharbi, Atkins and Stanier, 2017). It may not be enough to simply improve the operational efficiency of IT enabled business processes to achieve agility, which is necessary to operate in this dynamic market. To sustain competitiveness, organizations may also need to achieve significant transformation of their IT enabled business processes and management structures (Yang et al., 2015; Battleson et al., 2016). As emphasized, it is important to understand that the adaption of Public Cloud is non-trivial and results in a considerable amount of organizational change that will affect the migration process and employees in different ways
From an organizational perspective, for organizational uses to adopt Cloud Computing, employees need to get ready from technological, organizational and environmental aspects. (Yang et al., 2015)

### 2.2.1 Organizational Challenges

While adapting Public Cloud to organization with large IT legacy, different central challenges occur since these organizations heavily depend on their IT system that have been developed over a long time (Jamshidi, Ahmad and Pahl, 2013). Rai, Sahoo and Mehfuz (2015) emphasize some of these organizational challenges as business factors within the migration of Public Cloud; existing investments in IT, data security, regulations and provisioning. However, some argue that organizations and individuals need to develop new skills and competences in the change from on-premises computing to Cloud Computing to encounter the challenges (Bayramusta and Nasir, 2016; Alharbi, Atkins and Stanier, 2017). Yang et al. (2015) describe some challenges when implementing the service model from Public Cloud – SaaS. Namely, that the behavioral impacts of SaaS that alter how people obtain and use software, need to be considered. To implement service models offered by Public Cloud, such as SaaS, organizations need to get relevant personnel ready for the new circumstances.

All organizations have different routines. A challenge with routines is that they have to be learned, and learning is sometimes difficult. Learning disrupts and disturbs the day-to-day working of the firm, it can upset organizational arrangements and require efforts in acquiring and using new skills (Tidd and Bessant, 2013). Furthermore, learning requires time and money to be able to try new things (Christensen and Overdorf, 2000). Most organizations are unwilling learners and sometimes cope with the learning process by trying to short-cut the process by borrowing ideas from other organizations. This can be an unfavorable strategy since the shortened processes do not involve any adaption, customization, modification or change to fit the existing requirements. Therefore, no learning, and no development of new routines or new part of the underlying culture have been established. The temptation to copy emerges as particular approaches becoming fashionable. These fashionable approaches can become something which every organization thinks it needs in order to deal with its problems (Tidd and Bessant, 2013).

Christensen and Overdorfs (2000) define values of an organization as standards, which employees set priorities including internal orders, ideas and customers among others. Levitt and March (1988) name similar routines, which describe established sequences of actions for undertaking tasks in a mixture of technologies, formal procedures or strategies, and informal conventions or habits. Similarly, Tidd and Bessant (2013) define routines of an organizations as particular ways of behaving as a result of repetition. These routines are firm-specific for every organization (Tidd
and Bessant, 2013). Furthermore, values and routines of an organization reflect its cost structure or its business model since those define the rules its employees must follow for the company to succeed. Eventually, when successful, organizational behavior and routines are reinforced by both formal and informal structures, procedures and processes, where employees gradually come to assume that the processes and priorities used so successfully are the right way to handle common tasks (Christensen and Overdorf, 2000; Tidd and Bessant, 2013). An organization’s patterns and values, which reflect an underlying set of shared beliefs, are described as the culture of the organization (Tidd and Bessant, 2013). The culture emerges because of repeated experiments and experience and are learned by the employees. As an organization matures these patterns and behavior becomes more of an automatic response to certain situations (Christensen and Overdorf, 2000; Tidd and Bessant, 2013). However, these firm-specific routines that make out the culture cannot just be copied but must be learned. These routines and values are therefore transmitting the history of what has previously worked, where new members learn them when joining the organization. Therefore, Christensen and Overdorf, (2000) argues that culture is a powerful management tool. Furthermore, routines have an ability to be independent of particularly personnel, where these are constantly being adapted. Important to note is that these values and routines that are a significant part of an organization’s culture is what makes one organization different from another, in how they carry out the same basic activity (Tidd and Bessant, 2013).

When people are used to work within a certain system, they are wary of introducing changes or new systems. When the capabilities reside in processes and values, and especially when they have become embedded in the culture of an organization, changing capabilities to address new problems can be extraordinarily difficult (Christensen and Overdorf, 2000). Factors that can make employees resistant to change could be insecurity, loss of control, possibility of an increased workload, uncertainty and surprise (Beardwell and Thompson, 2017). Employees within an organization are hesitant to go through such changes unless they are well prepared and motivated. (Yang et al., 2015). Management must be cautious and well-prepared to ensure that the process goes smoothly (Tidd and Bessant, 2013).

Even though increasing numbers of organizations adopt services from Public Cloud, as the service model SaaS, Yang et al. (2015) describe that its diffusion is still far from full potential due to issues like security concerns, fear of losing control, and organizational resistance. As Yang et al. (2015) mentioned, implementing Public Cloud brings significant organizational changes that employees could be hesitant to go through unless there is a well-defined strategy and motivation for making this change. Furthermore, Maresova, Soeslav and Krejcar (2016) argue that company managers in general are not motivated to introduce new technologies mainly because that the definition of Cloud Computing is unclear.
Successful change is mainly the product of a cognitive and analytical processes (Iveroth, 2010) where organizational resources play a significant role in shaping these processes (Battleson et al., 2016). To gain the full benefits of adoption of Cloud Computing an organization needs to look beyond the changes to their computing systems and also make changes to the way it works, including their processes. (Chang, Walters and Wills, 2016). Processes are defined by Christensen and Overdorf's (2000) as the patterns of interaction, coordination, communication, and decision-making employees use to transform resources into products and services of greater worth. Processes are set up so that employees perform tasks in a consistent way, every time. Processes are established to achieve high quality in an effective way, therefore, they are meant not to change or, if they must change, it is through restricted and controlled procedures. This is one of the dilemmas of management, that processes are by their nature not meant to change, but when the same processes are used to tackle a different task then it is intended for, it is likely to perform indolently (Christensen and Overdorf, 2000). Levitt and March (1988) argue, after many years of close analysis of technological innovations, that even though there are technological difficulties and sometimes occasional major technical barrier to overcome, the majority of failures are due to some weakness in the way the process is managed within the organization. Furthermore, Christensen and Overdorf (2000) argue that the most important capabilities and disabilities aren’t necessarily embedded in the most visible processes in an organization such as logistics, development or manufacturing. The important capabilities are rather likely to be less visible background processes such as decision-making on where to invest resources, how different analysis is translated into financial projections or how plans and budgets are negotiated internally. In these processes many organizations’ most serious disabilities lie in coping with change (Christensen and Overdorf, 2000) where the competitive advantage may be gained by the development and use of these processes. Furthermore, the organizational processes are a product of embedded competences (Battleson et al., 2016).

Competence is highly needed in a change process (Kotter, 1996). The word competence is defined differently by various scholars. Boyatzis (1982) defines competence as an underlying characteristic of a person which provides effective and superior performance in a task. Martin (1995) defines competence as the ability to perform the activities predetermined to the levels of performance expected in employment. Brockmann et al. (2008) define competence as the knowledge-based performance that integrates practical and theoretical knowledge with personal and social qualities. Beardwell and Thompson (2017) describe competence as instances that represent the behavioral and technical abilities an individual employee must have, in order to meet the organization's goals. Boyatzis (1982) and Martin (1995) mainly mention the underlying qualities referring to knowledge that primarily results in high-end performance, whereas Brockmann et al. (2008) and Beardwell and Thompson (2017) also highlight the behavioral and
social aspects of competence that leads to the ability of performance. However, these definitions refer to the individual ability to apply knowledge, understanding, skills and performance to a work activity, and with these are the above described challenges important to manage to encounter organizational change.

2.2.2 Managing Organizational Change

Organizational change management refers to the process of implementing organizational changes in a business or a company and deals with the people involved in the process. Some of the functions that are managed within organizational change is communicating the vision and need for change, briefing employees about the changes and their role in them and establish a reward system in which individuals are given incentives to change the way they work (Beardwell and Thompson, 2017).

Often managers within large companies can, to some extent, foresee and identify disruptive changes coming. These companies have the resources to handle these changes such as talented managers and specialists, strong product portfolios, first-rate technological know-how, and financial resources. What the organization and the managers within it lack is a habit of thinking about their organization’s capabilities as carefully as they think about individual people’s capabilities (Christensen and Overdorf, 2000). Furthermore, even though managers have the right business information, leaders are less likely to make smart decision if the lack real-time data. Moreover, without a complete understanding of all components of their business, executives jeopardize their ability to identify critical weaknesses and plan for growth (Candito, 2019).

According to Christensen and Overdorf (2000), an organization that faces major change, is the worst possible approach may be to make drastic adjustments to the existing organization. If doing so, managers can destroy the very core capabilities that sustain the organization by trying to transform it (Christensen and Overdorf, 2000).

The most famous change management tools are Lewins 3-step and Kotter's eight-step model. Lewins model includes three steps, namely; unfreeze, change, freeze (Lewin, 1947). Kotter's eight step model include: establish a sense of urgency, create the guiding coalition, establish a vision and strategy, enlist a volunteer army, empower broad-based action, create short-term wins, sustain acceleration, anchor new approaches in culture (Kotter, 1996).

The first step of Kotter’s (1996) eight-step model is about creating urgency for change. Essential for urgency to be created is awareness. When creating awareness, Lewin (1947) focuses on diagnostic activities, such as interviews and questionnaires, which are powerful interventions. Lewin (1947) takes into consideration, that the need to change and awareness can change itself. To contribute to awareness, essential information needs to be communicated. Kotter (1996)
mention communication as a guiding responsibility, that cannot take place without a communication plan. However, no change will occur in an organization unless massive numbers of employees takes the opportunity. In Lewin (1947) unfreeze stage, it is emphasized that the importance of communicating the current problematic situation and clearly state why a change process is put into force. This will make an organization more willing to accept the new change and let go of old ways. The desire to change is addressed by Lewin (1947) in the unfreeze-stage and comes from the combination of disconfirmation, survival anxiety and psychological safety. Kotter (1996) on the other hand, refers the desire of change as not just a vison but a compelling catalyst. To deal with the resistance to change that might occur, Kotter (1996) emphasize to not just present an idea, but to create a movement, by using a volunteer army. Lewin (1947), on the other hand, does not address resistance to change per se but replaces it with motivation to change as earlier described in the unfreeze stage. Another way to meet resistance to change are by knowledge and training. Lewin (1947) emphasize the importance of support in the change stage which involves training exercises, coaching and learning-tools. Kotter (1996) just assumes that knowledge and training will be given as part of the change initiative. Reinforcement is one of the most important steps stated by both Kotter (1996) and Lewin (1947). Lewin (1947) describe the reinforcement as the main focus in the last step, freeze, where consistency, measurement and monitoring are perused so that the changes are internalized by the organization. Kotter (1996) focuses on establishing the new behaviors and organizational success making sure employees do not fall back to old habits. If an organization do fall back on old habits, corrective actions can be taken, monitored and celebrated to create short term wins (Kotter, 1996).

2.3 Organizational Aspects of Migration to Public Cloud

The migration towards Public Cloud is of technical advantages but will also implement some important organizational advantages (Chang, Walters and Wills, 2016; Deshpande, Sharma and Poju, 2019).

One advantage is that Cloud Computing offers a more standardized, efficient and flexible IT infrastructure, which drives innovation and responds to changes in the business. A more flexible infrastructure encourages an organization to make more experimentation and iteration, which enables the organization’s business to introduce new technology and services more quickly (Redhat, 2019). Battleson et al. (2016) argue that the IT Infrastructure capabilities with Cloud Computing are found to increase the awareness of an organization. This could specifically be done by developing capabilities for detecting and seizing marketing opportunities. With increased awareness, speed of development and delivery products could be increased.
Cloud Computing may also help an organization increase various forms of organizational agility (Sambamurthy et al., 2003; Battleson et al., 2016). Sambamurthy et al. (2003) describe three dimensions of dynamic capability, namely; digital options, organizational agility, and entrepreneurial alertness. Dynamic capabilities are described as well-developed digital options in the form of digitized enterprise work processes and knowledge systems to automate, inform, and integrate activities. Organizational agility is described as the ability to detect innovation opportunities and the opportunity to seize these by assembling an organization’s assets, knowledge, and relationships with speed and surprise (D’Aveni, 1994; Battleson et al., 2016). Similar, Sambamurthy et al. (2003) also describe organizational agility as the ability to detect opportunities and seize these, but mainly for innovation, by assembling requisite resources with speed. Battleson et al. (2016) mention organizational agility which include operational agility, market capitalization agility and strategic agility. Organizations with entrepreneurial alertness enable organizations to explore, detect any ignorance and determine actionable opportunities within their markets (Sambamurthy et al., 2003). These described dimensions play a mediating role between Cloud Computing investments and organizational performance (Battleson et al., 2016). Hence, organizational agility allows an organization’s different capabilities to interact with markets by exploring and seize opportunities for market expansion. For example, digital platforms such as internet computing enable an organization to quickly recognize changes and respond rapidly to changing customer requirements.

Furthermore, as organizations do not need to worry about acquiring and maintaining their own software applications, some scholars argue that the Cloud Computing adaption supports organizations to concentrate on their own, core business, where less resources are required for other business (Yang et al., 2015; Bayramusta and Nasir, 2016). In this environment, IT operations will be handled by experts in CSPs, and organizations will then not need to deal with a redundant load of IT operations. Apart from these advantages, with standardized operations follows that less personnel are required since it takes fewer people to do the same work with Cloud Computing (Deshpande, Sharma and Poju, 2019). Moreover, Maresova, Sobeslay, and Krejcar (2016), explain that Cloud Computing services appear to offer significant cost advantages, such as investment and operating cost savings, high elasticity of services as well as increased efficiency of certain business processes.

It is argued that the concept of Cloud Computing is not fully clarified, and its diffusion is still far from full potential due to issues like security concerns, fear of losing control, and organizational resistance (Benlian and Hess, 2011; Lee, Chae, and Cho, 2013) and therefore, are the managers are not motivated to introduce the Cloud Computing technology (Yang et al., 2015).
3. Method

This chapter outlines the method of the research process used to conduct the thesis, between the beginning of January to the end of May 2019. The limited research on organizational affects when implementing Cloud Computing made it suitable to conduct a case study as the main research method. The case study was conducted at a global company suitable to the description of IT legacy transformation, where the researchers acted as insiders.

3.1 Choice of Methodical Approach

A paradigm is described as the philosophical structure within scientific research, which influence how the research is managed and performed. With an interpretive paradigm, the social reality is formed by the researchers’ own perceptions. When adopting the interpretive paradigm, a case study is the most suitable methodical approach (Collis and Hussey, 2009). Furthermore, the purpose of the study is to investigate how migration to Public Cloud affects an organization with large IT legacy and to contribute to knowledge with the organizational perspective of the migration process. Hence, an inductive approach with empirical collection was used (Eisenhardt and Graebner, 2007; Blomkvist and Hallin, 2015).

For empirical collection, case studies are one of the most common types of research designs in the field of social science and is specifically used in inductive studies (Blomkvist and Hallin, 2015). A case study is also suitable when the purpose is exploratory with the aim to use the study to discover important dimensions of a phenomena that have previously been limed researched (Blomkvist and Hallin, 2015) and enables the discovery of new dimensions (Yin 2009). Theory-building research from case studies typically answers research questions that make use of words like how in unexplored research areas (Yin 2009; Eisenhardt and Graebner, 2007; Blomkvist and Hallin, 2015). Furthermore, a case study approach is relevant when the research question is regarding an “in-depth” description of some social phenomena (Yin 2009). Furthermore, a case study is also particularly suitable for illuminating and extending relationships and logic among constructs (Eisenhardt and Graebner, 2007).

A case study is an empirical study (Blomkvist and Hallin, 2015), investigating a contemporary phenomenon in depth and within its real-life context, where the boundaries between the phenomena and context are not clear (Yin 2009). This kind of study allows investigators to retain a holistic perspective with meaningful characteristics of real-life events, including organizational and managerial processes and internal relations and the maturation of industries (Yin 2009). Conducting a case study as a research method incorporates gathering enough amounts of information (Blomkvist and Hallin, 2015) from a variety of data sources, such as combinations of literature, interviews, and observations (Eisenhardt, 1989). The case study is used to develop theory inductively, by creating theoretical constructions and propositions from empirical evidence.
(Eisenhardt, 1989). The theory is then developed by recognizing patterns of relationship and constructs within the specific collected material (Eisenhardt and Graebner, 2007).

Several strengths are eminent when building theory from a case study. Case studies enables a combination of different research methods, which increase the validity of the study (Collis and Hussey, 2009), and is likely to generate novel, accurate and interesting theory (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). Also, the emergent theory is likely to be testable with developed constructs that can be measured, and hypotheses that can be evaluated. Another key feature and benefit of a case study is the possibility to adjust during the data collection process. Furthermore, the recollected findings from theory is likely to be empirically valid since the theory-building process has evolved from the analysis, consistent with the empirical evidence (Eisenhardt, 1989; Blomkvist and Hallin, 2015). Moreover, case studies give the opportunities to study multiple levels of analysis within a single study (Yin, 1984). Using a single case in this research, typically give the opportunity to explore a significant phenomenon under rare circumstances (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). It is also suggested that a single case study research design can be adopted when the case among other represents a representative, a typical, an extreme or a revolutionary case (Yin 2009). Also, it can be argued that exploring a single case could capture the reality better then generating a bit of data from several cases (Blomkvist and Hallin, 2015). This results in rich descriptions of the existence of a specific phenomenon. Lastly, the popularity and relevance of theory building from case studies is motivated to be one of the best bridges from rich qualitative evidence transformed to mainstream deductive research (Eisenhardt and Graebner, 2007).

There are some raised issues with conducting a case study. For instance, the emergent theory could result in subjective and primitive theory. To avoid that, the study should be characterized by systematics in choice of case, data gathering method and analysis method. Furthermore, choices, justifications and reflections of the process should be included (Blomkvist and Hallin, 2015). On the other hand, the emerged theory could be overly complex, lack the simplicity of overall perspective and could result in narrow and idiosyncratic theory (Eisenhardt, 1989). However, the many strengths of a case study as a research method conquer the few weaknesses described and is therefore argued to be a suitable approach for this thesis.

### 3.2 Selection of Case

There are many organizations facing change when adopting to emerging technologies in the market, like Cloud Computing. However, investigating how an organization is affected by these changes, it is particularly interesting to investigate a company with an IT legacy in need for change. Also, since the investigation being made from an organizational perspective, the investigation could benefit from investigating a large and incumbent company. If doing a single case-study, the chosen case should be the one that is most likely to yield the best data (Yin, 2009). The chosen
case company, a global telecom company we have chosen to call Company A, is chosen due to it is most suitable fulfilling both requirements to address the problematization earlier described. By selecting a most-likely case for the investigated phenomenon, the study has the possibility to contribute to knowledge, where general findings may be identified (Eisenhardt and Graebner, 2007). To help the process of the thesis, was a supervisor from Company A entailed, by giving supportive advises and aspects of the study.

3.3 Research Design

Case study research is one of the most difficult types of research to do because of the absence of routine procedures. To manage the case study, focus have been put on handling procedural uncertainties, ask good questions, listen, being flexible, and have a firm hand of issues being studied throughout the process. Furthermore, focus has also been put on how to avoid bias (Yin, 2009). One pitfall is to consider case study design to be a subset of variant of the research designs used for other methods, but the case study is a separate research method that has its own research design (Yin 2009; Blomkvist and Hallin, 2015). In the most elementary sense, the design is the logical sequence that connects empirical data to a study’s initial research question and to its conclusions (Yin 2009).

The case study research design was of an exploratory nature (Yin 2009), since there is a gap in the literature, which the thesis aspires to contribute. In particular, the thesis aspires to deepen the understanding of how large organizations with IT legacies could take advantage of Cloud Computing. The limited number of previous academic studies in this field from the chosen perspective made it an area suitable to be investigated from an exploratory perspective (Blomkvist and Hallin, 2015). However, to prevent that the case becomes too broad and ensure that it stays in scope boundaries can be implemented (Yin, 2003). In this case, the boundary was set to investigate the organizational effects of the Cloud migration process for an organization with large IT legacy.

Building theory from a case study is an iterative process, where it is important to take advantage of new insights. The central idea is to constantly compare theory and empirics with a theory that closely fits the compiled data. The researchers may focus on only one part of the process at a time, however, the case study as a research method requires constant iteration backwards and forwards between steps within the entire process (Eisenhardt, 1989) Also, the researchers must be open to what the empirics contain and adjust the purpose and the research questions (Blomkvist and Hallin, 2015).

The research process was based on a pre-study and a main study, as seen in Figure 3. During the pre-study, the process consisted of unstructured interviews at the case company in order to identify relevant research areas as well as finding relevant theory to address the problematization. The unstructured interviews were also conducted in order to gain insights into the case company and
formulate a general idea of what key issues should be studied. After identifying the main issue, the main study started. The main study started with the development of the problem formulation, purpose and research question that would shape the future study. The problem formulation was inspired from the current situation at Company A. Thereafter, the literature study was initiated, where earlier work and research within the suggested research area were critically and carefully reviewed. The information collected from the unstructured interviews and literature study were used as guidelines for the empirics that later were collected. The empirics were collected through semi-structured interviews, but also some information from the interviews conducted in the pre-study was used in the empirics. Furthermore, the empirics were discussed and analyzed based on the theoretical framework, leading to the conclusion of the study.

Throughout the entire study, the different parts of the thesis report have been constructed in a logical way. The research study was a highly iterative process where all parts of the thesis have been influenced and refined throughout the project to be able to develop new theory. The research design that was adopted during this study, is illustrated in Figure 3 and depicts the iterative process employed during the thesis work. Each part of the design will be presented in greater detail in following sections.

![Figure 3 – The research design of the thesis.](image)

### 3.3.1 Pre-study

The aim of the pre-study was to identify the underlying issue of the case company. Identifying the problem at the case company began with identifying relevant research areas of the upcoming case study. By doing so, a preliminary problem formulation and research questions were formulated. Using the preliminary problematization, a total of seven unstructured exploratory interviews was
conducted at the case company. These interviews were suggested by the supervisor from Company A and were conducted within different department areas and roles, as shown in Table 2. These unstructured interviews contributed to an overview of the organization and the current state of the internal IT infrastructure at Company A. These findings were used to understand what areas need to be investigated further and to iteratively develop and update the problem formulation. Furthermore, internal documents with specific information of Company A was reviewed and discussed to establish the final problem formulation.

Table 2 – Unstructured interviews during the pre-study.

<table>
<thead>
<tr>
<th>Department</th>
<th>Number of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sourcing</td>
<td>4</td>
</tr>
<tr>
<td>Group IT</td>
<td>3</td>
</tr>
</tbody>
</table>

### 3.3.2 Literature Review

The literature review was one of the most central parts of the thesis, building a foundation for the study and adding to the context and investigation of the case company. Furthermore, the literature review provided a comprehensive overview of the existing knowledge within the field of Cloud Computing.

The collected literature was comprised of a group of articles from journals, books, and other published works from different fields. The literature was found on various scholarly databases as well as exclusive information available at the case company. The three most used web databases were Google Scholar, IEEE Xplore and the Web of Science. The collection of information was conducted using the search words such as; *Cloud Computing, Public Cloud, Cloud Security, IT Legacy, Change Management, Managing organizational change*.

In this process, frequently cited authors and articles relevant to this study were identified and used in the literature review. The collected information was then clustered and triangulated to diminishing potential biases.

### 3.3.3 Data Collection

The case study was conducted with the help of collection of empirical data, where interviews were an essential source of information (Yin, 2009). The method for collecting data was semi-structured interviews, which was the qualitative part of the data collection. The main purpose of the interviews was to understand what the interviewee thinks, does or feels (Collis & Hussey, 2009).
In this specific study, the purpose of the interviews was to gain a broad perspective and characterize the employee's perception of how the implementation of Public Cloud solutions affect the organization from Company A’s perspective, based on real-life, in-depth context.

The semi-structured interviews were conducted with open-ended questions and deepening question based on the answers. The open-ended questions enable the interviewees to give broad, deep and reflected answers to the questions given. An illustration of the concept of “open-ended” questions is illustrated in Figure 4 (Bender et al., 2005). Moreover, the semi-structured interviews allow the researcher to add additional questions and get more detailed information, where it is needed (Collis & Hussey, 2009). This resulted in that each semi-structured interview generated a large set of collected data.

![Figure 4](image)

*Figure 4 – The structure of the semi-structured interviews.*

In this study, the interviewees came from three different departments: the IT department, the sourcing department and the service delivery department. The IT department is focusing on the internal IT ecosystem of Company A, as well as trying to transform the IT legacy within the organization. The sourcing department finds suppliers and negotiate the contracts based on the requirements given from the IT department. The service delivery department on the other hand is responsible for service delivery including strategy and performance. The reason these departments were chosen was because these departments where central in the change process towards Public Cloud.

Based on Eisenhardt and Graebner’s (2007) suggestion for minimizing the risk of personal biases, a diverse set of informants were selected regarding the hierarchal level within different departments. Furthermore, several interviewees in the same departments were interviewed during the semi-structured interviews. This way, the same information could be collected from different
sources within the same department. The chosen candidates for the interviews were handpicked with the help from the supervisor at Company A. The selection was based on roles, responsibilities, earlier experiences and current project involvements of the candidates. A total of 20 candidates was identified as suitable, where 12 of them were able to participate with one or two interviews. All interviewees are presented in Appendix 1 with a number and the department the interviewee belong to.

All the interviews were recorded, with the permissions of the interviewees. The duration of the interviews varied between 45-60 minutes. Thereafter, all the interviews were transcribed for later analysis with the aim of achieving increased reliability of the study (Yin, 1994). The interviews were conducted in Swedish or English depending on the interviewee’s preferences. The interviews were held face to face at Company A or over Skype when the interviewee was located elsewhere. Throughout all interviews, both researchers were present where one of the researchers was mainly responsible for conducting the interview and the other researcher was responsible for writing the protocol as well as making sure that all relevant and interesting areas were covered. Before the interviews started, the representatives at Company A were presented with a brief introduction and the preliminary purpose of the thesis. Thereafter, the interviews were guided with the help of a set of semi-structured questions, which can be found in Appendix 2. These questions were only used as a support to get the interview fluid rather than rigid (Yin, 2009). Furthermore, in the end of each interview, the interviewees were asked to give feedback, new areas to consider and additional candidates for new interviews.

3.3.4 Observation

Informal observations were made at the case company throughout the case study, where the researchers acted as insiders (Louis and Bartunek, 1992). The researchers where located at the Sourcing department where but also spent time on the other departments. The observations were based on every-day dialogues, informal discussions, meetings, inputs from multiple employees and social interactions. After these interactions, a discussion followed between the researchers and notes were taken if any information seemed important for the study. These notes were stored in the common database and used in the data analysis.

3.3.5 Analysis Method

The analysis of the case study evidence is one of the least developed and most difficult aspects of doing a case study, where much depends on the investigators own empirical thinking along with the displaying and presentation of evidence and careful consideration of alternative interpretations (Yin, 2009). However, a general strategy of the inductive case study research was the foundation
of theoretical propositions. The design of the case study was based on such propositions from where a set of research questions were developed, reviews of the literature, and new proposition (Yin, 2009), which had an impact over the overall results of the analysis.

The empirical analysis was done by a thematic analysis where all the empirics were reviewed, patterns identified and sorted in different categories and themes developed (Yin, 2009; Blomkvist and Hallin, 2015). To diminish the risk of potential biases, each researcher independently analyzed the data and individually created themes before brought up for discussion. It has been suggested that this process of patterns matching increases the construct validity of the thesis (Eisenhardt and Graebner, 2007). In parallel to the data collection, the secondary sources were continuously evaluated, leading to understanding of the material frequently increasing though the interaction between existing theory and the collected empirics (Blomkvist and Hallin, 2015).

3.4 Validity and Reliability

Several methodical actions have been taken to construct validity, external validity and reliability; these are all summarized in Table 3. To be able to construct validity, multiple sources were used in the data collection such as documentations, interviews and direct observation. The documentation includes the literature review, interview transcripts and notes.

The use of relevant theory for addressing the purpose is another important part of constructing validity. The sources from the literature review, referred to as the secondary sources, that were outlined in the literature review and needed for the analysis of the empirical findings were collected from legitimate and established journals in the field of Industrial Management to increase validity. Most of the literature regarding Cloud Computing has not yet reached the maturity level, however article published in reliable journals, no older than ten years was used within the organizational perspective area of Cloud Computing. Some of the journals that were used, to example the IEEE has provided support for research activity in Cloud in many years (Yang et al., 2014). Furthermore, the organizational theories are widely spread, accepted and have had great influence within the theoretical field. However, the secondary sources were critically analyzed by evaluating the reliability and validity of the sources’ research methods. Furthermore, the interviews were important to establish a chain of evidence. The semi-structured interviews were conducted with open ended questions to ensure that the interviewees gave answers that reflected their own thoughts (Collis & Hussey, 2009), rather than something coming from Company A. Furthermore, by using multiple sources from the same department, data triangulation was made possible which reduced bias in data sources and increases the reliability (Collis & Hussey, 2009). However, there is a risk that the representation of reality can be affected based on which subjects that have been chosen for the interviews. This issue was addressed by reciting the interviewees in the analysis in
order to give an accurate view of the context. The overall content of the interviews can have been affected by the fact that the interviews were recorded, which may have led to limited information. Furthermore, the researchers made sure not to reveal any given information from the study with the participants until the interview were finished. This way, the interviewees could give their honest opinions without being influenced (Collis & Hussey, 2009). These interviews were then analyzed with pattern-matching codes. Moreover, to increase the construct validity of the thesis the analysis was discussed with a supervisor at the case company and the thesis supervisor at the Royal Institute of Technology, KTH. The case company supervisor was involved with a discussion through the whole project, possessed extensive knowledge of the overall business and had over 17 years of experience working at the company. The two supervisors reviewed a draft of the case study report to extended with feedback of the overall findings and data collection.

To achieve external validity, empirical evidence accessed from a case study was used as previously outlined. The theory has been used in the single-case study both to build an understanding the technical changes to really understand how these effects an organization. As earlier mentioned, the theories regarding Cloud Computing have not yet reached the maturity level but are outlined and discussed in the literature review based on the facts available. The organizational theories, on the other hand, are well researched and composed, where the theories that can help fulfill the purpose of this thesis have been critically analyzed and outlined. Furthermore, multiple business units across the organization have been interviewed and the responses triangulated and reflected upon, to achieve external validity.

The goal of reliability is to minimize the errors and biases in the study (Yin, 2009). Based on the problematization the goal has been to achieve research that are logically consistent. To fulfill the goal, the research process has been performed independently, systematically and critically were the researchers have stayed impartial (Blomkvist and Hallin, 2015). During the study, the researcher has clarified the purpose of the study and built the thesis to fulfill it, with relevant theories and methods. Furthermore, to ensure reliability as many steps as possible were made operational and several methods were used during the case study (Yin, 2009). A case database where also established early in the project where all relevant information where continuously updated and available during the project.

Lastly, there was a time frame of 22 weeks for completing the thesis, which had implications on the sample size for interviews, where the data collection included 16 semi-structured interviews from 12 candidates. This might have affected the reliability and validity of the findings.
Table 3 – A summary of the qualitative measurements.

<table>
<thead>
<tr>
<th>Qualitative Measure</th>
<th>Methodological Action In the case Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct Validity</td>
<td>Use of relevant theory for addressing the purpose (Blomkvist and Hallin, 2015). Use multiple sources in the data collection (Yin, 2009). Pattern matching of codes (Eisenhardt and Graebner, 2007) Establish a chain of evidence of the findings (Yin, 2009). Have key informants review a draft of the case study report (Yin, 2009).</td>
</tr>
<tr>
<td>Reliability</td>
<td>Clarifying the purpose of the study and relevant theoretical concepts to the informant (Yin, 2009). Establishing a case study database (Yin, 2009). Description of the interviewed informants (Blomkvist and Hallin, 2015).</td>
</tr>
</tbody>
</table>

3.5 Ethical Considerations

To ensure ethical aspects are taken into consideration throughout the thesis, the four principles of the Scientific Research Council have been adhered to. These include: (1) informing the interviewee of the purpose of the research, (2) to consent claim of how the information is used, (3) to not disclose any vulnerable personal or organizational information and (4) to not use the information gathered during the research for other purposes (The Swedish Research Council, 2017).

The study was conducted at Company A, where Company A’s own code of conduct was followed. Furthermore, one other condition that had to be fulfilled, if the study was to be authorized by Company A was to sign a non-disclosure agreement (NDA). It was agreed that sensitive information, such as departments and the employee lists would not be disclosed to a third party. Therefore, all information that can be connected to the company was changed to “Company A” and all names of the interviewees were removed. Only the researchers and the supervisors at Company A are aware of the mapping between the letter notation and actual subunit. Furthermore, only the researchers are aware of what a specific interviewee has said. Third parties will not be able to track an answer back to a certain interviewee.
4. Empirical Context

This chapter introduces the case company and outlines the current situation at Company A, mainly emphasizing the current experience by Company A of the potential technological shift towards Public Cloud. In this context, it is worth noting that the empirical context is outlined in accordance with the description provided by informants across the organization. Thus, it does not contain any interpretation of the empirics but aims to provide an accurate description of the case company as seen from the perspective of its employees.

4.1 Company A

The case company, which also is the sponsor of this thesis, Company A, is one of the leading providers of information and communication technology (ICT) to service providers. Company A is a well-established international company and enables the full value of connectivity by creating game-changing technology and services that are easy to use, adopt and scale. Company A is operating in the business-to-business market and provides a range of products and services spread across the whole world.

4.1.1 The Case Study at Company A

Company A’s organization consists of four business areas, Networks, Digital Services, Managed Services and Technologies & New Businesses. The business areas are working within five market areas which represents all the regions of that Company A are providing product and services. The business areas and market areas are sorted under the group function which handles different functions; human resources, legal affairs and compliance, finance and common functions, marketing and corporate relations, and technology. All these areas are working together towards the case company’s customers, as Figure 5 is mapping.
The case study was conducted within one of the business market areas of Company A, namely Business Area Networks. Within this area, the case study was developed and supervised under the department of sourcing where the majority of the interviews were conducted. The sourcing department seeks to optimize efficiencies and deliver maximum value for Company A’s customers. Sourcing does this through a dedicated work to create and nurture relationships with partners and suppliers. Consequently, Company A wants to migrate the IT infrastructure to Public Cloud and thereby provide Cloud Computing capabilities for applications and services, both for Company A’s business and internal IT.

In order to get a deeper understanding and broader perspective of the case study, key informants from the Group IT department were also interviewed. The department of Group IT is within one of the other three business areas, namely Business Area Managed Services. When Group IT makes changes and new suppliers are required, the Sourcing department matches Group IT requirements with suitable suppliers. Therefore, the collaboration between the department of Group IT and Sourcing are very important.
5. Findings and Analysis

In this chapter, the findings and analysis are outlined, grounded in the empirical data gathered from the case study at Company A, regarding the potential technological shift. More specifically, this chapter presents the findings based on the empirical material collected from interviews and the observations obtained from the study at the case company. Furthermore, these findings are presented and embedded in an analysis. The findings and the embedded analysis are represented in the chapters of organizational readiness, cloud computing migration and potential opportunities of migration to Public Cloud. Moreover, some sections have been highlighted as a subchapter with an analysis supporting the evidences, where the findings are summarized.

5.1 Organizational Readiness

The change process of the IT legacy to Public Cloud, has resulted in several internal organizational challenges for Company A. For instance, many of the interviewees agreed that resistance to change is a central challenge for the migration process towards Public Cloud and that employees seems unmotivated to undertake the required changes for enable Public Cloud. Furthermore, many of the interviewees suggested that the mentality within the organization needs to be changed. Company A has been used to deliver products and services in a certain way for a very long time, which have developed the mentality that changes are not needed to stay competitive. One interviewee from the IT department expressed:

“It is very difficult to try to change different things in an organization that is used to deliver in a certain way.” – IT1.

This mindset of supporting old and convenient ways of working, seems to reinforce a complexity. When change is approaching, resistance appear within the organization. Thus, many of the interviewees agreed that change of the IT infrastructure is needed to stay competitive in the dynamic market of digitalization. Furthermore, the majority of the interviewees suggested that by increasing the motivation and competence of the employees, resistance to change could be reduced and therefore, facilitate the implementation of Public Cloud. The interviewee responsible for the core-infrastructure explained why the process of implementing Public Cloud have not been initiated earlier:

“[…] thus, changes that is not tolerated. The reason why we have not done this process before is mainly because the motivations towards it has not been there. Another reason is that we do not have the competence in-house to enable this changing process.” – IT1.
Hence, increasing the motivation could be essential for Company A to enable change. One interviewee of the IT department explained that it is important to guide all involved through the process by clarifying roles, and by giving the employees the opportunity to grow and learn. Interviewees from the IT department suggested that showing clear examples of different successful projects is the only way of increasing the motivation. By increasing the motivation, the journey towards Public Cloud could be more simplified. These employees also explained that consciousness and understanding of that the migration process is not a threat against traditional ways of working, but instead an essential process for Company A to survive. Furthermore, increased motivation urges to make radical changes.

Making radical changes of a slow adopting organization such as Company A entails other problems, such as losing control of the core-businesses when specific competence is shifted. One interviewee of the IT department suggested that fast and major changes could harm the enterprise and therefore should the strategy of implementing Public Cloud be elastic and short-time designed. The same interviewee also suggested that a good strategy is non-existing for these kinds of projects, mainly because reassessment is always required in a fast-changing market such as Cloud Computing. Hence, developing a long-lasting and good strategy appears almost impossible to stand by. On the other hand, some interviewees suggested that the lack of a clear strategy have made the journey more complex. The migration process towards Public Cloud has been developed and lead with minimal direction from managers higher up in the hierarchy. Several interviewees from the IT department indicated that clarifying the strategy could simplify the migration process to Public Cloud.

As any major change, the process of implementing Public Cloud does not create immediate business value, since there is a large operation connected to the change that needs to be managed. Employees who work every day with delivering services or products to customer, implicated that they do not have the time to spend on changing ways of working to create business value of Public Cloud. Therefore, since the employees are busy with the everyday work, they work for certain goals that is not in line with those of Public Cloud but rather to focus on satisfying the customer within the near future. IT3 explained the problematic:

“Company A’s IT structure is actually not inclined to changes – there is no will of change. The changes that is made demands that a customer inquire for it, and it has always been like that.” – IT3.

Different interviewees suggested that changes and directions need to be implemented from the manager board to change this short-time mindset. The journey towards Public Cloud is entailed to be communicated to manage the required changes.
Another aspect that have encouraged to resistance and affected the process towards Public Cloud, is that many employees appear to be unsure of how their role will change when migrating the IT legacy to Public Cloud. Public Cloud is simply an IT infrastructure automatization where fewer human resources are required to operate and handle the IT legacy. One interviewee of the IT department suggested that Public Cloud is a disruptive innovation, which means that some people will lose their jobs. Managing people with this fact in mind is therefore essential. Furthermore, other interviewees suggested that the culture of Company A has to be investigated and could be an explanation of the resistance towards Public Cloud. For instance, the interviewees from the IT department argued that Company A’s culture is very ingrained, and that the ways of working are of a certain way. One interviewee from the IT department suggested:

“We have a culture in Company A, saying that you succeed by being very close to the operator and selling hardware, which is very regulated. How do you manage this when changes are arising? The structure of our culture is very flat and not the culture leading from the top.” – IT5.

The majority of the interviewees suggested that the employees tend to favor processes and ways of working that feel comfortable. These processes have been convenient and advantageous for many years, leading to challenges of changing the mindset when needed. For a global organization as Company A, the complexity of managing different challenges of culture between different nations arises. One of the interviewees from the IT department explains that larger companies often have issues to move or make organizational changes when there is a mix of cultures. However, some interviewees argued that the cultural aspects have not been considered before and could be essential to examine further.

Furthermore, another interviewee from the IT department suggested that in order to succeed with Public Cloud, agile processes need to be developed, which will require both new IT competence and business goals. It is argued that competences of the employees of Company A needs to be updated to achieve more agile processes. IT1 suggested:

“I think Public Cloud, or Cloud Computing in general, require certain competence that should be within the organization. Competences of knowledge but also competence of ways of working.” – IT1.

The interviewees of the IT department agreed that the right competence is missing to enable moving the IT legacy towards Public Cloud. However, it is also argued that the external competence is very coveted and therefore hard to employ. To enable organizational readiness, interviewees suggested that a well-defined strategy with a holistic perspective is required to be examined further.
5.1.1 Strategy and Holistic Perspective

Within such a large organization as Company A, there are several subdivisions. The collected empirics from the case study indicated that these departments may have different perspectives and goals of their own. Consequently, these divisions have, to some extent, different driving forces and opinions on why the organization should adopt to Public Cloud. As the concept of Cloud has developed, so has the reasons of why adapting to Public Cloud. One employees of the sourcing department explain that reduction is the main driving force to Public Cloud. Other employees suggest that Public Cloud should be adapted based on the notion of speed. Speed refers to the whole process from development of innovations, to when the final products are delivered and available to the customers. Furthermore, other employees suggest that an emerging reason of why to adopt Public Cloud might be the security, offered by the CSP. With different perspectives and goals of the sub-divisions it is difficult to see the holistic perspective and develop a strategy that fits the whole organization for the migration to Public Cloud. One interviewee responsible for the IT department expressed the difficulty of a strategy towards Public Cloud:

“I don't think there is such a thing as a good strategy, you have to constantly reassess, these things are changing incredible fast, you can't even imagine, so couple how fast this industry is changing with how slow a big European company can move, it is almost impossible to have a strategy that you can stand behind in more than one or two years.” – IT5.

As suggested in the quote above, Company A is a large incumbent organization that stand before a challenging transformation process. Through the transformation of the internal IT architecture towards Cloud Computing, the majority of the interviewees witness that they lack a fully developed strategy of the Cloud migration process. Furthermore, the employees lack understanding of how this transformation is connected to the rest of the organization. What adds to the slow adaption towards the transformation, is that the IT market are years ahead and is constantly changing. Without a clear and common goal of the entire organization with transparent benefits of the migration, the process of moving from DCs to Public Cloud becomes unfeasible. When employees lack the holistic perspective, where the company wants to be and how they will get there, the direction of the migration is unclear, and confusion is created. This analysis is summarized to the first finding of how Company A is affected by Public Cloud:

Finding 1: When migrating to Public Cloud, the organization tend to be divided. This is exposed, though the subdivisions within Company A have different perspectives, motivations and goals with the migration from the traditional DCs of
the IT legacy to the Public Cloud. Without a holistic perspective coupled with a well-motivated and transparent strategy the migration process becomes unfeasible.

5.1.2 Internal Processes

The complexity of organizational change management also involves the internal processes of Company A. The empirics collected from the interviews suggested that the organizational processes often are rigorous, where these constantly require approvals, comprehensive planning and numerous meetings. Therefore, when change is required are these processes slow to adoption. The rigorous and time-consuming processes are designed to manage Company A’s complex IT legacy and are not adaptable for disruptive changes. This aspect has also been observed from employees that have discussed the every-day work. Interviewees from the IT department suggested that to enable for Public Cloud, these processes need to be adapted. This is therefore a challenge of change management, as expressed in the following quotation:

“The change management process is very obsolete, and we would need to manage this in an additional way.” – IT1.

Furthermore, several interviewees implicate that Company A have built a barrier of complex processes, but without the perspective of outcome. The ways of working have been the same for a very long time. In a global company such as Company A it is essential to manage different processes simultaneously. Therefore, as suggested by several interviewees, have processes been developed in an environment where a lot of people keep track of complexed details. Without any standardized solution, employees are forced to continuously shift between disparate sources of information, resulting in productivity issues. Several interviewees implicate that these processes or ways of working is not agile and not in synergy with a holistic perspective. Hence, the internal processes of how to work with Public Cloud instead of managing the on-premises solution, have to be changed. A represent from the sourcing department suggested:

“The IT department must adjust the processes and change the ways of working. So, there is rather an internal change management challenge for the staff than a technical challenge of moving applications to Public Cloud.” – S2.

A second interviewee from the sourcing department suggested that it is not only about the processes and ways of working, but a wider change is required. This type of change require that the employees also change their mindset, build agile processes, build the right competence, set goals and focus on the outcome. This is described in the following quotation:

"In order to succeed with Cloud, employees has to change its mindset, its way of working, processes, employees also has to develop the way they work to become more agile. You do not only require IT skills, but also skills within our business and
what you want to achieve, you also have to develop the staff and build the right skills." – IT4.

A third interviewee stated that it is not even about the processes per say, but that is something that is easily hidden behind. Rather, the actual change that is required, as the former interviewee also mentioned, is to change the mindset, culture, build the right competence and find people whom have done something similar before to help with the change process. The problematic is stated in the quotation:

“If you interview 100 people, you might here that processes need to be improved to enable Public Cloud, but if you really dug-in its actually about competence, mindset and culture. People kind of explains this as processes, which they could hide behind. Mostly it is about lack of competence because it’s hard to find people who have done this before.” – IT5.

The quotation also refers to that there are a lot of people that believe it is the processes that need to be changed rather than any individual changes of the employees. Several interviewees state that departments have tried to build agile processes but not succeeded. The tools are provided however, the departments have not been able to build an agile organization. This analysis is summarized to the second finding of how Company A is affected by Public Cloud.

**Finding 2:** To enable the utilization of Public Cloud, the current processes around the IT infrastructure are affected and in need of change. The majority of the interviewees witness that Company A has complex processes, which complicates the change process. However, changing the processes might seem difficult, but interviewees witness that change the mindset of the employees that manage these processes might be an even bigger challenge

### 5.2 Cloud Computing Migration

Company A has several technologies that is called “Cloud”, that employees tend to refer to when the employees mention different Cloud Computing solutions. Based on the interviews, the empirics indicate that the word Cloud describe different projects, services and deployment models within the organization and include different characteristics of the different solutions. The definition of Cloud is therefore generalized within the organization. One interviewee expressed the notion:
“The word Cloud is to general and there is not enough thinking and discussion about the meaning of the word when talking about Cloud. So, what I would like to see is a structure for Company A when talking about Cloud Computing.” – IT5.

This aspect has also been observed in the every-day dialogues with employees. Based on the empirics collected from the interviewees, the generalization and unclear structure of Cloud Computing also entails in uncertainties of what IT legacy and security means. Several interviewees explain that the concept of IT legacy does not only cover the old traditional IT infrastructure, but IT legacy sometimes refers to the context around these systems which affect how the company distribute, manage and renew its IT solutions. Furthermore, based on the interviews, the security risk is a broad concept, since the security risks regard several topics such as managing data regulations, traffic, operational maintenance and stability, change of machinery and control of example costs, accesses, among others.

The interviewees at the IT department explained that the current IT legacy at Company A is the result of many years of investments, development and improvements of the IT infrastructure. Furthermore, the IT legacy consists of large amounts of data servers at specific location in DCs where the company has an established in-house solution. The interviewees continue to explain that the DCs are built and scaled to the size that it requires access to significant electricity, since the DCs are in need for power, both to drive the server operations and for cooling. Therefore, are the DCs designed to meet the absolute peak demand which means that the number of servers is redundant during any other time. These servers provide services at any hour of the day, seven days a week. Several interviewees suggested that instead of putting focus on the utilization, the servers in the DCs are measured and evaluated based on performance and availability. The following quotation illustrates the problematic situation of the redundant resources:

“The problem with the servers is that they have extremely low utilization, about ten percent. I believe you can reduce the number of servers if you optimize how these are used.” – S2.

As stated in the quote above, the capability of the DCs is therefore inefficiently provided, where the in-house solution uses more resources than necessary. Handling this type of large IT legacy requires significant resources with focus on the physical DCs rather than the outcome of the specific resources used. With such a low utilization as the Sourcing Business Partner stated, the majority of the operational solutions of the DCs are largely ineffective, costly and utilizes large physical resources. Hence, Company A with large IT legacy also need to focus on the non-essential parts of their business. A thoughtful discovery is that 90 percent of the servers are utilized and do not only require large resources to function, but neither contribute to the value creation of the
company. Companies without an IT legacy have a head start when adapting to the Cloud Computing market. The following quote describes the issue:

“Companies that are without this type of IT legacy have disrupted the market, with the ability to constantly adapt new tool set and ways of working.” – IT4.

Consequently, the IT legacy affects Company A. This could lead to that Company A fall behind its competitors in value creation and distribution. Eventually the IT legacy could impair the company’s position at the current market offerings.

The majority of the interviewees suggested that one of the largest hampering factors when considering utilizing Public Cloud is the distress of security aspects. The interviewees explained that security risks are a broad concept in the context of Cloud Computing migration, as a result of the many security components of security within a large organization. The majority of the interviewees implicated that there is common appreciation that the in-house DC is safe regarding these security components, since the functionality that is managing these components is a result of many years of investments, development and improvements. Several interviewees from the IT department explained that the management of the security components is possible to control in Public Cloud. However, the empirics collected from the interviewees indicated that there are different opinions of how safe the management of these security aspects are. Only a few of the interviewees at Company A perceive the migration towards Public Cloud as a challenge regarding security and sees the migration as a potential security threat. The difficulty was suggested by an employee working in the IT department:

“It is difficult to know how secure Public Cloud are, it is part of an alteration process.” – IT1.

The quote also illuminates the uncertainty and the lack of guidelines in the transformation process. However, the majority of the interviewees of all concerned departments have suggested that other employees within the organization consider security as a main issue when migrating to Public Cloud. One interviewee from the Sourcing department expresses:

“What is a myth and what is actually real? It feels like there is a lot of preconception statements that it is unsafe to utilize Public Cloud, which I believe is possible to disprove.” – S2.

The quote refers to the underlying vagueness and lack of guidelines that describes the current situation at Company A, regarding the security of Public Cloud. Without a common understanding and guidelines, the security risks are difficult to manage and produce unnecessary complexity to
the security aspect. Hence, the following subchapters examines more thorough the analysis of findings conducted from the empirics regarding IT legacy and security.

5.2.1 Changing the IT Legacy

The definition of IT legacy is differently described by different interviewees, where some refer to the IT legacy as old IT systems and some adds the old processes to the concept. Hence, as earlier described by interviewees, the IT legacy is the outcome of many years of IT architecture development, where new layers of architecture have been added continuously. Hence, this type of environment has resulted in high complexity. The complexity contributes to the difficulty to manage the IT legacy, where it is inconvenient to make changes. This problematic is described in the following quote:

“The IT legacy of today is that there is no structured way to handle all environments in the same way. You have a huge amount of operations of everything which means that you create unique ways of working for each environment, that is what drives cost today.” – S6.

The quote above describes the large customization of the IT legacy, where managing changes in a high complex environment increases the challenge of keeping up in a technological shift. Interviewees from the sourcing department explained that usually when a large customer like Company A have negotiated with service providers, they are used to have the distributed IT solutions customized after their requests. The CSP of Public Cloud, on the other hand, offers a standardized offer to all customers, where one-size fits all. Therefore, to be able to utilize Public Cloud, interviewees implicate that Company A for the first time need to adapt their processes to the services and boundaries that the CSP provides.

Moreover, the complexity of the IT legacy aggravates the very purpose of the IT deliverables, which support core capabilities and creates value for the organization. This issue is described in the following quote:

“We have developers, products and salespeople that all are in the lead, for these to be able to continue their work, they need capabilities that is not available today.” – IT1.

This statement sheds light on a serious issue, where areas within the company that all contribute to the value creation of the company, do not have access to the right capabilities. That employees do not have access to the capabilities they need can result in inefficiency and affect the time to market negatively and as a result delay new income.
The majority of the interweaves suggested that it is often possible to move the IT legacy to Public Cloud, where Public Cloud can be configured to function in the same way, and where the only difference is the liberation of the in-house DC. This type of process of moving application is called a “lift and shift”. However, some interviewees argue that when doing a lift and shift, many problems are transferred to the new Cloud Computing solution. Thought, many applications are not built to be available to run in Cloud Computing environment. Hence, interviewees explain that another option of moving applications within the IT legacy is to re-architecture each application, which can be executed in different levels depending on the application. One interviewee from the IT department explains that Company A got the recommendation from two of the leading CSPs to do re-architecture before migrating to Cloud Computing to make the migration smooth. However, interviewees explain that re-architecture requires investments and for investments to be made, it needs to be specified how long each application should be utilized. Moreover, interviewees suggest that when migrating from an on-prem solution to Public Cloud, it is not only important to make sure that the application that is moved to the Cloud functions, but the new solution also has to fit into the IT ecosystem where the different solutions talk to each other. Furthermore, some changes in the IT legacy might affect other applications. This knowledge is in the possession of key individuals within the organization.

The utilization of Public Cloud might offer solutions to historical difficulties such as unfeasible technological solutions, complex agreements and contracts, and physical supply issues required for the functionality of the products that Company A offers. The deployment model of Public Cloud offers a standardized service, where the concept of one-size fits all is offered to the customers. The service enables speed to all the technology processes of the business, including development, testing and delivering. The Sourcing Business Partner expresses:

“It will be faster and better with Public Cloud. An absolute advantage is that we will receive a standardized service that is more stable.” – S2.

Furthermore, the Public Cloud enables infrastructure automation with high availability and a sense of simplicity. The distributed service from Public Cloud is integrated, reliable and with an ensured functionality. In the event of that any application should be shut down, it is still possible to quickly manage the imperative functionality in the Public Cloud.

Moreover, interviewees from the Sourcing department argues that the Public Cloud deployment model differs from that of the traditional infrastructure, which could enable decrease of financial funding of the IT infrastructure. No additional investments are required to handle the in-house DCs. Therefore, can the organization move from the former model of CapEx, where funds are bounded and used to acquire, upgrade, and maintain the physical assets of the DCs (Kostic, 2018).
The deployment model of Public Cloud only requires the consumer to pay for the services used, the organization can adapt the model of OpEx to run their IT infrastructure.

One interviewee responsible for cross-functional tasks in the organization, explains that OpEx represents the day-to-day expenses and short-term costs necessary to keep the business running. Consequently, with the utilization of Public Cloud instead of utilizing IT legacy the economic efficiency increases, and it is possible to decrease the costs (Botta et al., 2016). Furthermore, interviewees from the Group IT department verify that the utilization of Public Cloud grants speed of deployment and the cost efficiency when moving from bounded capital, CapEx to OpEx. The speed of delivery entails the possibility to quickly shut down operations within Public Cloud to avoid unnecessary costs. One interviewee from the IT department suggested:

“With Public Cloud, we get speed of deployment; better speed, efficiency of costs by leaving CapEx, and we get people who are experts and managing other people who are experts on the things we do around infrastructure. Additionally, we get more time to focus on our core-capabilities.” – IT1.

Thus, the organization has the possibility to devote more resources on their core business, in a more effective and in a more conceivable environment with the Public Cloud deployment model. Some interviewees suggest that with the increased availability of IT, the satisfaction rate of employees will also increase. This could as a result increase the motivation, because employees feel proud to work in a forward-thinking organization. Ultimately, Public Cloud therefore offers Company A the possibility to strengthen their position at the current market.

**Finding 3:** When migrating to Public Cloud, the organization tend to be divided. This is exposed, though the subdivisions within Company A have different perspectives, motivations and goals with the migration from the traditional DCs of the IT legacy to the Public Cloud.

### 5.2.2 Security

The empirics collected from interviews implicate that there is one generalized risk when talking about migration to Public Cloud, namely security. Though, the security risk is a broad concept in the context of Cloud Computing migration, as a result of the many security components included in the concept. The collected empirics from interviews indicate that within a large organization, there are different perspectives when talking about the concept of security, and what a migration to Public Cloud implies. However, the majority of the interviewee’s agreed that the current in-house DC provides a false belief of security. Furthermore, the majority of the interviewees also imply that migrating from Company A’s DC to Public Cloud do not increase the security threats.
The majority of the interviewees suggested that migration to Public Cloud can be a reason for the transformation as mentioned in the following quote:

“*What is coming, and this is really interesting, the main thing that people are worried about right now is the security of Public Cloud, but in the reality, one of the main reasons why go to Cloud Computing will be because of the Security.*” – IT5.

Several interviewees explain that the CSPs have incentives, capabilities and resources to develop the services to improve their business and that the CSPs are often innovative, flexible and change-friendly, which in the long run makes them more attractive than an in-house DC. Furthermore, they also explain that CSPs, that deliver Cloud services as their core business, have massive investments, more licenses and knowledge than any other organization that have their core business elsewhere. Moreover, interviewees also explain that CSPs are continuously working to achieve the highest security level possible, where they have the most competent personnel and where the operative security model is continuously tested and iterated. Thus, the CSP are taking new lengths to keep the security of the stored and distributed information, where the CSP are analyzing behaviors to find and identify intruders. Therefore, as the majority of the interviewees suggest that the security risks can even be lowered when migrating to a third party. One interviewee working with a project of moving different service components of IT to Public Cloud suggested:

“*Public Cloud can be safer than our solutions we provide today. There is a security device around Public Cloud, much better than the one we have here today.*” – IT1.

One interviewee mentioned another advantage of Public Cloud, the maintenance and operational stability of CSP. A CSP has better abilities to cope with any disturbance in the operational stability in the event of any server failures. Another interviewee further explains that the CSPs are reliable and can cope with these situations and restore in a more effective way than the in-house DC. Furthermore, when having an own DC, trying to keep up with the CSP is costly and time-consuming when this does not align with the core business of the company.

Another aspect of security when migrating to Public Cloud is the feeling of lack of control. When using the distributed serviced of a CSP, the management of the control is left to the provider. This can be seen as a threat where Company A has to trust that the CSP is managing the security aspects as specified by Company A. However, one interviewee of the Internal IT department states that the actual risk is when the management of the security aspects are not clearly expressed;

“*When it comes to security, I think the risk is to have someone else do the work for you if you have not clearly specified how it should be done. But in the long run, I*
believe that you could get better control if you clean up what you have, before you migrate to Public Cloud.” – IT2.

The interviewee also mentions that the control of the information could be enhanced when utilizing Public Cloud, if the information is processes and sorted before migrating it. However, one of the interviewees does not see the threats that are enabled by the primary technology such as the actual risk, rather the lack of competence of the employees, insight and understanding in combination with the human factor that are managing the information in Public Cloud, as the biggest security risks. The following quote highlights these issues;

"I think the security risk is more connected to the ignorance, I claim that the lack of competence, insight and understanding of data is the biggest risk.” – IT3.

It is a challenge to encounter the ignorance of Public Cloud. The part of the issue that describes the lack of competence can be managed and meet with education and organizational guidelines of how the Public Cloud offering should be approached. However, the quote does not only identify the competence as the biggest risk, but the insight and understanding of the Public Cloud. These parts will take additional time to establish where some mistakes might have to be accepted if made, to see the development within the organization towards migration to Public Cloud.

When migrating to Public Cloud or Cloud Computing in general, there are several regulations that needs to be taken into consideration which could be hampering the Cloud migration. One of them that Company A needs to apply is GDPR, since the headquarters of the company is located in Sweden, Europe. Changing the conditions of where customer data is stored requires the acceptance of the individuals which adds to the complexity of the migration. When migrating to a CSP, the control is handed over. This is a security risk since the company could process valuable information of the company customers, even though the third party is not allowed to access it. Furthermore, when migrating valuable data, Company A cannot make sure the data is stored and secured properly from security threats outside of the CSP. Another aspect is that the CSP do not only have access to the sensitive data of the customers of the company, but the CSP might also have access to sensitive and valuable company information. Therefore, it is important to analyze what potential motive the CSP could have when handling this type of data. However, it is possible to handle this type of information securely in the Cloud by segregation and encryption if performed correctly. Instead of seeing this as a challenge as the majority of the interviewees do, one of the interviewees of the internal IT department stated that it should be seen as an opportunity to handle information classification;

"Some countries are very strict on data. Instead of seeing it as an obstacle, see it as a possibility to clean up and manage our information classification.” – IT2.
The quote highlights that the management of data and information not necessarily have to be an obstacle, rather a transformation process in need of guidelines. Furthermore, as the majority of the interviewees see it as a potential risk and difficult to handle, further competence could be needed, and the change illustrated to change the mindset of the employees in this matter.

**Finding 4:** When migrating to Public Cloud there is a lack of a common understanding of what Public Cloud offers security-wise. There is a general view within Company A that security is a great risk when migrating to Public Cloud, which leads to an uncertainty and a generalized opinion of Public Cloud as a security risk.
6. Discussion

In this chapter, we have reviewed the purpose and the research question of the thesis. The research question is answered by discussions of the findings from the empirics along with the earlier outlined theory. In the subsection of organizational change, the areas of organizational change including internal processes, culture, resistance to change and strategy are discussed. In the next subsection, the important aspects of changing IT legacy are discussed including generalization of Cloud Computing as well as security. The discussion of each subsection, Organizational Change and Changing the IT Legacy, results in and ends with a recommendation of the thesis to deliver a common overview of the organizational effects of Public Cloud. Later, sustainability implications of the thesis are discussed.

Throughout the research process, actions have been directed towards addressing the purpose of the thesis: investigate how the migration to Public Cloud affects an organization with large IT legacy with the aspects of organizational challenges that emerges when utilizing Public Cloud.

Subsequently, as the thesis aspires to bring new empirical evidence to the discussion of how Public Cloud can affect an organization with large IT legacy, the research question is designed to address the purpose. The research question has been addressed in the context of a case study in order to contribute to knowledge. This has been done to the extent that the research question of the study is answered by discussing the areas that emerged from the case study. To be able to answer the research question of the study, two topics are discussed; Organizational Change and Changing the IT legacy. The discussion of these areas will outline in two recommendations for the specific area. Simultaneously, as the different discussions are covered, the outlined purpose will be fulfilled.

By elaborating on the organizational readiness, aspects of Cloud Computing with the advantages of Public Cloud, allows us to address the research question. The research question was:

**RQ:** From an organizational perspective, how will migration to Public Cloud affect an incumbent organization with large IT legacy?

The decision to move the IT infrastructure to Public Cloud is not the end of the journey, rather the beginning. Although, the move to the Public Cloud is a technical one, the migration process has substantial organizational effects that need to be managed. When migrating to Public Cloud, organizations tend to focus on the technical area of the migration process towards Cloud Computing, even though the empirical evidence from the case study indicated that organizational challenges are a highly important part of the change process. Accordingly, many scholars argued that Cloud Computing drives large-scale organizational changes, that will affect the migration process and employees in different ways (Iveroth, 2010; Maresova, Sobeslay, and Krejcar, 2016). Some scholars also argued that in order to take advantage of the full benefits of adopting Cloud...
Computing, an organization needs to look beyond the changes to their computing systems and make changes to the way it works (Chang, Walters and Wills, 2016). Similar findings from the empirics, both from theory and from the interviewees indicated that, this type of large-scale change is complex, where no pre-determined strategy can easily be executed, rather the change of this scale need to be continuously refined (Iveroth, 2010). Based on the empirics collected from the interviewees, a change of this scale is likely to affect organizational department such as: Internal IT, Development, Networks, Operations, Finance, Sales, Service Delivery and Support. These departments would have to refine existing processes and develop new processes to gain full benefit of Public Cloud. However, the constant iteration of new processes should contribute to optimization of daily operations.

When investigating the migration process of an organization with large IT legacy towards Public Cloud, empirical evidence gained from interviewees indicated that this process is constrained by multiple layers of complexity of change management. In line with the findings conducted from the interviews, the limited research on organizational challenges when migrating to Public Cloud emphasizes that when adapting Public Cloud to an organization with large IT legacy, several organizational changes are required (Yang et al., 2015; Battleson et al., 2016; Maresova, Sobeslay, and Krejcar, 2016). Furthermore, findings from both interviews and by theory emphasize that the definition of Cloud Computing is not fully understood (Yang et al., 2015; Maresova, Soeslav and Krejcar 2016) and may need to be updated (Miyachi, 2018). This may result in lack of motivation within an organization to introduce new technology and processes (Tidd and Bessant, 2013; Yang et al., 2015).

6.1 Organizational Change

As found in the empirics and by the theory, the process of migrating to Public Cloud comes with several challenges. The change process involves several challenges of change management such as changing the routines, values, culture, processes, resistance to change and lack of competence. These challenges will require learning of new routines, disruption of the day-to-day working, may upset the organizational arrangements and require time and money to use new competences (Christensen and Overdorf, 2000; Tidd and Bessant, 2013). The empirics collected from the interviewees implicated that there is some resistance to the migration process of Public Cloud in Company A. Theory indicated that most employees that are used to certain ways of working, are unwilling to introduce new technology and ways of working (Christensen and Overdorf, 2000; Tidd and Bessant, 2013). As a result, employees may try to inhibit or short-cut the change process (Tidd and Bessant, 2013).
For instance, the empirical evidence collected from the interviewees suggested that a company with substantial IT legacy is bounded with rigorous organizational processes. This has also been observed in every-day discussions. Furthermore, the empirical evidence collected from the interviewees suggested that historically have these processes needed substantial meetings and planning, and that have required approval before new changes could be made. It was further found that such companies tend to fall back on traditional ways of working, aggravating the process of change. Rigorous and obsolete processes coupled with the complexity of change management of Public Cloud, result in organizational challenges such as: change management, culture, internal processes, IT legacy and security.

6.1.1 Internal Processes

Organizations with large IT legacy are heavily dependent on their IT system, which have been developed over a very long time (Jamshidi, Ahmad and Pahl, 2013; Chang, Walters and Wills, 2016). Moreover, the way organizations are using IT resources and capabilities are constantly shaped by the changing environment of digitalization (Alharbi, Atkins and Stanier, 2017). Therefore, is it argued that the IT enabled business processes need to be improved, to be more efficient and transformed to achieve agility (Battleson et al., 2016). Christensen and Overdorfs (2000) explains that processes are established to achieve high quality in an effective way and are therefore not meant to change. Hence, this is further explained as one of the dilemmas of management, that when processes are forced to tackle a different task than it is intended for, it is likely to perform indolently (Christensen and Overdorfs, 2000).

In line with theory (Chang, Walters and Wills, 2016), findings from interviewees indicate that in order to obtain the full benefits of Public Cloud, a change of processes is required. As indicated by the interviewees, organizations with large IT legacy often have complex and inefficient processes. These processes include patterns of interaction, coordination, communication, and decision-making, which employees use to transform resources into products and services of greater value (Christensen and Overdorfs, 2000). Many scholars argued that successful change is the product of a cognitive and analytical processes (Iveroth, 2010). However, the important capabilities are likely to be a less visible background process, where the majority of failures are due to some weakness in the way the process is managed within the organization (Levitt and March,1988). As suggested by the empirical data collected from interviewees and in line with theory, the processes within an organization needs to be adapted to the Public Cloud to be successful (Chang, Walters and Wills, 2016), where organizational management plays a significant role in shaping these processes (Battleson et al., 2016). The empirical evidence raises different questions of how this should be done. There were some difficulties by the interviewees, to answer the question of why the changing process had not been initiated earlier. Some interviewees argued that there is a lack of manager leading the changing process forward. As a result, to this finding,
Christensen and Overdorf (2000) described that larger organizations could to some extent, foresee and identify disruptive changes coming if they have resources to handle these changes such as talent managers. Maresova, Soeslav and Krejcar (2016) argued that managers in general are not motivated to Cloud Computing since the concept is unclear. Furthermore, trying to make drastic adjustment when an organization faces major changes could destroy the core capabilities that sustain the organization (Christensen and Overdorf, 2000).

6.1.2 Culture and Resistance to Change

In line with theory (Yang et al., 2015; Battleson et al., 2016; Maresova, Sobeslay, and Krejcar, 2016) our study indicate that the migration process composes a major human resource component, that will affect how much internal effort an organization have to dedicate to manage the transition. For large organizations with IT legacy, resistance to change is a major challenge that occur with this change process (Yang et al., 2015). People within a change process does not always know what their future role in the organization will be because of the changes that Public Cloud requires. If the employees know their own part of the transformation, the process towards Public Cloud can easier be manage and resistance to change be diminished (Kotter, 1996). However, findings from the interviews suggested that large changes and transitions are always delicate. Therefore, large organizations need to consider how the employees that don’t have the right skills are managed and the transition handled with care.

As in any change process, the change process towards Public Cloud will result in some employee implications (Iveroth, 2010; Maresova, Sobeslay, and Krejcar, 2016). As suggested in the empirics from the interviewees, the automatization and standardization of processes will require less resources and employees. Companies need to consider whether the organization have the skills necessary to handle the migration and have the right insight and understanding of the new environment. Individuals might need to develop new skills and competences in the change from on-premises to Cloud Computing (Bayramusta and Nasir, 2016; Alharbi, Atkins and Stanier, 2017). Therefore, many new opportunities for the employees will occur, where Cloud-based roles for those wishing to advance or change their career will be available. New employees with training programs to upskill the skills of the existing workforce will be required to manage this new architecture and environment (Bayramusta and Nasir, 2016; Alharbi, Atkins and Stanier, 2017). For those who are comfortable in current positions and don not want to develop their skill, some local internal services will continue to be managed on-premises, where these employees can help improve and maintain any existing on-premises architecture that will need to remain. This can be a way to maintain morale levels and demonstrate that you still have all employees’ interests in mind (Tidd and Bessant, 2013).
A change of large scale can first be initiated when all the involved employees have understood the problems of maintaining in the current problematic environment (Iveroth, 2010), have a common awareness (Lewin, 1947), and a sense of urgency (Kotter, 1996). These changes need to be well-communicated to create motivation for change, and take resilience to change into consideration (Lewin, 1947; Kotter, 1996). Furthermore, a clear future end state (Iveroth, 2010) and well prepared and motivated change process needs to be established (Yang et al., 2015) as well as the effects of the Public Cloud implementation (Lewin, 1947; Kotter, 1996).

6.1.3 Strategy

By examining the empirical data from the interviewees, it became clear that the employees of the case company had different motivations of why the company should migrate from its traditional IT legacy to Public Cloud. The employees of the departments have different perspectives, motivations and goals of the possible utilization of the new deployment model, Public Cloud. Without having a holistic perspective together with a well-motivated and transparent strategy, the migration process becomes unfeasible (Yang et al., 2015).

The empirical evidence substantiated that Cloud Computing in general was successful because of the cost reduction. But in contrast, other empirical evidence from interviewees also indicated that implementing Public Cloud would not only be a matter of cost, but rather a factor of speed and security of why moving towards Cloud Computing (Battleson et al. 2016; Redhat, 2019). However, these perspectives were spread widely over the organization, raising common strategy challenges. Research on the strategy of Cloud Computing, indicated that the implementation of Public Cloud requires a strategic planning to help the organization to access their abilities to achieve desired objectives (Alharbi, Atkins and Stanier, 2017).

The above discussion of organizational change, including the complexity with internal processes, culture and resistance to change, and strategy, implies for the first recommendation of the thesis:

**Recommendation 1:** To manage the fast-changing environment, organizations should develop a change enable and flexible strategy with a clear end goal divided into smaller parts. To reduce the complexity of organizational challenges, organization needs to be unified by communicating a vision and need for change from a holistic perspective. Furthermore, why the change is needed should be clearly communicated along which effects the change. Moreover, during a large-scale change, organizations should be transparent where the employees should be briefed about their role during the change process. To motivate the employees, reward system should be established in which individuals are given incentives to change the way they work.
6.2 Changing the IT Legacy

Previous research suggest that many organizations still rely on their IT legacy systems to support their core business (Jamshidi, Ahmad and Pahl, 2013; Bennett, 1995; Gholami et al., 2016; Rai, Sahoo and Mehfu, 2015). Furthermore, Gholami et al. (2016) describe that the applications, part of the IT legacy, often have been developed without any considerations of the requirements to utilize the Cloud environment. Therefore, organizations cannot easily utilize the Cloud-based environment (Jamshidi, Ahmad and Pahl, 2013). The empirical evidence from interviewees indicate that Company A still rely largely on their IT legacy systems, where a lot of the systems are built without taking Cloud requirements into account. The empirical findings align with previous theory that indicated that Company A pursues the IT legacy as a burden and a strain that is difficult, complex and unfeasible when facing change (Benett, 1995; Stonebraker, 1995). This notion has also been observed from informal discussions. Furthermore, the IT legacy is described by interviewees as highly ineffective, which inhibits development and value creation within an organization. As indicated in the collected empirics, Cloud Computing can be a solution for problems that follow from a large IT legacy and security issues. Cloud Computing offers a more standardized, automated, efficient and flexible IT infrastructure that can be easily managed (Battleson et al., 2016). This IT infrastructure enable innovation, respond to changes in the business, detect opportunities and seize these. This type of IT infrastructure also enables experimentation and iteration based on the unlimited, on-demand distribution of IT services (Sambamurthy et al, 2003; Battleson et al., 2016). Furthermore, evidence from the interviewees which align with theory, suggest that the infrastructure of Public Cloud would enable the organization’s business to introduce new technology, applications and services more quickly (Redhat, 2019). This would also increase the awareness of an organization which leads to speed of development and delivery (Battleson et al. 2016; Redhat, 2019).

Another aspect of migrating the IT legacy to Public Cloud, mainly argued by scholars, is that there is a large security risk (Jamshidi, Ahmad and Pahl, 2013; Deshpande, Sharma and Poju, 2019). When migrating to Public Cloud, an organization essentially hand over a level of responsibility to the CSP. The CSP will be responsible for the security, applications, virtualization, maintenance, power and cooling of the hosted hardware of the Cloud which is their core business. (Bayramusta and Nasir, 2016; Hashem et al., 2015). The majority of the interviewees suggests that the security risk is the same as when having an on-premises solution since the threats that exist today are the same when migrating to Public Cloud. The empirical evidence from the interviewees further suggested that the security risk could even be lowered when migrating to Public Cloud, since the CSP could offer higher quality of the service since it is their core business (Sefraoui, Aissaoui and Eleuldj, 2014; Hashem et al., 2015).
6.2.1 Cloud Computing as a Frequently Used Word

When examining the empirical data from interviewees, it became visible that the case company had no common description and representation of what defines the concept of “Cloud Computing”. Cloud Computing is a broad concept, where the word is frequently used in many contexts for different technical solutions within Company A. Public Cloud is included in the concept of Cloud Computing and therefore lacks a specific definition in the context of the Public Cloud migration process. However, as also visible from the interviewees was the importance to recognize that the concept of IT legacy as well as the concept of security is both broad concepts that lack specific definitions.

The most accepted definition of Cloud Computing states that it is a model that includes distribution of several functions such as networks, servers, storage, applications, and services, all on-demand (Mell and Grance, 2012). However, as Cloud Computing have emerged, and the concept of Cloud Computing have been accepted and adopted, Company A illustrated that the concept of Cloud Computing has been generalized. Therefore, as indicated by both the empirical evidence from interviewees and previous theory, the concept is in need of a more specific definitions (Miyachi, 2018). However, it is beneficial that the concept is widely accepted and embraced throughout industries since the concept is of Cloud is actively used. Hence, the generalization of Cloud can complicate the communication between employees and divisions. The lack of a corporate definition and understanding of what Cloud Computing implicates leads to an uncertainty and misunderstanding of what the migration process towards Public Cloud really means.

6.2.2 Security

An important consideration when consider changing the IT legacy is the security aspect. The empirical evidence from the interviewees indicates that the case company has a generalized view within the organization that other employees believe that security is a great risk when migration to Public Cloud. However, since the majority of the interviewees argue that having the IT infrastructure on-premises provides a false sense of security, the interviewees indicates that the security could be enhanced when migrating to Public Cloud.

In contrast to this finding, the majority of scholars argued that the security of Public Cloud is a risk. A central notion of the theory regarding the security risks of Public Cloud, is the large amount of data and applications in danger for data leakage. Hence, data of large CSPs are distributed across national boundaries (Yang et al., 2014) and shared in the same environments, outside of the company control (Ali, Khan and Vasilakos, 2015), which escalates the security concerns. To regulate the concern, legal jurisdictions, such as SLA and GDPR are established (Yang et al.,
Security are of several dimensions that can affect a large organization with large IT legacy when migrating to Public Cloud and should be take into consideration. The IT market is changing quickly, where the collected empirical evidence from the interviewees suggests that migration to Public Cloud can enhance the security. The empirical evidence is somewhat contradictory to the majority of the research previously outlined, since the empirical evidence not only indicates that security is not an issue, several interviewees also state that it will soon be a reason for migrating to Public Cloud. Whilst, the security operation within Public Cloud is like the rest of the services, standardized, which makes the security offering clear and transparent to the organization (Sefraoui, Aissaoui and Eleuldj, 2014; Hashem et al., 2015). As earlier mentioned, the interviewees described the CSP as innovative, highly competent and venture on their core business, where as a result, the information should be well protected. However, findings from the interviews suggested that a potential mistake from either the CSP or Company A, can have devastating consequences. If a data leakage occurs where sensitive customer information gets leaked that breaks the rule of GDPR, large penalties will be demanded from Company A. Because of data leakage, the brand reputation may also be damage and future revenues may be lost. Equally harmful is a leakage of company-related, sensitive information. Moreover, it was discussed from the interviewees that another aspect to consider is the motives of the CSP since Company A has been developed for generations, where a large amount of data has been charted, stored and are in possession of Company A.

The above discussion of changing the IT legacy, including the generalization of Cloud Computing and the concerns about the security risks, implies for the second recommendation of the thesis:

**Recommendation 2**: The complexity of managing changes in the current IT environment hampers the essential value creating business processes. Moreover, the generalized view of security as a large risk further inhibits the evolvement and process towards Public Cloud. However, the automated technology enabled by Public Cloud provide speed and movement within the company which enhances the innovation possibilities, the everyday business operation, the efficiency, the value creation and the time to market. Moreover, to manage the different opinions regarding safety, competence shall be built within the organization to address security of Public Cloud. Furthermore, common guidelines should be established of how security should be managed with Public Cloud.

### 6.3 Sustainability Implications

Organizations that utilize their own DC are likely to have built and scaled the DC to the size that it requires access to significant resources, such as space, physical assets and electricity. Hence, the
DC are over-dimensioned hardware-wise and still active, but it still requires power to function as well as cooling. With a low utilization of private or in-house DCs, the resources that are used are far greater than necessary to produce the same value as the situation with the DCs of Public Cloud. The possibility of migrating to Public Cloud entails a sustainability implication, since the hardware within the DC are optimized across several users. The utilization rate is higher than when utilizing an on-premises solution. However, the same recourses are still used but the utilization of the resources is considerable higher.

Furthermore, having a complex IT legacy that is difficult to manage hampers the development for future needs. The resistance to change and the lack of competence within the area of Cloud Computing affect the sustainability within the organization, since organizations may not be prepared for a migration of this scale. The migration to Cloud Computing will streamline processes which will result in speed and opportunity for value creation as well as competitive advantage. However, the need of change will affect the employees of any company that stand before large changes. The effectiveness of the processes will also result in some employees becoming redundant. A consequence where people may lose their jobs may not be seen as sustainable. The people that are affected by the technical shift and the change that follows these should have the opportunity to learn new capabilities and competences that are needed for the future migration process of an emerging technology shift.
7. Conclusion

This chapter aims to address the purpose of the thesis through the research question, presented in an aggregated conclusion from the findings and discussion. The chapter also include suggestions for future research.

Throughout the research process, focus have been directed towards understanding the organizational aspects of migrating from a traditional IT infrastructure managed on-premises, towards Public Cloud. Anchored in a case study at an incumbent company, the thesis bridges literature on Cloud Computing, organizational change and other different important aspects of the migration process. Hence, the thesis contributes to better understanding of how organization with large IT legacy are affected of and how such organization could prepare to the emerging changes of a potential technology shift as Public Cloud.

Although the migration to Public Cloud is a technical shift, the empirical evidence from the case study has indicated that the migration process has equal or even more important organizational affects to consider. Implementing Public Cloud entails the complexity of organizational change management and has large effects on internal business operations and processes. The case study showed that Company A is experiencing multiple layers of complexity of change management, constraining the migration towards Public Cloud. There is also a general uncertainty within the organization of what this technology shift really means, and the top-strategy seems to be too vague. For a slow adapting organization as Company A, the dynamic, fast developing market complicates the ability to develop a change enable and flexible end-to-end strategy and planning from a holistic perspective. Furthermore, to enable the utilization of Public Cloud the processes are affected, new agile, effective and automated processes are required that are adaptable after Public Cloud. Hence, there is organizational change management complexity that consists of; change management, culture, internal processes, IT legacy and security, are essential to be managed to successfully migrate to Public Cloud.

The literature review, the findings from the case study and with the following discussion, allows us to conclude that moving from a traditional IT legacy environment to the environment of Public Cloud is fundamental for a large incumbent enterprise to stay competitive. Thus, implementing the deployment model of Public Cloud would enable automatization of both technical and managerial aspects, such as standardizations of processes and the IT legacy. With automated technology and standardized processes, the speed of developing and delivering products and services will increase. The increased speed of these processes enables innovation possibilities, efficient the every-day business operations and cost efficiency. As a result, Public Cloud could enhance value creation for an organization.
An organization cannot make changes without taking some level of risk. There are many great challenges that an organization must be prepared to handle. Mitigating the challenges of organizational change, legal restrictions, strategic, and security risks inherent in migration to the Public Cloud will be key to an organization’s success. The generalized view of security as a large risk further inhibits the evolvement and process towards Public Cloud. Furthermore, to move the IT legacy to Public Cloud, the discussion about ways of working, mindsets and different cultures are required to be carried forward, otherwise will the change process be hampered.

In summary, by fulfilling the purpose, the thesis makes a contribution to the understanding of how a large incumbent organization is affected by changing the IT infrastructure to the deployment model of Public Cloud and how an organization could prepare to the emerging changes of a potential technology shift.

7.1 Future Research

We hope that the findings and following recommendations have sparked interest for future research to examine the emerging research field of organizational aspects of migrating IT infrastructure to Public Cloud. As the study was delimitated to the organizational perspective, additional research of the technical perspective could be further considered to combine these two perspectives together.

As the study has shown, utilizing the deployment model of Public Cloud would deliver increases cost efficiency, increased speed of development and delivering, and finally increased security of IT. However, the uncertainty of which of these outcomes should be focused on when moving to Cloud, differs. Perhaps most interesting, that could add value, would be to examine these three possible outcomes of utilizing Public Cloud by providing different structural aspects of the way an organization thinks about Cloud Computing. By presenting different user cases, where each case has a different strategy, approach and challenges, could value questions for an incumbent company be in a more structural way. By doing so, the migration process towards Public Cloud, of each sub-division, could be clarified.

However, the empirical evidence of this thesis emphasizes that resistance to change is one major challenge for enabling Public Cloud for an incumbent organization with large IT legacy. The combination of resistance to change with the unclear structure of Cloud Computing, complicates the migration process. Therefore, it would be interesting to investigate the consequences of being somewhat late of adopting a new disruptive innovation as Public Cloud. Consequently, this could result in a better understanding of why this migration process is inevitable.
Using the outlined reasoning and applying the two recommendations of the thesis as guidance for future scholars, allows us to deduce one interesting question for future research:

**Future RQ:** What are the risks of being late to the adoption of Cloud Computing, Compared to competitors?
References


Appendix A: Interviewed Informants

Table 4 – Interviewed stakeholders from different departments, presented by title, description of role, and interview date.

<table>
<thead>
<tr>
<th>Title</th>
<th>Description of Role</th>
<th>Interview Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Delivery Department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDD1</td>
<td>Responsible for governance, GDPR, different processes and different certifications of products and services. Works close with Sourcing Delivery Application and Platform, which involves close communication with the Sourcing Department.</td>
<td>2019-04-15</td>
</tr>
<tr>
<td><strong>Sourcing Department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD1</td>
<td>Global category responsible for SaaS Cloud Services and especially for Operational Expenses. This involves IT Services and some concerning security issues. Alyona A.</td>
<td>2019-02-15</td>
</tr>
<tr>
<td>SD2</td>
<td>Works with Sourcing Delivery Application and Platform of IT Services, and are responsible for cross-functional tasks in the organization.</td>
<td>2019-02-19</td>
</tr>
<tr>
<td>SD3</td>
<td>Identifies appropriate suppliers, negotiate contracts and predicts future company needs. Works especially with the infrastructure of IT Services – data center, storage of data and spaces of servers, which include Cloud Services.</td>
<td>2019-02-14</td>
</tr>
<tr>
<td>SD4</td>
<td>Sourcing Line Manager, Operation and Strategy responsible. Ensures that the organization has the best available contract with supplier, maximizing the marginal to customer. This role also involves the position as Sourcing Business Partner to a Solution Area of Digital Services, where Cloud Computing solutions is customized.</td>
<td>2019-02-20</td>
</tr>
<tr>
<td>SD5</td>
<td>Managing the different sourcing categories and checks globally where preferred services are more suitable located. Also, a relationship manager for some of the suppliers, especially for co-locations – space and power within DCs suppliers. Also responsible for the global</td>
<td>2019-05-07</td>
</tr>
</tbody>
</table>
account and therefore supervising projects that is going on in certain regions. This role manages only on-prem solutions.

**SD6**
Service responsible within IT Sourcing and for a team which all services goes through. This is all outsourcing services, telephony services, computers, SaaS systems, and all system integration towards customers.

<table>
<thead>
<tr>
<th><strong>ITD</strong></th>
<th>Description</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITD1</strong></td>
<td>Responsible for the core-infrastructures of IT, which involves the responsibility of different service components that are essential for other services, products or application within Company A. Works with a project of moving these services of the internal IT to a Private Cloud.</td>
<td>2019-02-21 - 2019-04-15</td>
</tr>
<tr>
<td><strong>ITD2</strong></td>
<td>Works closely to the Head of Architecture &amp; Portfolio and is product responsible for Cloud Solutions. This role enables the possibility for Company A to purchase and utilize Public Cloud.</td>
<td>2019-03-19 - 2019-05-02</td>
</tr>
<tr>
<td><strong>ITD3</strong></td>
<td>Manage people, development and performance for number of IT portfolios, such as Public Cloud. Accountable for budgets of investments, run and line costs, and head count planning.</td>
<td>2019-02-22 - 2019-05-08</td>
</tr>
<tr>
<td><strong>ITD4</strong></td>
<td>Works with business relationship for IT Cloud Services, which involves working with different strategies, marketing and stakeholder management. This role looks with the perspective of both Public and Private Cloud Solutions.</td>
<td>2019-04-16</td>
</tr>
<tr>
<td><strong>ITD5</strong></td>
<td>Leading the Group IT department and particularly responsible for driving strategy portfolio and architecture for IT.</td>
<td>2019-05-08</td>
</tr>
</tbody>
</table>
Appendix B: Semi-Structural Interview Protocol

This appendix presents the different areas covered during the interviews conducted throughout the main study of the research process. The appendix covers the most important questions where some questions may have been asked additionally depending on the interviews response and are not included in this template.

Introduction

(All interviews begun by the researchers presenting themselves and the purpose of the case study.)

1. Do you approve recording of this interview?

Orientation in the Organization

1. Could you please tell us about yourself and about your role in the organization?
2. What does the department, that you are a part of, do?
3. How is this department connected to the rest of the organization?

More detailed questions

IT Legacy

1. What does your internal IT structure look like?
2. What is your experience of Company A´s large IT Legacy?
3. Why do Company A want to move away from its IT Legacy?
4. What needs to be done to get away from this Legacy?
   o Technically?
   o Organizationally?
5. Why have the IT systems not been adapted to Public Cloud before?

Cloud Strategy

1. Does Company A have any goal or a strategy with the implementation of Public Cloud?
2. Do you feel that there is a connection within the IT Group to the transformation to Public Cloud within the Company A strategy - from a holistic perspective? If NO, what are you missing?
3. How will the implementation of Public Cloud affect your department? Organizationally and Technically?
4. What is your next step to move towards Public Cloud?

Organizational Change Management
1. What organizational challenges emerges with the implementation of Public Cloud?
2. How could the internal processes that you have today be improved?
3. How does the organizational culture look generally at Company A and how is it compared to the culture of your department?
4. Is resistance to change an issue when migrating to Public Cloud, why?
5. What is your department measured on?

**Governance Management**

1. How would Public Cloud influence Governance at Company? Why?

**Security Management**

1. What is your opinion regarding security of Public Cloud?
2. What are the biggest issues in terms of security when consuming Public Cloud?
3. What restrictions must one observe when looking at using Public Cloud?
4. What are the Security benefits of using Public Cloud?

**Final Questions**

1. What is your opinion on the transformation and change towards the use of Public Cloud?
2. In your opinion, is there anything we have failed to cover?
3. Do you have any colleague we could talk to, to get a better understanding?