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**Big Data within Service Organizations: Developing and
Executing a Competitive Advantage- A Resource Based
Perspective**

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Author: María Graciela Galindo Soberón

Supervisor: Mia Larson

Abstract

The purpose of this paper is to underline how the usage of Big Data among service companies can help to sustain a competitive advantage. The world's constant changes and transformation is forcing the service industries organisations to rethink the way to conduct businesses, particularly in satisfying existing and possibly new customers in a digital age. The constant digital transformation has granted the opportunity for service organisations to new ways of interaction with customers and to gather useful insights to further develop a competitive advantage. Through semi-structured interviews, knowledge was gained regarding how companies are using Big Data in combination with the resources and capabilities at their disposal, in order to sustain their competitive advantages. The findings from the various interviews reveal a gap on how the service organisations are managing the usage of their resources, and conclude the research by presenting four major insights. Firstly, the thesis finds that there is a weak link between a service organisations adaptive capabilities and data acquisitions. In other words, service organisations arguably need a more outside-in approach, in order to ensure that the data gathered is the most relevant and not too "noisy". Secondly, there is a lack of talent to support the data management processes of a service organisation. This is particularly relevant regarding data architects and engineers, who are capable of building and scaling data systems that can handle Big Data. Thirdly, management must become more tech-savvy if the service organisation is to fully exploit a more data-driven approach. Finally, service organisations must establish a culture that motivates employees to continuously strive to improve their existing competencies, by adopting an emphasis for lifelong learning.

Key Words: Big Data, Resource Based View, Data Management, Service industry, Competitive Advantage.

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1. Introduction

This chapter is devoted to a brief explanation of the research topic and subsequent aim of this thesis. First, the research background is introduced, which lays out the current situation of big data, and its usage among services companies. From there, the focus is put on narrowing down the problem of service companies using big data, which ultimately sets the scene of the research question.

1.1 Research Background

Since the dawn of civilization, the human race has progressed through its ability to store and analyze information (Marr, 2015). Within the latest decades, this ability has developed exponentially, particularly thanks to the advances in computer technology, in which the power of computers has doubled every two years (Schaller, 1997). Hence, what filled the space of an entire library before can now be stored in a USB stick that fits in your pocket. Additionally, the birth of the Internet has paved the way for a new era, where as since 2005, 90% of all data has been created within the two previous years (Hillstrom, 2005). This new reality poses both opportunities and challenges. While it has become easier than ever for virtually any company to gather information, it has also become increasingly difficult to both store and distill all this into insights. But before turning to how companies might address this, the paper will firstly outline the situation of what is referred to as “Big Data”, and how companies go about using it as of today.

The term “Big Data” itself has become a bit of a buzzword In recent times as companies have realized the immense potential of exploiting this as a way to fuel their business and stay ahead of the curve (Manyika, et al, 2011). Among the first to have been acknowledged with defining the term is Doug Laney, who provided the initial theoretical framework to explain what big Big Data entails. More specifically, this is through the three “V”s, namely volume, velocity, and variety (Laney, 2001). This framework has proved to be the foundation on which the academic sphere has further built upon the understanding of Big Data, for example by upholding Laney’s alliteration and providing additional “V”s, such as “veracity” (Chen et al, 2014), and “value” (Chen & Zhang, 2014). Additionally, other studies of Big Data

have been through the application architecture, chronological development, and evolution of major application models (Yaqoob et al, 2016).

However, understanding Big Data from a technical perspective alone is not the only focal areas for scholars. More recent studies have also focused on the applications of Big Data from a business context, in terms of how valuable insights can be distilled for businesses. This in turn implicates an abundance of different solutions for businesses to exploit Big Data. Hence, by collecting and storing the various information ranging from customer interactions to prices of their competitors, companies are able to obtain a holistic picture of the landscape they are in, and thus make more informed business decisions (Manyika, et al, 2011). This in turn sets a significant precedent for companies to “gear up” and establish an architecture that can support this gathering and storing of data on a large scale, as well as the processing power to analyze it. However, this has proved to be a rather cumbersome endeavour for many companies, particularly among SMEs who lack the various tools and know-how to execute this in practice.

1.2 Research problem

Further research on Big Data and its possibilities for businesses is arguably worth conducting, given its relevance in recent times, as well as the apparent gap that companies experience in terms of exploiting it to their advantage. As hinted previously, while a significant portion of existing literature on Big Data has been examined from a technical perspective (Yaqoob et al, 2016; De Mauro et al, 2016), there is also a growing number of publications within a business context, which explores the analytical opportunities related to big data, and how it can viewed as a competitive advantage for companies.

In relation to this, Big Data is playing an increasingly important role for companies and their competitive advantage. As technology has developed throughout time, so too has the capabilities of the organization to gather information of increasing magnitude. They are able to reach out to the customer through numerous channels, such as social media platforms, in order to gain a better understanding of what customers want (Walker, 204). However, this has arguably also turned the landscape into a jungle, wherein the dangers of unreliable

sources and lack of validation can obscure one from truth. Access to data alone will not guarantee prosperity today. It is equally important to be able to curate information, which subsequently enables one to derive insights from data, in order to navigate the jungle safely, and sustain one's competitive advantage.

Competitive advantage has in turn been defined as the ability to outperform others through the attributes and resources of the firm (Porter, 1980, 1985, 1990). With a constant change in the markets, evermore demanding customers, and the large amounts of data available, the mission of outperforming competitors has become a challenge. Several scholars have suggested different ways for how organizations can develop competitive advantages. For many years, the focus of competitive advantage has been on the relationship between the firms' environmental opportunities and threats and its internal strengths and weaknesses; i.e. SWOT analysis (Porter, 1980).

However, the focus on competitive advantage has in turn shifted from the external environment to instead focusing more on the organization's internal resources, which encapsulates the concept of the Resource-Based View (RBV). More specifically, the most predominant themes in the 1950s was that firms had to pay attention to the external forces of the industry, in which the competitive advantage was based upon one's positioning within; influenced to a large degree by the ideas of Porter (Francisco, 2015). Today, however, a major school of thought is promoting the ideas of RBV, in the sense that the competitive advantage is derived from the resources at the organization's disposal. These "resources" in turn can appear rather broad, as they encompass anything tangible or intangible, that helps produce the benefit offered. From the context of the service industry, this can arguably become complex, as it involves an amalgam of countless factors, creating a vast puzzle that service organizations must attempt to put together by the bits of information (one resource that is becoming increasingly sought for) at their disposal.

The first notions of the Resource-based View are credited to Wernerfelt (1984), who published an article with the same name. The original concept was influenced by several schools of thought, such as the traditional study of distinctive competencies, Ricardian economics, Penrosian economics, and the study of the antitrust implications of economics

(Barney & Arian, 2001). However, it wasn't until six years later, with the concepts of a compelling managerial style by Prahalad & Hamel (1990), that the ideas of internal resources were diffused into a more practical context (Wernerfelt, 1994). Since these early theoretical developments of the concept, the Resource-Based View has thrived in both a theoretical and empirical context, as several academic contributions to develop the term further has published. Among the most notable are Barney (1991), with highlights the importance of strategic factor markets and role of expectations. Finally, Teece, Pisano & Shuen (1997) introduce the importance of the firm's abilities to develop new capabilities coined "dynamic capabilities", which in turn has proved to be developed further on in both an academic and practical context.

This academic focus on big data will also be the point of departure for the research of this paper, in relation to how it influences a company's competitive advantage. Hence, this thesis will attempt to explore the business opportunities associated with Big Data. More specifically, through the lens of the Resource-Based View, the thesis will look to assess the competitive advantage of service organizations. The contribution of this paper is in relation to several research avenues. Firstly, it would levitate our understanding of Big Data in a more business oriented way, by exploring how companies can better use Big Data in their business practices. Furthermore, the research would also add some more academic depth to the already established field of Resource-Based View, by adding a dimension that examines the resources that companies must consider in relation to Big Data, in order to sustain a competitive advantage.

1.3 Research purpose and question

Having outlined the challenges of distilling insights from the immense amount of data, in order to sustain a competitive advantage for a service organization, the purpose of this thesis can be formulated to be the following:

RQ: From a Resource-Based perspective, how can service companies use Big Data to sustain their competitive advantage?

Before elaborating on how this paper proposes to answer the above research question, there resonates several notions that should be addressed accordingly. Firstly, the notion of “service company” can encompass a great deal within the business academic circles, and addressing the concept in its entirety arguably lies beyond the scope and limits of this thesis. Although this paper was only able to gather empirical data from the software, agency and automotive (leasing services) industries, a case can be made the key findings are still applicable to any industry in which services are its core value offering. Additionally, the thesis will narrow the scope of service companies, by focusing only on small or medium enterprises (SMEs), since the largest company interviewed employed 280 employees. Hence, it plausibly wouldn’t seem appropriate to proclaim that the findings of the case companies would be directly related to large multinational organizations as well. Secondly, the phrase “use Big Data” is also up for several different interpretations. Within the context of this paper, it implies how organizations are able to gather more insight from the large amount of data they possess, and turn these into actionable steps for implementation. The theoretical discussion of this paper will essentially attempt to operationalize three key concepts; Big Data, Resource-Based View, and Competitive Advantage. Hence, this thesis underlines the fact that how these concepts are understood depends to a large degree on perspective; if it had been from industrial production instead of service, the elements presented of the three concepts would maybe have been different. Thus, these elements are developed based on the researcher’s perception and interpretation of various academic literatures that exists on the three concepts.

1.3 Structure of Thesis

This thesis will be structured into 6 main parts. The first is this introductory chapter, which sets the scene for the various concepts that play an important role in the study of this paper, as well as formulating the research question. The second part will be a theoretical discussion that aims to operationalize three concepts, namely Competitive Advantage, Big Data, and Resource-Based View, in in order to provide a foundation of what said concepts entail. The output of this discussion will be a theoretical framework, which attempts to illustrate how the three concepts are connected, and will subsequently provide the basis for gathering the empirical data. The third part introduces the methodology of this paper, which uses

Saunders's (2008) "Research Onion" to go through the various method approaches chosen in this paper, as well as data choices. The fourth part consists of examining the empirical data collected, which in turn is based on interviews from Danish service companies that possibly work actively to use Big Data as part of their competitive advantage. The aim of this empirical discussion is to apply the theoretical framework in a practical context, by assessing the relationships between how Big Data and the competitive advantage from a resource based view. The fifth part is the analytical discussion which investigates what patterns and trends are in the empirical data. The final part of this thesis will discuss the conclusions of these findings, as well as possible avenues for further research and address limitations.

2. Theoretical Framework

Understanding how Big Data can sustain a service company's competitive advantage from a resource-based view requires a theoretical framework, with the intent of discussing/operationalizing the three main concepts of this thesis; namely Big Data, the Resource-Based View, and Competitive Advantage. Having this discussion that ultimately attempts to present and describe the elements that constitute these concepts in turn makes it easier to understand how they all can relate to each other, thus answering this paper's research question. This theoretical framework will take its departure by firstly explore what a "Competitive Advantage" entails. Then, the thesis will shift gears and immerse itself in the more technical concept of Big Data; not just to identify the technological aspects that make up Big Data in general, but also from a more process-driven approach, in terms of how service companies can be viewed as using Big Data. This will subsequently provide the context for examining the resource-based view, meaning that it will be operationalized in a way that relates more to Big Data.

2.1 Competitive Advantage

Having mentioned the previous research activities related to competitive advantages in the introductory part, the basic elements that make up the notion are discussed below. More specifically, the paper will explore the particular strategies from Porter (1980) that an organization can adopt in order to achieve a competitive advantage. Subsequently, additional notions are addressed, which are important to consider within the context of a service organization.

2.1.1 Basic Competitive Strategies

Firstly, is the overall cost leadership, where an organization strives to achieve the lowest production and distribution costs. These low costs in turn enable the organization the price its services lower than the competition, hence offering a compelling advantage for customers to choose said organization over its competitors (Porter, 1980). While this strategy perhaps is mostly applied to production companies that make tangible products, rather the service

organizations, there are also cases of the latter; most notably Amazon.com, which during its nascent stage didn't actually produce anything. Rather, the Seattle-based company developed an operational model in which its service offering was a lean service delivery of books, and eventually other goods.

Another competitive strategy for achieving a competitive advantage is for the company to focus its efforts on creating a differentiated line of services, so that it becomes a leader within a given industry space. Such a positioning entails that customers would prefer to consume the services of the company, given the price doesn't exceed the perceived value (Porter, 1980). However, this threshold can be set rather high, if the company manages to create a service offering so that is significantly construed by customers as valuable. Within the service industries, this strategy is perhaps the most popular, given that the nature of services doesn't have the same rules for economics of scale as product-oriented organizations. Furthermore, the rise of the service-dominant logic (Vargo & Lusch, 2006), has implied that even production companies attempt to exploit peripheral services, as a strategy to achieve a competitive advantage through differentiation.

The third and final competitive strategy for establishing a competitive advantage is what Porter (1980) proclaims to be a focused competitive strategy. More specifically, this entails that companies focus on providing products or services to a limited market segment, instead of attempting to market to a larger customer base. Hence, the company is able to provide a more valuable offering to its customers, since the product or service potentially will be more attuned and therefore relevant to the particular customer segment. Given the increasing complexity of customer needs and demands in virtually any industry, this strategy is also adopted a lot by various companies. Furthermore, a case can be made that the "unicorn" organizations (Simons, 2016) of more recent times grow so immensely in scale by establishing a strong foothold within a particular segment, before then leveraging the awareness of the "won" segment as a springboard to a peripheral segment. This is also referred to as a bowling-alley strategy, as the company attempts to strike down segment pins that create a domino effect (Moore, 1999).

2.1.2 Sources of competitive advantage from a service-dominant perspective

The above-mentioned strategies by Porter (1980) can be seen as the fundamental bricks to building an understanding of what a competitive advantage entails. However, on a more critical note, the abovementioned strategies are rather generic as they can also relate to production-oriented organizations that produces goods. Since the scope of this paper is to explore how to sustain a competitive advantage among service companies, the thesis will turn to some academic notions that view sources of competitive advantage from the view of service companies only.

Porter & Millar (1985) mentioned information as an important resource to achieve competitive advantage for service companies, which arguably also applies very appropriately with the scope of this paper, in terms of Big Data. More specifically, they address it as the information revolution and pointed out the importance of information technology, the information generated by the business and the technologies that will later process all the information. Furthermore, they emphasize on how information affects competition through the changes in industry structures, which in turn has potential to create competitive advantages, as well within the context of whole new business within a company's existing operation. Nowadays, that information is not only generated by business, but as well by customers, social media and technology and has now been acknowledge as data. Data is available and accessible for everyone, and permits the company to perform activities that to collect and capture information and providing knowledge that was not there before. With the uprising velocity in which data is growing it faces limitation such as storage, technologies capacity of acquirement and process. lack of places to storage this information, the difficulty of its manipulation and the fast and constant grow that overcomes the technologies that process it. (Porter & Miller, 1985).

Hence, the need of specialized knowledge in within data and all the aspects that surrounds it. Grant's (1996) suggested knowledge as a main source of value. Knowledge can be transferred and has a potential for aggregation (Cohen and Levinthal, 1990). This knowledge can later be transformed with the help of the firm's organizational capability and turned into insights for the organization creation of competitive advantages. The great availability of data out there, that is generating even more constant and faster changes in

the market suggest for the pursuit of new ways of achieving competitive advantage. D'Avani (1994) introduced the idea shifting from a sustainable competitive advantage perspective into a more temporary one. Based on the analysis of competitive advantages under the condition that these evolve quickly and constantly, the boundaries in which industries work on are more rapidly passed, and the loyalty of customers has significantly being altered. Also in account that following firms catch up way faster with "pioneer" firms than they used to. Shifting from a sustainable competitive advantage to a temporary one means that the own firm must destroy their own competitive advantage and create a new one at the pace of the market and customer's change. This does not necessarily mean that competitive advantage strategies must shift for all industries or firms, it should be taken into consideration on how industries and firms want to compete strategically. McGrath (2013) has talked about future strategies based on the way that firms wish to compete and a clear view of the boundaries the firm may be facing.

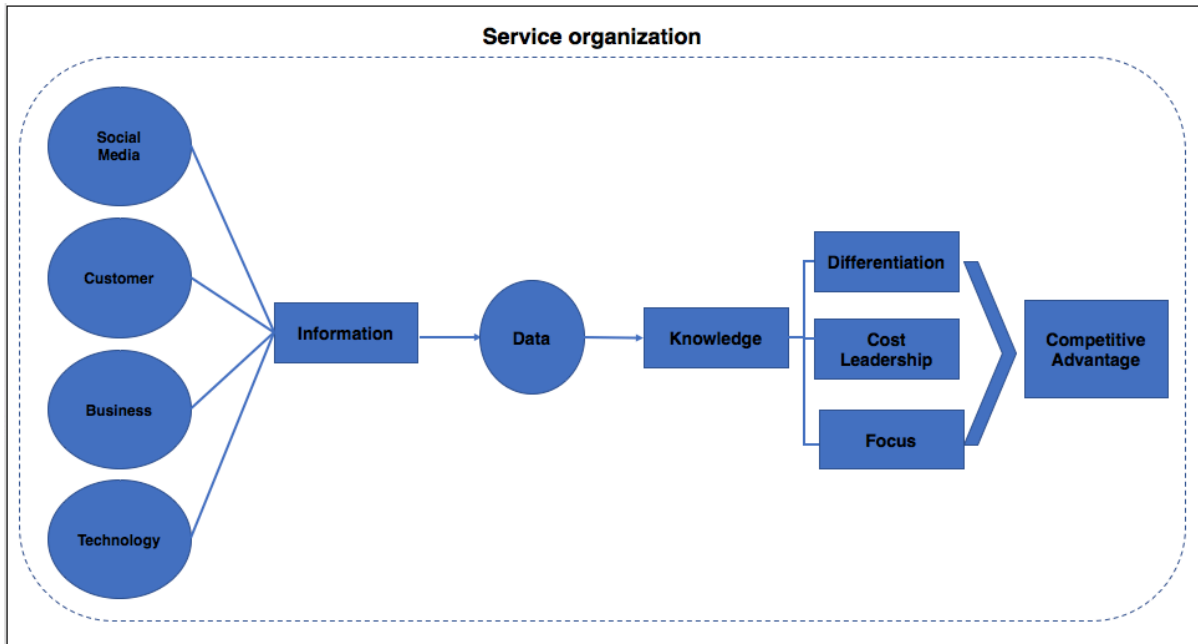
2.1.3 Summary: Competitive Advantage

In summary, Porter's (1980) ideas of an overall positioning strategy (i.e. cost leadership, differentiation, and focus) proved to be an instrumental way for companies to perceive how they could establish a competitive advantage. Furthermore, literature on establishing a competitive advantage for service companies has also been developed on top these three fundamental strategies; most notably by emphasising the importance of information and knowledge as a paramount source (Porter & Miller, 1985; Grant, 1996; Cohen and Levinthal, 1990) which in turn is also highly relevant within the scope of Big Data.

On a more critical note, however, these views only considered the external environment as the main source to develop a competitive advantage. This was addressed by several business academics in the following decades; most predominantly by Barney (1995), who stressed the importance in the analysis of internal weaknesses, as part of a complete understanding of sources for a competitive advantage, and its integration with the environmental analysis. In order to assess the internal attributes these have been referred and categorize as *resources and capabilities* (Barney, 1986, 1995, Dierick et al 1989) and can be divided into any aspect or area within the firm. For example, there are financial, physical, human and organizational resources, but in order to have useful insights in the

creation of competitive advantages these resources and capabilities. The paper will address these concepts more in depth in relation to the resource-based view, and how this can sustain the competitive advantage.

Figure 1: Competitive Advantage as Illustrated.



(C) Grace Galindo 2017

Sources: Porter, M. E., & Millar, V. E. (1985). How information gives you competitive advantage, Grant, R. M. (1996). Toward a knowledge-based theory of the firm, and Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. Adapted, merged and further developed by Grace Galindo (2017)

2.2 Big Data

Having presented and described the elements that constitute a competitive advantage, the paper will now turn to addressing Big Data, and how it can be described and presented. Although the term has been increasingly hyped from the onset of the 21st century, the concept itself is possibly rather nascent, let alone within a business context. These in turn have only scratched the surface, since the conclusive remarks appear to be that to make big data a more strategic tool, managers and leaders are in need of a process to establish the advantages delivered from investments made in organizational resources for big data (Braganza et al, 2017). Hence, the paper will explore Big Data from the point of departure

from the discussion in the introductory part, which briefly outlines how academic literature has characterized the term through several characteristics. More specifically, the 3 “V”s will be explored below, followed by more recent academic additions, which fit the alliterative trend.

2.2.1 The 3 “V”s

Volume is in terms of the data magnitude, since Big Data sizes are typically reported in either terabytes and petabytes. The volumes are relative and can vary from factors such as time and the type of data (Gandomi & Haider, 2014). However, one study by IBM showed that datasets over one terabyte was considered Big Data - to put into context, that would be the equivalent of around 16 million Facebook photographs (Shroeck et al, 2012). While this definition of volume might be relevant at the time of writing, it is also important to stress that volume is relative - what might seem like Big Data today might not be the case ten years from now. Additionally, it is also the combination of different data sets that gives it the meaning of “big” (Gandomi & Haider, 2014), which introduces the subsequent “V”.

Variety relates to the “structural heterogeneity” (Gandomi & Haider, 2014 p. 2) in a dataset, as technological advances has permitted organizations to collect different types of structured, semi-structured, and unstructured data. The former, while probably the most ideal for analysis because of being tabular, only constitutes 5% of all existing data (Cukier 2010), Unstructured data comes in the shape of text, images, audio, or video, which lacks these more structural organization that allows machines to analyse such data types. In the middle of the spectrum is then semi-structured data, one example being Extensible Markup language (XML), which is the textual language used for exchanging data on the web (Gandomi & Haider, 2014).

Velocity refers to how fast data is created, as well as the speed at which it should be analysed. This has most likely experienced an exponential rise in more recent times, as the rapid increase of mobile devices and sensors have led to an unprecedented rate of additional data creation, fuelling the need for more sophisticated data processing, as well as real-time analytics and evidence-based planning. These torrents of information produced has in turn also provided organizations with the opportunity to use this immense magnitude

of data as a basis for creating a better customer experience, such as through more personalized services based on e.g. demographics (Gandomi & Haider, 2014).

2.2.2 Additional “V”s

The three “V”s discussed above feasibly make-up a rudimentary understanding of what Big Data entails. On a more critical note, however, these Vs only define how Big Data from consumers differs from that of “normal” large-scale data sets. As more organizations have been able to gather masses of data that fit this “Big Data” description, it has also become increasingly relevant to underline the importance of collecting, analyzing, and extracting the insights hidden within Big Data (Erevelles et al, 2014). Hence, in the interest of operationalizing the notion of Big Data within the context of today’s complex data reality, the paper will also introduce two other “V”s, namely “Veracity” and “Value”. Each of these are discussed in brief below.

It has been postulated that IBM coined “Veracity” as an additional “V”, in order to express the unreliability that is part of an increasing number of data sources. One common example are the sentiments from both existing and potential customers on social medias such as Twitter and Facebook. Such factors are arguably highly uncertain in nature, as they entail human judgment, which is not always explicit and thus difficult to interpret. Nevertheless, the information and, in turn, insights inherent within are still valuable for organizations to obtain. Hence, there is a growing need for organizations to manage this uncertain and imprecise data, by using more sophisticated analytical tools that is developed for mining uncertain data (Gandomi & Haider, 2014).

“Value” was said to be introduced by Oracle as another complementary characteristic to defining Big Data. More specifically, this characteristic attribute the importance of value of a data-set, in the sense that data obtained in the original data form typically has a low value relative to its volume. This is in relation to the fact that one cannot do much with a data-set, regardless of size, if it is complex if not impossible to actually “clean” into a form that allows for further analysis (Gandomi & Haider, 2014). This point has also become increasingly acknowledged by service organizations, as they realize that the true value of Big Data is

being able to extract the insights hidden within. In that regard, the paper will now turn to how data should be managed to get these insights.

2.2.3 Big Data Processes

As hinted several times above, although Big Data can appear an interesting aspect for organizations to consider in their business landscape, it is probably worthless by itself. To enable the potential inherited within, in terms of more evidence-based decision making, organizations must establish more efficient processes, to convert the high volumes of data into actionable insights (Gandomi & Haidar, 2014). That said, at the time of writing there no specific rules that explain how to treat the data gathered. However, several techniques have emerged, which can be used based on what kind of data is being dealt with (Maltby, 2011). Hence, this paper will now turn to this overall process of extracting insights from big data, based on Labrinidis & Jagadish (2012), who firstly break down this overall process into two main sub-processes, namely data management and analytics. Each of these sub-processes will be discussed in turn below.

2.2.4 Data management

Within the data management sub-process, the first step is data acquisition - i.e. the actual collection and gathering of data sets across potentially multiple source and channels. Several data sources, such as sensor networks - notably a data source from which the Internet of Things (IoT) is also gaining significant traction - can produce an incredible magnitude of data. Although such data can be filtered and compressed by orders of magnitude, the data plausibly has limited interest, since much of it will prove to be rather useless in terms of actionable insights. (Labrinidis & Jagadish, 2012)

The second step within the data management sub-process is subsequently is the extraction, cleaning and annotation of data. Since raw data collected is typically not in a format ready for analysis, it needs to pull out the required information from its underlying sources, and in turn express this in a structured form. More specifically, it requires differences in data structures, as well as semantical data to be expressed in forms that make it possible for a computer to understand what it should analyse upon. While some may proclaim that Big Data is *a/ways* appearing to tell the truth, it can actually be far from reality. This is an

important consideration to recognize, as it makes the whole extraction, cleaning, and annotation process significantly more complex, as it entails more than merely citing sources. (Labrinidis & Jagadish, 2012)

This leads to the third and final step of the data management sub-process, which is integration, aggregation, and representation. More specifically, data mining requires data that is or can be integrated, “cleaned”, and being trustworthy. Furthermore, it must be relatively easy to access for query and mining interfaces, as well as scalable mining algorithms and other Big Data computing environments. However, a major problem with how Big Data analysis is conducted today is the lack of coordination between different database systems. Hence, data analysts today are constrained by a rigid system whereby they must export data from a database, perform non-SQL processes, and bring the data back. (Labrinidis & Jagadish, 2012)

2.2.5 Data Analytics

The first step of the second sub-process, namely data analytics, is the actual modelling and analysis of the data obtained by the organization. This in itself is an extensive step, and could easily be a research on its own, in terms of reviewing and evaluating the numerous techniques and tools that exist today for modelling and analysing data (Labrinidis & Jagadish, 2012). Among the most common is possibly text analytics, or text mining, which refers to techniques that extract relevant information from textual data. Examples of this could social network feeds, blogs, forums, emails, survey answers, and call centre logs. Furthermore, text analytics involves, among other things, statistical analysis and machine learning, in order to efficiently convert large volumes of text generated by humans into meaningful summaries, which take account for the complex social intricacies embedded. Another notable technique is video analytics, or video content analysis (VCA), which is becoming more relevant as both organizations and individuals are conveying information through video content.

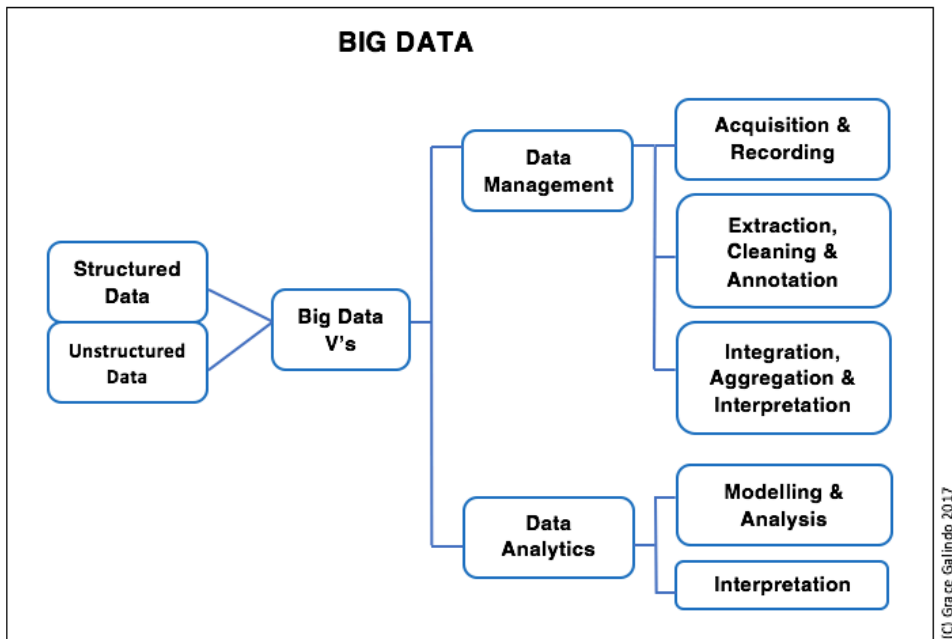
Finally, Having the ability to analyse Big Data is of limited value if users cannot understand the analysis. Ultimately, a decision-maker, provided with the result of analysis, must interpret these results. Usually, this involves examining all the assumptions made and retracing the analysis. Furthermore, as we saw above, there are many possible sources of error:

computer systems can have bugs, models almost always have assumptions, and results can be based on erroneous data. For these reasons, users will try to understand, and verify, the results produced by the computer. (Labrinidis & Jagadish, 2012).

2.2.6 Summary: Big Data

To summarize, the technological advances within computation and virtual storage has spurred a more cost-effective way for organizations to capture and gather information of immense sizes. This has in turn also implied a significant increase in the adoption of analytical tools to help said organizations make more informed decisions on a larger scale. As more innovations continue to enter this big data analytics space, however, scholars and businessmen alike suggest that the more radical innovations have yet to emerge. One example is within real-time analytics, which potentially is set to become among the more prolific areas of research because of the growing possibilities within location-aware social media and mobile apps. Furthermore, Big Data is a lot of “noise”, in the sense that a significant portion of information collected by organizations most likely have limited value. Hence, more sophisticated statistical techniques are predicted to emerge, which will more readily apt for mining Big Data, while also remaining aware of more unique characteristics, which in turn could reveal the more valuable insights (Gandomi & Haidar, 2014). To summarize the operationalization discussion of Big Data above, the paper has attempted to illustrate the elements that constitute both the notion of “Big Data”, as well as the related processes that make it valuable for service organizations to exploit.

Figure 2. Summary on Big Data



Sources: Labrinidis, A., & Jagadish, H. V. "Challenges and opportunities with big data". 2012. Adapted, merged and further developed by Grace Galindo, 2017.

2.3 Resource based View

Having outlined what elements constitute a competitive advantage, as well as how Big Data can be presented, the paper will now turn to how a service organization can sustain this competitive advantage, within a Big Data context (i.e. what resources and capabilities that are relevant)

While the introductory part briefly introduced the notion of Resource-Based View in terms of its origins and research development since its inception, the paper will now turn to exploring the main concepts of the theory. Furthermore, as hinted in the discussion above, a central aspect of the Resource-Based View is also to understand what *resource* entails, which should be addressed initially. In a general sense, it is possible to categorize resources as either human, intangible, and/or tangible, and can also be considered either static or dynamic. Furthermore, three central elements constitute the Resource-Based View, namely the functionality, combination, creation and decay of resources. In other words, it is through

the combination of resources, that organizations debatably add value. The value obtained from this creation process from resources in turn is influenced to a certain extent by the history of the organization, in the sense that the resources possessed by the organization are in constant flux. In perfect market conditions, the cost of acquiring resources would be the same as the value obtained by said resources, as soon as they are utilized to implement the market strategies. By contrast, however, if the firm acquires resources and simply use them the same way as they always have, it will consequently be complex to achieve a sustained competitive advantage (Lockett, Thompson & Morgenstern, 2009). Prior to this however, the paper will firstly set the scene by introducing the VRIO framework, which is considered an instrumental element of the resource-based view.

2.3.1 VRIO

Considering the academic consensus that sparked the popularization of the Resource-Based View, namely to recognize the importance of these internal resources (e.g. human resources, organizational processes, and information & knowledge) scholars have since explored what exactly this entails. Among these early ideas was the concept of VRIN, postulated by Barney (1986), who argues that strategic resources have four attributes, i.e. Value, Rarity, Imperfect Imitability, and Non-substitutability, which together makes up the acronym VRIN. The first two attributes of the VRIN model - Value and Rarity - are what together confer the competitive advantage of the organization. However, having just these attributes is not enough to obtain a sustained competitive advantage. To be able to sustain the value and rarity of resources, they must also be Inimitable and Non-substitutable (Francisco, 2015). As the VRIN model has been further discussed in academic circles, the model has in turn also seen several adjustments. Among the more notable developments is the change of the last attribute in the model, namely the Non-substitutability. More specifically, several scholars argue that even though a resource has the first three attributes, a firm must also be organized in such a way that it can exploit the potential of its resources and capabilities (Barney & Hesterly, 2012). In other words, if an organization has abysmal processes, policies, and procedures, it can prohibit the organization from exploiting the competitive advantage of a resource. Hence, the organization is an important factor that can either enable or prevent the realization of a resource's value.

On a more critical note however, there are also postulations that the Resource-Based View does not seem to be too able to support significant and sustained competitive advantage in the face of an ever more rapidly changing business environment. More specifically, the issue pertains that resources in the above-mentioned often is within a more static context - it does not provide sufficient explanations on how successful firms endure over time with an increasing competitive environment (Francisco, 2015). This is particularly true for organizations in more high-tech industries, where underlying factors such as Moore's Law exemplify the rapid innovative development, paving the way for an increasing number of disruptive opportunities that can send even (or rather, especially) incumbent organizations on the path to bankruptcy. In light of this, the academic literature has had a particular focus on the *capabilities* of an organization, within the context of the Resource-Based View. This is perhaps what enables companies such as IBM to keep up with the rapid adaption and change in their business landscape.

2.3.2 Types of Resources

Barney & Hesterly (2012) suggest four main resource categories; namely human, physical, organizational, and financial (Barney & Hesterly, 2012). Given the scope of the paper, the three former resources will be examined in further detailed, within the context of Big Data.

Human resources encompass everything the individual employees of the company, in relation to - among other things - her experience, relationships, judgment, and intelligence. The importance of human resources is broadly understood across any company in a given service industry, as the employee-customer interaction is often what triggers the service experience for the customer (Gronroos, 1988). Within the context of Big Data, the human resource conceivably encapsulates four distinct roles within the service company. Firstly, there is the data engineer, who focuses on the back-end of the big data infrastructure and is the more technical-oriented individual. Secondly, there are data architects, who like the data engineers are technical, however they differ in that they have a more holistic approach to data science and Big Data. Together, these roles are what creates the data infrastructure of the service company, thereby ensuring that data can be acquired, cleaned, and integration. The two other roles, Analysts and Managers, are the business-savvy aspect to Big Data. The former is specialised in distilling the insights from clean data, and visualising

these in a manner that the manager in turn can understand and subsequently make more informed decisions, as well as convey to the rest of the organization (Ryoo, 2016).

The physical resources make up the physical technology that the service company utilizes. More specifically, this entails the company's offices and equipment, as well as any access to raw materials (Barney & Hesterly, 2012). Additionally, it can also include the company's technological computer hardware and software. From a Big Data context, this implies computer devices that are powerful enough to actually process Big Data, as well as servers - these can in turn either be physical servers that is located within the premises of the particular company, or it can be cloud-based which in a sense would be more intangible in the sense that another company would actually administrate the servers for the company, meaning that the particular company would never see or touch the servers. Other software resources include digital databases and warehouses, which stores the data for the company, as well as various data cleaning and visualisation software (Ryoo, 2016).

Finally, organizational resources make up the attributes and values of the group of individuals at a company. This includes, among other things, the company's reporting structure, as well as the formal and informal planning, coordination, and controlling. Additionally, the culture and relation among the different groups of individuals within the firm also play an important role (Barney & Hesterly, 2012). In terms of Big Data, the most prominent aspects of organizational culture that this paper will focus on moving forward are two aspects: data-driven culture, and lifelong learning. The Data-Driven culture has gained popularity in more recent years, given the conventional premise that everything can be measured - and what can be measured can in turn be improved (McAfee & Brynjolfsson, 2012). Such an organizational resource is paramount if companies are to adopt and use Big Data continuously. In addition to this, a company must also create instil a lifelong learning mentality as a part of its culture, which entails a motivation and engagement to constantly explore and learn about any advances that enables the company to remain on the forefront of Big Data innovation (Sharples, 2000).

2.3.3 Dynamic & adaptive capabilities

Capabilities are potentially an important subset of what a firm's resources entail, which can be defined by Makadok (2001) as "an organizationally embedded non-transferable firm-specific resource, whose purpose is to improve the productivity of the other resources possessed by the firm" (Makadok, 2001 p. 389). Hence, capabilities are often based on skills of the employees, as well as tangible or intangible processes that inhibit a firm to utilize its other resources to a more efficient degree, thereby enhancing the productivity of such resources.

Dynamic capabilities, originally developed by Teece et al (1997), extends this notion of capabilities further, by proclaiming that an organization must continuously learn new skills, which are significant forces that limit the extent of exploitation that organizations can obtain from their bundle of resources (Teece, Pisano & Shuen, 1990). Additionally, in exploring what components make up the concept, Eisenhardt & Martin (2000) suggest that dynamic capabilities are based on three underlying drivers, namely simplicity, experimentation, and iteration. In other words, the foundation for developing dynamic capabilities is that an organization is able to facilitate a learning environment, in which individuals easily can perform multiple tests across various areas, in order to better gain new knowledge within an environment that rapidly changes (Eisenhardt & Martin, 2000). In extension to this, Ambrosini & Bowman (2009, p. 30) propose the following definition of the term "dynamic capabilities", namely that "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Furthermore, dynamic capabilities probably carry aspects that can be associated with organizational processes such as product development, resource allocation, and knowledge creation. Such processes in turn generate vast networks of collaborations between both internal and external stakeholders, which are what generates resources combinations (Hill & Jones, 1995).

Within the academic context of dynamic capabilities, two major schools of thought exist. One argues that the concept needs its own theory to better explain the drivers and underlying themes upon which the concept is built (Teece, 2007; Teece et al, 1997). A main premise behind this argument is that sustained competitive advantages in more dynamic markets (e.g. high-tech industries) is so infrequent because of rapid changes, which

consequently requires a more in-depth understanding of that context, and subsequently dynamic capabilities thereof. On the other hand, others suggest that it the concept simply extends the theory of the Resource-Based View, by simply putting the theory within the context of more dynamic environments (Peteraf & Barney, 2003). In the context of this paper, dynamic capabilities will be viewed as the latter of school of thought, to a certain degree due to the sake of simplicity, as the former argument would require a more extensive dive into the theory of dynamic capabilities as a more separate notion.

Although dynamic capabilities have gained traction since its inception, there are perhaps some significant limitations regarding the concept which should be considered. More specifically, the notions that underline dynamic capabilities are rooted in the fact that organizations tend to have an inside-out approach (Day & Moorman, 2010). This entails that organizations evaluate the capabilities they should develop based on the resources they have at their disposal, instead of sensing the market landscape, and placing emphasis on what the customers expect. Such an outside-in approach is coined by S. Day (2010) as “adaptive capabilities”, and is reportedly stressed among others by Amazon.com, one of the most successful businesses in modern times, in which Jeff Bezos describes how they consider adaptive capabilities:

“Rather than ask what we are good at and what else can we do with that skill, you ask, who are our customers? What do they need? And then you say we’re going to give that to them regardless of whether we have the skills to do so, and we will learn these skills no matter how long it takes [...] There is a tendency I think for executives to think that the right course of action is to stick to the knitting—stick with what you are good at. That may be a generally good rule, but the problem is the world changes out from under you if you are not constantly adding to your skill set.” (Lyons, 2010 p. 86)

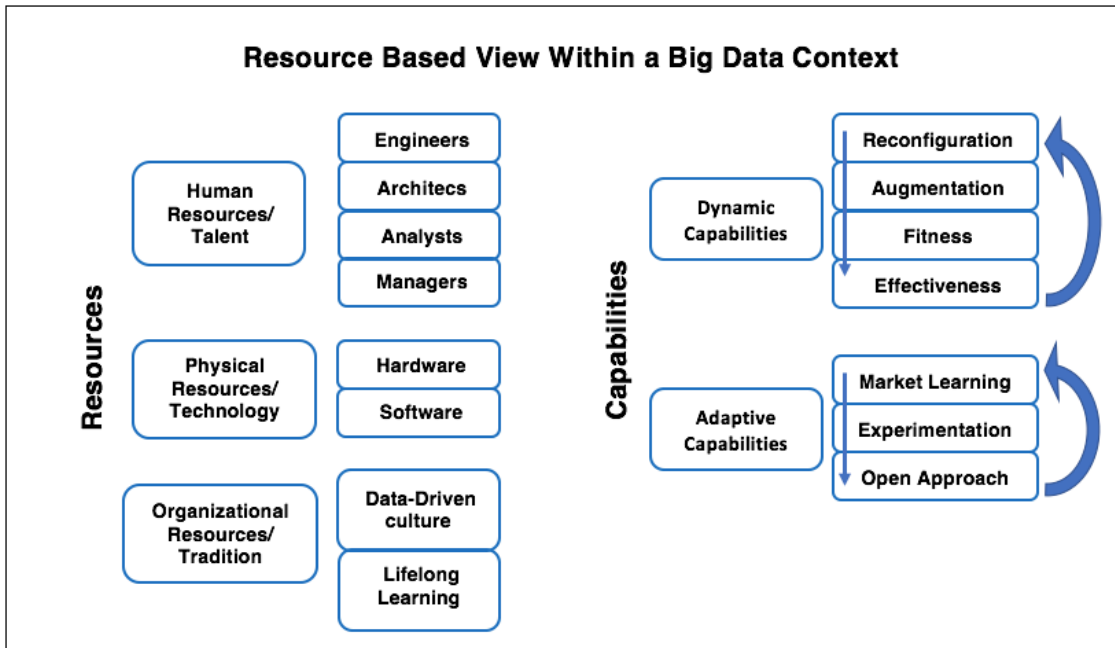
George Day (2014) examines this further, by proposing three adaptive capabilities, which an organization must have in order to adjust more swiftly to dynamic and fast-changing markets. The first is vigilant market learning, which enhances the insights of the market more deeply, and subsequently provides a warning system to better anticipate the changes in the market. Second are adaptive market experimentations, which iterates various planned

experiments, and ensures that the organizations constantly learn from what these experiments provide as results. Finally, organizations must have an open marketing approach, as it establishes relationships with partners that are more attuned to any potential market changes. (Day, 2013). These three adaptive capabilities will be adopted in the theoretical framework of this paper.

2.3.3 Summary: Resource-Based View in terms of Big Data

In conclusion, the Resource-Based View theory plausibly offers an interesting perspective on Competitive Advantages. Firstly, it provides a novel approach on how organizations can sustain their competitive advantage by focusing on internal resources rather than traditional theories that tend to rely solely on external environments, such as competition (e.g. Porter, 1979). This is relevant in the modern business landscape, where rapid changes are constant across countless industries - let alone the service industry. This is also exemplified among the more recent business literature, such as Ries (2011) who created a substantial movement, in which the competitive advantage lies at utilizing the resources at the organization's disposal more efficiently. More specifically, this entails building a "minimal viable product", followed by rapid experimentation and testing, which inhibits more substantial learning (Ries, 2011); ultimately fostering an organization's dynamic capabilities. Furthermore, this also draws strong parallels to the drivers of dynamic capabilities discussed, which were explored by Eisenhardt & Martin (2000). Hence, to summarize, the key takeaways from the Resource-Based View discussion above can be illustrated as the following.

Figure 3. Resource Based View Summary



(C) Grace Galindo 2017

Sources: Shahriar Akter, et al. “How to improve firm performance using big data analytics capabilities and business strategy alignment?” *Int. J. Production Economics*, 2016 and George S Day, “Closing the Marketing Capabilities Gap”. *Journal of Marketing*. 2011. Adapted, merged and further developed by Grace Galindo, 2017

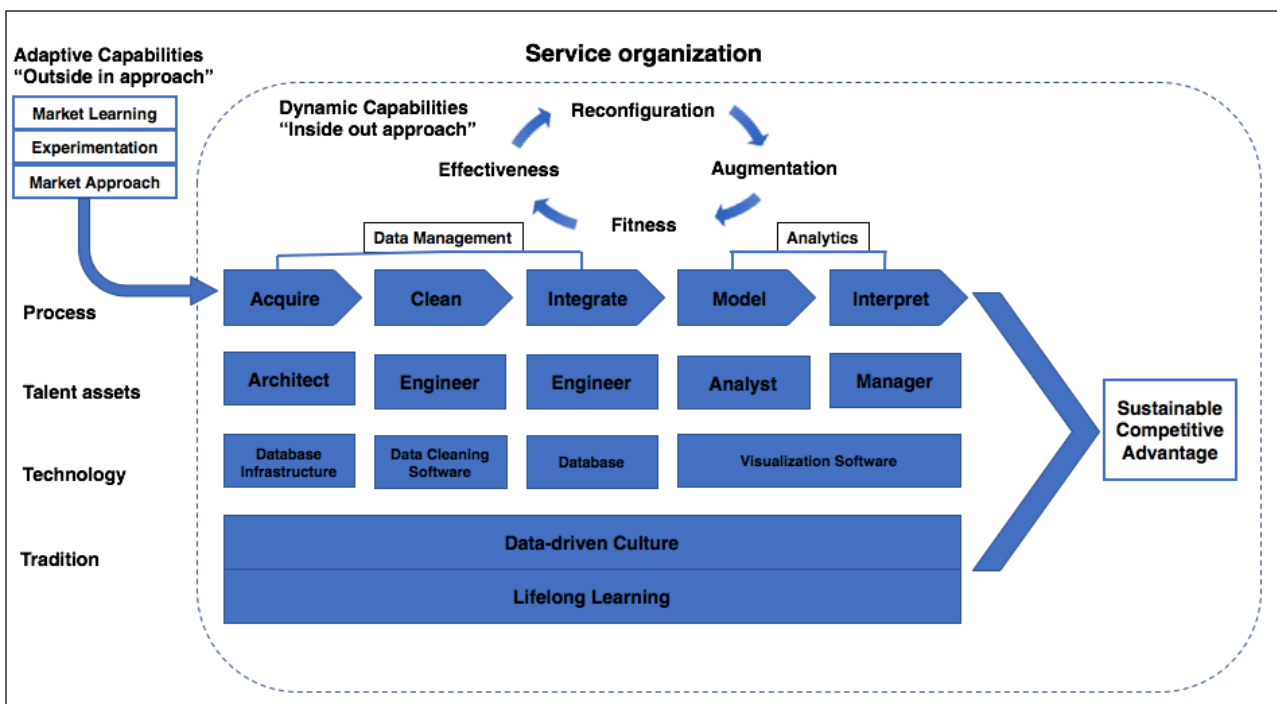
In this Resource Based View framework three main resources have been identified as key in order to develop a competitive advantage. Firstly, there are the human resources (referred to within a Big Data context as “Talents”) which entails the roles of the service company, within a Big Data context. More specifically, these roles are Engineers, Architects, Analysts, and Managers, who were presented in the discussion above. Second are the physical resources (or “Technology”), which encompasses the service company’s IT capabilities; i.e. the databases, infrastructure, storage capacity, tools, networks, etc. All these various aspects can be grouped in under “Hardware” and “Software”. Lastly, are the Organizational resources (“Tradition) and capabilities such as; organizational learning, culture, structure, planning, strategy, integration and execution. Additionally, in order for a service company to fully exploit these resources, they must arguably still follow the VRIO concept, so that they – among other things - can help extract the right insight information. Once the firm has identified their resources and capabilities, it should be able to integrate them together with

their external and internal competences and the environment to achieve the end goal of creating a competitive advantage.

2.4 Theoretical framework Summary

In summary, developing a competitive advantage requires insights in either market, customers, product or any area upon the firm wishes to compete. Big Data and its analysis should be considered as an enabler for competitive advantages. Insights in information is only one of the needed elements, once this one is possessed there are other element within the firm and its thinking that must change in order to achieve the ultimate strategic approach to the creation of competitive advantage. The paper has attempted to illustrate the various elements of the three theoretical concepts together in the figure below:

Figure 4. Overall figure towards achieving a sustainable competitive advantage.



Sources: Ryoo, J. (2016). Big data jobs are out there - are you ready?. Day, G. S. (2014). An outside-in approach to resource-based theories. *Journal of the Academy of Marketing Science* and Poulson Barton, (2016), Become a data scientist. Merged and Adapted by Grace Galindo (2017)

The figure represents how all the elements previously described work together towards a sustainable competitive advantage. In the outer part, there are the adaptive capabilities which will influence how processes within in the organisation work. Within the organization are four key elements, namely the process of Big Data itself (which in turn is broken into data management and analytics, and the three T's, which represent the resources, Talent assets (Human resources), Technology (Physical resources) and Tradition (Organizational resources). The correct application of resources, processes and capabilities can help the organisation achieve a sustainable competitive advantage in a Big Data usage context.

3. Methodology

This chapter firstly outlines the purpose behind the research, before discussing the subsequent methodology, with its structure inspired from the “research onion” by Saunders et al (2008) (see appendix 6.2.1). Each “layer” of the methodological figure represents a section, which is discussed in turn below. 4.1

3.1 Research purpose

Although the nature of the research question is explanatory, i.e. *how to use Big Data in order to sustain the company's competitive advantage*, it nevertheless requires an exploratory approach as well, in terms of understanding the underlying concepts in question. Hence, the purpose of this research is handled with the exploration and explanation studies, in which the paper firstly will explore the theoretical concepts of Big Data, Resource-Based View, and a competitive advantage, before then subsequently building a more explanatory understanding of how they relate. Exploratory studies can be understood as figuring out what is happening, seeking new insights, and to ask questions and to assess phenomena. This encapsulates the first part of the thesis research (Robson, 2002). Explanatory in turn is studying a particular situation or a problem, in order to explain the relationships between variables (Saunders et al, 2008). The key elements of competitive advantage Big Data, and resource-based view lay the theoretical foundation for discussing how the three are intertwined, and what factors that depict any relationship among them, leading to fully answering the research question.

3.2 Philosophy

Founding an adequate philosophical basis proved strenuous. Are the notions of competitive advantage, Big Data, and resource-based view all social realities that exists independent of social actors, or is it something that human beings have invented? Can the phenomena be explained in a value-free way (Remenyi et al, 1998), in the sense that the researcher is independent of, and neither affects nor is affected by, the subject of competitive advantage, Big Data, and resource-based view? On one hand, arriving at a conclusion that could prove true, independent of human thoughts and beliefs, would arguably be a major theoretical contribution to further developing the notion of e.g. the resource-based view within the

context of Big Data. However, the variables to which the thesis' research question revolves around - develop, sustain etc. can maybe appear more complex to fully comprehend than in mere formulas and definite laws. Hence, the underlying research philosophy is declared to be interpretivism, since it sympathizes with the philosophical premise that the richest of insights can only be fully appreciated if we understand the differences between humans in our role as social actors. This paradigm is further rooted in phenomenology, which asserts that views the thesis' subject as a social phenomenon, and is thus concerned with generating meanings and drawing insights into what this phenomenon constitutes (Saunders et al, 2008). This entails that competitive advantage, Big Data, and resource-based view, does not necessarily carry a universal truth that is irrespective of its context, further implying that the operationalization of the concepts in the theory chapter are constructed by the researcher from her understanding of previous literature, and can best be understood in a symbiotic sense; that competitive advantage, Big Data, and resource-based view are to be understood from the context of the service industry. Having presented this underlying research paradigm, the section now turns to elaborating on the ontological, epistemological, and axiological considerations.

3.2.1 Ontology

Having outlined that competitive advantage, Big Data, and resource-based view are created from the perceptions and actions of social actors, the paper asserts a subjectivist view in relation to the nature of reality. Hence, competitive advantage, Big Data, and resource-based view are social phenomena under a current state of revision, and therefore holds no universal truth. Various definitions of the concept thus far in both academic and professional circles are all true to some degree, insofar as how its constructors view and subsequently apply it in their particular contexts. Remenyi & Williams (1998) stress the importance of studying the details of importance, and to understand the reality or perhaps the reality working behind them (Remenyi & Williams 1998). In other words, it is necessary to explore the subjective meanings motivating the actions of social actors, in order for the researcher to fully understand these actions. This is encapsulated in the term social constructivism, and implies that people's practice of competitive advantage, Big Data, and resource-based view is considerably different across various contexts, as they all carry different assumptions and interpretation of what the concept means.

3.2.2 Epistemology

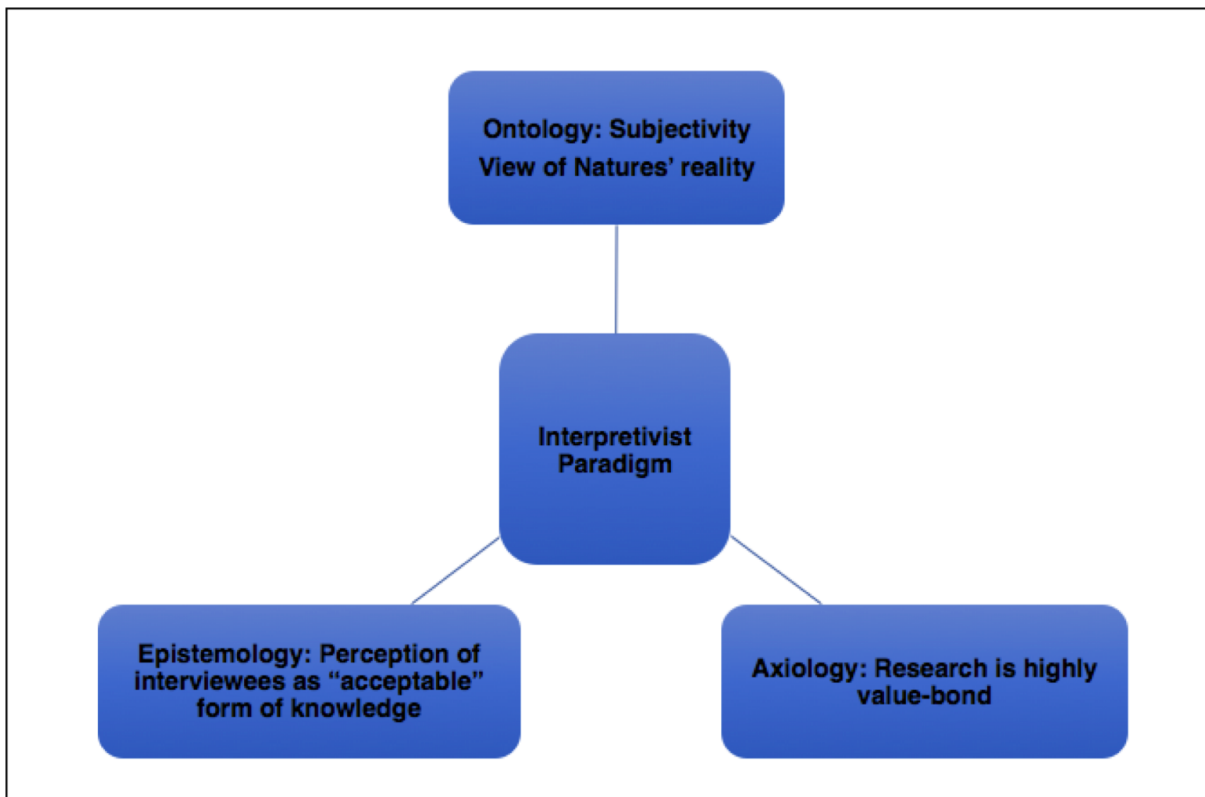
How we perceive the world around us in turn leads us to consider what one should regard as “acceptable knowledge” in regards to understanding competitive advantage, Big Data, and resource-based view. Saunders et al (2008) suggest two different epistemological types through the “resources” researcher, and the 7 “feelings” researcher (Saunders et al, 2008). The former is argued to be utilized by natural scientists, who are confident with the collection and analysis of “facts”, since they view objects as independent of human thought. This would imply that data collected on competitive advantage, Big Data, and resource-based view would be unbiased and thus “objective” constructs to reality. The later by contrast would be more concerned with the feelings and attitudes placed behind the data, which would be entirely dismissed by the “resources” type, since such data cannot be measured or modified. Nevertheless, in line with the interpretivism paradigm, the thesis’ epistemology will be more devoted to understanding the underlying drivers behind any quantitative data, which constitutes “acceptable knowledge”.

3.2.3 Axiology

Given the view that world reality is a social construct, the role of values in research also becomes a significant aspect to cover. Heron (1996) argues that values are the guiding reason for human action. The axiological ability of the researcher is in turn demonstrated by articulating his or her values, as the basis for making judgments about the research conducted, and how the researcher plans to do so. Hence, the choice of the interpretivist approach also reflects the values of this thesis’ researcher, as well as the data collection choices that will be discussed below. In the case of competitive advantage, Big Data, and resource-based view, this entails that the researcher places more value on personal interactions with those questioned for the project, rather than acquiring data from anonymous interviews. This is not to discredit the absolute validity of such data collection choices, but given the epistemological and ontological considerations above, personal interactions probably provide a better understanding of how a social actor perceives reality, which is the closest one can come to the truth (Saunders et al, 2008).

The interpretivist paradigm and its subsequent considerations can be illustrated in the figure below.

Figure 5: Research paradigm overview (Grace Galindo, 2017)



3.3 Research approach

The subsequent “layer” of the Saunders et al (2008) research onion is the research approach, which can be viewed as the precursor to the thesis’ research design elaborated later on. This layer presents the two major research approaches, namely induction and deduction (Saunders et al, 2008). Since the interpretivism paradigm is adopted, the induction approach can be viewed as the most rational brick to build further upon the philosophical foundation. Induction tends to emphasize, among other things, the importance of gaining a close understanding of the research context, the collection of qualitative data, as well as an understanding of the meanings human beings attach to events (Saunders et al, 2008).

3.4 Design strategy

In line with an inductive approach, the primary design strategy chosen is case study research, defined by Robson (2002) as the strategy for doing research that requires

empirical investigation of a concurrent phenomenon within its real-life context, using various sources of evidence. Such a strategy arguably best complements the preceding research choices thus far. The case study strategy enables the researcher to explore the richness of a context in detail such as, among other things, the “attitudes and feelings” that lie behind quantifiable data. Based on the interpretivism paradigm, this is regarded as the most “acceptable knowledge”, leading the researcher to the most accurate depiction of the reality of nature. To further elaborate on the case study strategy, Yin (2003) offers further distinction based on two discrete dimensions: single case v. multiple case & holistic case v. embedded case. Since the thesis has approached several multinational organizations, the first-dimension leans towards multiple cases. More specifically, these were SanderMap, Andersen & Martini, Magnetix, WireDelta, and TaskLift. Furthermore, the study looked at how these companies were using Big Data on a more holistic level, in terms of how they influenced their competitive advantage.

3.4.1 Semi-structured interviews

An interview is a purposeful discussion between two or more people (Kahn and Cannell 1957). Semi-structured interviews allow the research to gather data based on people's experiences, feelings, values and others is key within the usage of semi-structured interviews (May, 2011). By conducting semi-structured interviews, the researcher is able to explore and explain themes that have may have emerged from the use of a questionnaire (Tashakkori and Teddlie 1998). In terms of explanatory studies, semi-structured interviews can be used in order to understand the relationship between multiple variables (Saunders, 2008). In the case of the research purpose of this paper, semi-structured interviews are the appropriate method to investigate the usage of Big Data within companies in order to sustain a competitive advantage. Semi-structured interviews will allow the research to understand how the variables in the research question (Big Data, Competitive Advantage and the Resource Based View) relate to one another and further be able to respond to the research question.

3.5 Data choices

Since the case study design allows for more extensive research of the cases' particular contexts, the empirical data choice relies firstly on qualitative data collection, in terms of semi-structured interviews made with the 5 case companies.

3.5.1 Defining the interviews.

An interview is the most appropriate method when attempting to obtain data in circumstances when the questions required an in depth explanation (Easterby-Smith et al. 2008; Jankowicz 2005). Subjects such as Big Data and Competitive Advantage can be better defined through interviews which will allow the interviewee to better elaborate on the concepts and how they are managed in the context of their company. Therefore, the interviews conducted on the chosen companies needed to be diverse, meaning, the attempt was to conduct 2 interviews per company. But achieving to conduct interviews within international corporations can present several issues. In this case accessibility and time were major factors that could have limited the number of conducted interviews.

3.5.2 Sampling and Conducting Interviews.

Appropriate to the exploratory research and following Bryman's (2011) sampling concept regarding qualitative methods, were as long as the researcher is able use the collect data to establish a theoretical stand, 10 interviews were considered sufficient to gain knowledge and understanding on how companies use Big Data.

The interviews were conducted with: CEOs, developers, marketers and analysts within the companies. The variety of interviewees allow the research to acquire a higher level of understanding of the subject within different levelled employees. Therefore, providing sufficient knowledge to be able to locate possible areas for improvement.

All interviews were personal interviews, meaning the researcher and the interviewee were both present at the time being. As well, all interviews were conducted under Lund's University code of ethics. The first contact with the interviewees was via email where a background of the researcher and the research was sent, together with a draft of the interview and a request to meet to further conduct the interviews. Once the respondents

agreed to meet a following formal invitation with time and date was sent out to them. When the researcher and the interviewee met, the way the interview was going to be conducted was settled as well as how the empirical data gather was going to be handled. Further permission to record the interviews was requested as well as the permission for using the empirical data for the findings and conclusion of this thesis, all these requests were approved under the condition to send the main conclusions of the paper for confirmation and approval.

In regards to the subject of the paper and the different backgrounds form the interviewees the questionnaire for the interviews was divided into three sections (Big Data, Competitive Advantages and Resource Based View) aspiring to get a deeper understanding of all the main areas of interest for the paper. Furthermore, once the interviews were conducted the researcher proceed to the transcription of these. Because of the complexity on the subject and its elements it was considered necessary to transcribe all of them. While the researcher managed to conduct 10 interviewees for the thesis, it also proved complex to ensure that all participants had fully understood what the scope of the actual interview was about. In some cases, there appeared to be slight confusion as to what e.g. the resource-based view entailed, which required a more thorough explanation to ensure that there would be no misunderstandings.

3.6 Data Analysis

The analysis procedure is in turn what links the qualitative and quantitative data collections techniques with each other. The analysis procedure adopts the concept of thematic coding, which summarize the main themes constitute the data collection process. Key words are collected from the qualitative data gathering, referred to as “codes”, and subsequently structured into “basic”, “organized”, and “global” themes (Attride-Stirling, 2001). Hence, it illustrates the train of thought from the empirical data collection, to the identification of the elements that can present and describe competitive advantage, Big Data, and resource-based view

3.6.1 Trustworthiness and Authenticity

The evaluation of qualitative studies can be assessed by two main parameters, trustworthiness and authenticity, originally developed by Guba & Lincoln (Bryman, 2012), which are parallel to the reliability and validity issues addressed by LeCompte (Bryman, 2012). Trustworthiness can be broken further down and assessed through different dimensions, more specifically in accordance to; credibility, transferability, dependability and conformability, which will be discussed further in turn. Credibility is the extent to which one has followed the accepted procedures in conducting qualitative investigations (Kuada, 2012). In the context of this research investigation, this is reflected in the semi-structured interviews conducted, in which the questions were open-ended and provided an opportunity for further dialogue within a particular area, if that was considered relevant within the scope of the thesis. Transferability requires a detailed account of the context of the study conducted, so that other researchers may compare studies (Kuada, 2012). The context of this study is conducted within the academic literature of Big Data, Resource Based View and competitive advantage on a graduate student level. This implies that the knowledge within the literature is rather limited compared to other scholars contributing to the mentioned literature. Furthermore, given that the overall purpose is purely academic, the interviewees providing the paper with insights from a business context is also limited. Dependability requires detailed records of the various phases of the research process, problem formulation, interview transcripts etc. providing evidence that the study has been done in a prescribed manner (Kuada, 2012), reinforcing the credibility and transferability of the paper. Such records are saved on Google Drive documents and are available upon request. Finally, confirmability essentially entails that the researcher has acted in good faith throughout the research process, and that no other interest other than the reality set out to investigate exists (Kuada, 2012). The second overall evaluation criteria, authenticity, relates to the fairness of the investigations (Kuada, 2012), such as the viewpoints of the relevant people. Regarding the evaluation of qualitative research conducted, the researcher has taken great strides to ensure that the views of the various interviewees were portrayed as truthfully as possible. This was done among other ways not only by transcribing all interviewees, but also by providing quotes from the various participants in the later chapters.

3.6.2 Data quality issues

Some major issues related to the trustworthiness and authenticity is the quality in the data. The concept of reliability is the main concern when addressing interviews, this is due to the lack of a standard process for interviews. In regards of interviews, reliability refers to the concern if a similar study will reveal the same results (Silverman 2007). The issue of reliability is referred as bias. The first type of bias is related to the interviewer and whether if he or she is imposing their own point of view on the subject forcing the interviewee to reply under the same context. The bias of the interviewee is even more complex, as the interviewee responds can be affected by several factors, which appeared evident in some cases when initiating an interview, and having to spend more time elaborating on the concepts in order to ensure that both the interviewer and interviewee were on the same page before discussing said concepts in detail.

Table 1. Methodology Summary (Grace Galindo, 2017)

Research Purpose: Exploratory and Explanatory mix	First part explores the key elements of Big Data, Resource Based and Competitive Advantage among Service Organizations
Philosophy: Interpretivism	Ontology: Subjectivism Epistemology: "Feelings" researcher Axiology: Value-bound research
Research Approach: Inductive	Development for usage of Big Data within Service Organizations in order to develop and sustain a Competitive Advantage.
Design Strategy: Case Study	Multiple and Holistic case studies
Mixed Method Research	Semi-structured Interviews

4. Analysis & Findings

Having outlined the various philosophical stances, as well as the process of the data collection for this research, the subsequent step in this paper is to present the relevant findings from the empirical data. This is carried out by using the theoretical framework developed as the analytical structure, thereby ensuring that theory and empirical data are in alignment, and that the research question can be fully answered. More specifically, the structure of this chapter is divided into three main parts. Firstly, the competitive advantages of the various companies are explored, which is necessary before understanding how to actually sustain a competitive advantage. Second are the companies' usage of Big Data, in terms of how the data management and analytics process is performed. Finally, this sets the scene for discovering how this usage of Big Data from a resource-based view. As mentioned in the methodology chapter previously, the paper uses a thematic coding approach to summarize the main findings of this analytical discussion, which in turn introduces the "actionable insights" that form the concluding part of the research.

4.1 Overview of case companies

Before analyzing the empirical data based on the theoretical framework, the paper will first and foremost provide a brief outline of the 5 case companies, as well as the interviewees that were kind enough to take their time and participate for this research. More specifically, for the empirical analysis, 10 people from 5 different companies with a daily use of data have been interviewed. The interviews conducted had 3 key elements, Big Data, Competitive advantage and Resource Based View. Things like understanding what Big Data means to each of the interviewees was essential to better understand how companies use it, and to what extent it impacts their competitive advantage. Additionally, the interview also attempted to better understand how the resources of the company are being integrated with the acquisition and analysis of data, in order to sustain a competitive advantage.

4.1.1 SanderMap

For the SanderMap company Sandeep Sander founder and CEO and David Sander, Project Manager of the company have shared their points of view on subjects such as Big Data, Competitive Advantage and the Resources based view of their company. SanderMap was founded back in 1989 by Sandeep Sander, CEO of the company, and its main activities have been centred around human talent. Today SanderMap is run by a talented team of management based in Copenhagen and developers based in Bangalore, who are helping in the development of a human resources software to help develop expertise in Strategic Human Asset Management. This software offers services that include the use of Artificial Intelligence (AI) and Machine Learning to large corporations and individuals in order to develop LifeLong Learning and Employability. It is cloud-based software solution that helps the companies or individuals to assess, develop, and optimize their competencies. One of the main goals of the company is help organizations align their strategic goals with the right competencies to raise up the employability of every individual.

The way the SanderMap software works is under the concept of self-assessment of competencies which are scaled from 1 to 5 and once the self-assessment is completed the software is able to identify with the usage of data from the company, where the average is low or where it is high. An average is low when it is between 1 and 2 which means the employee has a gap that need to be cover, and average of 3 means the employee has the competencies needed to fulfil their jobs and an average of 4 means an employee can help coach others and at last the average of 5 means they can do speeches and speak in conferences. Based on the scores on the necessities of the company and individuals as well as time and budget the SanderMap provides a flow of activities to follow in order to keep employees competencies updated. In order for the SanderMap solution software to provide the correct and needed competencies for each individual and company, there is a need of a lot of information and data based on what the companies and the markets need.

4.1.2 Magnetix

Magnetix is a Danish web and dialogue agency that consults businesses in digitalization, it is a combination between a media and marketing agency within a digital context. The company was founded back in 2000 and was recently acquired by Isobar, which in turn is part of the a network of digital agencies called Dentsu Aegis. The main goal of the company

is to integrate a digital agency's focus on creating customer contact with a direct marketing agency focusing on retaining it, through the insights and the intelligent deployment of technology. Magnetix seeks to bring together developers, experts in marketing, and strategy - among others - with a vision of putting the customer's needs in first and to set new standards to create a good relationship between the companies and the customers. Some of the services the company offers varies from website development, basic search engine marketing (SEM), different types of online marketing campaigns in social media, emails etc. and app development. Within the company there are different areas that help create this integration between companies and customers some of them are: reporting department, strategy and innovation department and media buying and optimization department and of course a great design department in charge of the creative ideas.

For the empirical data gathering, the researcher could interview 3 new talents within the company and within the different areas previously mentioned. Kristian Wagner, a lead developer within the reporting department at Magnetix has helped the company develop different dashboards that help present and visualize the data and insights to the clients. Marcus Kauffmann analytics expert at Magnetix in charge to help elaborate reports that will be presented to the clients and Jacob Sander, associate strategist at the strategy and innovation department, part of the team that helps develop strategic project for clients. Having these three interviews gives a wide overview of the perception and usage of data, depending the department, and how to best utilize it depending on their abilities to best deliver to the client.

4.1.3 TaskLift

TaskLift is a start-up founded in Copenhagen, Denmark 3 years ago. It is an application that offers the solution of Quality Assurance and Documentation. Even though it is a young and small company with only 6 employees, it has a very dedicated team. It started as an idea for the construction industry where workers, companies, etc. could qualify and assure the work that was performed. It quickly to be an application for any kind of industry where verification, quality assurance and documentation is needed. TaskLift creates software's solutions to digitalise work processes. What the software in TaskLift aims to do is to help companies in industries where the work needs to be documented and make it easier to

analyse how long it takes to do certain tasks, make the whole documentation more agile. Mr. Rasmus Wolff who has been working at TaskLift for the past year and a half has been vital in providing valuable insights through the interview on TaskLift's activities and usage of Big Data.

4.1.4 Andersen & Martini

Andersen & Martini is an authorised car dealership in Copenhagen founded in 1939. It is the largest Opel authorized dealership in Denmark and one of the largest KIA dealers and cars dealerships, among other brands. The company has been listed on Copenhagen stock exchange. Andersen & Martini employs around 275 people and it has 7 branches in Denmark, holds 9 different sales outlets and 7 workshops. The main activities of the company are: car selling, leasing and repairs. The company has become an excellent example on the usage of data in order to know and understand their customers probably better than they do themselves, some of their goals is to try to be more effective and with the help of technology, a well-established website and the usage of data for the understanding of customer needs, the company has been able to develop different kind of strategies in their different departments and branches.

For the empirical findings on Andersen & Martini the researcher was able to talk to the CEO and major shareholder of the company Mr. Peter Hansen and the workshop manager in the area of Søborg in Copenhagen Mr. Claus Hansen. Being able to interview them has given two different but also similar perspectives on how a car dealership functions, what are the main goals and how the usage of data in different areas of the company can help achieve an overall strategy

4.1.5 WireDelta

WireDelta is a relatively new company, since it was founded approximately 5 years ago. The company was founded by Mr. Mark Dencker, CEO of WireDelta who runs it together with his business partner Mr. Aske Buemann, who is CTO. It is a web and mobile developer company and it is a consultancy based service company. Mr. Mark Dencker and Mr. Aske

Buemann have contribute to the empirical findings by sharing some of Wiredelta's primal activities mainly surrounded by the usage of data.

The idea of building a company such as Wiredelta came from the realization of the difficulties that building a website presents, this team of young men decided to create a website where the main goal is helping customers to build a website and mobile app for their businesses. Right now, the concept for building these websites is very straightforward and very manual, but they have realized that this process would not be like this forever and that it is only a matter of time until someone comes up with a smatter idea of doing more with less. For this reason, for the past one and a half year the efforts of the company have been centred towards developing and training Artificial Intelligence (AI) software. The vision the company has with this AI is that, at some point some processes for building a website or an app will be automated.

The AI software the company has been developing is a “chatbot”. The chatbot is a data driven software powered data through AI technology, this chatbot has the solemnly purpose to answer all the possible inquiries from the customer related to building a website or an app. This chatbot is a live chat where customers can insert any kind of questions and will get an answer without the need of having another person on the other end of the chat to respond, the bot is also linked to wikis, blogs, and other sites to provide more information. “The purpose of this chat is to answer simple questions with simple answers” (M. Dencker, personal communication 06-06-2017). This is just the beginning. Efforts right now are driven towards being able to feed the bot with as much data and knowledge as possible regarding all frequent questions from clients and expected answers, so that in a future this chatbot cannot only provide an answer but implement it, which is considered the ultimate step towards building an AI, that can replicate and provide the feeling of talking to a real developer. The main goal is to have Wiredelta's as a technical HUB where customers can build in an app or website in an easy way helped by the AI and if more help is needed then customers can reach a consultant.

4.1.6 Summary of key findings from case companies

SanderMap	About company	<ul style="list-style-type: none"> - Human Resources software focus in helping develop expertise in Strategic Human Asset Management - Platform designed for companies and individuals that centers in tailoring competences in order to offer LifeLong Learning and employability for the future. Driven by Self-assessment
	Big Data	<ul style="list-style-type: none"> - Big Data is large datasets that are not that easy to handle with a simple computer and it is not as easy to understand at simple sight - It is the data that the company has directly and the data that can be gather from other sources. - SanderMap uses Big Data for tailoring the platforms according to their customers need and provided the needed insights regarding the results of the self-assessment
	Marketing strategies	<ul style="list-style-type: none"> - SanderMap is on the software industry - Going for bigger companies who have a need for tailored competences - As well as looking for individual clients at leading universities that can provide a blue stamp for the company - In the future develop AI and machine learning technologies to upgrade the offer of services
	Resource based view	<ul style="list-style-type: none"> - Human asset is key for any company, that is the main reason why this paltform has being developed. Developers and management skills are essential for understanding clients are their needs and be able to communicate them - Communication, knowledge and information sharing are key in the developement and working form of the company - There is no need for possesing technological resources since this can be outsourced or acquired through other companies
Magnetix	About company	<ul style="list-style-type: none"> - It is a digital agency/bureau founded back in 2000 - The main goal of the company is to integrate a digital

		agency's focus on creating customer contact with a direct marketing agency focusing on retaining it, through the insights and the intelligent deployment of technology.
	Big Data	<ul style="list-style-type: none"> - Data insights are essential for the company to understand how clients behave in what is called "sessions" as well as for pitching ideas to clients - The gathering of data is done via social media, sessions and most importantly information that clients share - To develop strategies for the clients according to interviewees the company does work with Big Data. But not all areas in the company do.
	Marketing strategies	<ul style="list-style-type: none"> - Omnichannel is the new buzzword within the company and express the desire to be present everywhere. - Create communication between the clients and the clients, clients is how the company manages their marketing strategies. Creating dialogue
	Resource based view	<ul style="list-style-type: none"> - People are essential for the well functioning of the company, they are the ones who have helped developed new strategies by the complete understanding of technology and their usage. - Organizational resources have helped the company to engage the employees, generating a great work atmosphere, inspiring them to go for more. The structure of the company allows as well good communication between all level employees - Technology is a given with a company such as Magnetix
Tasklift	About company	<ul style="list-style-type: none"> - A second generation of digitalization app that offers a quality assurance and documentation solution - TaskLift is a startup founded approximately 3 years ago. It started out as an app center only in providing solutions for construction company but develop their concept to offer the

		<p>solution to any kind of company that needs documentaiton and quality assurance services.</p>
	Big Data	<ul style="list-style-type: none"> - The company has very little usage of Big data mainly because they have just started and they have very few active users. - They understand the importance of data gathering in order to improve and upgrade the services they have offer, but unfortunetely the company does not count with the needed resources
	Marketing strategies	<ul style="list-style-type: none"> - The company has just launched their product to the market, and the marketing efforts are very poor still, there is a need to center more efforts towards learning and selling. - The fact that the company has very few users limits them towards the gather of data
	Resource based view	<ul style="list-style-type: none"> - TaskLift has a very good team of people working on the app, but they are missing in some other resources such as technology in order to fill the gap for collecting and analysing data. - Organizational wise the company has gone through some re-structuring which hopefully mean better management and that efforts will be center more towards achieving a stronger competitive advantage
Andersen & Martini	About company	<ul style="list-style-type: none"> - One of the biggest and most recognized authorized car dealership in Denmark. Has a total of 9 sales outlets and 7 workshops. - Main activities of the company are: car selling, leasing and repairs.
	Big Data	<ul style="list-style-type: none"> - The company is seeking to utilise data about the clients in order to offer them a better service and attract new clients and retain - Andersen & Martini makes usage of data in order to measure

		<p>performance with KPI's.</p> <ul style="list-style-type: none"> - Have knowledge about the kind of cars that are own in some neighborhoods which gives them a wide range area to work with
	Marketing strategies	<ul style="list-style-type: none"> - Offer better services to customers when they come to dealership or workshops in order to attract and retain clients to an authorized car dealership. - Understanding the clients needs and be ahead to what they will be needing offer a better performance. Utilize their capacity to the maximum
	Resource based view	<ul style="list-style-type: none"> - Process and Systems are key for the well functioning of the company towards their goals. Processes come first since they are the way of working, systmes are not very useful if there is not first established a process that need to be followed. - Knowledge and information sharing to keep employees updated regarding on what is happening in the company and how they should be following the processes.
Wiredelta	About company	<ul style="list-style-type: none"> - Wiredelta is a website and app developer software comapny. - It's main objective is to help any kind of customer that wants to be online to create their own website or app with the help of a chatbot, that with the help of AI helps clients with any kind of inquiries while building the website or app.
	Big Data	<ul style="list-style-type: none"> - Wiredelta interviewees have a similar approach to Big Data, where they consider Big Data is the kind of data that cannot be storage or processed in ones computer - Under this assumption they do not consider Wiredelta works with Big Data for now, but they reckon in a close future and with the growth of the company and the chatbot the might be working with Big Data. - Wiredelta mainly works with text data that does not require a big storage capacity. The company also works with tools like

		Google analytics which help them to track the development of the AI and website.
	Marketing strategies	<ul style="list-style-type: none"> - Wiredelta is on the software and development industry. - Their main segment is anyone with a need or desire to create a website and or app. - The company works with both small and big companies and the main key element of differentiation is their AI. - Their AI is considered the competitive advantage since it is what the company can offer to clients that others cannot.
	Resource based view	<ul style="list-style-type: none"> - Human talent is their major asset and resource, the engagement of employees is essential for the company as well as retaining and acquiring new talents. - There is a need for the company to acquire new capabilities in order to keep up with the AI they are developing - Some of the major skills that will be needed to develop in the future are technical skills in order to better understand the AI functioning.

4.2 Competitive Advantages among companies

Understanding how Big Data can sustain a competitive advantage can prove difficult if one is not aware of what that competitive advantage is in the first place. For this, the paper will adopt Porter's (1980) three different strategies discussed in the theoretical framework, in order to determine the competitive advantages of the case companies. However, since the paper did not find any cases of the selected companies adhering to a cost leadership strategy, the section will only explore the differentiation strategy and focused strategy within the empirical data findings.

4.2.1 Differentiation Strategy

The case companies that appeared to follow a differentiation strategy as a source of a competitive advantage (Porter, 1980) arguably appeared plentiful. That said, although the common denominator may be the fact that these particular companies differentiate

themselves holistically, one could arguably dive further into these sources of a differentiated competitive advantage more granularly. More specifically, the different ways in which these companies differentiate are significantly different. In the case of TaskLift for example, as a software developer company, there is a lot of competition in the market and there are company that have the same concept as TaskLift. Therefore, what the company is striving to do in order to differentiate itself is appear as a non-specialised app. In this regard, Mr. Wolff mentions how there are some other companies that even though they are doing the same they have a more specialised approach to certain industries. TaskLift has a knowledge of the market needs actually being quite generic, what the software offers is a schedule control report that can be filled out in the application and that is easy and fast to do it. This report generator is flexible to any customer needs no matter the industry they are in, another key differentiator is that the application works without having to be online, the software counts with a GPS location that can work offline and a timestamp that can help guarantee a secure and valid documentation.

Another example of a differentiation as a source of competitive advantage (Porter, 1980) - yet with a different approach to achieving this differentiated competitive advantage - is Magnetix. However, unlike TaskLift, their differentiation doesn't necessarily stem from a single product or service per se, but rather by the abundance of competencies that are at their disposal in-house. Due to the activities that Magnetix perform, the company's main approach towards its clients is through dialogue and at the same time they try to extend that communication pattern as much as possible. The goal is to create a connection between the company and its customers through a looped circle, creating a cycle, either through email flows, media campaigns, or other channels, Mr. Wagner mentioned. In these regards, Mr. Kauffmann will refer to it as the customer journey which endeavours to create the bond between the company and the client. Segmentation presents a difficulty for a company such as Magnetix, due to the services the company offers there is no really one industry where the company specializes, so the company can perform with any kind of industry that needs digital support for their business according to Mr. Sander. Even so, the company has set out to reach for large corporations in need for digital assistance. As for now, the company relies on a very privileged position due to the merge with ISOBAR, this implies the company can go international when it comes to taking projects, according to Mr. Sander. Magnetix has a

wide range of services that can offer to different types of clients, there are front and back end department offerings, creative social, and campaign offerings, which mainly depend on the customer's requirements. One of the latest and trending strategies in the company is being "Omni-channel" in broad terms this refers to have a presence everywhere, Mr. Kaufmann relates it to creating this customer relationship across all kind of platforms. The Omni-channel experience is created by the adaptation of new technologies

Due to the company having so wide offerings, and being a sort of mix between digital and media agency, the competition market range is equally wide. Some key differentiators within the company is the newest concept developed called "Omni-channel". Through this concept the company can create the customer experience among any kind of platforms and provide the desired customer relationship, subject upon which the 3 interviewees agreed on. Another essential differentiator is, the offering the company has in terms of data and the close relationship between executing the campaigns and reporting them to the clients, according to Mr. Wagner. The digital skill sets the company possess to make possible the customer journey is also a valuable asset, which has previously been mentioned by Mr. Kauffmann. As an overall of the competitive advantages within the company lies the ability to integrate all the services into one same goal, which in the end helps to add value to the service according to the interviewees. The way the company can tailor campaigns and efforts in accordance to what the customer requires and help them create this dialogue that the company praises on.

A third and final example of a differentiation strategy is the Andersen & Martini, which more specifically stems from information as a competitive advantage (Porter & Miller, 1985). Both Mr. Peter Hansen and Mr. Claus Hansen hinted on the fact that competition within the Danish automotive industry is intense, and few players in the industry have succeeded by positioning themselves as cost leaders. The automotive or vehicle industry is where the company performs. Mr. Peter Hansen explains how for a company like authorised dealership is difficult to segment the market since this segmentation task has been overtaken by the car manufacturers. What the company does instead, is to spot if these segments that have been previously established have been increasing or decreasing, but again these swifts depends mainly on how the manufacturers market the cars. Regarding their own

segmentation, they focus on clients considering private leasing since after exhaustive Danish automotive market research the company has figured out that's what the market wants. Mr. Claus Hansen's as a Workshop Manager, refers to the workshop segments where they work with small, private and corporate vehicles, also to all the people who has a driver's license, which means the company has a wide market to reach.

In this case, it is possible to appreciate the overall overview from Mr. Hansen's (CEO) perspective and Mr. Claus Hansen Workshop Manager. As a car dealership, the competitive market is in fact big and companies must go the extra mile to differentiate themselves, also due to manufacturers having a considerable role within the market preferences. Other issue Mr. Peter Hansen mentioned how even though Andersen & Martini is one of the most recognized car dealerships in Denmark sometimes customers refer to the company as the brand of the car they are looking to acquire. When it comes to used cars, the company's main competition is against private leasing and in this case Mr. Peter Hansen talks about the difficulties it opposes due to tax regulations and norms that have been set by the Danish government. In this scenario, the company has figured out a strategy that makes the deal as appealing as private leasing and together with the usage of data the company has being able to understand the customer needs and therefore, know when it is most likely that a customer will require buying a new car, in this way the company is always prepared to seal the deal. The kind of strategy followed on a workshop differs, but with the same data and the same knowledge extract from it, the workshop can be ready to take in cars that require any kind of repair or adjustment and meet customers' demands. As some key differentiators, Mr. Peter Hansen mentions the presence the company has online, the speed on how the company manages leads, having the right people dealing with leads and having the right structure has help them to be quick to react to this leads. Mr. Claus Hansen agrees with the website and presence the company has online, as well as the company ability to manage the use of data to oversee all the activities being performed within the company and the workshops.

4.2.2 Focused strategy

Among the companies that appeared to follow more of a focused strategy as a source of competitive advantage - based on their emphasis with only catering to a particular segment of customers (Porter, 1980) was WireDelta and SanderMap.

According to both, Mr. Dencker and Mr. Buemann from WireDelta, the foremost segment are customers that need to go online, clients who want to get started and might have simple requirements initially and the hope as mentioned before is to keep growing with them, help them expand their business and upgrade their websites. Clients that have a hard time to get online, get an app or a website, clients that need to get to the next step. Wiredelta targets small companies (SME's) as well as small companies, but there is no particular industry since they start from the fact that everyone goes online. The company does not limit its range to one kind of market or customer. Having this wide-open range of customers can be both a luxury and difficult since the segments are defined with the references the company builds.

Within the software development industries, there is a great amount of competitors, both interviewees agreed upon that the key elements that Wiredelta has to differentiate themselves is the AI (Chatbot) that has been mention previously. It is acknowledged that clients are always looking for an extra when it comes to software developer companies, what makes them special, what can the company do that other cannot? The Wiredelta team knows that the worst that can happen to a customer when trying to build a website is been left alone, but when customers use Wiredelta they have online support 24/7 because of the Chatbot. The AI the team of developers at Wiredelta have developed helps them assure to their customer and potential customers, that they will always be able to have an answer to their inquiries with the Chatbot and if for some reason this cannot provide one, then the technical support team will strive to answer within the next 24hrs. There are also some other technical but essential differentiators such as the add-ons the platform provides. When it comes to summarizing the competitive advantage of the company Mr. Dencker and Mr. Buemann have said without a doubt or any hesitation that the AI Chatbot targeted towards SMEs looking to build their digital presence is what makes them stay ahead of the curve.

Another example of a focused strategy is in terms of SanderMap, where both Mr. Sandeep Sander and David Sander implicitly discuss adopting a focused strategy as a source for a competitive advantage (Porter, 1980), based on the fact that SanderMap only targets HR professionals within large multinationals corporations, since they typically face the obstacle of moving from strategy to execution. However, segmentation of the market for a software developer company has proven to be tough, since there are a lot of competitors that offer a similar solution as well. Starting from this, how the company attempts to segment corporations is mainly done by looking at the customers' company profile, meaning that the company will strive to work with large international companies at first and then the small local companies. Mr. David Sander talks as well about how SanderMap is developed under a business to business (B2B) concept and mentions as well how SanderMap works with big corporations with +500 employees, where the vertical separation is such that the managers' knowledge about how their employees and other departments are doing is very limited. Mr. Sandeep Sander mentioned that segmenting the market in this way is the easiest due to what the software offers and targeting big corporations is also a matter of affordability. SanderMap in addition segments the market by countries and languages seeking to reach companies whose corporate language is mainly English. SanderMap targets individuals mainly through business schools. The reason why SanderMap has divided the market into individuals and corporations is because, with larger corporations the company can offer tailored solutions into their specific profiles and requirements, as for individuals the offer is as well tailored solutions but categorized by industry. Therefore, Mr. Sandeep Sander is certain that the most important decision makers for the SanderMap solution software are the Senior Executives, so the company strives to target Senior Executives together with CEOs, CFOs of different corporations, making the upper segment more appealing for SanderMap. Therefore, the company's main strategy for is to attract a few large corporations that have a major impact in other organizations.

4.2.3 Summary of competitive advantages among companies

In summary, the paper finds that the source of competitive advantages among service companies are often related to one of two strategies: Differentiation or Focused strategy. As mentioned however, it is also possible to explore these two strategies on a more granular level, which would reveal that sources of e.g. differentiation vary significantly. For example,

TaskLift's source of a differentiated competitive advantage proved to be in their actual product, which no other vendor could seem to copy. For Magnetix and Andersen & Martini however, the services they provide are pretty much the same among other digital agencies and car dealerships, respectively. For Magnetix, the differentiated competitive advantage was based on their extensive range of competencies in-house, which enabled them to carry out large projects under one roof, rather than having to outsource different parts to various other specialised bureaus. For Andersen & Martini, their competitive advantage arguably stems from their detailed knowledge and information spanning from workshop performances to customer satisfaction. Such granular measurements allowed them to quickly follow on any internal or external deficiencies a lot better than any other car dealerships. These various granularities embedded within the competitive strategies are arguably not discussed in the initial thoughts of Porter (1980) arguably, although Porter & Miller (1985) do touch upon this when discussing information and knowledge as a source of competitive advantage, which was mentioned in the theoretical chapter.

4.3 Usage of Big Data in companies

"[...] A word of caution when it comes to Big Data - particularly in the definition of it because I think Big Data is just becoming data, and it is not really becoming 'big' anymore because everything is just huge". (K. Wagner, Magnetix, personal communication, 17-07-2017)

The usage of Big Data appeared rather varied when exploring this based on the framework adopted from the theoretical discussion. More specifically, the data management and analytical processes in relation to Big Data among the case companies were different to a great extent. One reason for that could be, as hinted in the theory, that the understanding of Big Data varies significantly from company to company.

For Mr. Wagner at Magnetix for example, Big Data is a contested subject and he defines it relating to 2 main components, the first one is the amount of data and the second is the depth of the data, point out the what he thinks are the elements that differ data from Big Data. Under his perception there are not small sets of data, but Big Data definitely has the

focus on creating and understanding many different kinds of data sources. “It seems that Big Data is just becoming data and it is not really becoming big anymore because everything is just huge” (K. Wagner. Personal communication, 2017). For Mr. Sandeep Sander at SanderMap, the term of Big Data is the data that the company has directly and the Big Data that the company uses from other sources, for example in this case SanderMap works with leading universities like INSEAD and Harvard and together they develop algorithm that are bases to some extent in the usage of Big Data. Another example that showcases the difference of Big Data usage is at TaskLift, in which Big Data concept as perceived by Mr. Wolff is the ability to gather the available data on a subject, all the available data and afterwards have the capability to process it. It is not only the amount of data, but it is the ratio between the amount of data that can be collected by an individual or a company, and the amount of data that can actually be analysed

4.3.1 Data Management

In terms of Data Management, the first step of the sub-process is the acquisition of data (source), which overall appears to be rather limited across the various case companies.

For SanderMap, it appears that they have rather limited activities related to the Data Management sub-processes. On a more granular level, SanderMap does have activities with acquisition and recording of data, in terms of data collected from APIs of various social media platforms. That said however, the actual “cleaning” and parsing of this unstructured data into more tabular formats that are ready for analysis, appears to be rather lacking. In terms of the Analytics sub-processes, there is a certain degree of analysis and modelling of data, mostly in terms of data gathered from a user, which is in turn used for particularly predictive analytics - e.g. how likely a user/employee of a company is to churn.

In the case of TaskLift it appeared that they were not acquiring or recording Big Data, the activities related to the extraction, cleaning, annotation, integration, aggregation, or representation, are all obsolete. However, Mr. Wolff does stress that TaskLift is working towards becoming a more data-driven organization, which is reflected on internal projects such as software application, and setting up a back-end system that can extract data on users, moving forward

At Magnetix, it was particularly the integration, aggregation and representation of the data utilized, which seemed to take up most of Mr. Wagner's and Mr. Kauffmann's work flow. In the case of Mr. Jacob Sander, albeit he personally did not think that he was working with Big Data, he appeared to focus on the two former sub-processes of Data Management, namely "Acquisition & Recording", as well as "Extraction, Cleaning and Annotation". In terms of the Analytics sub-process of Big Data processes, Magnetix appears to more invested in this sub-process rather than the actual Data Management of it. The reason for this, as hinted by all three interviewees, is that there is a lack of resources to facilitate these processes. More specifically, there are potentially a limited number of individuals at the company capable of actually performing these Data Management activities. Furthermore, these individuals - located within the IT department of Magnetix - already have a hectic daily schedule that would impede them from performing these activities. This in turn implies that the organizational resources devoted to the Data Management activities are also limited, since there does not appear to be any significant executive mandate within Magnetix as an organization, to support this.

Andersen & Martini has several activities related to the Data Management sub-processes. More specifically, Andersen & Martini are able to use the workshop data to see how the different locations are performing, as well as how to enhance the customer experience more proactively. That said however, it does not appear that any activities related to the "cleaning" and parsing of more unstructured data into tabular formats that are ready for analysis.

Regarding WlreDelta, in terms of developing new websites and applications for clients, they not only acquire and record data to their storages; they also build it up from scratch, as they scale up businesses and help them acquire data from e.g. visitors to sites. Furthermore, the Chatbot that the team is building, which according to Mr. Dencker will be able to respond to simple questions and answers, is also an interesting and more novel approach to collecting customer/visitor data. That said however, they did not appear to dedicate a significant portion of their time on extracting, cleaning and annotating data gathered. Similarly, there is also very limited activity related to the integration, aggregation, and representation of data, which constitutes the final element of the Data Management sub-process.

4.3.2 Analytics

Regarding the analytical sub-processes of Big Data, the case companies appeared to be more conscious compared to the Data Management sub-processes. This was reflected, among other things, by the explicit statements among both managers and specialists regarding how they were able to both model the data at their disposal, and subsequently communicate the insights from this to other individuals within their respective organization.

One example of this was at Magnetix, in which the data analytical processes seemed to be a more central part of the day-to-day activities, since both Mr. Wagner and Mr. Kauffmann from the Media & Optimization department, as well as Mr. Jacob Sander from Strategy & Innovation, appear to be doing modelling and analysis of data-sets, as well as interpreting the results of this. From the resource-based view, these activities are also supported to a larger extent than Data Management activities. For one, there are considerably more individuals at Magnetix who are capable of performing these activities. Hence, the human resources are quite substantial. Additionally, there are several different physical resources at the disposal of all three interviews, more specifically through various software and cloud-based solutions, which enable both Mr. Wagner, Mr. Kauffmann, and Mr. Jacob Sander to perform the necessary Analytics activities more efficiently. Finally, the organizational resources were also appeared more evident for Analytics-related activities, in the sense that both the managers of the Media & Optimization and Strategy & Innovation departments would be keener on supporting their subordinates to excel further in their Analytics-related activities.

At WireDelta, there appears to be significantly more related activities. More specifically, a large extent of the analysis performed at WireDelta is based on data from e.g. Google Analytics, wherein they track the visitor behaviour of both client websites, as well as their own. Additionally, Mr. Dencker stresses that the company also processes a vast amount of textual data, a highly unstructured source of data. Hence, this requires a more sophisticated computational brainpower, since interpreting such data types is significantly more complex for a computer relative to e.g. tabular/structured data. Despite working with these data types however, both Mr. Dencker and Buemann are adamant about that the fact that WireDelta does not truly work with Big Data. Although, as mentioned, WireDelta as an organization

appear to have the human, physical, and organizational resources at their disposal to accommodate any of these mentioned Analytics sub-processes, they seem to fall short from particularly adaptive capabilities needed to fully exploit the potential of Big Data for the years to come.

Another example related to the usage of data within SanderMap is related to how the company attempts to predict the future within the labour market, do some forecasting, among predictive analytics which seeks to pinpoint which employees are more likely to leave a company. The company mainly uses text data which is firstly gathered from companies who deliver data from their employees as well as through Application Programme Interfaces (API's) that the company has with some social media platforms.

Andersen & Martini also seem to have several activities related to modeling and interpretation, which makes up the Analytical sub-process (source). This is particularly reflected on the extensive reporting dashboards displayed by Mr. Claus Hansen, which has been developed to be used in-house. These dashboards give a real-time overview of the performance of the different warehouses, as well as the customer satisfaction. Using this, analysts such as Mr. Claus Hansen himself are able to quickly distill the insights they need based on their clearly defined KPIs, which can then be communicated straight away to his superiors, if any data anomalies should arise.

In the case of TaskLift however, because they arguably do not use Big Data, the modelling, analysis and interpretation are also non-existent. That said, Mr. Wolff does mention that TaskLift has activities in place that does perform analytics, albeit on a smaller scale, which in that sense doesn't classify as Big Data.

4.3.3 Summary of Big Data usage

In summary, it appears that the analytical sub-process among the various case companies are rather established, although the data management process is lacking. More specifically, the acquisition process seemed non-existent for almost all companies except WireDelta, where Mr. Dencker could outline a more detailed description of how they go about collecting

their data. However, there are also some companies that still lack an overall process for using Big Data. Such was the case for TaskLift, which struggles to work with Big Data since through Mr Wolff perception the company is not that close to work with Big Data yet. There are several areas where the company intends to work with Big Data as soon as possible, one of the areas where the company expects to be working with Big Data soon is, online marketing, this activity is relatively new in the company but there is a realization that to perform as desire there is the need to collect data, to further analyse it and get the information that is really needed for the business.

Additionally, the cleaning and integration processes regarding data management also seemed rather weak, which arguably makes sense since they are dependent on the acquisition of the data in the first place. If data is not consistently acquired from the organization, the integration of this data will also prove incredibly complex (source), there could also be some factors related to the lack of resources to help support these processes, which will discussed in further detail in relation to the resource-based view.

4.4 Big Data from a Resource-Based View

“AI is not going to take over jobs, it is going to create new jobs, and I know what does jobs are going to be for my people” (M. Dencker, Wiredelta, personal communication, 06-06-2017)

In terms of this interplay between the Big Data processes and the resources & capabilities utilized by the companies, the paper will firstly attempt to examine the interplay between the resource-based view elements - i.e. Human (talent), Physical (technology), and Organizational (tradition) resources outlined, as well as the Dynamic and Adaptive capabilities within a Big Data context. In other words, the elements established from the theoretical framework regarding the talent, technology, tradition, and capabilities of the company will be explored based on the the different case companies.

4.4.1 Talent

At TaskLift, the human resources were a highly significant resource type for the organization, which Mr. Wolff reflects in terms of the developers employed there. Mr. Wolff even makes the case that the developers as human resources are the most important resource that TaskList has. Hence, One of the strongest suits of the company is the human talent the company possess. The staff of developers is surprising since they are able to program tasks that are above the normal level of a company the size of TaskLift, according to Mr. Wolff, this is one of the main resources the company counts with. Aside the fact the app has been developed in-house and the great team behind its development is what has been giving TaskLift the lift it needs to go off to the market.

Regarding Magnetix, the organization as a whole seems to have the human resources to support such a competitive advantage, given the wide range of talents available at Magnetix; from developers to designers. The people within the company seems to be an essential resource/asset according to the interviewees. People and their skills are what makes the company able to achieve the goals create and sustain a competitive advantage. The company is very good at making the employees feeling part of the company, part of a team, part of something bigger, having unique personnel with different kind of skills that can work together for the same purpose is one of the biggest resources of the company.

Andersen & Martini as an organization seem to have the human resources in place to sustaining this competitive advantage, given the different positions among employees that holistically cater to this competitive advantage. Furthermore, Mr. Claus Hansen also talks about the challenges the company has to deal with and what he has taken as a personal challenge, to get all the employees in the same track, improve the facilitation of a learning environment within the company so in the future, the company can keep integration and have a better workflow. Mr. Claus Hansen also talks about the challenges the company has to deal with and what he has taken as a personal challenge, to get all the employees in the same track, improve the facilitation of a learning environment within the company so in the future, the company can keep integration and have a better workflow. Changes are constant as with any other industry and for the automotive it seems that the future is going to be shifting towards a more online business performance. Andersen & Martini is quite advanced

on this matter, Mr. Claus Hansen talks about how even though the industry changes cars will always need to be repaired so the change towards the online business might not be in this area but instead focus on the customer's life cycle, alluding to the way the company might be buying and selling cars online. Mr. Peter Hansen has a similar perspective on this matter, he can see how the future is not going to be car showrooms disappearing completely, since there will always be a need from the customer to see, feel even maybe try a car before making the decision of buying.

The importance of talent was also emphasized by Mr. Buemann, a significant resource that helps WireDelta achieve their competitive advantage in the first place are the human resources in the organization. More specifically, the development of the AI is to a large degree based on the ideas of their employees. Furthermore, WireDelta do big efforts regarding human resources to create an atmosphere that is appealing for employees to go and work. The importance of diversity and engagement were also some other key resources. Mr. Dencker can well concur on this, he has expressed on the importance of retaining talent as well as being able to scout new talent and not only being able to develop but to build up a team. Having a strong management team, networking and lead developers are key for the building of this AI. Information sharing and accessibility is something that the company does as well, there is a huge library with all processes descriptions, wikis, information etc. that anyone in the organization can access. There is always this effort to put all the knowledge on paper or online so everyone can access it and update it. As part of being a people based company Wiredelta recognizes on the importance to make sure that everyone in the organization no matter their position or place of work to make them feel part of the same organization. They recognize the challenge this opposes due to factors such as culture and mentality, but there is always this constant effort to make everyone feel part of Wiredelta no matter what in trying to create loyalty towards the company

At SanderMap, neither of the two interviewees have a technical background, leaving the responsibility of the actual development of their competitive advantage at the hands of their developers, who are based in India. Furthermore, although these developers have more technical competencies, their primary strengths are within web development, whereas algorithms and machine learning requires competencies within particularly statistics. As

mentioned, the technical competencies that SanderMap as an organization possess today could benefit from further learning with especially statistics and other object-oriented programming languages such as Python and R, which could harness the potential of Big Data, and thus better sustain their competitive advantage significantly.

4.4.2 Technology

According to Mr. Wolff, TaskLift has all the tools needed, and right now there is no big need in databases servers or storage since the company is just starting to collect data from the users. Regarding the perception of Mr. Wolff, Tasklift's lack of resources is mainly due to the company being on an initial phase and there was a lack of vision on what might be the resources that the company needed in order to perform. There was not enough consultancy to other experts or people with other skill sets to think about the need of possible resources for the solution. From a Big Data perspective though, the physical resources appear lacking, since they as an organization has no software or other relevant tools, which can help them process Big Data, either in relation to Data Management or the Analytics sub-processes.

At Magnetix,, according to different departments these resources are better developed or have a bigger impact than others. Magnetix appears to have substantial physical resources at their disposal, that enables them to steer towards this digital versatility direction. More specifically, this ranges from the cloud-based and software tools mentioned before for more efficient analysis, to extensive SaaS designer solutions that help the UX departments translate the ideas and visions of companies into something more tangible.

Additionally, Andersen & Martini also has substantial physical resources at their disposal, that enables them to sustain their competitive advantage - most notably in terms of the key performance indicator dashboards, which they have built themselves. All the various resources at Andersen & Martini work in conjunction with technology, technological tools in the company are used for activities such as; planning, forecasting, understanding the customer's lifecycle and of course gathering of data. According to Mr. Claus Hansen data is the biggest resources they have and as mentioned before the key is to collect the data, to create Key Performance Indicators (KPI), that have as a intention to understanding clients and in the future create trend lines. As for a workshop Mr. Claus Hansen reckons there might

be an increase on customers' expectations with quality and time, and here is where he believes data will come in useful in order to predict what customer needs will be in the future. There might be the need for managers and employees to acquire new skills regarding clients satisfaction and approaching them, since most likely the industries big swift towards a more online business performance is far away from happening.

The resources at WireDelta that are important towards the development of their competitive advantages are the physical resources. Wiredelta relies upon Google applications developed by Google to create accessibility for everyone. Another internal tool the company uses is called ASANA, a management tool that allows them the employees and management to have a better overview of the tasks that are being worked on as well as the responsible ones for them. At last one of the most useful tools is Google Analytics. This software is the whole foundation of the AI by processing words it helps analyse sentences and find the needed keywords that have to be found in the databases for replies. The databases for the AI and Google Analytics is something that is in its initial phase and Wiredelta is working on the structure on how best set it up to work with the analysis of the users flow and the optimization of the website and AI.

SanderMap has decided to outsource it so the company does not own any databases, servers, etc. Mr. Sandeep Sander stresses how this works perfectly for the company since they have everything the company is in need for, and there is no ambition of owning anything more. The algorithms as physical resources are in turn what enables SanderMap to tailor their services to meet any needs of clients, regardless of size and industry. From a resource-based point of view, however, there is possibly a significant potential for further improvement. Furthermore, the physical resources, are also rather limited in terms of the actual tools and devices used to sustain their competitive advantage.

4.4.3 Tradition

At TaskLift, there appear to be room for improvement. More specifically, as hinted by Mr. Wolff, there appears to be some political squabbles that prevents the organization to be focused, and also disrupts the culture of the company. In terms of the organizational structure and resources of the company, there is a problem caused by the holding company

of TaskLift which gives them a step back. The holding company is dealing with many industries and a lot of different companies under their responsibility and what makes it a bigger problem is that this is the first time they are dealing with a service company, which creates a big gap between the holding company and TaskLift. Mr. Wolff has mention how the company has access to external resources that can help give a better understanding and turn to what are Tasklifts main needs as a company. He realizes that most important activity is understanding what customers need and are expecting from a company like TaskLift. The growth of the company in the past years has been fast which has led to a bit of unstructured but there is the belief that in the future the company will be able to structure itself and create a turnaround strategy that will support TaskLift's growth.

The company has a lot of work ahead of them, improving the facilitation of a learning environment for employees. To centre the efforts in the needs of the company, for Mr. Wolff that would be selling and the need of more specialized jobs within the company to support its growth. There are so many things that the company wants to do in a future but Mr. Wolff talks about how structure would be essential before any other big change comes along. There is still a long way to go for the company to be able to put to work together their resources in order to sustain a competitive advantage in terms of structure. Mr. Wolff talks about working with synergy and how the company has what it takes to achieve its futures goals and how it is just a matter of attracting the correct funding and people.

At Magnetix, the organizational resources can be exemplified through the numerous partnerships that have been established with some of the world's biggest SaaS and cloud-based marketing vendors, such as Google and Oracle. This closer cooperation gives Magnetix the opportunity to create an extensive suite of different solutions, so that they have a higher chance of saying "yes" to any requests or inquiries from clients. Overall, the company appears to have a solid organizational culture and structure, communication as well as dialogue, which is defined as the key elements on which the company bases their strategies, making communication within the company easy and simple. According to the interviewees the company has a great learning environment, there are always seminars, conferences that teach the employees and clients how the company work and the company drives the employees to learn more and go over the line of duty to keep learning. For a digital company with a growth rate as Magnetix change is a fact, due to the merge with

ISOBAR there might be some organizational or structural changes that will require the company efforts to keep having a harmonious work culture. The three interviewees have reached among the same conclusion on how the industry and probably their jobs will be needing to change in the future. Some of the changes at Magnetix are going to be related to the Omni-channel culture will help or make the company integrate other technologies, newer technologies that will be needing a lot of data, but key will be the extracting of that data as well.

The organizational resources at Andersen & Martini can be exemplified through the emphasis and determination of both Mr. Peter Hansen and Claus Hansen to make Andersen & Martini have highly data-driven organization, with employees that are willing to learn more in order to better exploit the opportunities associated with Big Data moving forward. Putting together the resources requires a well-planned strategy from the company, Mr. Claus Hansen acknowledges that the structure the organization possesses has been important to improve communication between managers of the different branches with the CEO and COO. Communication is vital for a company the size of Andersen & Martini, specially having branches all around the country, for example, whilst creating strategy is crucial that all branches know the overall goal and can adapt the strategies to their own market, departments and customers. Planning, strategy and other activities should not vary from top management and local management, there is only room adjustments and so far, the company has been capable of doing that. Finally, the organizational resources can be exemplified through the emphasis and determination of both Mr. Peter Hansen and Claus Hansen to make Andersen & Martini have highly data-driven organization, with employees that are willing to learn more in order to better exploit the opportunities associated with Big Data moving forward.

At WireDelta, the tradition of their organization comes down to the attempt to create a culture that appeals and motivates employees to do their best. Hence, the organizational resources are to a large degree present at WireDelta as an organization, given the significant mandates from both the CEO and CTO to create a culture that facilitates a desire to learn and work with sophisticated technology (more specifically AI), which in turn appears to be a major driver towards establishing and sustaining differentiation as a competitive advantage.

Additionally Mr. Buemann talks about the importance to continue with the engagement of employees to ensure that employees do not sense any kind of threat from automated processes, but more that they see it as help. “The more technical you become the more you can work with AI” (A. Buemann, Wiredelta, personal communication, 06-06-2017), technical capabilities, knowing limitations, adaptability skills (capabilities), technical skills and acquiring in general capabilities are key elements to keep growing in the industry. “In the end, everything is centred around people” (A. Buemann, Wiredelta, personal communication, 06-06-2017)

The organizational resources at SanderMap do seem to be relatively more present than the two previous resource types. This is possibly reflected in especially Mr. Sandeep Sander’s emphasis on “lifelong learning”, and how crucial a part of their culture it is to be eager and dedicated to continually learn and develop one’s skills and competencies. Additionally, SanderMap has a very well established work culture, they have 4 essential documents regarding everything there is to know and should be known of the company such as; the overall strategy, business plans, budget and forecast, together with a Corporate Manual, templates and a website that is accessible for everyone in the company. These resources together with the mentioned previously have contribute to SanderMap being a working environment facilitator. In regards of this, Mr. David Sander comments on the trade-off between expert and knowledge, the real time learning and how SanderMap cares the best practices and next practices for their clients.

4.4.4 Capabilities

In terms of capabilities, as hinted in relation to human resources, TaskLift enjoys strong technical capabilities, which ensures the features that in turn make up the competitive advantage of the organization. Looking at the dynamic capabilities, however, there is room for potential. One reason for this is the fact that TaskLift at the time of writing does not seem to have any concrete action plan for how to develop capabilities that can support any future Big Data efforts. Furthermore, the strategic direction of TaskLift also seems rather uncertain, which in turn makes it difficult to identify which areas should be a top priority moving forward, as well as what capabilities should be developed.

In terms of the two types of capabilities at Magnetix, there appears to be more dynamic capabilities than adaptive, based on the interviews with Mr. Wagner, Mr. Kauffmann, and Mr. Jacob Sander. While the latter did stress the importance of Magnetix acquiring more extensive analytical skills, it still proved difficult for him to assume what new capabilities would be vital in his department, 5 years down the line. Overall, none of the three participants seemed to have any explicit ideas for what new capabilities they would need to excel at in their current job functions, 5 years from now. Hence, a case can be made that the adaptive capabilities at Magnetix falls a bit short, given the employee's' limited awareness of how capabilities they would need to adapt to. Hence, there is going to be the need to adapt to the newest trends in technology and safety and privacy issues. Some of the processes are going to be automated and there is going to be an increase learning in Artificial Intelligence and Machine Learning. Machines will absolutely help with the automatization of some activities and probably take over activities that will not require much human talent, but the human talent will always be needed in order to understand these new technologies. There will definitely be a need to acquire new skills especially in a digital agency where probably some managerial jobs will disappear or need to be modify in terms of making them more digital. Learning to code would be one of the future skills in the industry, understanding analytics as well. But what will oppose a great challenge is to keep the ability of putting all the company's resources together in order to achieve their goals.

In terms of the capabilities at Andersen & Martini, there appears to be more dynamic capabilities than adaptive, based on the interviews with both Mr. Peter Hansen and Claus Hansen. While the latter did stress the importance of Andersen & Martini developing more analytical skills, it still proved difficult for him to assume what new capabilities would be vital within the workshop that he is in charge of. Overall, neither of the interviewees appear to have any exact notion or ideas for what new capabilities they would need to excel at in their current job functions, 5 years from now. Hence, a case can be made that the adaptive capabilities at Andersen & Martini probably falls a bit short, given the employee's' limited awareness of how capabilities they would need to adapt to.

WireDelta as an organization does appear to encompass the technical capabilities necessary to build and develop an AI chatbot. However, there is, also has room for further

potential and development, in terms of the dynamic capabilities related to their competitive advantage. In the other hand, being able to predict the exact skill-sets needed to be at the forefront of AI technology in the future, and thus sustain their competitive advantage, is incredibly complex, since the pace of technological innovation within the field seems exponential. Nevertheless, to successfully sustain their competitive advantage, WireDelta must leverage the various resources at their disposal (e.g. dedicated data-driven culture that encourages further learning with AI and other related technologies) and ensure that the capabilities among the employees are adapted swiftly to the rapid changes within AI technology.

The goal for Wiredelta is to keep growing within the next years, develop an amazing AI that will help the company create a bigger client portfolio. Build up integration with other tools that will provide the company with more data. Mr. Buemann seems to have the idea that AI will take the job to a more automated process and manual processes might be replaced. The most likely turn of events is not that there will be organizations with no people, but there are going to be organizations where people, employees do more customized activities, because there will always be activities that need to be done completely by humans. Mr. Dencker shares this sentiment, he knows that developing this AI might remove him as a developer at some point but he reckons that: “AI is not going to take over jobs, it is going to create new jobs, and I know what does jobs are going to be for my people” (M. Dencker, Wiredelta, personal communication, 06-06-2017). The need to develop new skills will be important, skills such as working efficiently, keep employees engaged even though they might feel threatened of being replaced by computers and as well have the ability to manage activities that were previously performed by employees and in the future, might be performed by computers.

In the case of SanderMap, a case can be made that they already have a relatively better outlook than other case companies interviewed. The major reason for this is Mr. Sandeep Sander’s adamant emphasis on lifelong learning, which could prove to be a significant enabler for developing new capabilities, which are needed to sustain their competitive advantage in the longer run. Change is constant and the next steps for SanderMap is to continue in developing their AI. Mr. Sandeep Sander believes that AI, Machine Learning and

technical inventions will continue to play an important role in the industry and most likely automatization will take a bigger part within the software development industry. This signifies there is going to be an increasing need in web security, safe protection of data and therefore, more employees. In Regards of the automatization for the future and data driven markets, there is a strong belief that the human factor within companies will not go away, humans are essential for innovation and the way Mr. Sandeep Sander sees the future is human driven instead of data driven. Mr. David Sander acknowledges that with automatization probably in a future his job as Project Manager will technically disappear, but he sees potential in learning new skills such as coding, acquisition on more technical skills that will help improve management, and will help to keep employees closer in the future.

4.5 Summary Big Data from a Resource Based View

First and foremost, the paper finds that there is a strong basis for a company to sustain it's competitive management through Big Data, by utilizing the relevant resources and capabilities that can support the various Big Data processes. However, having explored how these various elements of the different theoretical concepts are carried out by service companies in a more practical context, the paper finds several important "gaps", which should be addressed in order to sustain one's competitive advantage more effectively through Big Data. For example, a case can be made that the adaptive capability abilities of an organization, which in turn play a vital part of sustaining a competitive advantage, are directly linked with Big Data. In other words, if an organization is able not only to acquire and gather Big Data, but also extract the insights from the noise associated with it, the organization will have a strong foundation for developing their adaptive capabilities, since they will better know what the future holds for them. Furthermore, the absence of working with Big Data also leaves a more obscured picture of the market landscape that the organization operates in. This is the case of TaskLift, whose features that supposedly should give them a differentiated competitive advantage don't appear that valuable, given the limited influx of potential customers.

In order to better summarize the discussion above, the paper has identified four "global themes" that make up these "gaps" identified, and hence the major conclusive insights of this research (see figure 5.4), which will be elaborated further in the subsequent chapter. As mentioned briefly in the methodology, throughout the various interviews the researcher has

gathered “codes”, which are essentially snippets of some of the major points that were mentioned among the different interviewees. These codes were in turn combined into basic themes, which in turn formed “organized” themes, and finally the global themes.

Table 2. Code Framework (Grace Galindo, 2017)

Codes	Basic Theme	Organizing theme	Global theme
Gender	Customers	Acquiring Data	Adaptive Capabilities to support data acquisition
Age			
Needs that need to be covered			
Niche that wants to be reached			
Time spent on website	Sessions		
Navigation on the website			
Purchase has been completed			
Data provided by clients	Organisations/Companies		
Data provided by governmental Institutions			
Social Media			
Mail flows			
Campaigns	Development	Adaptive Capabilities	
Market and customers needs			
Value of data			
Forsee the future	Human Resource	Talent	
Human capabilities will always be needed			
Right collection of data			
Work together with technology	In-house	Data Processes	Lack of Talent for Data Management Processes
Noisy data			
Insights gathering			
Fit to companies objectives	Lack of Support		
Need for more technical jobs			
Especialization/ Expertise			
Developemnt of new technologies	Software	Technology	
Hadoop Big Data tool			
Asana project management tool			
Tableau Visualisation tool	Hardware	Tech Savvy Managers	
Computers			
Servers	Goals	Management	
Growth			
Productivity	Change		
Continous motivation			
Innovative advances			
Radical innovations	Improvement	Continous improvement	
Lack of data understanding			
Programming	Iteration		
Learning data technology			
Refinement of data-related skills	Engagement	Dynamic capabilities	Emphasis on LifeLong Learning
Motivation			
Fulfillment	Competencies		
Skillset			
Aptitude	Rapidly evolving markets	Need for learning	
Customer needs			
Rapid data growth	Technological advancements		
AI technology			

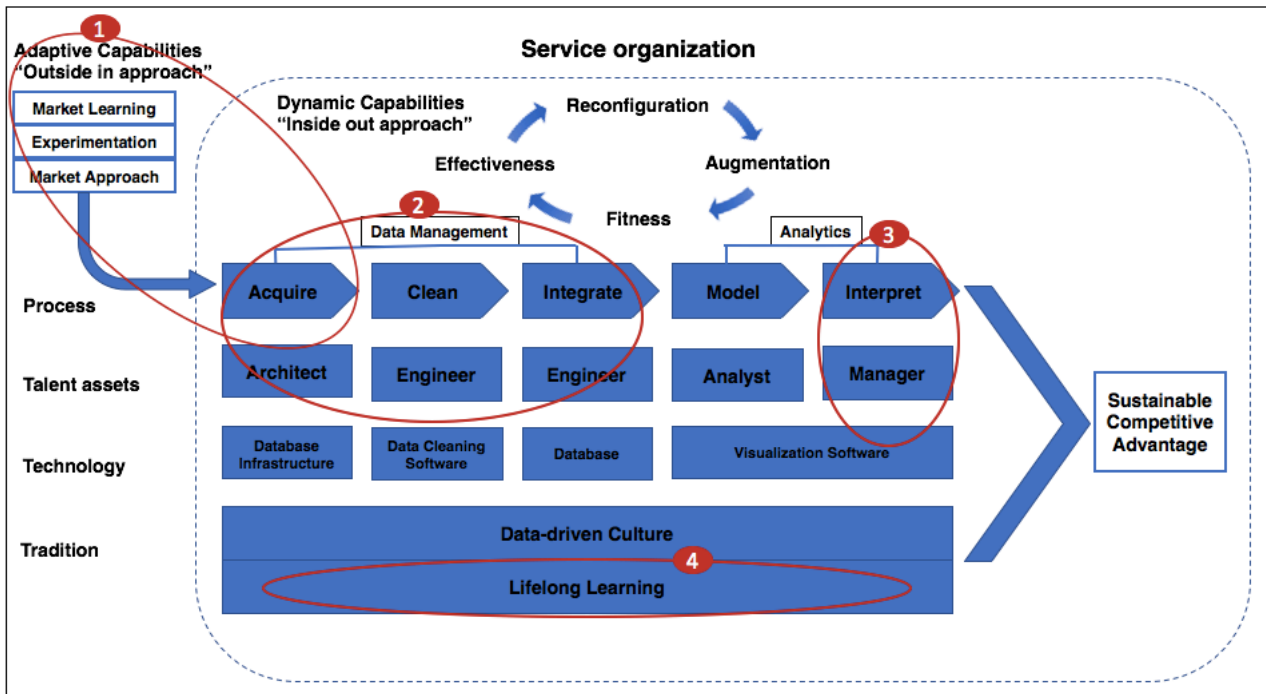
5. Conclusion

The final chapter of this paper will outline the conclusion of the study. Firstly, the research question is addressed, based on the results of the various interviews conducted of the case companies. More specifically, the paper answers the research question through the resource-based view, by offering actionable insights in terms of human (Talent), physical (Technology), and organizational (Tradition) resources, as well as the organizational capabilities. Secondly, the paper will make a case for the main contributions in relation to the literature associated with the Competitive Advantage. Finally, the limitations of the study are addressed, and ideas for further research are subsequently presented.

5.1 Overview of the Study and Answer to Research Question

This paper has explored how service companies can use Big Data to sustain their competitive advantage from a resource based view. In order to answer the research question, firstly, the theoretical foundation allowed for the paper to break down these three concepts; Big Data, Competitive Advantage and Resource Based View into elements, which in turn provided a better picture of how they can be seen in relation to each other. With this theoretical framework in place, the paper subsequently utilized this as a basis for gathering empirical data. Through the analytical discussion that aimed at consolidating the data in relation to the theoretical framework developed, the paper will now present four actionable insights related to the gaps identified from the analytical discussion which effectively enables service companies to sustain their Competitive Advantage using Big Data.

Figure 6. Results from empirical and analytical discussion, pointing out gaps within the resources, capabilities and organisation to sustain a competitive advantage.



Sources: Ryoo, J. (2016). Big data jobs are out there - are you ready? Day, G. S. (2014). An outside-in approach to resource-based theories. *Journal of the Academy of Marketing Science* and Poulson Barton, (2016), Become a data scientist. Merged and Adapted by Grace Galindo (2017)

1. Adaptive capabilities to support data acquisition is important

Based on the empirical data, this paper found that virtually all case companies in the study had a weak relation between their adaptive capabilities in terms of market sensing, and the data acquisition. More specifically, in order for a service organization to sustain their competitive advantage, it becomes crucial that the data acquired is from relevant areas of the market landscape. In this way, data acquisition comes from a “spray and pray” to a more focused approach. As addressed by G. Day & Moorman (2010) in the theory, most companies still have an inside-out approach where they only evaluate the capabilities that should be developed based on the resource at their disposal. The problem with the latter approach is that service organizations will also collect “noisy” data, which turns out to be irrelevant for subsequent analysis, and will thus have to be “cleaned” away regardless. In

order to attend to this issues is imperative that companies have a vigilant market learning, dare to do market experimentations and lastly swift to an open marketing approach (G. Day, 2013). Magnetix was perhaps the service organization that was most conscious about this, as they e.g. already had established partnerships that would help them be more attuned to the dynamics of their market space. Having this more focused approach to acquiring data based on the three adaptive capabilities outlined will provide more valuable data, which appears to be a significant gap among the service organizations interviewed. This actionable insight is supported by Claus Hansen stating that:

“The most important thing is to predict future customer behaviour and market changes, this is done most effectively by analysing trends from collecting large quantities of data - the skill is to select the right KPI's and understand the results” (C. Hansen, Andersen & Martini personal communication, 2017)

2. Lack of talent for data management process can be a major challenge

The importance towards a better data management has been defined by Labrindis & Jagadish (2012), where they stress the importance of integration, aggregation and representation of the data to assure it's trustworthiness. However, it lacks to mention the importance of human talent in order to process this data. Given how conventional belief at the time of writing appears to be that technology will replace human jobs in the years to come, the human resources might at first glance seem irrelevant for organizations to consider. Based on the empirical data however, there seemed to be a clear consensus among all interviewees, regardless of size, industry or degree internationalization, that the human employees, i.e. talents, are crucial to sustaining their competitive advantage, let alone establish it. This is particularly relevant for the data management process, given how few service companies appeared to have talents that were able to acquire data on a Big Data scale. There is this palpable need for organizations to establish more efficient process to convert the amounts of data into actionable insights (Gandomi & Haidar, 2014). This paper has found that, while it might be true that particularly automation through technological advances will force some to retire early or look for opportunities elsewhere, the technological landscape is maybe not at a level where human beings are completely obsolete. The developments within AI for example, will still require dedicated data scientists that can sustain the trajectory. A case can be made that there might actually be a deficit of such job

positions in the future! Hence, talent that can support the data management process will be a bare necessity for an organization with the ambition of using Big Data, in order to sustain their competitive advantage. Mr. Peter Hansen agrees with these mentioned in an email correspondence sent to him, stating that:

"I find your 4 main findings/conclusions important and relevant for Andersen & Martini. I agree that technology alone does not do the job. We also need competent people who can analyse "big data" ... and we need to turn data into solutions that can increased sales and add more value to our customers. We look forward to your final paper and will make use of it". (Mr. Peter Hansen. CEO, Andersen & Martini, personal communication, 2017)

3. Tech savvy managers are part of the future success

In extension to the importance of talent mentioned just above, it is also becoming increasingly important for service organizations to have managers that are capable of interpreting data more concisely. This entails managers not only being able to understand the visualised data presented to them by the analysts, but also knowing how the data was processed to provide the insights. Additionally, the holistic overview of managers combined with a more technological understanding provides managers with the benefit of asking more relevant and concise questions to the analysts, who in turn are able to go back to their data modelling with a clearer objective, this relates to what has been expressed by Gronroos, (1988) referring to the broad understanding of human resources in the company. Having tech savvy managers can contribute to strength the employee-manager relationship and therefore, having a clearer vision to what need to be done. Furthermore, it would also enable the managers to communicate directly with the engineers and architects of the service organization, would give managers the opportunity to optimise the Data Management and Analytics sub-processes, and thereby the entire Big Data process of their organization.

4. Emphasis on lifelong learning is essential in a dynamic business world with change and transformation

The resource based view perspective points out the importance of an organization to be organized in such ways to exploit the potential of its resources and capabilities (Barney & Hesterly, 2012). As well, how the constant and rapid change in business environment has

opposed a great threat for companies to sustain a competitive advantage. A prominent emphasis in terms of organizational resources, i.e. tradition, among all interviewees was the importance of a culture that fosters the desired learning behaviour among their employees. Virtually all case companies mentioned the fact that a data-driven culture was critical on their path to utilizing Big Data, which also seemed to be a specific goal that the interviewed service companies wanted to achieve within the foreseeable future. However, very few of these service companies in turn seemed explicit regarding the importance of this continuous process of learning, i.e. lifelong learning. In other words, it is paramount that employees are constantly motivated to acquire more knowledge and skills related to Big Data, regardless of their role as either engineer, architect, analysts, or managers. While there were no objections to instil lifelong learning in their respective organization, it would plausibly appear that few are aware of how to actually go about implement such a cultural aspect. Mr. Sandeep Sander agrees to these observations in an email sent to him, stating that:

"I agree to all your 4 points. Very interesting and relevant for SanderMap, and our clients"
(Mr. Sandeep Sander, CEO, SanderMap, Switzerland. Personal communication, 2017)

5.2 Contribution

This paper was mostly dedicated to widening our understanding in relation to the competitive advantage, more specifically in terms of how it can be further developed through the utilization of Big Data. That said however, a case can be made that the study has also provided some useful contributions to the resource-based view and Big Data, since the paper aimed to understand how all three concepts can be seen in relation to each other. For example, the operationalization of Big Data into the two sub-processes, namely Data Management and Analytics (Labrinidis & Jagadish, 2012), has given a novel approach on how these processes can be perceived, in terms of the resources and capabilities at the organization's disposal. In other words, reading this study will hopefully give the reader a clearer understanding of what is required to perform these sub-processes, in terms of both human, physical, and organizational resources, but also by challenging the reader to consider what capabilities are required. The latter is particularly prominent, since the empirical data has shown how most organizations are actually far from able to exploit

opportunities associated with Big Data, because few if any employees encompass the necessary skillsets to work with Big Data in a meaningful way.

5.3 Limitations

Several factors limited the research of this thesis, which are important to recognize. Firstly, the thesis research only included five case companies in total, all of which had their headquarters in not only Denmark, but Copenhagen as well. Hence, the data findings from the empirical data collecting arguably are too weak to make the claim that these findings would accurately reflect the majority of organizations around the globe, let alone in Denmark - a case could be made that companies headquartered in Jylland alone (Grundfos, Danfoss, Lego, etc.) exploit Big Data differently from a resource-based perspective. Additionally, the case companies in the study were all SME's which entails that larger organisations possibly use their resources and capabilities in a different way. Addressing these shortcomings would have been to have a significantly higher number of companies included in the research, as well as ensuring that these samples were appropriately diversified, so that the findings would better cover Danish organizations to begin with as well as for various sizes.

For simplification purposes, the thesis chose to operationalize the three concepts down into only few elements per concept, and subsequently only these elements among the concepts as a whole. Although adopting such a view might help to understand rather complex issues in a simpler way, it arguably also limits the extensive reality of both Big Data, the resource-based view, as well as competitive advantages to a significant extent. For example, the paper chooses to view Big Data as only two sub-processes consisting of two to three activities each. Although such an operationalization makes it easier to understand Big Data within a more practical context, it potentially also neglects the more technical aspects of the concept, which in turn are important to consider if one is to gain a more comprehensive understanding of Big Data. Another example is in relation to resource-based view: since the operationalization of the concept was based on the interpretation of the paper's researcher, who in turn constructed her understanding from within the context of Big Data. Hence, the notion of what resource-based view entails for others will differ significantly if they were exploring the concept from another context such as product marketing. One way to address

such a shortcoming could have been a more extensive literature review of the three theoretical concepts, as well as the gathering of qualitative data from notable experts within each concept, in order to get a more detailed operationalization. This more in-depth approach would have revealed more elements that constitute the theoretical concepts, which in turn could have revealed other interesting insights as to how organizations could exploit Big Data, and hence sustain their competitive advantage.

5.4 Further Research

Further research is needed in the newest technologies involving the usage of Big Data such as Artificial Intelligence and Machine Learning as well as the proper analytical tools to extract the desired insights of data according to companies' objectives and industries. George S. Day agrees with these remarks in an email correspondence sent to him, stating that:

"I agree with your observations about the value of advances in AI, data analytics etc. although we don't have too many successful applications as yet." (G. Day, personal communication, 2017).

The research should address for instance how companies need to develop adaptive capabilities in regard to what the customer is expecting. The concept of predicting the future should also be addressed in future research, due to the constant and fast change in technologies and therefore client's expectations. Research on Big Data should also consider that the term is becoming more mundane every day and trying to define what makes data big is not as easy as it might seem. The understanding of companies and people regarding data is subjected to their own goals, the way they collect data and what they needed to use it for, which in academic terms it is not the correct way to determine if the data being used can be defined properly as Big Data. As the findings from the present research show, resources within the company, especially human resources, are essential to put into action the data that is being collected, so further research is required regarding the efforts that should be made in terms of resources for full and in depth application of data for competitive advantages.

6. References & Appendix

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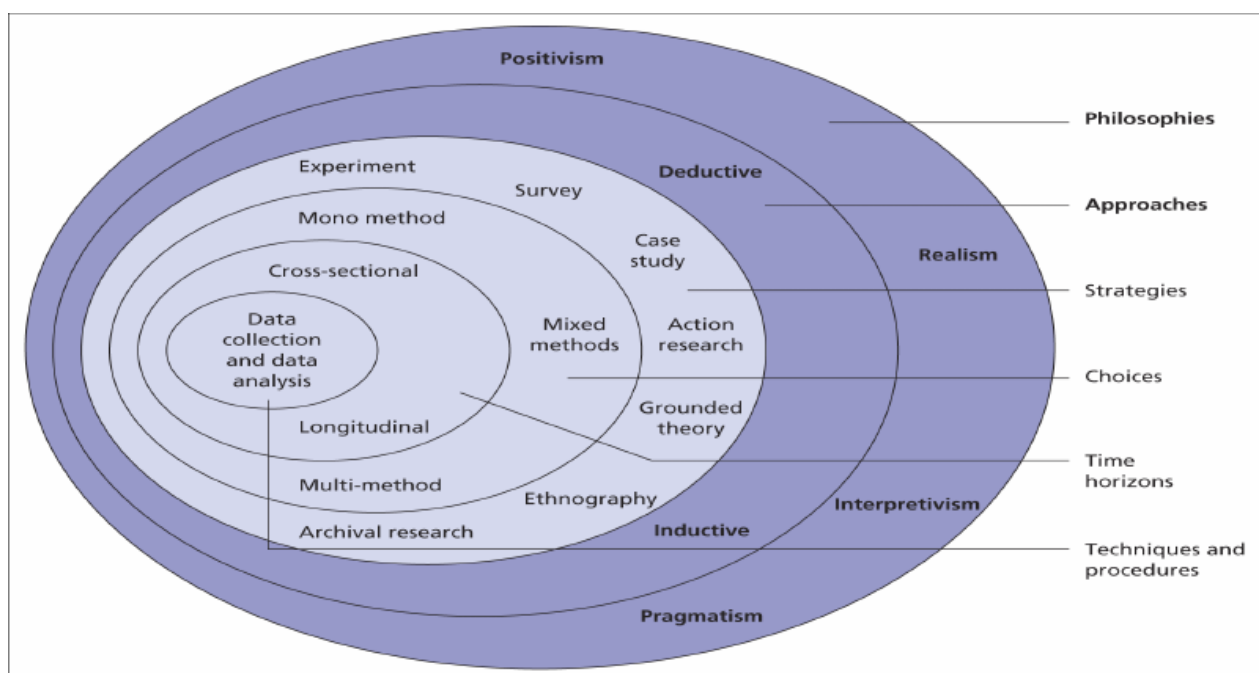
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6.2 Appendix

6.2.1 Research Onion



Source: Saunders, M., Lewis P. and Thornhill, A. (2008) Research methods for business students. Pearson Education.

6.2.2 Semi-structured interview.

Title: Big Data within Service Organization: Developing and Executing a Competitive Advantage- A Resource Based Perspective

Thanks for contributing with this qualitative research on Big Data, and taking the time to read this interview and allowing me an hour of your time to talk about this subject. It is highly appreciated

Apart from the introduction the interview is divided in 3 sections: your thoughts on Big Data, the firm's current competitive advantage and the use of resources at your disposal that help sustain it.

Research Question:

- **From a resource-based perspective, how can service industries use Big Data to develop to sustain their competitive advantage?**

1. INTRODUCTION

- Please start by telling a bit about yourself and your background, and expand on what work you do.

2. BIG DATA

- How would you define Big Data?
- Based on your definition, would you say that your organization uses Big Data?
- What type(s) of data do you work with?

3. COMPETITIVE ADVANTAGE

- Can you briefly describe in what industry your company is involved in, and how you segment your market?
- Are there any particular segments of what you described, which you target particularly?
 - Why? (optional)
- What are some of the key differentiators that make you stand out from competitors?
- How would you position your company and top 3 competitors on a value/price dimension?
- To summarize all this, what in your opinion, is your competitive advantage as a company?

4. RESOURCE BASED VIEW

- Can you elaborate on what resources you have, that make it possible to achieve this CA?
- Human Resources - what would you say are your most important resources, and which ones would you say lack?
 - E.g. information, management, decision-making, personnel, analytical skills, and business expertise
- Physical Resources - which of these resources do you have, what would you say are your most important ones, and which ones would you say lack?
 - E.g. IT capabilities; databases, infrastructure, storage capacity, technology, networks and softwares.
- Organizational Resources - which of these resources do you have, what would you say are your most important resources, and which ones would you say lack?
 - E.g.: Organizational learning, culture, structure, planning, strategy, integration and execution
- Dynamic Capabilities & Adaptive Capabilities:
 - Does your workplace facilitate a learning environment? (i.e. through courses or meetups?)
- How do you think your particular work will change over the next 5 years?
 - Will you need to acquire new skills to meet these changes?

- Does your company have the ability to put together the resources?