

Cloud Service Selection for Startups: Identifying how Swedish startups prioritize when selecting their Cloud services

ANDRÉ ATTAR



**KTH Industrial Engineering
and Management**

Master of Science Thesis
Stockholm, Sweden 2016

Val av molntjänster för startupföretag:

En masteruppsats om hur svenska startupföretag
prioriterar när de väljer deras molntjänster

ANDRÉ ATTAR



**KTH Industrial Engineering
and Management**

Examensarbete
Stockholm, Sverige 2016

Cloud Service Selection for Startups

Identifying how Swedish startups prioritize when selecting their Cloud services

Degree Project by André Attar

Student of Information Technology & Industrial Management

Master of Science Thesis
INDEK 2016:128
KTH Industrial Management &
Information Technology
SE-100 44 STOCKHOLM

Val av molntjänster för startupföretag

**En masteruppsats om hur svenska startupföretag prioriterar när de väljer
deras molntjänster**

Masteruppsats av André Attar

Student inom informationsteknik och industriell ekonomi

Examensarbete
INDEK 2016:128
KTH Industriell Ekonomi &
Informationsteknik
SE-100 44 STOCKHOLM



KTH Industriell teknik
och management

Master of Science Thesis INDEK 2016:128
**Cloud Service Selection for Startups:
Identifying how Swedish startups prioritize when
selecting their Cloud services**

André Annosh Attar

Godkänt 2016-06-15	Examinator Esmail Salehi Sangari	Handledare Henrik Ugglå
	Uppdragsgivare KTH	Kontaktperson -

Abstract

A startup's ability to make correct decisions regarding their Cloud choices is essential if they intend to stay competitively relevant in their business. Choosing the Cloud solutions that allow for an optimal level of production can give startups that operate in most industries a competitive advantage. However, new startups have a plethora of factors to consider when choosing a Cloud provider, which is the basis of the thesis.

The purpose of the study is to explore and gain insight regarding how new startups can make suitable decisions when selecting different Cloud services. The study's main data collection method is a set of interviews that were conducted with CTOs from some of Sweden's most promising startup companies.

The study thoroughly discusses the three largest Cloud providers (Amazon Web Services, Azure, and Google Cloud Platform), and attempts to reveal how these Cloud services are positioned in the eyes of the customers that use them on a daily basis.

A main finding of the study was that the most important factors to consider when selecting a Cloud provider is its compatibility with your company's IT-environment, the quality and quantity of its services, how well managed it is, if it offers data protection compliances, and ultimately, the prices of the services it offers. Furthermore, information derived from the interviews imply that new startups ought to make their IT-solution as simple as possible in order to reduce the chances of running into integration problems with different Cloud solutions. The author intends for the study to be a guideline for new startups to better understand what factors they ought to prioritize when selecting Cloud providers.

Key-words: Cloud provider, Startup, CTO, key factors, SaaS, PaaS, IaaS, PoD, PoP



KTH Industriell teknik
och management

Master of Science Thesis INDEK 2016:128
**Val av molntjänster för startupföretag:
En masteruppsats om hur svenska
startupföretag prioriterar när de väljer deras
molntjänster**

André Annosh Attar

Godkänt 2016-06-15	Examinator Esmail Salehi Sangari	Handledare Henrik Ugglar
	Uppdragsgivare KTH	Kontaktperson -

Sammanfattning

En startups förmåga att ta de rätta besluten när det kommer till deras val av molntjänster är otroligt viktigt. Genom att välja de rätta molnlösningar så kan man se till att företaget får en bra möjlighet att växa, och att rätt molnlösningar kan det kan ge de flesta startups digitala verktyg som kan ge konkurransfördel. Det finns däremot mycket att tänka på när man väljer en molntjänst, och det är vad studien bygger på.

Syftet med detta projekt var att utforska och bättre förstå hur nya startups kan ta de rätta besluten när det kommer till deras val av molntjänster. Studiens huvudsakliga datainsamlingsmetod var tolv intervjuer som utfördes tillsammans med CTOs från några av Sveriges mest framgångsrika startupföretag.

Studien utför en noggrann diskussion och jämförelse på de tre största molntjänsterna i världen (Amazon Web Services, Azure, och Google Cloud Platform), och försöker att visa hur dessa molntjänster är positionerade enligt de kunder som använder sig av molntjänsterna vardaligen.

Studien visar att de viktigaste faktorerna som man bör tänka på när man väljer molntjänst är: hur pass kompatibel den är med företagets IT-miljö, kvaliteten och mängden tjänster som leverantören erbjuder, hur pass managerade leverantörens tjänster är, om leverantören överensstämmer med regler för uppgiftsskydd, och kostnaden för molnleverantörens tjänster. Ytterligare så fann man indikationer från intervjuerna att nya startups bör försöka sikta på molnlösningar som är så enkla som möjligt och helst att dessa lösningar är integrerade lösningar som molnleverantören själv erbjuder, och detta på grund av att det kan vara svårt att integrera molnlösningar från olika företag. Författarens avsikt för denna rapport är att den ska vara en riktlinje för nya startups så att de kan förstå vad de bör tänka på när de väljer sina molntjänster.

Nyckelord: Molnleverantör, Startup, CTO, nyckelfaktorer, SaaS, PaaS, IaaS, PoD, PoP

List of Abbreviations and Glossary of Terms

This page lists the abbreviations and terms that were used in the thesis.

Abbreviations

IT - Information Technology
CTO - Chief Technology Officer
SaaS - Software as a Service
IaaS - Infrastructure as a Service
PaaS - Platform as a Service
AWS - Amazon Web Services
MA - Microsoft Azure
GCP - Google Cloud Platform
CRM - Customer Relationship Management
ERP - Enterprise Resource Planning
EC2 - Elastic Compute Cloud
SQL - Structured Query Language
GRS - Geo-Redundant Storage
API - Application Programming Interface
PoP - Point of Parity
PoD - Point of Difference
SRC - Swedish Research Council
CPU - Central Processing Unit
EEA - European Economic Area
CDN - Content Delivery Network

Terms Description

PoP	- Associations which are not necessarily unique to a single brand
PoD	- Attributes which customers tend to associate with a particular brand
Cloud	- Enables access to a shared pool of configurable computing resources on-demand
SaaS	- Software services which can be provided over the Cloud
IaaS	- Infrastructure services which can be provided over the Cloud
PaaS	- Platform services which can be provided over the Cloud
Cloud provider	- Provides with Cloud services to custome

Table of Contents

- 1. Introduction 1**
 - 1.1 Background..... 1
 - 1.2 Problematization 1
 - 1.3 Purpose..... 2
 - 1.4 Research Question 2
 - 1.4.1 Sub-question 1..... 2
 - 1.4.2 Sub-question 2..... 2
 - 1.4.3 Sub-question 3..... 2
 - 1.5 Limitations and Delimitations..... 2
 - 1.6 Disposition of the Report..... 3

- 2. Literature Review..... 4**
 - 2.1 The Cloud..... 4
 - 2.1.1 Software as a Service..... 6
 - 2.1.2 Infrastructure as a Service 7
 - 2.1.3 Platform as a Service 7
 - 2.1.4 Public Cloud Market Leaders 8
 - 2.1.5 Selecting a Vendor 9
 - 2.2 Brand identity..... 10
 - 2.2.1 Points of Difference and Points of Parity..... 11

- 3. Method..... 14**
 - 3.1 Designing the Research Process 14
 - 3.2 Methods used for Answering the Research Questions 14
 - 3.3 Selection of Companies 15
 - 3.4 Data Collection 17
 - 3.4.1 Literature Review 17
 - 3.4.2 Pre Study Feedback Session 18
 - 3.4.3 Interviews 19
 - 3.5 Validity, Reliability, and Generalizability 20
 - 3.5.1 Reliability 20

3.5.2 Validity.....	20
3.5.3 Generalizability.....	21
4. Empirics.....	22
4.1 Results from the Pre-Study.....	22
4.2 Results Connected to SQ1	22
4.3 Results Connected to SQ2	26
4.4 Results Connected to SQ3	30
5. Analysis	33
5.1 Analysis Connected to SQ1.....	33
5.2 Analysis Connected to SQ2.....	35
5.3 Analysis Connected to SQ3.....	36
6. Discussion.....	38
6.1 Discussion of Main Findings	38
6.2 Discussion of Methods Used	39
6.3 Discussion on Sustainability.....	41
7. Conclusions and Future Research.....	42
7.1 Fulfilments of research purpose.....	42
7.1.1 Research Question 1.....	42
7.1.2 Research Question 2.....	42
7.1.3 Research Question 3.....	43
7.1.4 Main Research Question	43
7.2 Research Limitations and Future Research	44
8. References.....	46
Appendix A - A template of the basic set of questions used to conductthe interviews	50
Appendix B - Cloud provider selection for the 12 companies involved in the study	51
Appendix C - Distribution of integrated vs third party SaaS solutions	52

Figures and Tables

Figures

Figure 1 - Disposition..... 3
Figure 2 - The Cloud Computer Model..... 5
Figure 3 - Brand Identity. Aaker and Joachimstaher (2000)..... 11
Figure 4 - The Initial Stages of a Startup Firm 16

Tables

Table 1 - Selection of companies along with ID, role of each interviewee, the company’s turnover in 2014 and the number of employees 16
Table 2 - ID, Role of Interviewee, operating industry, and turnover in 2014 for each startup that was selected for the pre-study. 19
Table 3 - Key factors derived from the interviews 23
Table 4 - factors derived from the interviews 25
Table 5- PoPs shared by AWS, Azure, and GCP 26
Table 6 - PoDs for AWS 28
Table 7 - PoDs for Azure 29
Table 8 - PoDs for GCP 30
Table 9 - Arguments for integrated solutions..... 30
Table 10 - Arguments for using third party SaaS solutions 32

1. Introduction

The introductory chapter will present the reader with background to the study, the formulated problem, and the purpose of the study. This chapter will also discuss the delimitations of the study, in order to clarify the scope of the project. The chapter is concluded with a disposition of the report, which thoroughly shows how the report is structured.

1.1 Background

For many years, organizations relied on investing massive capital outlays on both hardware and software in order to make their business eligible to make use of IT. This means that you needed a plethora of in-house servers which would collect and process colossal amounts of data, while also purchasing software licenses for each employee. A terribly expensive task, particularly for startup companies with a limited budget to allocate on IT-expenses (Shi et al, 2010). Besides the initial costs for gearing up your hardware and software, C-level executives must also regard the heavy running costs involved in terms of maintenance and upgrading their IT-environment (Hazmi et al, 2012).

In the past decade, the world has seen the uprise of a completely new market, namely Cloud services. Much like leasing a car as opposed to buying it, Cloud providers are able to provide their services and solutions for a monthly subscription fee. This means that you are able to hire hardware and software from a Cloud provider as opposed to buying it, which releases a lot of burden on C-level as there is no requirement to have everything in-house (Antonopoulos and Gillam, 2010). As a result, Cloud computing has fundamentally changed the way in which IT-services are deployed, developed, scaled, updated, and maintained (Marston et al, 2010).

Clouds are therefore particularly attractive for startups, as it provides a relatively easy and economically feasible manner in which they can construct their IT-environment. Selecting suitable Cloud services can give startups access to colossal amounts of storage and processing power, as well as complex digital tools which allows them to excel in their business (Rong et al, 2013) (Hofmann & Woods, 2010).

1.2 Problematization

Many companies have realized the potential in using Cloud based services for establishing a data infrastructure and gaining access to software. However, the Cloud service market is still in its infancy with many well established companies such as Amazon, Google, and Microsoft battling it out with each-other and trying to obtain a competitive edge in order to dominate the market. With each Cloud provider granting different conditions of costs, customer service, and functionality, choosing the correct Cloud provider is by no means an easy task for startups who seek to utilize Cloud services.

There are many factors to consider when selecting Cloud services, for example, there are inherent privacy risks involved in using Cloud services, as a user essentially inputs unencrypted data on a machine that the user does not own, making the user exposed to data theft (Pearson et al, 2009).

Data security is just one example of a factor that startups have to consider when selecting a Cloud provider.

1.3 Purpose

The purpose of this research is to act as a guideline for new startups so they can gain a better understanding in what they ought to think about when selecting their Cloud services. In order to accomplish this, the study will attempt to explore and find the most important factors to consider when selecting a Cloud provider. The study will also attempt to compare and position the three largest Cloud providers in the world, based on a qualitative study performed on the customers of these Cloud providers. Lastly, the study aims to explore what particular Cloud software solutions Swedish startups use. In order to achieve this, the author interviewed 12 CTOs from highly regarded startup companies in Sweden.

1.4 Research Question

How can CTOs in new startups make suitable decisions regarding different Cloud services?

1.4.1 Sub-question 1

Are there factors that startups in Sweden perceive as more important when it comes to selecting a Cloud provider?

1.4.2 Sub-question 2

How are the top Cloud providers positioned in the Cloud market?

1.4.3 Sub-question 3

Do Swedish startup companies opt for integrated SaaS solutions that are developed by their Cloud provider, or do they instead opt for more complex best-of-breed SaaS solutions?

1.5 Limitations and Delimitations

The study will only include the three largest aspects of the Cloud, namely Software as a Service (SaaS), Internet as a Service (IaaS), and Platform as a Service (PaaS). As a result of this, aspects such as Metal as a Service (MaaS) are left outside the scope of the study. Furthermore, the study was narrowed down to only focus on Cloud customers who operate in Sweden due to close proximity for conducting the interviews. Consequently, the primary data of this research will only be obtained from Swedish companies, therefore, any conclusions cannot be applied to companies who operate outside of the study's intended focus area (i.e. the study's findings are not applicable to companies outside Sweden).

Although the study does not limit itself to any specific industry, a prerequisite for startups to be included in the study is that their operations must be data-heavy in the sense that they require Cloud services in which to store chunks of data, as well as processing power to process that data. This is a prerequisite due to the fact that these types of companies are strongly reliant on choosing Cloud providers that are able to provide them with storage and computing powers as

well as the necessary digital tools needed to operate their business. The startups that were interviewed in this study are in a relatively early stage of development, meaning that a delimitation of the study was that the startups involved must have between 10 and 30 employees.

1.6 Disposition of the Report

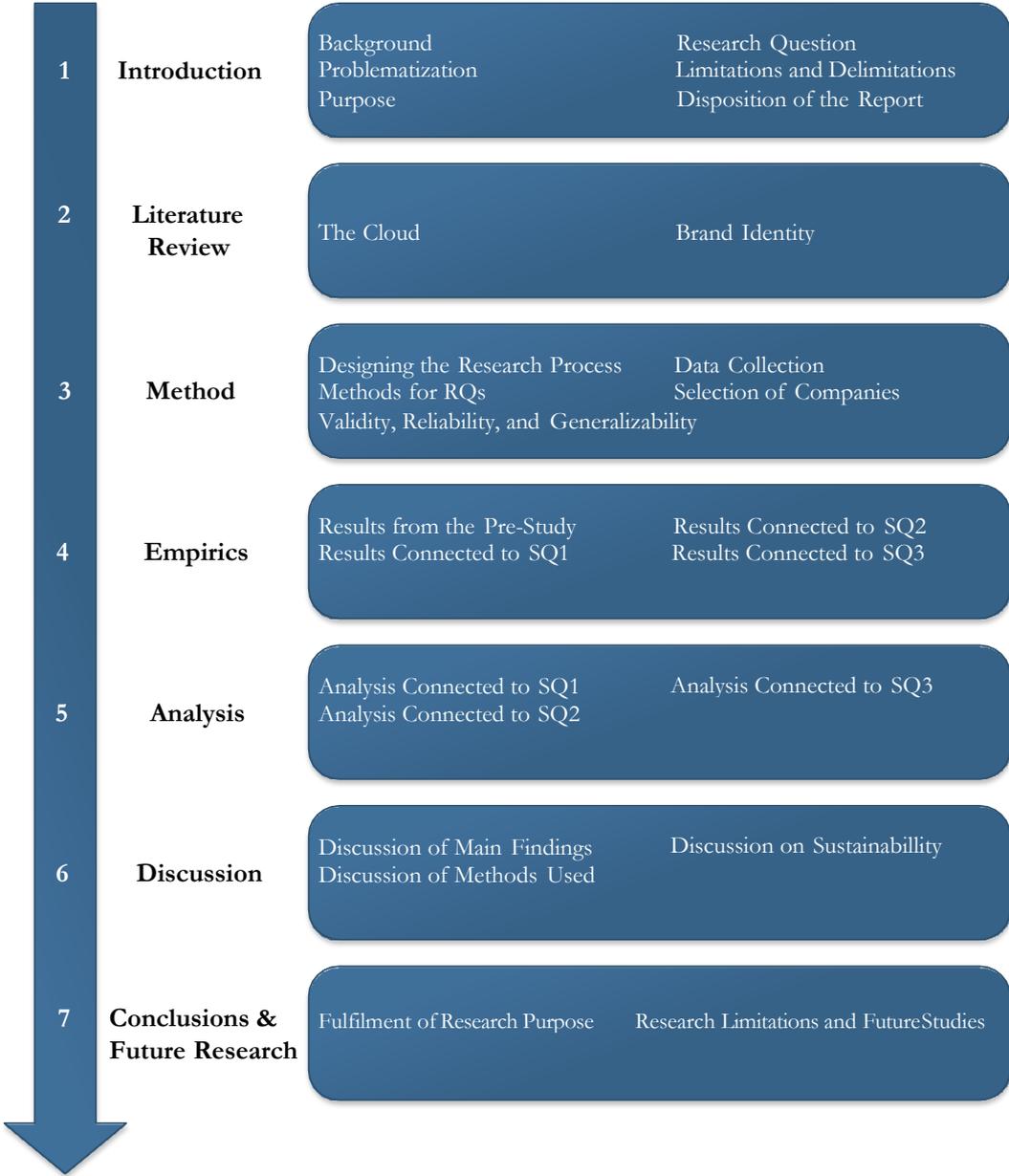


Figure 1 – Report Disposition

2. Literature Review

This chapter will provide a literature review on topics that are related to this study. This includes a review of existing knowledge on the Cloud, and also a summary of the current public Cloud market leaders. This chapter also encloses brand identity theories as well as previous studies that have been made on closely related topics.

The literature research in this chapter is based on information collected from scientific articles, academic journals, and books. The literature review has been continuously iterated upon throughout the study in accordance with Collis & Hussey (2014), which stresses the importance of critically evaluating the existing literature on a continuous basis throughout the project.

As previously discussed, choosing a Cloud provider is by no means easy from a customer perspective. Cloud computing is still growing, and so is the number of companies that offer different kind of Cloud services (Rossi et al, 2015). However, if you look at statistical data, there is one Cloud provider who is immensely bigger than its competitors in terms of market share. A study performed by Synergy Research Group shows that the current Cloud market leader (in Q1 2016) is Amazon Web Services (AWS) with an astounding 31% market share. The next three largest Cloud providers were Microsoft Azure, IBM Smartcloud, and Google Cloud Platform (GCP), who stood for an aggregated 22% of the worldwide market share in Cloud services (SRG, 2016).

2.1 The Cloud

There has been a massive increase in interest for Cloud computing over the last couple of years, and as a result, it is topic that is being comprehensively studied. This study will use the standardized definition of Cloud computing, as is defined by The National Institute of Standards and Technology (NIST):

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

From the definition, you can extract some vital components for Cloud computing. Firstly, a Cloud provider must be able to provide hardware computing resources such as networks, servers, and storage, as well as software computing resources such as applications and services on demand. The computing resources of a Cloud provider are pooled, meaning that they are meant to serve multiple customers simultaneously, using a so-called multi-tenant model. The multi-tenant model is an essential aspect of any Cloud provider, allowing physical and virtual resources to be dynamically assigned and reassigned based on the needs and demands of the customers. In multi-tenancy, several customers are consolidated into the same database, meaning that a single software application can serve multiple customers (Aulbach et al, 2008), effectively reducing software costs for the provider.

Furthermore, the provider must attain an adequate level of information security. It is their responsibility that the stored data remains confidential and untampered with. At the same time, Cloud providers should be transparent with their customers by providing the relative costs and resource usage of the utilized services.

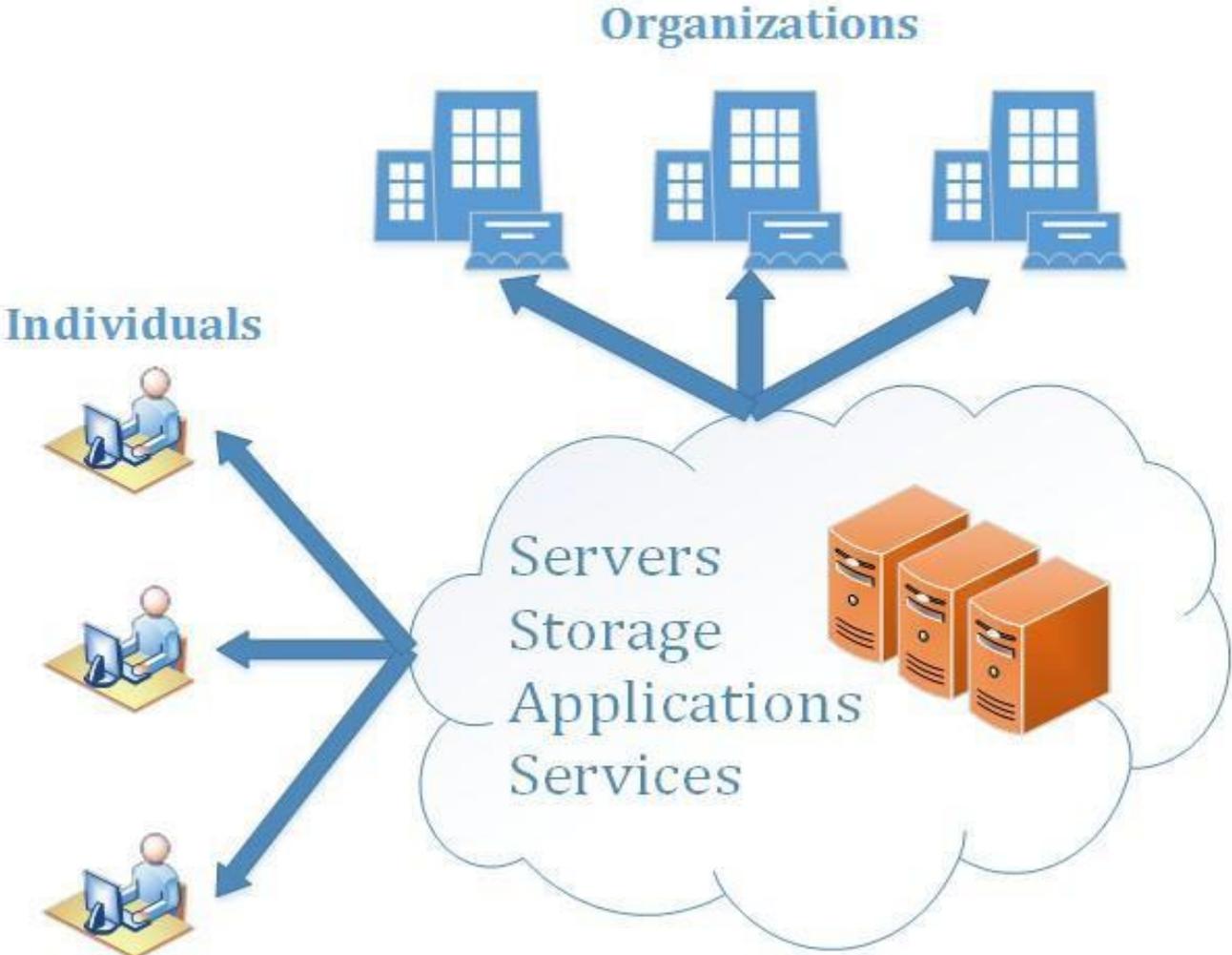


Figure 2 - The Cloud Computer Model

Cloud computing is therefore a model where a company provides computing resources to users. The term “Cloud” is derived from the fact that the network elements (or data centers) that enable the services of a Cloud are invisible to the user, as if concealed behind a cloud (figure 2).

All Clouds are composed of one or more data centers that are interconnected, and each data center is made up of compute and storage resources which are linked together via a network. A Cloud integrates all resources into one huge pool of shared resources which can be intelligently and automatically managed. Thus, Clouds are able to adapt to the ever-changing resource demands of customers. (Intel, 2014)

Cloud computing usually come in two different forms; namely a public Cloud or a private Cloud. Public Clouds are hosted by a Cloud service provider such as AWS or Microsoft Azure, who rent

space on the cloud to their customers via the internet. In this case, the customers do not own the data centers that generate storage capacity and processor power for their business needs, but rather they are owned by the Cloud provider itself. This is the most common type of Cloud, and what people generally think about when they hear the word Cloud. Customers who use public Cloud services are able to offload much of their management responsibilities to their Cloud provider, making the public Cloud a popular choice to host management applications that are used on a daily basis such as Email, Customer Relationships Management (CRM), and Enterprise Resource Planning (ERP). By renting space on the cloud, you effectively eliminate any capital expense in favor of paying for a fee-for-service, meaning that you only pay for the amount of services that you use (utilization and data volume of services) (Garrison et al, 2012). Finally, public Clouds offer scalability through its so-called “on-demand” capacity which means that businesses are able to choose solutions and services that meet their business goals without being limited by their data infrastructure capacity.

Private Clouds, in contrast to public Clouds, generally runs on an organization’s own intranet where the data is protected by a firewall, allowing for a greater level of security. This type of Cloud is lucrative for companies who already have invested in expensive data centers, as they are able to use the data infrastructure they currently have. Furthermore, private Clouds are a non-shared resource, which allow for much greater control and customization to fit a particular organizational need. Companies therefore use Private Clouds to run their core business applications that enable unique competitive advantages such as R&D and supply chain, as these resources are not shared nor visible for external parties.

It is important to note that companies are not bound to a single cloud type, in fact, many companies use a combination of both private and public Cloud solutions to fit their different needs. This is called a hybrid Cloud solution, which indeed is a common practice for Swedish companies. Nonetheless, regardless of the Cloud type, all Clouds are niched to deliver a particular type of service. The three main type of services provided by the Cloud is software, infrastructure, and platform, which will now be briefly explained.

2.1.1 Software as a Service

The SaaS-model, which is the most common type of Cloud service, simply implies that software can be provided to a user by a vendor, usually for a subscription. The length of the subscription is entirely based on how long the user intends to use that particular service, and ranges from a minute to an annually based subscription (although, most subscriptions are a monthly payment). Unlike the traditional model of purchasing a software for a one-time fee and installing it on your computer, the SaaS model instead has the software installed on the provider’s servers which the user’s computer simply connects to through a web-browser (Marston et al,2010).

Depending on the length of the subscription, SaaS can end up costing a customer more than outright buying the license for a software. However, using a fixed deposit-model for purchasing several software licenses requires a massive one-time capital deposit. Therefore, using a subscription-based purchasing model such as SaaS can decrease the financial burden on C-suites who intend to provide software to their organizations (Goscinski & Brock,2010).

The software services provided through SaaS are essentially extensions and tools that provide features which can help organizations with their daily tasks. This includes mail servers, presentation tools, Customer Relationship Management (CRM) tools, and vector graphics applications. As an example, CRM software can provide powerful tools for sales teams who strive towards closing deals. Salesforce, the world's leading CRM provider offers customer prediction through predictive analysis, which helps sales teams to better understand the behavior and needs of their customers. Furthermore, many SaaS services offer Enterprise Resource Planning (ERP) solutions, which provide tools for managing a company in their financials, supply chain, manufacturing, operations, reporting, and human resources (Microsoft, 2016). ERP also provides the tools necessary for rapid decision-making which can help the overall productivity of the company.

There are generally two ways to incorporate SaaS solutions into your IT-environment. You can use SaaS solutions that are services developed by your Cloud provider, for example Microsoft Dynamics, which is an extended service available for Microsoft Azure customers that provide tools for CRM and ERP, or you can use so-called "best-of-breed" SaaS solutions which are services developed by third-party companies who often specialize in one type of service (e.g. Salesforce who focus on CRM). This study explores integrated and third-party SaaS in the third sub-question.

2.1.2 Infrastructure as a Service

In the IaaS model, customers pay a subscription fee in order to move their infrastructure to the Cloud. The customer is provided with processing, storage, networks and several other basic computer resources. Much like in the SaaS model, customers are not able to control the underlying cloud infrastructure, however they are able to manage deployed applications, operating systems, storages, and in some cases they have limited control of networking components such as a host firewall (NIST, 2009).

2.1.3 Platform as a Service

PaaS is the Cloud model that essentially provides users with a platform in which they can develop, run, and manage applications. Similarly to the other Cloud models, it is the provider's responsibility to maintain the underlying infrastructure needed to develop the applications. With most PaaS providers, the user develops applications by simply inputting their code into a provided folder. Although, there are other types of web applications such as One.com that uses a drag-and-drop method for creating websites and applications.

Regardless of the Cloud model, it is up to the provider to make sure that the software and hardware is fully functional and continuously updated. Thus, unlike the traditional model, any costs related to maintenance, repair, and upgrades are completely eliminated for the customer (Goscinski & Brock, 2010). The Cloud models provides great value to not only Cloud customers, but also Cloud providers because receiving recurring deposits instead of a fixed deposit is somewhat favorable due to giving you a much more stable form of income.

Before the following section, we have to make a certain distinction by clarifying what a "Cloud provider" actually provides. Cloud providers usually either specialize in either providing IaaS and

PaaS solutions (Microsoft Azure, Amazon Web Services, e.t.c), or SaaS solutions (e.g. Salesforce and Upsales). Hence, in order to separate the two, the term “Cloud provider” will only refer to IaaS and PaaS providers, and Cloud providers who specialize on SaaS solutions will simply be referred to as SaaS providers. This clarification is required because although large Cloud providers such as Amazon also provide software solutions, smaller third-party providers tend to not provide IaaS and PaaS solutions as they are focused on delivering a particular software which they specialize on.

2.1.4 Public Cloud Market Leaders

This section presents the three public Cloud providers who currently have the largest market share in the Cloud market, namely Amazon Web Services (AWS), Google Cloud Platform (GCP) and Microsoft Azure (MA). This section only regards PaaS and IaaS.

The current dominator of the public Cloud market, AWS, is a subsidiary of Amazon.com which was released just over a decade ago. The services provided by AWS are currently operated from twelve different geographical locations across the world, with five new locations coming in 2017, albeit, none of these are located in Sweden (Amazon, 2016). Two of these geographical locations are in Europe (Ireland and Germany). AWS is still available in Sweden, however all data must be routed to another country in which AWS operates. AWS has over 70 different Cloud services that specialize on providing a broad range of services including databases, analytics, storage and application services. Arguably, Amazon thus has a marketing strategy that focuses on providing a diverse amount of services so they become a suitable choice to a broad range of customers. This may partly explain how they have managed to grasp such a large share of the market. The most popular service provided by AWS is Amazon Elastic Compute Cloud (EC2).

EC2 allows users to rent virtual computers (servers) on which they can run computer applications. Different applications require a varying amount of servers to process said applications, and EC2 tackles this by providing users with access to a scalable amount of servers quickly and inexpensively. Users connect to EC2 through AWS or an Application Programming Interface (API) and simply choose the desired amount of servers and operating system. Users only pay for the servers they use (at an hourly rate), and can quickly terminate the service when they are done. EC2 also provides a wide range of server-types, ranging from budgeted servers which have relatively low processing power and storage capacity to extremely complex servers which can be classified as supercomputers (AWS,2016).

A main competitor of AWS is Microsoft, who stepped into the Cloud game a few years after Amazon by releasing Microsoft Azure in 2010 (initially called Windows Azure). In terms of geographical availability, it is currently superior to AWS with 18 locations worldwide. Azure’s geographic locations in Europe are in Holland and Ireland, and Microsoft does not currently plan to expand its operations to Sweden. Much like AWS, Azure provides a wide variety of Cloud services. Beyond the standard set of services which a customer expects from a Cloud provider (e.g. storage and development tools), Azure provides tools and extensions for Microsoft’s own applications and software, including Visual Studio Application Insights, SQL databases, and Office 365. Geographic redundancy is desired by all users who rely on servers which always are online. These users can choose an additional feature, Geo Redundant Storage (GRS), where data

is stored in a secondary location (in a location with the closest proximity to the primary location), backing up all the users' data to ensure that everything is up and running in case the primary data center would fail. However, they are by no means alone in providing geographic redundancy; both Amazon and Google have similar solutions. Furthermore, in accordance with the Microsoft Azure Agreement, Azure vows not to use user data for any other purpose than to resolve technical issues, and also explicitly state that they will not disclose user data to third party requests. By contrast, Google does not provide such guarantees.

Finally, the Cloud provider with the biggest growth in the first quarter of 2016 is Google, who overtook IBM and became the third largest Cloud provider in 2016 (SRG, 2016). Google Cloud Platform (GCP) is the most recently introduced big Cloud provider, and it was launched in 2011. GCP only operates in four locations worldwide, with the only geographical location in Europe being in Belgium. Much like AWS and Azure, GCP provides users with services trivial to the Cloud such as scalable storage and hosting capabilities through their App Engine. GCP also provides extensions of Google's own products, for example Google Prediction API is a powerful IT tool that uses Google's machine learning algorithms in order to provide users with data analytics and outcome prediction. Although GCP has had a slow start, they have built a Cloud service that is cost-effective, high performance and constantly improving. With plans to expand into ten new locations by 2017, Google have shifted into top gear and they are a serious competitor to AWS and Azure (Google, 2016).

2.1.5 Selecting a Vendor

From a customer's point of view, there are many things to take into consideration when picking a provider for your Cloud service needs. Although the Cloud as a whole is subject to a lot of research, there is currently a limited amount of research done on the success factors and critical aspects for startup companies when selecting a provider from the customer's perspective. Startup companies have a limited capacity to operate their own IT-infrastructure, and the fact that they rely on IT services within a relative short time after starting up means that startups almost always are predestined to become Cloud customers (Repschlaeger et al, 2013). For this reason, the first sub-question of this study researches the factors that are critical from a customer's perspective to close this gap of knowledge, and this section presents a few basic aspects which have been discussed in previous studies on the subject.

When selecting a Cloud provider, there must be a sufficient amount of reliability that the provider will be around tomorrow. If your provider goes bankrupt, you run a serious risk of losing all your data, as the process of moving your data from one provider to another (i.e. data migration) is an immensely difficult task. Migrating Cloud solutions is purposefully difficult, as it is a trick used by Cloud providers to avoid customers from moving to their competitors, a phenomenon called vendor lock-in (Perilli et al, 2009). The data format in which data is exported is constructed in a way so that it results in all kinds of complications when it is imported to another provider (Venezia, 2013). This means that customers must also think about finding a provider that offers a universal format for exporting data, so it is compatible with other solutions.

The difficulties that come with data migration mean that you generally want to avoid switching provider. For this reason, you want to choose a provider which you intend to stick with for a

long time. As a result, customers must also choose a Cloud provider that offers a sufficient level of scalability, which should be a basic premise for any legitimate provider (Zhang et al, 2010). Even if a vendor is able to provide your present hardware and software needs, a customer must consider the provider's capability to provide satisfactory Cloud services in upcoming years when your company has grown.

Although this study primarily focuses on helping new startups choose their Cloud services, studies show that Cloud providers strive towards distinguishing certain customer groups and their preferences, and in turn attempt to diversify the amount of services that they offer so they can reach an optimal amount of customers (Katzmarzik, 2011). Consequently, the providers need to understand the preferences of Cloud customers (Benlian et al. 2010), which in turn increases the need for studies such as this one, which focuses on critical factors for choosing a provider from the customer's perspective.

Studies on Cloud customer preferences among startups are extremely limited, and one point of this study is to fill this gap of knowledge by exploring the thought-process of Swedish startups when selecting their Cloud services. That being said, one previous study found that startups tend to lean towards providers that are scalable and affordable (Repschlaeger et al, 2013). However, the Cloud market evolves quickly, and a lot has happened in the past three years. As we will see later on in the study, an assumption made by the author going into the study is that being affordable and scalable is no longer a means in which Cloud providers can differentiate themselves from their competitors, as all top Cloud providers offer relatively similar prices and scalability (Finnegan, 2016). One knowledge gap is therefore to find the factors that truly are important for Cloud customers when choosing a provider, and also what the differences between the top Cloud providers are.

2.2 Brand Identity

The following section will explain Brand Identity, mainly using theories and models by Aaker and Joachimstaher.

Brand identity is a term that encompasses all the qualities which the core of a brand is made of. The essence, or the soul of the brand, is hidden deeply within the core (see figure 3). A brand which has a strong brand identity has an essence which can communicate its value propositions with consumers. It is Apple's essence who tells millions of people to stand in line and purchase each new version of an iPhone.

In order to create a strong brand identity, a firm must focus on ways in which they can differentiate themselves from their competitors (Ghodeswar, 2008). This means creating long-term sustainable competitive advantages that are difficult to replicate, which in term allows a firm to have unique value propositions that are alluring for consumers. By accomplishing this, a firm gains a unique brand essence which allows them to stand out from the crowd.

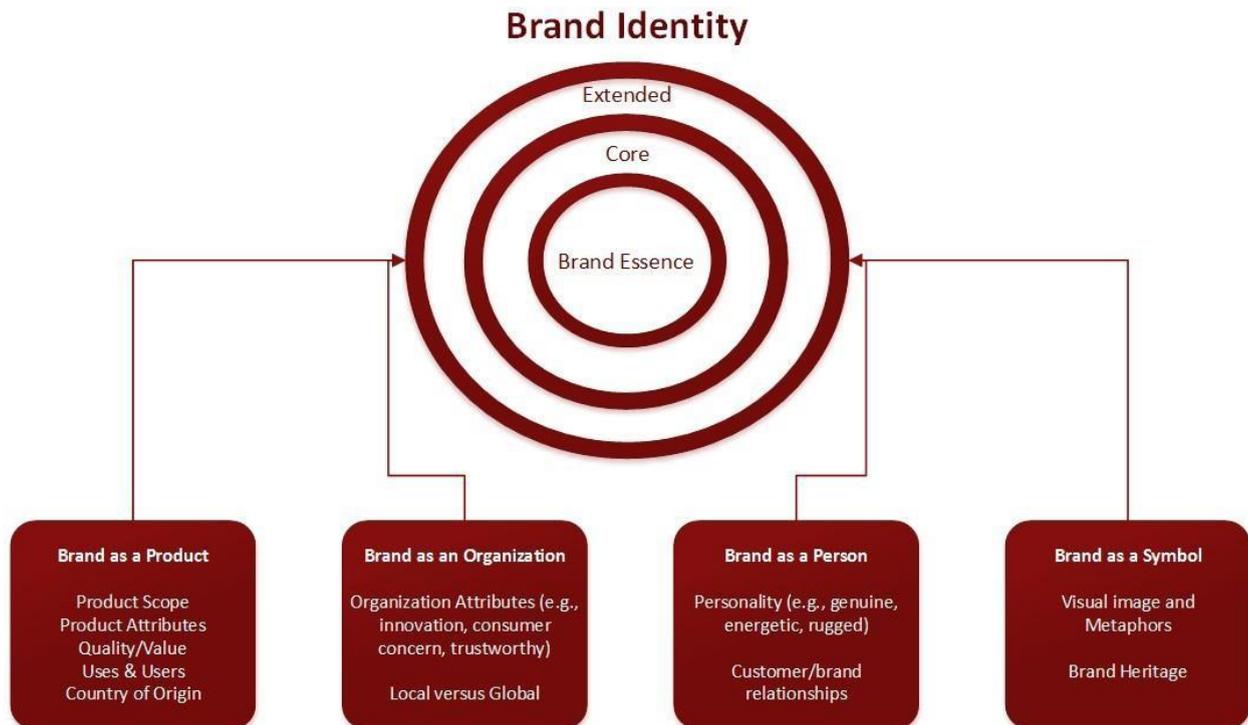


Figure 3 - Brand Identity. Aaker and Joachimstaher (2000)

Aaker and Joachimstaher (2000) depict the brand identity of a firm as a product of four categories, namely brand a product, brand as an organization, brand as a person, and brand as a symbol. A firm must choose the categories in which they want differentiate to themselves. For example companies such as Mcdonald's and Coca Cola are symbol-intensive brands who focus on association through visual perception.

In this study however, we will only concern ourselves with the brand as a product category. More specifically, the study is narrowed down to focus on the product attributes within this category. For a Cloud provider, product attributes are the characteristics of their Cloud services. These include (but are not limited to) the terms that were previously discussed, such as cost, scalability, data migration, and server uptime.

In this study, we explore the product attributes of different provides, but more interestingly, we investigate the product attributes that the current market leaders (AWS, Azure, and GCP) tend to focus on in order to differentiate themselves from their competitors, as well as finding out which product attributes they have in common.

2.2.1 Points of Difference and Points of Parity

This subchapter primarily uses theories provided by Kevin Keller in order to categorize product attributes as either a Points of Difference or a Points of Parity. The point of establishing the points of difference and points of parity of a particular brand is that it gives us indications towards how that brand attempts to position itself in its market.

In order for a firm to create a strong brand identity, they must define their Points of Difference (PoD) and Points of Parity (PoP) (Keller, 2013). Kevin Keller, in his book “Strategic Brand Management” explains that PoDs are the set of attributes that a consumer strongly associates with a particular brand, which gives them the uniqueness that we previously disclosed. For example, a PoD for Swedish furniture retailer IKEA would be that they took something that was considered quite luxurious, home furnishings, and made it available for the mass market at a reasonable price. By building their reputation on the notion that Swedish companies can provide safe and inexpensive products for the masses, they have created a unique brand essence (Keller, 2013).

PoPs, on the other hand, are the attributes or characteristics that are not unique to any particular firm, but rather adapted by most firms that operate in the same market.

According to Keller, there are three types of points of parity, namely:

- **Necessary Points of Parity** - These are the basic attributes that are necessary for a firm that wants to exist in a particular market. This means that a customer will naturally assume that these particular attributes exist as they are the standard of that particular business. For example, necessary PoPs in the banking industry would be checking and savings plans, safety deposit boxes, and ATMs.
- **Competitive Points of Parity** - Competitive PoPs are the attributes that are particularly designed to negate a competitor’s PoD. A firm can assert themselves in a strong competitive position if they are able to replicate the attributes which provide a competitor an advantage in a particular area. For example, Hyundai spent decades repairing their damaged reputation of producing inferior cars, and when they at the turn of the century had bumped the quality of their cars to an accepted level, customers could instead turn to Hyundai’s PoDs (i.e. price, styling, milage e.t.c.) (Aaker, 2013).
- **Correlational Points of Parity** - Correlational PoPs are the negative associations that arise as a result of a brand’s positive attribute, due to being inversely correlated. From a customer’s perspective, if a brand is good at one thing, it will not be able to provide satisfactory solutions in some other particular areas. A classic example here would be that customers do not often label a brand as “inexpensive” while at the same time “of the highest quality” (Keller, 2013).

Keller (2013) therefore explains that PoPs first of all provide a basic set of attributes, which do not have to be equally as good as a competitor’s PoPs, as long as a sufficient amount of customer’s believe their solutions to be adequate. Secondly, PoPs are important because they can help to undermine a competitor’s PoDs. He thus argues that the key for successful positioning is perhaps not to focus on differentiation through PoDs, but to instead focus on achieving the necessary, competitive, and correlational PoPs, given the fact that PoPs usually are easier to achieve than PoDs. What is important to realize here, is that there is an ongoing cycle where firms attempt to differentiate themselves through a PoD, followed by competitors conforming to those changes by establishing their own competitive PoPs that weaken the effect of the PoD.

The result of this is that top actors within a mature market, such as the Cloud market, share many similar product attributes as a consequence of waves of “attacks” and “counters”.

Given the fact that digital markets mature much quicker than traditional markets (Edelman, 2014), the author’s intuition going into this study was that the Cloud market already had developed and matured to a point where top providers only could differentiate themselves through PoDs that are highly resistant towards being replicated (e.g. reputation, or user-friendly interfaces). This implies that other product attributes such as cost, server uptime, and level of security are irrelevant for most customers, since all top providers offer similar services.

By establishing the PoDs and PoPs of a brand, we can gain a great insight in the brand's identity and image, which in turn allows us to better understand how a brand positions itself in a market (i.e. how a brand differentiates itself from its competitors, and the associations that customers uniquely make to a particular brand). PoPs and PoDs are thus a great means of establishing the relative positioning of a brand (Keller, 2013). Kotler and Armstrong similarly explain how positioning is all about arranging for a product to have a distinct and desirable place in the minds of target customers (Kotler & Armstrong, 2014). For this reason, the main methodology of this research is centered around acquiring qualitative information from people who work with Clouds on a daily basis.

According to Keller, there are three particular criteria that must be met in order for a product or service to be uniquely associated with a brand and therefore qualify as a PoD. These criteria are:

- **Desirability** - The consumers must find the PoD personally relevant and important. Keller explains that brands tend to have compelling PoDs if they are successful in tapping into growing trends, and thus adhering to elements that matter for the consumers. An example is the American fruit juicy company Apple & Eve’s who succeeded by riding on the wave of an increasingly health-minded beverage market by pure providing with pure, natural fruit juices.
- **Deliverability** - A company’s ability provide with deliverable PoDs is dependent on two main factors; namely the company’s actual ability to make the product or service (feasibility), and how effective they are at convincing their consumers they are capable of doing so (communicability).
- **Differentiation** – Consumers will naturally try to look for brands that can provide viable solutions that are distinctive and superior. Brands that succeed in establishing a strong position in the market which is defensible and difficult to attack is bound to have position that will last for years.

3. Method

The following chapter will explain the methodology that was used for conducting this research. We will discuss how empirical data was gathered, and how that empirical data fulfills the purpose of the research. The chapter is then concluded by thoroughly explaining the validity, reliability, and generalizability of the research.

3.1 Designing the Research Process

A properly designed research process is a vital element for a well-established thesis, as it helps to make sure that the research question is answered in a correct manner (Collis & Hussey, 2014). Since the sub-questions of this research were aimed to explore how Swedish startup companies choose their Cloud solutions, and as well as investigating how the Cloud providers are positioned in the market, this study has an abductive research approach. An abductive research approach allows the author to switch between ideas and theories and thus make the research an iterative process (Blomqvist and Hallin, 2015). This is an ideal approach for this study, as it allows for the author to analyze the results by a constant interaction between theories and the study's empirics, and in that way seek the most likely explanation for the results. Furthermore, an abductive research approach is suitable to this study because it allows for a constant iteration of the research questions throughout the span of the project, by constantly revising up-to-date research material. With the limited amount of previous research and observations done on the topic, an abductive research allows the author to provide with a likely explanation based on existing theories as well as the empirics of this study.

That being said, there are also inductive elements in the study's approach as it attempts to make predictions based on data gathered in the empirics in such a way that it is pursued to extend human knowledge. Contributing with new theories and knowledge based upon patterns found in statements made in the interviews is also a form of inductive reasoning (Collis & Hussey, 2014).

The author's idea regarding the focus area of the study has always been the Cloud, as it is an IT-related area which has bloomed in the past years. The initial idea was to select an industry which is heavily reliant on using Cloud-related services, such as the entertainment industry, and then to perform a thesis on Cloud provider selection for bigger companies within the entertainment industry. This idea was then revised and made to focus on startup companies in Sweden, due a few reasons. The two main reasons for this revision was that, firstly, startup companies are a lot smaller and perhaps do not have the same level of knowledge and expertise as companies that are mainstream when it comes to selecting a suitable Cloud provider, which makes a study like this much more useful for startup companies. Secondly, the overwhelming majority of startup companies, if not all, also rely on Cloud providers for their IT needs.

3.2 Methods used for answering the Research Questions

This thesis uses a qualitative approach for answering the main research question and its sub-questions. Qualitative data is usually easier to gather although more difficult to analyze (Collis & Hussey, 2014). The method of gathering empirical data in this study was a set of semi-structured

interviews that were conducted on startup companies in Sweden. The interviews were conducted on CTOs (Chief Technology Officers), who are responsible for a plethora of IT-related tasks, including choosing a suitable Cloud provider for the company. The author then used an interpretivistic approach for analyzing the collected qualitative data. In accordance with advice by Collis & Hussey for an interpretivistic analysis approach, the results section provides direct quotes from the interviews which help the reader understand how the answers were interpreted. Data collected in this manner tend to be rich in detail and nuance (Collis & Hussey, 2014).

The first sub-question “*Are there factors that startups in Sweden perceive as more important when it comes to selecting a Cloud provider?*” was answered qualitatively, primarily through information gathered during the interviews. The collected data was then strengthened by information gathered in the literature review. The literature review aimed to map what existing literature said about key drivers (i.e. what previous studies had found). This sub-question was meant to explore and see if most startup companies valued the same factors as essential when choosing a Cloud provider. The results-section related to answering the first research question provides a list with factors that were discussed during the interviews, and then the analysis-section related to answering the first research question (sub-chapter 5.1) analyzes the results (i.e. factors) that were obtained.

The second sub-question “*How are the top Cloud providers positioned in the Cloud market?*” is answered by investigating the PoPs and PoDs for each Cloud provider. The author intended to use the interviews with CTOs as a means of finding these parities and differences. The PoDs were established based on the criteria presented in the previous chapter, meaning that the interviews were used to categorize an association as a PoD if it had an adequate level of desirability, deliverability, and differentiability by a satisfactory number of CTOs.

The analysis-section then uses the results of the interviews for this part (i.e. the parities and differences) to discuss how the top Cloud providers are positioned in the Cloud market in accordance with positioning theories provided by Kevin Keller. Similarly to the first sub-question, the primary method for answering this question was thus qualitatively through the interviews and then the data was complemented by information gathered through the literature research.

The third sub-question, “*Do Swedish startup companies opt for integrated SaaS solutions that are developed by their Cloud provider, or do they instead opt for more complex best-of-breed SaaS solutions?*”, was primarily answered through data gathered in the interviews, and then complemented with data from the literature research. Each interview discussed this particular matter, as the author wanted to gain insight in how startups incorporate SaaS solutions into their IT-environment.

3.3 Selection of Companies

The author had three main criteria which companies had to fulfill in order to be eligible for participating in this study. Firstly, of course, they would have to be a startup company residing in Sweden. A main reason for this delimitation was that close proximity allowed for interviews with CTOs to be more accessible. Secondly, all startups involved in this study had to show some form

of credibility in the sense that the startup had to be listed as a highly regarded. For this reason, only startups who had shown high quality and potential were selected for the study.

Finally, the size of the company (i.e. the number of employees working at the company) had to fit the requirement of the study, which was 10 to 30 employees. A general assumption is that there are three stages of growth for startups. The first stage is the startup phase, and companies in this phase only usually have between 1 to 10 employees because the company was recently founded. Companies at this stage are not in the scope of this study, simply because most companies who reside at this stage have not grown sufficiently. The second stage for startups is the growth phase. This is where the number of employees roughly is between 10 and 30.

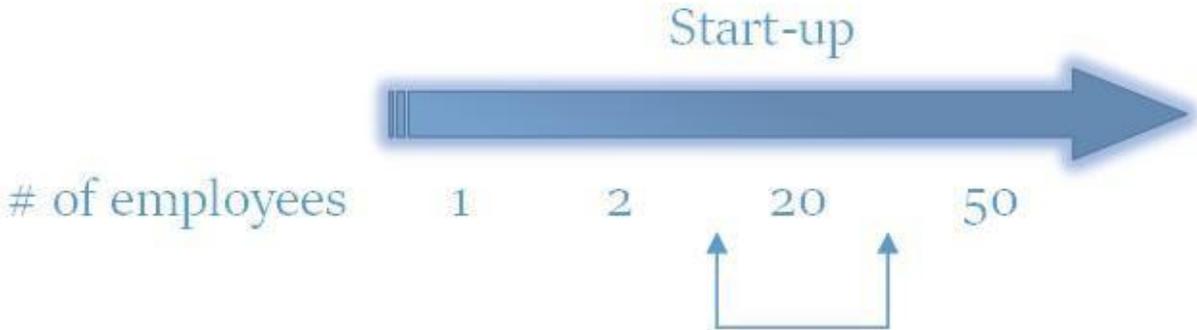


Figure 4 - The initial stages of a startup firm

Most startups who are at this phase have shown that they have potential and are capable of growing even further (i.e. they are not fully matured). The premise of this statement is the fact that an overwhelming majority of startups tend to fail within a few years of being launched (Patel, 2015). The study would benefit most from interviewing startups that are at the growth phase, and for this reason, all startups involved in the data collection of this study are reside in this stage. Startups who have more than 30 employees are outside the scope of study, as bigger companies require more complex Cloud solutions that usually do not apply to startups that reside in the first two stages.

The author selected startups for the study by finding different lists for most promising startups in 2015. From these lists, the author created a list of his own consisting of roughly 80 startups that were eligible for the study (i.e. fulfilled all 3 criteria). The author then attempted to contact these companies, and in the end, 11 startups were interested in participating in the study.

Table 1 - Selection of companies along with ID, role of each interviewee, the company’s turnover in 2014 and the number of employees.

Interviewee ID	Role of Interviewee	Turnover 2014 (Tkr)	Number of Employees
ID 1	CTO	>3000	>20
ID 2	CTO	*	<20

ID 3	CTO	>3000	>20
ID 4	CTO	*	>20
ID 5	CTO	<3000	>20
ID 6	CTO	>3000	>20
ID 7	CTO	>3000**	>20
ID 8	CTO	<3000	>20
ID 9	CTO	<3000	<20
ID 10	CTO	*	<20
ID 11	CTO	>3000	>20
ID 12	CTO	*	>20

* companies that have registered in 2014 and have yet to present their first turnover.

** turnover for 2015

3.4 Data Collection

All data in this study was collected qualitatively through interviewing CTOs. The author strived to interview CTOs at top rated startup companies, which turned out to give highly satisfactory answers. Data was collected through semi-structured interviews, where the questions asked by the author differed slightly depending on the interview (although, there were a standard set of questions which were asked at each interview). This method allowed the interviewees to freely express themselves, thus allowing for an optimal amount of data collection from each interview. The case study approach fits well with the research, as one of the base premises for a well-conducted case study according to social scientist Yin K. Robert is that “the case study inquiry relies on multiple sources of evidence, with data needing to converge in a triangulating fashion” (Yin, 2009). Similarly, this study is inspired to find patterns in the data from several interviews (i.e. common factors, ideas and beliefs from the primary data) that can be triangulated. The case study is an exploratory case study, which, according to Yin, is a great method for researches that mainly focus on “What”-questions (Yin, 2009). In the case of this study, an exploratory case study allows the author to (amongst other things) find and test the importance of different factors to consider when selecting a Cloud provider. What is important to consider here, is that a single case study is by no means generalizable in the sense that it can prove certain elements to be true or false in reality, however, as Yin puts it, case studies can strive to “expand and generalize theories”, and that “the goal is to do a "generalizing" and not a "particularizing" analysis” (Yin, 2009). In accordance with this, a contribution of this thesis is that attempts to position IT services (Cloud providers in particular) through the method of interviewing CTOs.

3.4.1 Literature Review

The initial phase of the study was to conduct a thorough literature review in order to gain a better understanding of the Cloud. As a term, the Cloud is quite broad as it encompasses a wide variety of services which can be provided. The first step of the study was to narrow down the aspects of the Cloud that would be studied. Here, the three most popular types of Cloud services that would be explored in this study were selected (i.e. IaaS, PaaS, and SaaS). It is good to note that the research was not performed in collaboration with a specific company, and so it was up to the author to select the study areas within the Cloud which he believed would give the study a holistic approach.

Once the Cloud services were selected, the author then moved on to research previous research that have been performed on topics included in this study, particularly key factors that should be considered when selecting a Cloud provider from a startups' perspective. The author used this part of the literature review to construct the field of research of the study. The author used previous studies as a foundation to build his own research, and to contribute in specific areas in which there are knowledge gaps. Data gathered through the interviews were also used as a method of seeing whether it corresponds to previous research and theories.

The author then proceeded by researching fields within industrial management that were relevant to the study. This includes the research of brand identity theories and models proposed by Aaker and Joachimstahler, as well as Kevin Keller's theories on PoPs and PoDs. The next step was to investigate the data collection methods that would be used in the study. The author has previous experience with combining quantitative and qualitative methods (e.g. through a questionnaire which is followed up by a set of interviews). The method is too difficult to perform under the circumstances of this study without negatively impacting the study (e.g. time constraints) and therefore this study has empirics which builds on solely qualitative data. The author spent a fair share of time researching and constructing the interviewing method (i.e. semi-structured interviews) and coming up questions that would give satisfactory answers during the interview.

The literature review was primarily conducted through digital libraries that provide scientific articles. The two main digital libraries chosen for this purpose was KTHB and Google Scholar. The literature review was performed by entering several key-words (listed below) that were tied to each sub-chapter.

“Cloud Computing”, “Cloud Services”, “Public Cloud”, “Private Cloud”, “Public Cloud Providers”, “Software as a Service”, “Infrastructure as a Service”, “Conducting Semi-structured Interviews”, “Platform as a Service”, “Cloud Data Migration”, “Vendor Lock-in”, “Semi Structured interviews”, “Cloud Provider Selection”, “Brand Positioning”, “Brand Identity”, “Points of difference”, “Points of Parity”

3.4.2 Pre Study Feedback Session

Before conducting the main interviews, a pre-study was conducted in order to understand if the interview questions lead to answers which could be used in order to answer the study's research questions, or if they needed to be revised before conducting the main set of interviews. The pre-study was conducted on three startups in Sweden that operate in the E-commerce, Media, and Consultancy industry.

Table 2 - ID, Role of Interviewee, operating industry, and turnover in 2014 for each startup that was selected for the pre-study.

Interviewee ID	Role of Interviewee	Industry	Turnover 2014 Tkr
ID1	Product Specialist	E-commerce	*
ID2	Head of Sales	Media	<3000
ID3	CTO	Consultancy	>3000

* company that registered in 2014 and has yet to present their first turnover.

The pre-study interviews ranged from 20 to 35 minutes and provided a lot of information for the author. Some questions were revised as a result of the pre-study, but overall, the semi-structured interviews gave evidence towards being a satisfactory data collection method, which allowed the author to continue the study by conducting the real set of interviews.

3.4.3 Interviews

The interviews were conducted in order to gather data that would be used to answer the main research question along with its three sub-questions. The literature research provided the author with a great amount of information about the Cloud. This allowed the author to conduct interviews with CTOs who were highly knowledgeable about different Cloud providers. Twelve interviews were conducted, and all of them were with CTOs at Swedish startup companies who have proven to strive for excellence in their own industry. The interviews were meant to act as a medium for the author to create deeper discussions that would provide the research with qualitative data. All interviews were conducted in Swedish (except for one which was conducted in English), and the length of the interviews varied between 25 and 50 minutes. The interviews were either conducted over a VoIP, or face to face depending on the preference of the interviewee.

The interviews were conducted with a semi-structured approach, using a basic set of questions as a template that would form the rest of the interview. The interviewees were free to talk about anything, however if they stepped too far away from the intended area of the research, the author would steer the interview back into the correct area. By using a semi-structured approach, the author was able to hear what the next question would be based on the answer given by the interviewee for the previous question, and so it was an effective means of a smooth interview. It was the author's intention not to be too leading with the questions in order to minimize bias. Once all interviews had been conducted, they were benchmarked with each other, in an attempt to find patterns in the answers of the different interviews.

A template of the questions posed at the interviews is available in appendix A.

3.5 Validity, Reliability, and Generalizability

Throughout the study, the author has made repeated efforts in enhancing the validity, reliability, and generalizability of the study. The author mainly used theories presented by Collis & Hussey in their book *Business Research* as a means of achieving a satisfactory level of validity, reliability, and generalizability.

3.5.1 Reliability

Collis & Hussey define reliability as being how similar a study's results would be, if the study were to be repeated. They further explain that quantitative data gathering methods are a great way of enhancing the level of reliability of a study, which makes sense as quantitative methods usually come in larger sets of data, allowing the data to become more saturated. Since this study does not make use of a direct quantitative data collection method such as a questionnaire, it had to make sure that it achieved an adequate level of data saturation in the interviews. In practice, this means that you have to conduct an adequate amount of interviews, and you will know that your data has a satisfactory amount of saturation when your interviews start giving you answers that are similar to previously conducted interviews (i.e. data you already have collected before). In accordance with this, the author believes that enough interviews were carried out, and that the last 2 or 3 interviews started giving repeated data. This hints towards the saturation of the study being satisfactory, meaning that the data is also reliable and if the study were to be conducted again, it would most likely yield similar results.

As previously explained, semi-structured interviews tend to often derail since the interviewee is free to speak. In theory, this means that it affects the reliability of the study negatively since each interview derails in a particular way, and thus no two interviews are the same. The author attempted to counteract this by using the same base template of questions for each interview.

Furthermore, in accordance to the information requirement principle for ethical guidelines proposed by the Swedish Resource Council (SRC), all parties involved in the study received full anonymity. This means that the contact information of the interviewed CTOs is not disclosed, which in turn may affect the reliability of the study negatively as a replicated study with the same research methods conducted on other individuals may yield different results. However, given that data collected in this study reached a high level of saturation, this would probably not be the case.

3.5.2 Validity

According to Collis & Hussey (2014), authors should strive to include a qualitative set of data in their study, as it enhances the validity of the study given that it is used under the right context. Collis & Hussey (2014) explain that a study can be said to have a high level of validity if the research measures what it intended to measure, and if the findings accurately reflect the phenomena that is being studied.

An essential part of the study was to conduct interviews on CTOs with several years of experience with different Cloud providers. Thus, a lot of time was spent trying to find suitable CTOs that would want to be involved in the study. Interviewing CTOs meant that the research

indeed measured what it intended to measure, increasing the level of validity of the study.

The pre-study was largely conducted because it would enhance the level of validity of the study. The author used the pre-study interviews as a testing ground to see if the interviews yielded data that accurately reflected the phenomenon that was being studied. This was done in order to understand if the study indeed measured what it intended to measure, as was the case.

Furthermore, the questions posed at the interviews were constructed in a way that minimized the question being misinterpreted. Clear questions pave a way towards an interview with a high level of validity. If the interviewee misinterpreted the question, or simply provided an answer that derailed too much in the sense that the answer was irrelevant to the question, the author would restate the question more clearly and then ask the interviewee to answer again. An advantage to being a lone conductor of interviews was that the author could make sure that each interview was carried out in a similar fashion. Furthermore, it was easy to detect the point at which the interviews had reached an adequate saturation since the author had full control over conducting the interviews.

3.5.3 Generalizability

The study used a randomized approach for selecting companies that would be interviewed. Out of the list of 80 eligible companies which was previously disclosed, the author used a random number generator ranging from 1 to 80, and then repeated this process 20 times. In the end, there was a final, randomized list of 20 companies that the author would contact in hope of getting their consent to interview their CTO. The author mailed and phoned these companies, and informed them about the purpose of the study. These companies had a three day period to reply, and by that time, if they had either not replied or declined, the author would construct another randomized list of 20 companies which would be contacted. This process was repeated until 12 CTOs had agreed to be in the study.

The study does not delimit itself to a single industry for startup companies, but rather, any company that was deemed as eligible for the study qualified to be included. This includes companies from a broad range of industries, which may impact the generalizability of the study positively since a plethora of industries are included in the study. Although the last interviews conducted tended to not yield new data, this may have been a coincidence and thus a more extensive study that included more companies may have increased the generalizability. The problem here is that there are time constraints, and so the author believed 12 interviews to be a satisfactory amount of interviews given the circumstances.

4. Empirics

The following chapter presents all data that was collected in this study. With the exception of the pre-study subchapter, 4.1, this chapter only has raw uninterpreted data, and the data is analyzed in the next chapter.

4.1 Results from the Pre-Study

Going into the pre-study, it was the author's intuition that the Cloud market had matured to a point where the top provider's offer similar services and prices, and that they only would be able to differentiate themselves through means which were highly difficult to replicate, such as brand reputation. This was proven to be mostly false during the pre-study, as the interviewee's believe there to still be several reasons to pick one over the other.

"What I value most when selecting a Cloud provider is who is able to manage my data easiest. Do I have to construct my own data warehouse, do I have to call tech support, or can I sign up and be ready to go?" - ID P1

"Do the Cloud providers offer a simple pricing list which is easy to follow? What services do they have that their competitors cannot offer?" - ID P2

"Prices of different services is of course something we take a look at." - ID P3

Some of the key factors revealed by the pre-study were differentiation, simplicity (i.e. the simplicity of navigating through a Cloud provider's website, services, and so on), and how good the integrated SaaS solutions that came as a package with the Cloud provider were. However, price seemed to be the factor that was important for most of the pre-study interviewees.

It is important to note the author chose to minimize bias when exploring the importance of different factors when it comes to Cloud provider selection by not explicitly asking questions such as "how important is geographical redundancy?", but rather let the interviewee speak about different factors that came to their mind. This was done in order to not be too leading with the questions, and the same method was incorporated into the real set of interviews after the pre-study.

4.2 Results Connected to SQ1

This sub-chapter will present the results that are connected with the first sub-question: *"Are there factors that startups in Sweden perceive as more important when it comes to selecting a Cloud provider?"*

There were five factors that could be derived from the interviews that stood out in terms of relevance and importance. These will be regarded as "key factors". Each key factor is presented and explained in table 3, and then the remaining factors which were deemed to be less important than key factors will be enclosed in a similar style but in a separate table from the key factors (i.e. table 4). The importance of each factor is first briefly explained, followed by quotes from different CTOs.

Table 3 - Key factors derived from the interviews

Key Factors	Explanation
Compatibility with IT-environment	<p>The most crucial factor in the minds of the CTOs when selecting a Cloud provider was how well their existing IT-environment could integrate with a Cloud provider. Companies primarily run on either Linux or windows based operating systems, and it is simply a deal-breaker for CTOs to pick a provider that doesn't integrate well with their systems.</p> <p><i>"We wanted to pick the Cloud platform which was most compatible with our IT-environment. Azure was ruled out because it is a Microsoft company, and thus we chose AWS, since our company is Linux-based." - ID 2</i></p> <p><i>"If you're already working with a Microsoft environment, you should choose Azure since it uses the same ecosystem. However, our IT-culture leans more towards Linux and therefore we picked AWS". - ID 5</i></p> <p><i>"Azure has always been the clear choice for us. Unless there are drastic changes made to our IT-infrastructure we will stick to Azure because we use a lot of software from Microsoft." - ID 7</i></p> <p><i>"Previously, we were interested in trying out Azure. However, they focus largely on the .NET framework which runs on Windows, and so Azure does not focus so much on us who are Linux-based clients. There are many levels of abstractions in the way for us to use Azure, making it very difficult for us to use. Therefore we chose AWS which is a much more suitable choice." - ID 11</i></p>
Quality and quantity of Services	<p>The quantity of different services provided, along with the quality of said services, is another key factor for CTOs when selecting a provider. The vast majority stated that they would pick a provider that gave them the digital tools needed to operate their business, and thus having a large selection of services to choose from is a big plus. The quality of a service is also dependent on how quickly information is transferred from a company's devices to the Cloud provider's data centers and back, also known as a roundtrip time.</p> <p><i>"How flexible they are when it comes to choices is very important for us, as well as the quality of the services they provide. For example, Azure offers a very well managed SQL database." - ID 1</i></p> <p><i>"Amazon has very large selection of services - they can give private networks that are extremely customizable, and their whole offering is very mature and constantly being developed". ID 2</i></p>

	<p><i>“Fast ping and roundtrip times are immensely important for us. AWS can provide us with roundtrips that are three times faster compared to the benchmarked providers.” – ID 11</i></p>
Well-managed Provider	<p>Choosing a Cloud provider that is self-managed and able to provide solutions to customers in a satisfactory manner is another factor that was important for CTOs. The inability to provide an adequate level of customer service has meant that one CTO was forced to change provider.</p> <p><i>“The biggest factor for me, personally, is that it is a well-managed service provider. I should not have to bother with hiring system administrators that take care of the servers. This means that it is not my responsibility to make sure that the servers have good uptime, nor is it my responsibility that our data is well-protected. AWS lets me sleep at night knowing that everything simply works.” - ID 9</i></p> <p><i>“Google offers a Cloud platform that has serious flaws in areas in which they simply cannot. Google does as Google wishes, and they are not customer oriented at all. We have lost all trust for Google, and are currently moving our operations to the AWS elastic Cloud”. - ID 10.</i></p>
Data Protection	<p>Data protection laws are another essential factor for startup companies when selecting their provider. This means that the provider still can transfer personal data in a manner that complies with the existing data protection regulations.</p> <p><i>“It was critical for us to pick a provider that had a compliance with data protection regulations. Will they provide a Data Processing Agreement which includes model clauses that are approved by the European Commission?” - ID 2</i></p> <p><i>“When the Safe-harbor framework was declared invalid back in October, Microsoft ushered in new legal safeguards that enabled us to continue transferring data between EU and the US. If they could not offer this, we would have to switch to another provider”. - ID 8</i></p>
Price	<p>Many CTOs agreed that price was one of the main factors that they considered when selecting a provider. Not only the price itself, but also how easy it was to see the costs depending on what CPU, memory, and storage you selected.</p> <p><i>“Price was an important aspect to consider when selecting a provider. It was much easier to gather information from a website that neatly listed the prices depending on Cloud specifications”. ID 4</i></p>

	<p><i>“The budget of the company was quite limited when we started the company, and so of course price was a factor for us. However, things have changed and today there are no drastic differences in prices between Azure and AWS” - ID 8</i></p> <p><i>“Price was an important aspect, but it was not a deciding aspect. We had to choose something we would be content with for at least three years.” - ID 10</i></p>
--	--

Table 4 - factors derived from the interviews

Factors	Explanation
Scalability	<p>Scalability is also an aspect to consider when selecting a provider. Being able to flexibly choose your Cloud specifications is a must, as the size of a startup company (and the resulting IT requirements) is very dynamic.</p> <p><i>“Naturally, we need a lot more computing resources today, in comparison to when we started the company. We knew this two years ago and were therefore very interested in picking a provider that offered elastic computing” - ID 7</i></p>
Geo-redundancy	<p>Geographical redundancy is the manner in which providers are able to replicate your data from one datacenter to another. Your information is mirrored to another region so that if there is a power outage in one data center, you will still be able to use your services through another data center which has a copy of all your data. The CTOs saw Geo-redundancy as a fundamental aspect that must be provided by the Cloud provider. All data centers are prone to sooner or later experiences power outages, you just have to be prepared for it.</p> <p><i>“Azure has amazing geographical redundancy; they offer a vast amount of selection here, and it is very easy to choose how you wish to mirror your databases and choose the regions in which you want to do so.” - ID 6</i></p> <p><i>“Azure can provide the best geographical redundancy, you can rest assured that servers are up and running at all times. If there is a power outage that disables their data regions in the EU, they have a back-up generator on a truck that is ready to power the data centers. On a truck!” - ID 8</i></p> <p><i>“AWS has had some major power outages in the past. But they have worked hard to deliver a redundant interconnected network of data centers. They knew they would be done for if they kept on screwing up.” - ID 9</i></p>

History	<p>Some CTOs considered the background history of the provider to be a factor. Previous records of companies can give indications towards how they may act in the future.</p> <p><i>“Azure has made some critical mistakes in the past with encryption keys that were simply unacceptable”. - ID 2</i></p>
---------	--

4.3 Results Connected to SQ2

This chapter will present the results that are connected with the second sub-question: *“How are the top Cloud providers positioned in the Cloud market?”*. This section uses Kevin Keller’s definitions and criteria for PoPs and PoDs to explain what the top Cloud providers have in common, and also how they differ. Similarly to the previous subchapter, this subchapter presents the results from the interviews in tables. Firstly, the PoPs shared by all three Cloud providers will be disclosed, followed by three separate tables that disclose the PoDs for each provider. The PoPs included here are the necessary PoPs which a Cloud provider must have in order to exist in the Cloud market.

Table 5 - PoPs shared by AWS, Azure, and GCP.

Point of Parity	Explanation
Data Protection	<p>The overwhelming majority of CTOs are up-to-date with the current EU data protection directives. After the events of the EU-US safe harbor framework being rendered invalid, most CTOs were curious to see whether their Cloud provider would find a work-around so they could continue their cooperation with their business.</p> <p>AWS, Azure, and GCP all provide model clauses, which are a standard set of provisions which are defined by the European Commission, that in turn enable personal data to be transferred in a compliant manner outside the EEA (European Economic Area).</p> <p><i>“Of course, things will be different once the new EU-US privacy shield is released, but for now, the largest Cloud providers rely on Data Processing Agreements that contain temporary EU model clauses. Luckily, AWS, IBM, Google, and Microsoft all offer these model clauses. Smaller Cloud providers will be the ones who will be hit hardest as not all will be able to comply with the necessary clauses.” - ID 8</i></p>
Data Security	<p>The Cloud providers have invested heavily into fortifying their networking infrastructure in such a way that information remains intact. The data they deal with is extremely sensitive, since much of it is personal information. Most CTOs agreed that it is of uttermost importance that the data they place on the cloud maintains its integrity, and that you cannot do much</p>

	<p>else than put your trust in the hands of your provider and hope that information does not get leaked.</p> <p><i>“As a customer, you must have confidence for your provider being reliable when it comes to data security, it is a hygiene factor.” - ID 1</i></p> <p><i>“If you run your own private servers, you can forget about having control over every attack vector. AWS has skilled engineers that take care of the security for you.” - ID 5</i></p>
Content Delivery Networks (CDN)	<p>A CDN is a system of distributed proxy servers that allow for improved speed, performance, and reliability of user content. These proxy servers are located closer to the users than the data centers in which their user data lies in, and these are called edge-nodes. Even though none of the top Cloud providers have data centers in Sweden, all provide edge-nodes through their proxy in Stockholm. The interviews interestingly showed that although most CTOs were aware that their own provider had edge locations in Sweden, some did not know that their provider’s competitors did too.</p> <p><i>“Amazon provides edge in Sweden, through their Cloudfront CDN. What this means is that content is cached in Sweden can be processed much quicker. They certainly have a big advantage here.” - ID 9</i></p> <p><i>“Latency (ping) and roundtrips are extremely important for us. We’ve tested our ping with AWS which is roughly 18ms, and for similar providers it is 40ms which is a big difference.” - ID 11</i></p>
Startup Boosting Programmes	<p>The top providers are well aware that startups have a tough time getting started with their Cloud services due to costs and other factors. For this reason, AWS, Azure, and GCP have all initiated their own startup booster programs designed to help startups build and scale. These programs offer between \$100000 to \$120000 in Cloud credits that startups can use to purchase difference Cloud services (Amazon, 2016) (Microsoft, 2016) (Google, 2016). CTOs using AWS, Azure, and GCP used these boosting programs, and no brand in particular is associated with these programs.</p> <p><i>“AWS has a startup boosting program called Amazon Activate which gave us \$100000, and they also gave us free customer support and help regarding which servers to choose.” - ID 11</i></p> <p><i>“Google gave us \$100000 in Cloud credits which helped us get started with GCP. We used our credits to try several different services.” - ID 12</i></p>
Geo-Redundancy	<p>The ability to replicate your data to another data center so that your services remain online in the event of a power outage is a vital element for</p>

	any Cloud provider. All providers offer similar services when it comes to mirroring your data to other data centers, however, Google is the only company which currently only has one data center in Europe. This means that if you select Google as your Cloud provider, your replicated data will be in either Taiwan or US east coast which indeed is not optimal.
--	---

Table 6 - PoDs for AWS

Point of Difference - AWS	Explanation
Reinvests profits	<p>There were conflicting results regarding if whether Amazon takes out profit from their AWS, but most CTOs who used AWS agreed that a key advantage for using AWS is that they reinvest a big portion of their profits into developing interesting new features.</p> <p><i>“AWS is biggest by far. They are hungry to continue innovating and developing new products, and they have always had a history of diversifying their ideas. They also do not take out any profits and reinvest everything into new products. Bezos (CEO) has hinted towards the AWS as being a powerful tool for attracting new customers.” - ID 5</i></p> <p><i>“They reinvest a lot into R&D.” “Amazon makes money from AWS, maybe not amazing profit but they still make some money.” - ID 2</i></p>
Most mature provider and largest variety of services	<p>AWS has been a Cloud provider for the longest time, and has naturally had more time to mature in comparison to its competitors.</p> <p>The general consensus amongst the CTOs was that AWS had raised the bar to a new level, and that they are the ones who currently define what a Cloud provider should be capable of. AWS is the definition of a modern and mature Cloud provider.</p> <p><i>“Google has not be around long enough, they do not have a mature offering of services yet.” - ID 2</i></p> <p><i>“Using AWS, I have a great feeling of control and freedom. The services they offer are very easy for me to use, which minimizes the time I have to spend trying to make things work. For example, we use their Elastic Block Store service which allows us to scale up or scale down our storage based on our current workload very smoothly” - ID 9</i></p> <p><i>“Azure offers services that are slow and dull, and their interfaces are awful.” - ID 4</i></p> <p><i>There is definitely an advantage to using AWS's - they offer fantastic tools for SCRUM, code repository, as well as continuous development and deployment through their</i></p>

	<i>CodePipeline service. For an app-developer such as ourselves, they offer everything you need. - ID 5</i>
Price	<p>The CTOs were well aware of the ongoing Cloud price war. All though price was a factor that was considered back when they chose their provider, many state that it is quickly becoming a non-factor due to all the price cuts going on. While no provider is explicitly known for having cheaper prices, AWS is the company who actively tries to differentiate itself by constantly engaging in price-cuts.</p> <p><i>“Hypothetically, if I were select a provider today, I would not consider the prices so much since they offer relatively similar prices. There is so much else to think consider.” - ID 6</i></p> <p><i>“AWS is constantly trying to lower the price of their services, however, their competitors are quick to respond by lowering their own prices.” - ID 9</i></p>

Table 7 - PoDs for Azure

Point of Difference - Azure	Explanation
Sting Accelerate	<p>Sting accelerate is a program in which 14 to 16 Swedish startups annually are selected to get a financial investment of 300 000 Swedish crowns, along with business coaching and free office space at SUP46 in Stockholm as well as access to a whole list of other useful tools for startup companies. As for Cloud services, Microsoft offers three years of free Azure to all startups who were selected to join the Sting accelerate program. Out of the twelve startups that were interviewed in this study, one had been selected in the Sting accelerate program, and of course, the CTO was delighted to speak positively about Microsoft.</p> <p>It is important to note that Sting Accelerate is not included with the other startup boosting program because it is fundamentally different in the sense that it gives startups a lot more than just customer support and financial aid.</p> <p><i>“We used to use a much smaller Cloud provider, but now we have gained access to a lot more services using Azure, for free! It is amazing. I highly recommend new startups to sign up for Sting Accelerate. ” - ID 6</i></p>
Does not mine customer data for advertisement	<p>Not all Cloud providers are entirely transparent when it comes to how they handle the data you put on their servers. CTOs using Azure were adamant in that their data would not be re-used in marketing.</p> <p><i>“Sure, you could use Google’s services and pay marginally less. But unlike Google,</i></p>

	<i>Microsoft does not use your client data nor do they sell client data to third-party companies. Google makes tons of profit from marketing, and they are cunning in findings loopholes in order to access your data ” - ID 8</i>
--	--

Table 8 - PoDs for GCP

Point of Difference - Google Cloud Platform (GCP)	Explanation
Fastest Rate of Expansion	CTOs generally agreed that if there area in which Google performs better than its competitors, it is their acceleration in the Cloud market. They are boosting the number of services they provide, as well as expanding the number of available data centers at an astonishingrate. <i>“We are very well aware of GCP’s tailwind in the Cloud world, it was the primary reason why we chose Google as our provider.” - ID 12</i>
App Engine	The two companies that used GCP did so solely because of the existence of app engine, a scalable PaaS tool provided by Google which is used to develop mobile applications <i>“We use GCP exclusively because of app engine, and the programmers seem happy with the service so there is no reason for us to switch” - ID 3</i> <i>“There is one Cloud service that stands out from the rest in application development, and it is GCP’s app engine. It is a vital tool for companies such as ours which focuses heavily on developing iOS applications. It is easy to use, and it scales really well with your product.” - ID 12</i>

4.4 Results Connected to SQ3

This chapter will present the results that are connected with the third sub-question: *“Do Swedish startup companies opt for integrated SaaS solutions that are developed by their Cloud provider, or do they instead opt for more complex best-of-breed SaaS solutions?”*. This sub-chapter will explain the arguments made for using integrated SaaS solutions and best-of-breed third party SaaS solutions in separate tables. A graph showing which solution CTOs opted for is available in appendix C.

Table 9 - Arguments for integrated solutions

Arguments made for using the Cloud	Explanation

<p>provider's own integrated SaaS solutions</p>	
<p>Integrated software is simpler to control.</p>	<p>The argument made by an overwhelming number of CTOs was that integrated solutions were specifically developed in such a way that they would work well with the provider's Cloud environment. You can more easily control your IT-environment using integrated solutions, and thus also minimize the amount of downtime you will have trying to make everything work.</p> <p><i>"Binding the solutions is an interesting problem. Some SaaS providers use third party support universal logging systems such as Active Directory. These systems are much easier to integrate into your IT-environment, however not every solution uses this. As a result, using third-party software can be troublesome to handle. - ID2</i></p> <p><i>"My primary responsibility is to maintain a high level of production. Therefore, I want to downscale everything to be as simple as possible; all I ask for is for things to run smoothly with as little downtime as possible. And this is why I chose AWS's integrated solutions." - ID 5</i></p> <p><i>"Azure's integrated software services are not the best tools, but you do not have to keep control of 10 different passwords for 10 different websites. Even if you choose the 10 best of breed software solutions, it is uncertain if your solution as a whole is better than an integrated solution as you will have trouble integrating everything." - ID 8</i></p>
<p>Cheaper</p>	<p>Integrated solutions are a lot cheaper than external third-party solutions. Most CTOs agreed that using integrated software is yet another way for newly started startups to reduce their IT costs while also creating a more easily managed IT-environment.</p> <p><i>"You can shoot yourself in the foot here, either your external SaaS solutions do not integrate with your environment at all, or you have to spend a lot of money in order to integrate everything. AWS is very good at integrating their own software services without any hassles." - ID 5</i></p>
<p>One Customer Service</p>	<p>A third reason to pick integrated software solutions was that you can turn to a single company for all your Cloud customer service.</p> <p><i>"Microsoft has very capable customer support, and I do not have to bother calling any other customer support since we run on Azure's integrated services. I can imagine it to be both expensive and time-consuming to call different tech-supports and to hire consultants to help you integrate each external software." - ID 1</i></p>

Table 10 - Arguments for using third party SaaSolutions

Arguments made for using third-party SaaS solutions.	Explanation
Allows for more complex solutions	<p>Startups that relied on external software argued that reason for choosing best of breed solutions instead of integrated software solutions was gaining access to more complex tools which are essential for them to run their business optimally.</p> <p><i>Microsoft is good at delivering extra software such as Word Online, PowerPoint, and integrated CRM systems. However, these softwares are often uninteresting for me, because I know that there is much better software out there. By using software such as Salesforce and Upsales, we are easily able to monitor data such as what we have sold, to whom we have sold, and more importantly, to whom we have not sold to yet. By using more complex tools, we can stay ahead of the game and gain competitive advantage". - ID 4</i></p> <p><i>It is simply impossible for us to only use one provider for IaaS, PaaS, and SaaS solutions. Our systems are too complex for one provider to be able to give us everything we need. This is why we use a multi-provider approach when it comes to our software needs. - ID 9</i></p>

5. Analysis

This chapter analyzes the empirical data that was gathered through the interviews. The chapter is divided into three subchapters where each subchapter analyzes data connected to sub-question 1, 2, and 3 accordingly.

5.1 Analysis Connected to SQ1

This subchapter analyzes the study's empirics as well as findings from the literature review that are connected with the first sub-question: *“Are there factors that startups in Sweden perceive as more important when it comes to selecting a Cloud provider?”*

Compatibility with IT-environment

The study shows that the most important thing to consider when selecting a Cloud provider is how you want to base your IT-environment. This is a key factor which in retro perspective is highly ranked for obvious reasons, partly because how easily it can be overlooked by people who intend to start a startup company, in the sense that you do not care about the operating system of your IT-devices until you already have invested heavily into purchasing said devices for your company, which in turn forces you to pick a certain Cloud provider because it the one that is most compatible with your IT-environment. Thus, in order to optimize the compatibility of your IT-environment, the first thing you should think about is whether you want your company to be Linux or Windows-based, and then you can select a Cloud provider in accordance to your IT-environment.

Quality and quantity of Services

Of course, being able to pick the right digital tools for your particular business is key in order to succeed as a company. From a CTOs' perspective, this means everything from providing your programmers a highly customizable platform where they can develop applications and websites, to more complex CRM tools that allow your sales team to find predictable patterns in your customer's purchasing history. Of course, there is nothing stopping companies from choosing services from different Cloud providers, although, the CTOs generally agreed that it is better to stick to one Cloud provider since services offered by the same provider are much easier to integrate data between. The study found that AWS was the most mature provider, and had the most diversity in terms of service selection. Azure was the second in terms of service maturity, and Google provides the least amount of selection. However, being flexible in the services you provide mean more than just the sheer amount of services that you offer your customers, it is also about the quality of the services, as well as how easily they can be controlled, monitored, and customized according the CTOs. This means that the graphical interfaces in the services of the Cloud provider must be simple to navigate through. The study found AWS to be the provider which CTOs talked most positively about in regards to this particular aspect, whereas both Azure and Google seemed to provide services that are difficult to work with.

Well-managed provider

Having a provider that gives you services that are managed with care is another important aspect to consider when selecting a provider. From a provider's perspective, this is an intangible asset in the sense that it is much more difficult for competitors to replicate compared to other aspects which have become points of parities such as price and CDNs. AWS was the provider that overall was deemed to be the best managed according to the study. Furthermore, the study shows that the CTOs that worked with AWS were the ones that were most satisfied with its uptime as well as its customer support. The study showed that CTOs do not want to waste time making sure everything works, they are only concerned with maintaining a high level of production which can only be done with a Cloud provider that is well-managed.

Data Protection Compliances

With the EU-US safe harbor framework being invalidated, Amazon, Google, and Microsoft all strived hard to comply with Data Protection regulations in order to allow customer data to be transferred outside the EEA. They all provide with EU model clauses, and thus, all companies are aligned with current data protection laws, making this a point of parity. However, the EU privacy shield is meant to replace the old and invalidated safe harbor framework, which for Cloud providers means that they may have to find new ways to comply with data protection laws in the future when the EU privacy shield is set into motion. This means that people who establish new startup companies will have to check whether the EU privacy shield has been enacted, and consequently check which providers can comply with the new EU data-regulations. For this reason, data protection is considered to be yet another important factor to consider when selecting a provider.

Price

The interviews gave indications towards that although price was an important aspect for CTOs when selecting provider, many stated that there indeed is an ongoing price-war between the providers, meaning that Cloud prices are constantly shifting. Amazon is the trailblazer when it comes to the most aspects of the Cloud, and price is no different. AWS has been responsible for many price-cuts in the past, which forced Microsoft and Google to follow suite. The dynamic nature of the price cuts makes it difficult to choose whether it is a competitive PoP from Microsoft and Google's point of view since they are the ones lowering their prices to AWS's, or if it is a PoD for AWS since they are the ones lowering their prices to start with. Traditionally, PoD will wither in time as competitors find PoPs that mitigate the effectivity of a company's PoD. In accordance, this is true for Amazon's price PoD too, but history indicates that they are likely to strengthen their price PoD in the future. Perhaps what is more important here not the attempt of classify price as a PoD or a PoP, but rather the fact that Amazon makes attempts to differentiate itself through lowering their prices, without sacrificing the quality or quantity of Cloud services they provide. That being said, as things currently stand, CTOs generally found Cloud prices to be similar for the top providers.

5.2 Analysis Connected to SQ2

This chapter analyzes the study's empirics as well as findings from the literature review that are connected with the second sub-question: *How are the top Cloud providers positioned in the Cloud market?*

AWS

The study shows indications towards that AWS provider their users with a larger selection of services, while at the same time striving for price cuts in order to reduce the level of profitability for its competitors. Based on the findings of the study, the author believes that AWS wants to use the fact that they have been around for a longer time compared to Azure and GCP, and that they have had enough time to mature to a point where they can perform waves of price cuts while still remaining profitable. This is reminiscent to American retailer Target's "expect more, pay less" marketing strategy. Amazon positions AWS in the same way, namely that the value proposition of the product is that it will provide the customer with high value for your money.

By reinvesting a lot of their profits into current and future products, they are able to accentuate the value of their services. As a result, customers can rest assured that they have selected a mature provider with quick roundtrip times (i.e. low latency) that minimizes the amount of hassle involved. It is unclear to whether differentiation through a varying amount of services as well as price is how Amazon intended to position AWS, but it at least AWS's strong points according to the CTOs involved in the study. AWS should however consider not stretching themselves too thin by focusing too much on differentiation through the quantity of their services, as it may affect the quality of their services. Keller similarly explains the importance of focusing on having adequate PoPs rather than being too focused on differentiating yourself.

Azure

Microsoft is an IT giant that knows that it cannot appeal to customers through its brand image in the same way that the flashier and more hip Google or Amazon can. What Microsoft can provide however, is a reliable and stable Cloud that makes up for its boring exterior with a good selection of software that can be integrated with Azure. One could say that a correlational PoP for Microsoft is that their robust image gives them a certain mundane look.

Nonetheless, Microsoft offers capable support that helps their customers to export and important data between different solutions, in order to help customers to integrate different services into their IT environment. Furthermore, the study shows indications of Azure having an edge over its competitors in terms of replicating client data (i.e. geographical redundancy), while also refusing to sell client data to third-parties or using client data for advertisement, unlike their competitors. Thus, Microsoft intends for Azure to be a reliable and sturdy choice as Cloud provider for customers whose IT-environment is Windows-esque. Also, Azure can further boost startups by aiding them through their partnership with Sting, in the shape of the Sting Accelerate program.

GCP

According to the study, Google does not currently have much going for it in terms of its Cloud service, GCP. GCP was the least chosen Cloud provider, and the ones who worked with Google

only did so because of their app engine service. The study shows indications towards Google positioning GCP as a product that developers can use for their PaaS needs, however, this is only a small piece of the cake and the author has no doubt that Google in the future will aim to claim its market share in the IaaS and SaaS markets as well.

That being said, as it stands, it is an immature Cloud choice compared to its competitors. For example, GCP only has one geographical location in Europe which means that if your company is based in Europe, you have to mirror your data to a data center located in another continent, which is not optimal. The positive aspect of GCP is that it is growing faster than any other competitor, and Google is heavily investing into making GCP a serious powerhouse in the Cloud market. The author believes that Google attempts to position GCP as an up-and-coming Cloud, and that they are working hard on cementing that image in the minds of existing and potential customers. Google is a flashy brand and there is no doubt that it is a company which young developers want to associate themselves with, however Google must keep on developing services for GCP and make it more mature, if it is to have any chance in competing with AWS or Azure.

5.3 Analysis Connected to SQ3

This chapter analyzes the study's empirics as well as findings from the literature review that are connected with the third sub-question: *“Do Swedish startup companies opt for integrated SaaS solutions that are developed by their Cloud provider, or do they instead opt for more complex best-of-breed SaaS solutions?”*

The study showed that CTOs that worked in larger startups and that had operated for a longer time were the ones who opted for more complex solutions through best-of-breed software. By using third party software from companies that specialize on certain SaaS products such as ERP or CRM, they believed that they could gain a competitive advantage since they had access to better digital tools. One CTO, for example, mentioned that his company was collaborating with a large mobile game developer to analyze data containing all clicks on the touchscreen of the user's devices. In order to do this, they had to use a third party SaaS tool called Exasol which is the world's fastest in-memory database for analytics, which allows for massive heaps of data to be processed rapidly. This particular tool is officially available for both AWS and Azure (Exasol, 2016), and according to the CTO that uses it does not have problems integrating with Azure. AWS provides their own version of in-memory database with their integrated solution, Amazon Quicksight (Amazon, 2016), a cheaper product that also can provide advanced calculations, although it is not as fast as Exasol. Pricing is a hugely important factor to consider when using best of breed solutions over integrated solutions. In this case, Amazon Quicksight costs a mere \$9 monthly, where Exasol goes for \$500 a month. In terms of pricing, the same pattern is repeated across several best of breed SaaS tools and their integrated equivalent (e.g. Microsoft Dynamics, their CRM tool costs \$85 monthly where the more complex Salesforce costs \$150 monthly).

That being said, there were also a large amount of CTOs that purposely opted not to go with best-of-breed solutions, and instead go with integrated solutions that came with their provider. The overall reasoning for doing so was that it can be difficult to integrate all the different solutions into their IT-environment, or they simply did not have the financial means for doing so.

Of course, the importance of using integrated software vs best of breed software may vary from industry to industry. If you are able to find out the types of tools that are used by your competitors, you may gain better understanding if you have to invest in best of breeds or not. Furthermore, the study shows that sticking to integrated SaaS solutions means that you can turn to one single company for all your customer service needs. It can indeed become bothersome for companies who opt for best of breed solutions from several different companies to keep tabs on several phone numbers and websites if you require customer service, although it is a factor that should not weigh as heavily as the other factors that you have to consider when making this choice, such as price and integration complications.

The general consensus of this is, if you can afford third party solutions that are not too difficult to integrate into your system, you may consider purchasing them as they are simply put better and more advanced tools compared to your Cloud provider's equivalent. By using more complex tools, you will be able to process and analyze data quicker, and also you can give your sales team an edge in finding predictable patterns in your customer's purchasing history, and these are two ways in which these tools can give your company a competitive advantage.

You may want to start with using the integrated solutions that come with your Cloud provider, as you can easily integrate everything into your system and try different types of SaaS tools, and in time when your company has expanded to the point where you can afford to use more complex tools, you ought to consider the best of breed third-party softwares.

6. Discussion

This section discusses the empirics of the study, as well as the analysis performed in the previous chapter. The chapter is then concluded with a discussion on the methods used to conduct the research as well as a discussion on Cloud sustainability.

6.1 Discussion of Main Findings

The study intended to interview CTOs regarding the Cloud choices they have made. The results of the study were meant to act as a guideline for new startups in order to help them select a suitable Cloud provider based on their priorities and preferences. This sub-section will discuss what the implications are of the study based on the main findings.

The study found that the most important factors to consider when selecting a Cloud provider is its compatibility with your IT-environment, its quality and quantity of services, how well managed it is, if it offers data protection compliances, and the prices of the services it offers. However, Clouds operate in an ever-changing environment as new services and software are constantly being developed, Cloud prices are constantly shifting, and data protection laws are in a state of constantly being altered. There is thus little value in evaluating the current overall most suited provider for new startups. Furthermore, one must take into consideration that each startup is different, and each one is given different circumstances. There is no Cloud provider that is universally better than its competitors in all cases. Instead, this study is meant to help new startup entrepreneurs to gain an insight regarding the factors that have been important in the past for CTOs when it comes to Cloud provider selection, and then make a selection that is fitting for their company.

That being said, if we were to hypothetically ask what the best choice for Cloud provider currently is, based on what the study found to be the most crucial aspects to consider when selecting a provider, then the study indicates that if your IT-environment is Linux based, there is no reason not to pick AWS. AWS has the greatest selection of services. It is well-managed in the sense that its services are reliable, and its customer support is convenient. AWS furthermore provides the set of necessary PoPs that make it a complete Cloud provider (i.e. compliance with all data protection laws, reasonable pricing, adequate data security, CDN edge nodes in Stockholm, and satisfactory geographical redundancy).

Furthermore, the study indicates that new startups ought to rely on integrated SaaS solutions as they are both cheaper and less complex to integrate into your environment. This is also yet another reason to factor in the amount of integrated services which each Cloud provider can give, in the sense that if you pick a mature Cloud provider with a large service selection, you will have to rely less on third party SaaS providers. This means that you give your company time to grow before getting your hands on more complex third party SaaS software tools, unless certain best of breed tools such as Exasol are prerequisites for operating in the business in which your company lies in, in which case you have no choice but to purchase it straight away. The study found most startups involved in the study to use third party SaaS solutions, and this may be

because most have already been around for 2-3 years and matured enough to start relying on more complex tools (see Appendix C for SaaS solution distribution). Interestingly, the study found that one startup had developed their own software through open source programming. Since they have the competency to do so, this company would rather build their own software because it gives them complete control over everything and they can customize the software to fit their particular needs.

A previous study on this topic indicated that scalability and affordability (i.e. price) would be important factors for startups when selecting a provider. By contrast, the author believes that the scalability should not be highly prioritized anymore, as all top Cloud providers must provide with scalable high performance machines. Price however, continues to be an essential part of Cloud selection, not only due continuous price cuts for Cloud services, but also because providers will continue to attempt to attract new startups through providing various benefits through boosting programs.

6.2 Discussion of Methods Used

This subsection discusses the methods used to perform the study in a critical manner, and how they may have impacted the findings of the study.

The data collection method used in this study was heavily reliant on the set of semi-structured interviews that were conducted with the CTOs. The author chose not to record the interviews, partly due to personal preferences but also because a few select CTOs did not want to be recorded. The interviews were instead transcribed during the interview, which is not optimal as it is difficult to type and listen simultaneously. However, the author did not find this to be an issue, and in instances where the author was unsure if he had correctly interpreted what an interviewee had said during an interview, the author would contact the CTO and ask if it was correctly interpreted.

As previously explained, the method for conducting the interviews was to use a template of questions that would be asked at each interview. However, each interview also had a set of follow-up questions that were based upon the answers that CTOs gave (these were mostly improvised questions that the author believed was suitable for an ongoing discussion in an interview). As a result of this, each interview was not identical in the sense that there were different questions being asked at each interview, which impacts the reliability of the study negatively.

If one were to further critically evaluate the study's method for collecting data, perhaps a sound argument is that 12 interviews (excluding the pre-study) is a low sample size. However, one must consider that CTOs are highly knowledgeable when it comes to IT and Clouds, which allowed the author to gather rich data. The richness of the data is further strengthened by the following two facts; the last few interviews that were conducted started to yield information which already had been gathered from previous interviews (i.e. indication of data saturation), and there were barely any instances of conflicting results from the interviews. For these reasons, the author

believes that the results gathered from the 12 interviews to be enough in order to make certain implications and fill the gaps of knowledge which the study intended to find.

Furthermore, the main findings of the study may have had its validity negatively impacted by the fact that CTOs who used a certain Cloud provider had a tendency to only speak positively of it, with a few exceptions. It felt as if the CTOs wanted to appear strong and adamant in the choices they had made in the past, and that they mostly had made the right choices. This means that there were very few CTOs that were dissatisfied with their selection of Cloud services, and as a result it was difficult to gather data about the negative aspects of AWS, Azure, and GCP. A majority of the startups interviewed were launched two to three years ago, a time in which GCP was in its infancy. This may partly explain GCP's low representation amongst the startups included in this study. If you would replicate this study in another three years, you may get different results as more people may have started using GCP in favor of AWS or Azure. That being said, finding which CTOs were dissatisfied with their Cloud choices is not a main part of this study, and Cloud customer dissatisfaction is perhaps better measured in a quantitative study.

Furthermore, appendix B shows the distribution of Cloud selection amongst the CTOs involved in the study, which shows that AWS is vastly overrepresented, and that only two companies used GCP. This may hint towards an indication that there is a correlation between how strongly a provider was represented and the amount of positive associations with that provider (since CTOs had a tendency of speaking positively about their Cloud choices), which may have affected the reliability of the study negatively. This means that if the study were to be replicated with another distribution of Cloud provider selection amongst the interviewees, the findings of that study may vary with the findings of this study. The distribution of Cloud provider selection for this study is not entirely in line with numbers obtained in the literature research. According to the literature research, AWS is roughly twice as big as Azure and Google combined (SRG, 2016), whereas the Cloud provider distribution for this study was that Azure was only as big as Azure and GCP combined.

The study is aligned with the literature research which explained that one reason why AWS is so dominant in the Cloud market is that they excel at diversifying their business ideas, with hope that some of these ideas turn out to become great innovations that people associate with AWS. Amazon is more generally more appealing to startups as they have a much more “flashy” image compared to for example Azure.

As for the generalization of the findings, the method used to select companies was to randomly contact 20 startups from a list of 80 startups, and by adding a random element to the selection of companies, the author was unable to guarantee that there would be an even distribution of industries that were represented in the study. This may have impacted the generalizability of the study in the sense that there was an imbalance in the industries represented in the study. That being said, the author found that there were strong similarities between the startups included in the study in the sense that all relied on Cloud services for similar reasons (building websites and applications, storage, e.t.c.). This may have mitigated the negative impact that the imbalance in industry-representation had on the study's generalizability.

6.3 Discussion on Sustainability

This sub-chapter briefly discusses the Cloud from a social, environmental, and economic perspective.

Although the study per se did not have sustainability in its scope, it is interesting to discuss the Cloud from sustainable aspects. Clouds run on large data centers that require colossal amounts of electricity to run, and it is therefore vital for providers to consider the environmental impacts of their business. Furthermore, there are a lot of e-learning tools that are available through the Cloud, where one can learn about the importance of sustainable solutions such as proper waste management (Cloud Sustainability, 2016).

Many IT-related solutions were historically developed for military and commercial needs, as the computing power that was necessary to run these solutions only was affordable by wealthy corporations or governments (Hill et al, 2012). However the Cloud offers digital solutions that are much more affordable. Free Cloud services such as Dropbox and Google Drive are thus sure to impact the lives of all kinds of demographics, especially less wealthy people who have yet to experience the Cloud and what it has to offer.

7. Conclusions and Future Research

This chapter aims to conclude the report by discussing the implications of the study based on the study's results and analysis. The fulfilment of research purpose for each sub-research question and main research question is discussed separately.

7.1 Fulfilments of research purpose

The purpose of this study was to gain an insight regarding the factors that have been most crucial for startups in the past when selecting a Cloud provider, as well as gaining better understanding in how Amazon, Microsoft, and Google position their Cloud services in the minds of their customers, and the thought-process behind selecting integrated SaaS solutions versus third-party SaaS solutions. These research questions were answered by analyzing data collected in thoroughly performed interviews, along with extensive literature research on the different topics. The author has offered his best interpretation and explanation to the results.

The overall research question for this study was:

“How can CTOs in new startups make suitable decisions regarding different Cloud services?”

The overall research question was then divided into three sub-questions. The following section summarizes the implications of the study related to each sub-question.

7.1.1 Research Question 1

Sub-question 1 aimed to investigate if there are factors which CTOs in startups consider to be more crucial when selecting a Cloud provider.

Are there factors that startups in Sweden perceive as more important when it comes to selecting a Cloud provider?

The study implicates that the following factors are most crucial when selecting a Cloud provider: compatibility with IT-environment, quality and quantity of services, if it is well-managed, data protection compliances, and price. Each company had their own priorities when selecting a Cloud provider, however this list is based on merging all factors included in every interview. The list is meant to help new startups to understand how to select a Cloud provider based on their particular priorities.

7.1.2 Research Question 2

The second sub-question had the purpose of exploring particular associations that Cloud customers make with AWS, Azure, and GCP.

How are the top Cloud providers positioned in the Cloudmarket?

The study found that AWS in the minds of the customers can give the best value in their services, and that by reinvesting a lot of their profits into developing current and future Cloud products, they can offer more innovative products than their competitors. The CTOs found Azure to be a sturdy and reliable giant in the Cloud market, which is well-suited for startups that already have a lot of Microsoft products incorporated in their IT-environment. While having a lesser selection of available Cloud services than AWS, the study indicates that Azure is more startup-friendly than its competitors as they offer \$20000 more in Cloud credits than their competitors, and by their partnership with Sting they can give startups further boosts through the Sting Accelerate program. GCP, while currently not having matured as much as Azure or AWS, offer a great PaaS service, app-engine, which is a great platform for startups to develop applications and websites. GCP has a lot of potential, and their plans to expand their geographical locations is unparalleled, but only time will tell if they can keep growing at their current pace.

7.1.3 Research Question 3

The third sub-question regarded exploring what choices CTOs had made in the past regarding choosing integrated software services versus third party software.

“Do Swedish startup companies opt for integrated SaaS solutions that are developed by their Cloud provider, or do they instead opt for more complex best-of-breed SaaS solutions?”

The study found integrated software services to be a lot more affordable, and also simpler to integrate into a company’s overall solution. The implications regarding this sub-question that can be derived from the interviews is that it is a wise choice to start off by running on integrated SaaS solutions, and then slowly migrate to third-party solutions with time. This way, as a CTO, you can ease the financial burden that commonly limit startups at an early stage while also making sure that you find the bare essential digital tools that you need to operate your business. If you have no previous experience with Cloud services, this is also a great way to try out and familiarize yourself with different digital tools. As for SaaS solutions, the study showed there are Swedish startups who have chosen a third option, namely to develop their very own software. These are highly personalized tools that are developed using open-source programming.

7.1.4 Main Research Question

By gathering information for the three sub-questions, the author hopes to provide a possible explanation to answer the bigger question:

“How can CTOs in new startups make suitable decisions regarding different Cloud services?”

Startups are faced with a plethora of matters to think about when starting up their business. The point of this study is to guide startups by making them aware of what they ought to think about when they make their Cloud decisions, and in that way reducing the downtime brought on by thinking about which Cloud selections to make. This means that the general advice, based on the implications of the study, is that startups choose a mature Cloud provider with a large selection of services that is optimally compatible with their IT-environment. It is vital that the Cloud provider has adequate services in terms of both quantity and quality, so that you as a new startup

do not have to bother with incorporating third-party solutions as the complexity that comes with doing so means that there will be further downtime before your business gets started. Furthermore, the more managed the Cloud service is, the less time you have to spend managing computing, storage, network, and operating systems, as well as the digital tools that run on top of your IT-infrastructure, which lets you maintain a high level of production. This is what you should strive after as a CTO of a startup; an overall simple IT-solution that allows your company to become productive as fast as possible.

By finding the PoPs of the top Cloud providers, as well as their individual PoDs, startups can more easily see the particular areas in which the providers are relatively similar, as well as the particular area in which each individual provider excels in. However, one must consider that Clouds are constantly shifting, and as previously explained, a provider's PoD will in time wither as they are counteracted by their competitor's competitive PoPs. For this reason, providers are constantly attempting to find new ways in which to differentiate themselves from their customers. There will be ceaseless waves of attempts to differentiate through new innovations as well as competitive PoPs that negate these innovations. Customers will always find new aspects of the Cloud to desire. With the recent increase of awareness regarding sustainability, perhaps customers will find environmentally friendly Clouds to be more desirable in the future, which will trigger a new wave of PoPs and PoDs. Therefore, new startups should therefore research up-to-date information about the provider they intend to select.

As a result of this, the study intends not to recommend a particular Cloud provider as there may be new data regulation laws or SaaS services in the near future that invalidate any recommendation. Furthermore, new startups must also realize that they by no means are bound to choosing a single provider, for example they could rely on AWS for IaaS Cloud storage services while also choosing GCP app engine for their PaaS needs, although the study implicates that data integration is less messy when you stick to a single provider. Moreover, new startups ought to use early-stage startup boosting programs which all providers offer in order to release some of the financial burden. Startups can use the Cloud credits they receive from these boosting programs to try out cheap and integrated software solutions, and in due time switch to more complex versions of these tools.

7.2 Research Limitations and Future Research

This sub-chapter discusses the limitations of the study based on the methodology, which can be complemented by an additional study in the future.

The choice of interviewing CTOs extensively may have impacted the results of the study negatively in the sense that their main role is to oversee and control the IT-department of a company. The Cloud is a broad term, encompassing all kinds of virtual services. CTOs, although knowledgeable about the Cloud as a whole, are for example not specialized programmers, which makes it difficult for them to be knowledgeable about advantages and disadvantages of using certain PaaS services over others. A future research on the same topic could therefore focus on interviewing several employees with different roles within different companies, in order to gain more extensive results.

The results of this research are not meant to be generalizable, but rather to be enriching by contributing with implications that can be used as groundwork for future qualitative and quantitative studies that build on this study. For example, the study showed that it was difficult to measure customer dissatisfaction using the study's methods, and it is perhaps more suited to be measured in a quantitative study using surveys. CTOs may have been simply forgotten what they are dissatisfied with in the heat of the moment when the question was asked, where as in reality they may have had a lot to complain about had they given enough time to think about the question. The same line of reasoning can be made with several questions posed, which is a potential weakness of solely relying on interviews as a data collection method.

Furthermore, it would be interesting to conduct a similar study but on larger and more mature startups. This would allow the author to gain better insight to how accurate the implications of this study are regarding the third research question (i.e. do larger startups rely more heavily on third party SaaS services?). There are many ways to alter the perimeters of this study in order to test the implications of the study, and this is just one example of how it could be done.

Finally, the thesis' answers to the main research question provides many different aspects and factors that individually can be studied in further research in greater detail. This is a great opportunity to perform a study that in contrast to this study focuses on the provider's perspective. This would most likely be a study that focuses heavily on customer-based brand equity, which attempts to understand the needs and the wants of the consumer. A study such as that one could have great use from qualitative studies such as this one.

8. References

Antonopolous, N., Gillam, L., 2010. Cloud Computing - Principles, Systems, and Applications.

[pdf] Available at:

<http://link.springer.com.focus.lib.kth.se/book/10.1007/978-1-84996-241-4/page/1>

[Accessed on: Mars 17 2016]

Aulbach, S., Grust, T., Jacobs, D., Kemper, A., Rittinger, J., 2008.

Multi-tenant databases for software as a service: schema-mapping techniques.

[pdf] Available at: <<http://dl.acm.org/citation.cfm?id=1376736>>

[Access on: 12 Mars 2016]

AWS Global Infrastructure, Amazon, 2016.

[Online] Available at: <<https://aws.amazon.com/about-aws/global-infrastructure/>>

[Accessed on: Mars 29 2016]

Benlian, A., Koufaris, M., & Hess, T. (2010). The role of SaaS service quality for continued SaaS use: Empirical insights from SaaS using firms. Proceedings of the International Conference on Information Systems 2010. [pdf] Available at:

<http://aisel.aisnet.org/cgi/viewcontent.cgi?article=1024&context=icis2010_submissions>

[Accessed on: 14 Mars 2016]

Cloud Sustainability, 2016. E-learning.

[Online] Available at: <http://www.cloudsustainability.com/t/waste-expert-overview>

[Accessed on: April 25 2016]

Edelman, D., Collins, L. 2014. McKinsey, Mastering Digital Marketing.

Available at:

<<http://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/mastering-digital-marketing>>

[Accessed on: Mars 26 2016]

Enterprise Resource Planning, Microsoft, 2016.

Available at: <<https://www.microsoft.com/en-us/dynamics/what-is-erp.aspx>>

[Accessed on: April 4 2016]

Exasol Pricing, 2016.

[Online] Available at: <http://www.exasol.com/en/faq/>

[Accessed on: April 14 2016]

Finnegan, M. Microsoft Azure vs Amazon AWS Public Cloud Comparison, 2016.

Available At:

<http://www.computerworlduk.com/it-vendors/microsoft-azure-vs-amazon-aws-public-cloud-comparison-which-cloud-is-best-for-enterprise-3624848/>

[Accessed on: Mars 25 2016]

Patel, N., 2015. Forbes – 90% of All Startups Fail.

[Online] Available at: <<http://www.forbes.com/sites/neilpatel/2015/01/16/90-of-startups-will-fail-heres-what-you-need-to-know-about-the-10/#218b3ce755e1>>

[Accessed on: 15 Mars 2016]

Garrison, G., Kim, S., Wakefield, L, R.,, 2012.

Communications of the ACM. Volume 55 Issue 9, September 2012. pp 62-68.

[pdf] Available at <:<http://dl.acm.org/citation.cfm?id=2330685>>

[Accessed on: Mars 15 2016]

GCP Expands Into US East and Japan, Google, 2016.

[Online] Available at:

<https://cloudplatform.googleblog.com/2016/03/announcing-two-new-Cloud-Platform-Regions-and-10-more-to-come_22.html>

[Accessed on: 16 Mars 2016]

Ghodeswar, B. M., 2008. Building brand identity in competitive markets: a conceptual model

[pdf] Available at: <http://link.springer.com/article/10.1007/s13174-010-0007-6>

[Accessed on: Mars 6 2016]

Goscinski, A., Brock, M. 2010. Toward dynamic and attribute based publication, discovery and selection for cloud computing, Future Generation Computer Systems, vol. 26, pp. 947-970, 2010

[pdf] Available at: <<http://www.sciencedirect.com/science/article/pii/S0167739X10000543>>

[Accessed on: Mars 13 2016]

Google Startup Programme, 2016

[pdf] Available at: <https://cloud.google.com/developers/startups/>

[Accessed on: April 20 2016]

Hazmi, Y, A., Campowsky, K., Magedanz, T., 2012. A Monitoring System for Federated Clouds

[pdf] Available at:

<http://ieeexplore.ieee.org/focus.lib.kth.se/stamp/stamp.jsp?tp=&arnumber=6483657>

[Accessed on: Mars 20 2016]

Hill, R., Hirsch, L., Lake, P., Moshiri, S., 2012. Guide to Cloud Computing. Computer Communications and Networks. pp 43-61.

[pdf] Available at: http://link.springer.com/chapter/10.1007%2F978-1-4471-4603-2_3

[Accessed on: 14 Mars 2016]

Hofmann, P., Woods, D. Cloud Computing: The Limits of Public Clouds for Business Applications. IEEE Internet Computing Volume 14 Issue 6. pp90-93.
[pdf] Available at:
<http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5617066&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxppls%2Fabs_all.jsp%3Farnumber%3D5617066>
[Accessed on: Mars 9 2016]

Intel (2014). Public Cloud vs Private Cloud vs Hybrid Cloud
[Online Video] Available at: <<https://www.youtube.com/watch?v=3WIJ4axzFIU>>
[Access on: 7 Mars 2016]

Katzmarzik, A. (2011). Product differentiation for Software-as-a-Service providers. *Business & Information Systems Engineering*, 3 (1), 19–31.
[pdf] Available at: <<http://link.springer.com/article/10.1007%2Fs12599-010-0142-4>>
[Accessed on: Mars 14 2016]

Keller, K. *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*, 4th Edition

Kotler, P., Armstrong, G., 2014. *Principles of Marketing*, 15th Edition. pp75.

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., Ghalasi, A., 2010. Cloud computing - The business perspective. *Decision Support Systems*, vol. 51, pp. 176-189, 2011.
[pdf] Available at:
<http://ac.els-cdn.com/S0167923610002393/1-s2.0-S0167923610002393-main.pdf?_tid=15aa3994-298e-11e6-88b6-00000aab0f26&acdnat=1464960270_b94487e1d07ce2c8c5489acc2617e736>
[Accessed on: 14 Mars 2016]

Mell, P., Grance, T., 2011. National Institute of Standards and Technology (NIST). The NIST Definition of Cloud Computing. Recommendations of the National Institute of Standards and Technology. [pdf] Available at:
<<http://faculty.winthrop.edu/domanm/csci411/Handouts/NIST.pdf>>
[Access on: Mars 4 2016]

Microsoft Bizspark, 2016.
[pdf] Available at: <https://www.microsoft.com/bizspark/>
[Accessed on: April 20 2016]

Pearson, S., Shen, Y., Mowbray, M., 2009. A Privacy Manager for Cloud Computing. Volume 5931 of the series Lecture Notes in Computer Science pp 90-106. [pdf] Available at
<http://link.springer.com/chapter/10.1007%2F978-3-642-10665-1_9#page-1>
[Accessed 3 Mars 2016]

Perilli, A. ENISA, 2010. European Network and Information Security Agency. Cloud computing: benefits, risks and recommendations for information security," European Network and Information Security Agency

[pdf] Available at: <https://www.enisa.europa.eu/publications/cloud-computing-risk-assessment>
[Accessed on: Mars 24 2016]

Repschlaeger, J., Ereik, K., Zarnekow, R., 2013. T-systems - Cloud computing adoption: an empirical study of customer preferences among startup companies.

[pdf] Available at: <http://link.springer.com/article/10.1007/s12525-012-0119-x>
[Accessed on: Mars 12 2016]

Rong, C., Nguyen, S, T., Jaatun, M, G., 2013. Beyond lightning: A survey on security challenges in cloud computing. Computers & Electrical Engineering Volume 39, Issue 1, January 2013. pp 47–54.

[pdf] Available at: <http://www.sciencedirect.com/science/article/pii/S0045790612000870>
[Accessed on: Mars 15 2016]

Rossi, F. D., Israel. C. D., César, A. F. R., 2015. Non-Invasive Estimation of Cloud Applications Performance via Hypervisor's Operating Systems Counters. [pdf] Available at

https://www.researchgate.net/profile/Carlos_Westphall/publication/275462504_ICN_2015_-_The_Fourteenth_International_Conference_on_Networks/links/553cd9e90cf29b5ee4b8f0bb.pdf#page=190>

[Accessed: 4 Mars 2016]

Shi, W., Hong, B., 2010. Resource Allocation with a Budget Constraint for Computing Independent Tasks in the Cloud.

[pdf] Available at:
http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5708467&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxppls%2Fabs_all.jsp%3Farnumber%3D5708467

[Accessed on: Mars 15 2016]

Synergy Research Group., 2016. Big Four Still Dominate in Q1 as Cloud Market Growth Exceeds 50%. [Online] Available at:

<https://www.srgresearch.com/articles/gang-four-still-racing-away-cloud-markets>>

[Accessed: 6 Mars 2016]

Venezia, P., 2013. Data Migration is hard to do.

[pdf] Available at:
<http://www.infoworld.com/article/2614398/data-center/data-migration-is-hard-to-do.html>>

[Accessed on: 10 Mars 2016]

Zhang, Q., Cheng, L., Boutaba, R. 2010. Cloud computing: state-of-the-art and research challenges, Internet Services and Applications, vol. 1, pp. 7-18,2010.

[pdf] Available at:
[Accessed on: Mars 2016]

Appendix A - A template of the basic set of questions used to conduct the interviews

What Cloud services do you use today?

Are you content with the Cloud choices you have made?

Which factors do you believe to be most critical when choosing a Cloud provider?

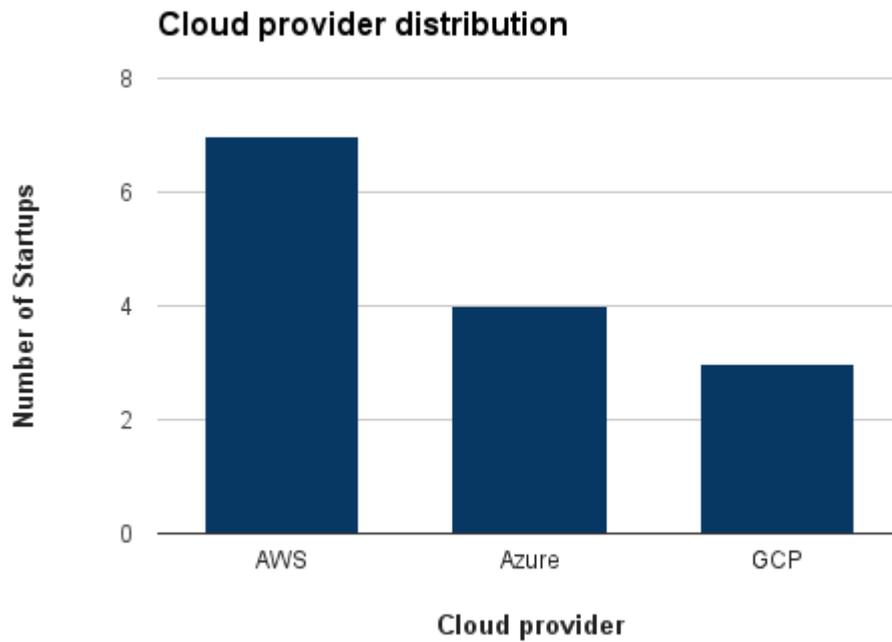
Do you use data replication services to mirror your data to other geographical locations?

Have you experienced power outages before, or other issues that have meant significant downtime for your operations?

Do you believe your Cloud provider to be innovative in terms of being able to provide with a flow of new Cloud solutions?

SaaS only - some companies seem to prefer so-called best of breed third party solutions for software services such as CRM and API-solutions, whereas other companies opt for software solutions that come integrated with the Cloud provider; what is your stance on this?

Appendix B - Cloud provider selection for the 12 companies involved in the study

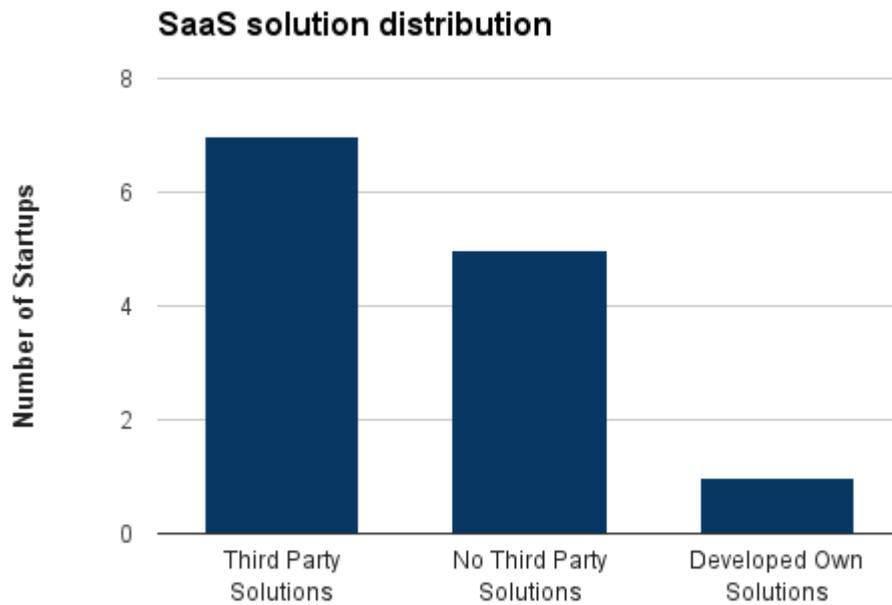


AWS - ID 1, 2, 5, 7, 9, 10, 11 (7 total)

Azure - ID 1, 4, 6, 8 (4 total)

GCP - ID 3, 10, 12 (3 total)

Appendix C - Distribution of integrated vs third party SaaS solutions



Third Party Solutions - ID 2, 4, 6, 7, 9, 11, 12

No Third Party Solutions - ID 1, 3, 5, 8, 10

Developed Own Solutions - ID 11