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Big Data in the Telecom Industry

A Study of How Big Data Affects Innovativeness and Market Dynamics

Abstract:

Companies and authorities have captured huge amounts of information for decades. But during recent years the amounts of accessible and analyzable data have exploded, giving rise to the term Big data. Big data has in many ways changed how companies look at their market, evaluate their business and analyze their customers, but to this date there are no comprehensive studies of its effects. This thesis aims to obtain an understanding of the phenomenon and analyze what effects Big data has on innovativeness and market dynamics. The research is conducted through a case study of the Swedish telecom market, together with theory and literature studies. With basis in ten in-depth interviews, this thesis concludes that Big data works as a powerful representational practice, which significantly affects the dynamics of the studied market. Furthermore, the findings suggest that Big data has a considerable impact on innovativeness and innovation processes within all three studied companies.

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1. Introduction

1.1 Problem

Companies and authorities have captured huge amounts of information for decades. But with the dispersion of the internet, together with the decreasing prices of computational power and digital storage, the amounts of data have exploded during recent years. These torrents of data are today flowing in every part of the global economy, giving different market actors huge amounts of valuable information (Science, 2011). Companies, for example, are now able to capture trillions of bytes of information about their customers, suppliers, and operations with the help of millions of networked sensors that are embedded in the physical world in devices such as computers, mobile phones, industrial machines and automobiles, sensing, creating, and communicating data every second of the day (Manyika et al, 2011). A significant share of the data is produced by individuals as a by-product of other activities. This kind of data, often referred to as "exhaust-data", originates from our usage of social media sites, smartphones and computers. By just going about our day, shopping, communicating, sharing, searching and browsing, we contribute to the pool of data without even reflecting upon it (Manyika et al, 2011).

The above-described phenomenon has given rise to the term Big data. Big data refers to datasets that are so large that typical database software are not able to either capture, aggregate, store or analyze them. The definition is intentionally subjective since it can vary significantly from different economies and sectors. It is also constantly changing due to the fact that when technology advances, the capability of software programs increases (Manyika et al, 2011). Since more and more individuals use smartphones, social media and other internet-based activities the growth of data is likely to continue in the future, pushing the upper limit of Big data further.

In recent times, the phenomenon has started conflicts, fuelled debates and caused deep suspicion within large groups of people around the world that see the data flood, and especially the analyzing of it, as an intrusion to their privacy. However, there is strong evidence that Big data can play an important economic role for many market actors, not only for companies but also for authorities and not at least for individuals. Some recent examples of how Big data is used today give us a picture of how different market actors can use this kind of information. Google, the global company that probably has access to the world's largest pool of data, uses their information creatively.

By analyzing their users' self-corrections they have developed well-functioning spelling programs. Furthermore, they have also created driverless cars that operate on Big data information. Another company that uses Big data to a large extent is the e-commerce site Amazon. By analyzing their customers' previous purchases they have developed a system to recommend them new products. This has proven highly profitable and today about 35 percent of Amazon's revenues come from product recommendations. But as mentioned above, Big data do not only provide new possibilities for private commerce. For example, Obama won the election 2012 by analyzing aggregated information about the 13 million voters that supported him in the 2008 election and by feeding computers with medical information compiled from Big data, computers can assist doctors in their work and, as many believe, also play an important role for medical diagnostics in the future (Nordström, 2014).

With other words there is no doubt that with the right tools and analyses, Big data is able to identify statistical patterns that can be used to predict behaviors and processes in a large variety of sectors. But except of the privacy issue, critics have recently raised the question about two other dangers connected to the usage of Big Data. First of all, there is a risk that the people using this kind of information neglect to consider that some patterns identified by Big data may lack causality (Nordström, 2014). Two incidents that seem to have a connection may as well depend on a third incident, and by neglecting this fact there is a great risk of drawing the wrong conclusions. Secondly, Big data is by definition based on historical patterns. By analyzing previous purchases, behaviors and communication there might be a risk of getting stuck in the past and hence neglect present and future trends. Primarily due to these two reasons, despite the fact that Big data in many cases already has been able to show its value and usability when it comes to productivity, innovativeness, growth and profits, many argue that an overconfidence in Big data may be dangerous in a societal perspective (Nordström, 2014).

1.2 Purpose and Research Question

As stated in the introduction, Big data is part of a new future in which almost everything people do on their digital devices is collected and analyzed by different actors. The enormous amounts of data will probably change the way we live in the future, and one question that many actors ask themselves is how Big data will contribute to the forthcoming. With that said, this thesis will try to investigate how Big data affects innovativeness and market dynamics. In general, collected data only represent previous occurrences; the same goes for Big data. Therefore, using large amounts of data do not add any new information about the future, something that might result in a more preservative and less dynamic market. There are several different techniques for analyzing sales, customer behaviors and other parameters for increased sales. However, the question is whether relying on old statistics and figures is beneficial from a creative perspective. In order to investigate this question, one has to understand how organizations use Big data in their daily processes and what sort of values it creates for different actors. Another aspect is to investigate the internal challenges that organizations meet, which may vary depending on the type of market. The privacy issue with Big data being collected all around the world is also an aspect that has to be taken into consideration. However, the main question of this thesis will be the following:

Since Big data by definition reflects historical patterns, how has an increasing reliance on it affected innovativeness and market dynamics?

1.3 Delimitations

In order to conduct this study certain delimitations were necessary. Firstly, the study has been delimited to one specific industry, the Swedish telecom market. Within this industry, three key categories of companies were chosen; a producing company, an operator and a content provider. There are of course other actors within this industry that could have been studied, but these three were chosen since they could be argued to be of highest relevance for this market. This limitation was necessary given that this thesis strives to achieve depth rather than width. Within each respective company, three to four people were chosen for in-depth interviews, a necessary limitation due to the time aspect.

Big data is today a huge phenomenon that affects different parts of a company and many processes within it. Studying more than one such part or process simply would not, due to the scope of this thesis, allow the thorough depth of analysis that this study strives to produce. Due to this, this thesis mainly focuses on how the use of Big data affects innovation and market dynamics.

1.4 Expected Contributions

The main expected contribution of this thesis is to increase and deepen the understanding of Big data and the usage of this kind of information in different organizations. With a focus on innovativeness and market dynamics, this thesis aims to both thoroughly describe how a number of chosen Swedish organizations work with Big data today, but also how the usage of Big data will affect the innovativeness of these organizations in the future. As a result, this study strives to be able to provide an indication of how Big data will affect market dynamics in large, and innovation processes and innovativeness for companies in general. Since Big data is a relatively new phenomenon and since the discussions about this topic tend to be centered on privacy issues, few academic studies have been conducted on the question this thesis focus on. In other words, a gap has been identified within today's research about Big data that provides a possibility to add to current knowledge in this field. Furthermore, the authors hope to be able to provide organizations with insights and implications of how to work with data of this kind in order for innovativeness to prosper.

1.5 Disposition

This thesis is structured with the help of a number of different chapters. The following chapter presents the reviewed literature and chapter three summarizes the theories applied. Chapter four describes the method used to conduct this study while chapter five presents the results achieved from it. Chapter six includes the analysis of these results and the last chapter, chapter seven, presents the conclusions and strategic implications together with suggestions of further research. For definitions of key words in this thesis, see appendix one.

2. Literature Review

In this chapter, previous studies and research findings within the area of interest are presented. The literature review starts by examining the definition of Big data, since there are differing opinions about what actually constitute Big data. Thereafter, the section continues by explaining and summarizing recent studies within the field of Big data and with support in such review, the section ends in acknowledging a gap in the literature.

Since Big data is quite a new subject, the research done within the area is limited. For this reason, a large part of the literature review below is based on Manyika et al (2011), which is one of the foremost reports within the subject at the moment.

2.1 The Struggle of Finding Common Ground

In "Big Data: The next frontier for innovation, competition, and productivity", a report by Manyika et al (2011) at the McKinsey Global Institute (MGI), the definition of Big data is explained as problematic since it by its nature is both subjective and moving. As Manyika et al (2011) defines it, Big data is datasets whose size is beyond the ability of what typical database software tools can capture, store, manage, and analyze. Since technology, and thus the capacity of the engaged software, can vary between countries, industries and companies this definition is highly subjective. As they describe, it is also moving since one can assume that technology will continue to advance in the future, pushing the limits of how large datasets software can handle, and consequently the size of datasets that qualify as big data will increase. With this said, one can never define Big data in terms of being larger than a certain amount of terabytes, for example. As it is today, Big data can range from a few dozens to many thousands of terabytes. These unclear boundaries have given rise to a confusion of what Big data really is, and this has resulted in the circulation of many differing definitions and ideas. However, this thesis will use the definition mentioned in this text and in chapter one.

2.2 Big Data as a Factor of Production

As many studies suggest, all point to an exponential growth of the amounts of data generated, stored and consumed in the years ahead (Lyman and Varian 2011, Bohn et al 2009, Bohn et al 2010, Hilbert and López 2011 and Gantz et al 2008). As it already is by now, both companies and consumers generate so much information that it is physically

impossible to store it all. What more is, Big data has today reached every sector in the global economy (Davenport, 2013). For most of these sectors, Big data has become crucial for economic activity and this kind of data today plays an equally important part for many organizations as other essential factors of production, such as hard assets and human capital.

As Manyika et al (2011) describes it, in the near future the highest potential to create value through the use of Big data will be in the most developed countries since they have access to the most advanced technology, and today therefore have a higher per capita data intensity. However, if looking in a longer perspective, with the right conditions there are great opportunities for the usage of Big data also in developing economies. No matter the region, the possibilities of Big data continue to evolve rapidly. With help from the advancement of technologies and analytical capabilities of software, in combination with the evolution of understanding among the people handling this kind of data, Big data will according to Manyika et al (2011) probably strengthen its position as an essential factor of production within many industries.

2.3 Big Data as a Value Creator

The report by Manyika et al (2011) shows on five specific values that Big data creates in organizations. The first value is based on the principle of letting data become more transparent. When doing so, the data becomes more accessible to those it is relevant for and creates a mutual understanding between consumers and companies (Ericsson Consumer Insight, 2013). Secondly, Big data enables experimentation that helps to discover needs within companies. These needs can be anything from diversity among employees to improved performance. Thirdly, Big data creates new possibilities when it comes to segmentation. When segmenting, one benefits from using detailed data, since that create more accurate results. Therefore the third value added from Big data is improved segmentation, which affects how companies customize actions towards large populations. The fourth value added from Big data is the automated systems that are created when having more information about how things work and handle. Today it is easier to replace human decision making with automated algorithms, something that was not possible before. Lastly, Big data enables companies to innovate and create new products and services in a way that previously was not possible, according to Manyika et al (2011).

2.4 Big Data as a Basis of Competition and Growth

According to estimates by Manyika et al (2011), a retailer that successfully uses Big data has the potential to increase its operating margin by more than 60 percent, suggesting that Big data is becoming a key factor for companies to grow, compete in their market and outperform their competitors. Aside of retailers, Manyika et al (2011) has observed many examples of how firms within other industries, such as financial services and insurances, use Big data to capture market share from competing firms. As Brynjolfsson et. al (2011) explain, there is growing evidence of how leading users of Big data capture more value at the expense of laggards across many different sectors. Therefore, despite the time and resources it requires, developing Big data capabilities should be seen as a long term strategy to achieve a competitive advantage (Manyika et al, 2011).

In addition to the shifts in value Big data may cause within industries, Big data will also generate completely new growth opportunities and sources of value (Manyika et al, 2011). For example, new categories of companies, such as those that capture and analyze industry data, have evolved as a result of the growing importance of this kind of data.

2.5 Big Data as a Source of Productivity and Consumer Surplus

In the report by Manyika et al (2011), there is evidence that Big data gives rise to opportunities with the potential to improve efficiency and effectiveness within companies in five studied sectors; US healthcare, US retail, Europe public sector administration, Global personal location data and Manufacturing. This will enable firms to produce higher-quality products and services to their customers at a lower cost, and is made possible since companies for example can leverage data to design products that better fit customer needs.

But the use of Big data does not only create productivity growth within firms, it is also beneficial for customers, consumers and citizens who in many ways are able to capture a large share of the economic surplus that Big data enables (Davenport, 2013). Examples of this are improved healthcare, higher-quality goods, better fit between products and consumer needs, as well as lower prices due to price transparency.

2.6 The Difference in Big Data Related Gains across Sectors

Not all sectors are positioned for greater gains when using Big data. According to Manyika et al (2011), some sectors such as Construction and Educational services have lower potential and historically less growth when using Big data. However, there are plenty of sectors that are positioned for greater gains when using Big data, some of these sectors are Computer and electronic products and Information. The report concludes that sectors which use computers and handle a lot of information in a large extent, are more likely to benefit from Big data, and that there are sectors that have the possibility to harvest a great amount of value in the future. An example of that is the health sector (Ericsson Consumer Insight, 2013). Due to monetary constraints and old technology, the health sector has not the possibility to yield the benefits of Big data at the moment, but probably will in the future, when the sector is further developed.

2.7 The Shortage of Necessary Talent

A threat for companies wanting to capture value from Big data is the shortage of necessary talent, particularly of people with deep knowledge in statistics and data analysis (Davenport, 2012). Manyika et al (2011) projects that the demand for such employees will far exceed the supply in the future when Big data has become an even more essential part of most businesses. Since this type of talent is difficult to produce and requires years of training, Manyika et al (2011) fears that this will be a global problem within some years from now. To remedy this shortage of talent, they suggests that companies in the United States, and in other economies that face the same problem, have to retrain a large share of the talent they possess, and in a long-term perspective it will probably be necessary for governments and universities to change the graduate requirements for certain educations.

2.8 Main Issues of Big Data

As Manyika et al (2011) explains, the growing use of Big data will evoke an increasing importance of a set of policy issues concerning privacy, security, liabilities and intellectual property. As the value of Big data becomes more apparent even to customers, the question of privacy is becoming bigger (Steen and Ström, 2011). The problem with this is that the categories of records that offer the largest human benefits are also the categories

that the consumers view as the most sensitive. An example of this is personal data, such as health and financial records.

Another issue is, as mentioned above, concerning data security and how sensitive data should be protected. With the rise of Big data, it will be essential to address these security issues through technological and policy tools to make sure that personal consumer information, confidential corporate data and even national security secrets do not end up in the wrong hands. Furthermore, legal issues about the intellectual property rights attached to data have to be addressed due to the unique characteristics of data compared to physical assets. The questions that have to be answered are for example who owns the rights to what data and in which ways this data can be used. Related to this is also the question of liability and who should be held responsible when the wrong use of data leads to negative consequences.

Aside from the policy issues, there are a lot of other factors that affect the potential of Big data. Technology, for example, plays a significant role. It is to a high degree the level of maturity of technologies (e.g. storage and analytical software) and techniques (i.e. new types of analyses) within a company that decides how much value can be created from Big data. Low technological power, incompatible standards and outdated formats often prevent the integration and analyze of data, resulting in lower gains.

Another aspect that is important to look upon, is how organizational managers and leaders often lack knowledge about Big data and how the value of it should be realized. As described in a section above, this could be a competitive disadvantage in many sectors. Companies thus should focus on creating talent that can derive insights and value from Big data and also structure workflows and incentives in a way that optimizes the use of Big data (Davenport, 2013). In a marketing perspective, it is important that executives prepare to meet the accelerating demand of relevant marketing, interaction and customized experiences from consumers. Areas in which the right use of Big data can be of great value (Dahlström and Edelman, 2013).

The access to data also plays a crucial role. To enable significant value creation, firms need to integrate data from multiple sources. This meaning that it often is not enough with the data that the company possesses itself. Access to third-party data is

therefore of great importance. Sometimes, however, this data could be hard to get since economic incentives are not always aligned to encourage stakeholders to share data.

The last factor that Manyika et al (2011) lists as of great importance to this matter is the industry structure. Sectors with a relatively low competitive intensity, such as the public sector, and sectors with a high concentration of profit pools, as for example US health care, are unlikely to capture the full potential of Big data. This is due to the fact that these industries often have limitations to their efficiency and productivity in different ways. Organizational leaders and policy makers will with the increasing importance of Big data have to consider how to restructure in order to optimize the capturing of the benefits that Big data can create.

2.9 Summary of Literature Review

As a result of the review of previous studies and findings within the area of Big data, the authors have become increasingly aware of the fact that this is a very new area of research. Thus, there are to this date no studies that can present a fully comprehensive picture of Big data. Therefore the presented literature above should be seen as a snapshot of what Big data is today and a beginning to an understanding of the subject, a subject that most probably will continue to evolve in a rapid pace the coming years.

With support in the studying of previous research, the authors have found one area, among many others, that still remain understudied. The area that caught the authors' interest is how Big data and the use of it will affect innovativeness and innovation processes within different companies. Some of the research presented above has touched this question but only on a rather shallow level. This thesis will try to go further into this subject and analyze the thesis question through the literature review and the theoretical framework presented in the following chapter.

3. Theory

In this chapter, the theories that are relevant for this thesis, and especially for the analysis, will be presented and described. The theories used will be divided into two separate parts, the first discussing theories related to marketing representation and the second one discussing theories related to innovativeness and innovation processes. In order to be able to answer the thesis question about how Big data affects innovation and market dynamics, one must first have an understanding of Big data as a phenomenon and how it works. This is explained through the market practices theories presented below. In order to understand Big data's influence on innovativeness, theories within technological innovation and external information will be applied.

3.1 Market Practices Theories

There are many theories that provide understanding of markets as a phenomenon, however very few analytical efforts have been made in combining market theories and practices. There are several different approaches to market practices, one approach concerns performativity which Callon (1998) brings up, suggesting that ideas about markets, and also marketing tools, take part in shaping markets. However, Callon viewed performativity and market practices from an economic sociology and sociology point of view, leaving the marketing perspective out. Therefore other researchers, such as Kjellberg and Helgesson (2007) decided to investigate market practices from a reflective perspective, having marketing as the academic discipline.

3.1.1 A Threefold Conceptualization of Market Practices

In the work by Kjellberg and Helgesson (2007), the authors draw parallels between the ideas behind the English landscape garden and the view of markets that was shaped during the same period from the writing of classical economists such as Adam Smith (Gill, 1967). They argue that markets are constructed and shaped by concrete activities just as these gardens, but these attempts are most often hidden by their natural appearances that makes us view the markets, and the mentioned gardens, as unshaped and unconstructed. But this comparison also shows us how the shaping of markets is very dependent on ideas. Ideas affect both what marketers and gardeners do, and also how their work is evaluated since these ideas influence the norms in society to a high

degree. Furthermore, landscape gardens, one of the most visual renderings of English home estates, illustrate the importance of re-presentation within markets, which also is based on ideas.

With the above as a basis, the authors go on by introducing a conceptual model of markets as being shaped by practices, in an attempt to explain the practical shaping of markets rather than studying markets as readymade. The model presents markets as the ongoing outcome of three different practices that are connected to one another by what the authors call translations. The three practices are; *exchange practices, normalizing practices and representational practices.*

Exchange practices refer to concrete activities related to the completion of individual economic exchanges. This includes all distinctive activities related to a specific economic exchange, i.e. specifying and presenting products, negotiation of prices and terms of delivery etc (see Håkansson, 1982; Prus, 1989a, 1989b; Sherry, 1990). There are also other more general activities that contribute to shape individual exchanges, i.e. advertising, organizing distribution of goods and comparative product testing. Referring back to the English garden, exchange practices corresponds to the activities directly related to cultivating a garden.

Representational practices include activities that depict the market and how it works by measuring and producing market images. These activities explain the market and give directions for actors on how to operate in it, and include for example analyses and statistics. The role of these activities brings us back to the issue of performativity and how these re-presentations contribute to shape the phenomena they depict (Latour, 1986; Osborne and Rose, 1999).

Normalizing practices contribute to establish norms, rules and guidelines for how a market should work. That is, they refer to the establishment of normative objectives (Brunsson and Olsen, 1997; Czarniawska-Joerges, 1988) and they reflect the observation that different actors try to influence markets in a certain direction. However, markets most often are not shaped or formed precisely in the intended way, but the objectives and the effectuated attempts are still important (Bauman, 1992; Czarniawska, 2003). In terms of specific activities, normalizing practices includes legislation, rules, industry standards etc. It is important not to forget voluntary standards, which could be either

official or private, since these have a great impact on markets (Brunsson and Jacobsson, 2000).

The authors suggest that this threefold conceptualization of market practices should be seen as an instructive tool when addressing issues concerning the practical realization of markets, and not be viewed as a description of ready-made markets. Therefore the practices themselves are not only of importance, but also the way they are interlinked with each other. Using the English garden metaphor once again, the transformation of garden paintings into garden designs represent the interlinks within practices. These gardens will later on develop into rolling hills and sparkling ponds, showing how gardening over time affects norms and representations of gardens. These reproductions or transformations of different phenomena are defined as *translations* (Callon, 1986). In general, a translation represents the basic social process through which an idea, a rule, a text, a technology or a claim spreads across time and space. If no one is there to meet up with the above-mentioned, there is no translation.

Altogether there are six types of translations that connect the three different practices to each other. These links, or translations, are central in the process through which market practices shape markets, since they cause the object that is mediated, as for example an idea, a product or a technology, to change. By describing these six translations the authors seek to explain how the three market practices impact each other.

As previously explained, normalizing practices set rules that define what the market is and how it should work. This affects representational practices since what is depicted depends on the definition of the market. In this way, normalizing practices gives representational practices measures and methods of measurement. Normalizing practices influence exchange practices by providing exchange practices with rules and tools for handling the exchanges.

Representational practices depict and describe the market. These descriptions impact normalizing practices since the institutions that set guidelines, rules and standards can get affected by them. Descriptions of the same market could be made in different ways, depending on the depicter's incentives and interpretation of the market. Representational practices also impact the exchange practices by measuring it and providing it with results and feedback.

Exchange practices provide representational practices with data and measurements, which can be described and depicted. The provided measurements clearly impact representational practices in this way. Exchange practices influence normalizing practices through lobbying. Various actors in exchange practices have different interests when it comes to how the market should work and they can lobby these to normalizing practices in order to achieve favorable market rules and tools.

3.1.2 Markets as Configurations

According to Storbacka and Nenonen (2011) markets can be viewed as configurations of market actors engaging in market practices, where the authors refer to the above-mentioned practices described by Kjellberg and Helgesson (2007). Market configurations are dynamic as new actors enter the setting and as actors introduce new content and ideas to the defined market network. This results in greater co-creation opportunities within the networks, due to increased marketness and configurational fit.

Each market actor has a mental model and a business model. The mental model represents the actor's deeply ingrained assumptions, generalizations and images that influence the actor's actions and understanding of the world. The business model defines the resources that a market actor possesses and the ways that actor can interact with other market actors and their resources. If one actor wants to affect the market network, one should use the mental models and business models in order to change the network setting. An actor's clout is dependent on the actor's size, network position and strength of the business model. This meaning that the most powerful actors within a network have the greatest opportunities to shape their markets and create favorable conditions for their business, these actors are defined as focal actors. Therefore, as a marketer you cannot be passive but must continuously develop the business model, and by imposing its mental model on the other actors, a powerful focal actor can make it the shared model of the whole market configuration.

Furthermore, Storbacka and Nenonen (2011) suggest that there are specific focal actor capabilities that improve the actor's ability to influence market configurations. They find four capabilities that are divided into; value sensing, measuring market configurations, price formation and market scripting. Value sensing describes the ability to generate a deeper understanding of the value creation potential in a selected market

configuration. Measuring market configurations stands for the ability to create and utilize good measurements of value creation. Price formation represents the understanding for the process by which the price for an exchange item is determined. Lastly, market scripting describes a single actor's ability to use activities to alter the current market configuration in favor of its own objectives.

3.1.3 Concertation and the Shaping of Trends

According to Rinallo and Golfetto (2006) trends within a market are shaped by focal actors through collective action and powerful representational practices. While Kjellberg and Helgesson (2007) acknowledge the role of performativity in the shaping of markets, Rinallo and Golfetto take a greater account to the actors in the market that specifically intend to shape the market. By collectively deciding on activities to proceed with in the coming future, which will have the effect of moving economic events along their desired path, large actors shape the coming trends in industries. This is referred to as the "concertation" mechanism, which is interpreted as a set of normative and representational practices that not only shape trends but also make markets. Rinallo and Golfetto thereby suggest that the relationship between market representations and actual markets in a postmodern world is reversed: it is the market that adjusts to representations and not vice versa. In this article, Rinallo and Golfetto use the clothing industry to illustrate this phenomenon, but the concertation that they describe can very well be used in other industries.

3.1.4 Sensemaking of Markets

With the starting-point in the commercial music industry and the Billboard music chart, Anand and Peterson (2000) outline another key mechanism through which markets, and more specifically fields within a market, are shaped. They suggest that in competitive markets, the market can be described as a magnet around which different actors assemble and that the understanding of this market is spread to the actors through the creation, distribution and interpretation of information about the market. In this way they argue that market information plays a significant role in the shaping of markets in many different ways. Firstly, market information provides a common focus of attention that serves to gather disparate actors into a common market, or a field within a market, giving the group of actors structure and connections. When a field or market then is

shaped, shared information continues to provide increased cognition of the market for its actors and can also trigger the formation of new niches and fields within a market, shaping the market and causing it to evolve.

3.1.5 Summary of Market Practices Theories

In all of the theories presented above, one finds market dynamics as the common denominator. In order to fully understand the market and what influences it, all of the theories add different values that are highly relevant for the analysis in this thesis. Firstly, the conceptualization of market practices is presented, in order to create an understanding of how different actions within a market affect one another. Secondly, market configurations are discussed, which explain focal actors and the way market actors can look upon their mental and business model, and how to understand and influence the environment with them. Thirdly, the concept of concertation is explained, which emphasizes the influence certain market actors can have on an entire industry. Lastly, the concept of sensemaking is defined, which gives an enhanced perspective of how the spread of information contributes to shaping a market.

3.2 Innovation Theories

There are many different theories concerning innovation, the three most common perspectives on innovation are; innovation in technology, innovation in processes and diffusion of innovations.

The technological perspective overlooks the development of new products, while the process perspective focuses on understanding innovation over time. Diffusion of innovations seeks to explain the rate in which new ideas and technological solutions develop. Not only does it focus on the rate itself but also on how and why solutions are developed at a certain rate. This thesis will however focus on the technological perspective of innovations, as a result of the market that is being studied and the fact that certain delimitations had to be done in this thesis.

3.2.1 The Structure of Invention

According to Schumpeter, technological change is divided into three phases: invention, innovation and diffusion (Arthur, 2007). Invention consists of the creation of new

technologies, while innovation is the actual commercial introduction of the new technology, and diffusion is the spreading of the new innovation. The process of invention has a logical common structure, which either is linking the need or purpose for something with the effect to satisfy it. For example, it could start with the need or purpose for new methods, since existing ones are not satisfactory. This is defined as seeking for a new principle, in which an idea to do something takes place in action. The process of invention can also start off with a phenomenon or effect itself. An example of that would be the creation of the x-ray, which from the beginning had no purpose to help people in medical need.

3.2.2 The Value of External Information

Outside sources of knowledge and information often play a significant role in the innovation process within an organization (Brock, 1975) and as March and Simon (1958) put it, most innovations at an organizational level result from borrowing from external parts rather than pure invention. As a clarification, outside knowledge could be both information from outside the company, but also information originating from other internal units within the firm, outside the formal innovating unit, as for example marketing or production units (Mansfield, 1968).

According to Cohen and Levinthal (1990) a firm's ability to recognize the value of new external information, collect it and assimilate it to later apply it to commercial ends is critical to a firm's innovative capabilities. This capability is referred to as a firm's absorptive capacity and is as the authors suggest a function of different factors, such as the firm's level of previous related knowledge and the diversity of expertise within the company. Why these factors are of specific importance to a firm's absorptive capacity is primarily because they confer an ability to recognize, evaluate and utilize outside knowledge, and in turn consequently give rise to innovative performance.

Aside from the two above-mentioned factors, Abernathy (1978) and Rosenberg (1982) have observed another factor that affects a firm's absorptive capacity. They argue that through direct involvement in production, a firm has a better ability to recognize and exploit new external information since manufacturing experience gives the firm a background that is necessary for the value recognition of new knowledge and the implementation of new methods and ideas.

3.2.3 Summary of Innovation Theories

The above-presented theories about innovation provide a good basis on which to evaluate the innovation aspect of the thesis question. The first theory about the structure of invention describes the different stages of invention and how innovation fits into this chain. The theory about the value of external information explains the importance of access to, and understanding of, information and data from outside the innovation units of companies. This theory also highlights different factors that are crucial for companies' ability to recognize and capitalize from such information.

3.3 The Theoretical Framework

Based on the theories above, the authors have created a theoretical framework that will work as an explaining tool for understanding how Big data affects innovativeness and market dynamics. The framework will be used in two ways. Firstly, analyze how Big data affects a market, through the market practices theories. Secondly, evaluate how Big data influences innovativeness and innovation processes. Each theory adds and explains specific situations, but together they add to the understanding of the thesis' main question, which is;

Since Big data by definition reflects historical patterns, how has an increasing reliance on it affected innovativeness and market dynamics?

4. Method

4.1 Research Design

In an attempt to contribute to fill one of the knowledge gaps identified within the area of Big data, a qualitative research study has been conducted. As the aim of this thesis is to gain deeper knowledge within this area and to thoroughly understand how the use of Big data affects innovations within organizations, a qualitative method is more suitable than a quantitative approach (Malhotra, 2004). Additionally, since the use of Big data is highly dependent on the context, such as organizational structure, the aim of the company and people engaged, our study requires contextual descriptions and insights of human behavior, something that a qualitative approach can provide in a much larger degree than a quantitative (Guba and Lincoln 1994).

One sort of qualitative study is the case study. According to Eisenhardt (1989), the aim of case studies is to provide description. Case studies are also claimed to be a suitable method in order to understand and interpret observations of a phenomenon (Merriam, 1994), just as this thesis aims to do. The choice of choosing a qualitative case study method is further supported by Yin (1994) that claims that if three different criteria are fulfilled a case study should be conducted. The first condition that has to be met is that the research question should answer *how* or *what*. Secondly, the research should focus on contemporary events and lastly, the researcher should not have control over behavioral events. Since our thesis meet all of these three conditions, a case study is suitable. Important to note, is that the case study previously has been criticized for being too specific and not a suitable basis for scientific generalization (Yin, 1994). However, this is a view that has been reassessed by researchers such as Weick (1979), and learning from a particular case should, according to Dubois and Gadde (2002) be considered a strength rather than a weakness since they, in line with Merriam (1994), claim that the interaction between a phenomenon and its context is best understood through in-depth case studies.

To increase the accuracy and strength of the conclusions, multiple sources of data have been used, in an attempt to apply methodological triangulation (Yin, 1994, Denzin, 1971). Apart from theory and literature review a number of in-depth interviews were conducted. This method was chosen since these kinds of interviews have a greater potential to reveal better and deeper insights than for example focus groups (Malhotra,

2004). Furthermore, in cases where one whish to gain a deep understanding of complicated behavior or processes by interviewing professionals, in-depth interviews are a suitable primary source of information, and not only a method to gain initial understanding (Malhotra, 2004).

4.2 Theory Selection

As support to the in-depth interviews, theory and literature have been revised. Theory in particular plays a significant role in establishing a base for analyzing and interpreting data and findings collected in the interviews. In this thesis an abductive approach referred to as systematic combining, suggested by Dubois and Gadde (2002), has been applied. They claim that case studies enable an intertwined process that offers opportunities that cannot be achieved by a linear process. Since in their opinion, theory cannot be understood without empirical observations and vice versa, they suggest that researchers conducting case studies should constantly go back and forth between empirical observations and theory, a process that they refer to as systematic combining.

In line with the thoughts of Dubois and Gadde (2002) and the concept of systematic combining, this thesis is based on a preliminary analytical framework which has, over time, according to what has been discovered through the empirical fieldwork, been developed. The evolving framework has in its turn directed the search of empirical data in the interviews, which in some cases have led to unanticipated findings that once again have redirected the theoretical framework through for example the adding of new relevant theories.

As a result of such process the theoretical framework presented in this thesis was obtained. Due to the strong link between Big data and marketing representations, theories about marketing practices have been revised. Since this thesis aims at exploring the effects of Big data on innovativeness and innovation processes, theories about innovation have also been studied.

The study by Kjellberg and Helgesson (2007) and their description of the threefold conceptualization of market practices provides a good basis for understanding what constitute the different market practices and how these interact with one another. This conceptualization adds a valuable framework when analyzing Big data and how the use of it affects the other market practices. Storbacka and Nenonen (2011) add to deeper

understanding of market configurations and how new market actors contribute to the development of market configurations. Their study also highlights the fact that some actors have higher impact on the market than others, and how these actors can influence the market according to their preferences, by for example using certain representational tools, such as Big data. By introducing the term "concertation", Rinallo and Golfetto (2006), go deeper into this subject and describe how focal actors, through collective action and powerful representational practices, shape the market. This is an example of the importance of overlooking not only which representational tools that are used within a market, but also by which actors they are used. Anand and Peterson (2000) provide another framework for analyzing how Big data can affect markets. As they suggest, market information, such information in the form of Big data, adds to the sensemaking of markets by providing a common focus of attention that gathers, structures and connects actors within a market.

Since this thesis aims at exploring how the use of Big data affects innovativeness and innovation processes, there was a need of defining what innovations are and look deeper into the nature of them. There are different views on innovation, in terms of what it represents and how it evolves throughout time. Due to the wide range of perspectives and thoughts of innovation, this thesis only focuses on technological innovation. According to Arthur (2007), innovation is the second step in technological innovation, starting with invention. The structure of invention will be analyzed with the perspective of using Big data within the cases used in this thesis. This will add to increased understanding of the whole innovation process when creating new technology. Another aspect of innovation is the use of external data when inventing new products. This is further discussed by Cohen and Levinthal (1990), who suggest that innovation within organizations is dependent on external information, such as information derived from Big data.

4.3 Data Collection

Since Big data is a relatively new term, rather few comprehensive studies have been made on the subject. For this thesis a number of different sources have been used, mainly academic reports, journal articles and industry analyses. To add to the understanding of the subject, information has also been collected from a number of in-depth interviews with professionals in three different companies and sectors.

4.3.1 Selection of Cases

The case selection process that has been used in this thesis is based on the telecom market. The telecom market provides a good foundation for analyzing the use of Big data within a complete chain of interactions. In order to capture the entire chain of reactions within the telecom market, this thesis has divided the analysis into three consecutive steps. The three steps are; producing company, operator and lastly content provider. These three types of companies together create a chain of interactions between each other and enable this thesis to overlook the usage of Big data within an industry.

The choice of producing company fell on Ericsson AB, since they are the largest producer of telecom equipment and solutions in the world. With daily use of large amounts of data, Ericsson is a good choice of company in terms of analyzing Big data usage. Based on contact information provided from Ericsson AB, the next choice of company in the chain fell on Tre AB, one of Sweden's telecom operators. Tre uses Ericsson's technology when creating their mobile network, in order to provide the operator services that their customers use. The final step in the chain of the telecom industry are content providers, which there are many of that are of relevance for this thesis. The main focus has been put on Sveriges Television, SVT, a national broadcaster that indirectly uses the mobile services provided by Tre.

When choosing which companies to work with, and what cases to study, this thesis has worked in a structured manner. In other words, the selection of cases has not been made randomly, which, according to Eisenhardt (1989), is neither necessary nor preferable. After interviews with Ericsson a number of operators and content providers were recommended to further study the chain. However, since there were many potential companies to choose from and some were easier than others to establish contact with, the choice of Tre and SVT can be seen as a convenience sample (Onwuegbuzie and Leech, 2007).

Additionally, another aspect has been added to the thesis, and that is the data research company, Gavagai AB, which analyses Big data in order to predict future trends and events. This company has given extra insight into the industry of Big data, and the coming use of it in future times.

4.3.2 In-depth Interviews

In advance of the interviews, theory was revised in order to secure the understanding of the concepts that were about to be investigated in the interviews. The interviews were conducted in a semi-structured manner, with a base in a pre-decided interview guide containing the questions that were to be asked in a specific order. However, during the execution of the interviews, follow-up questions were allowed to arise (Merriam, 1994). To enhance comprehensibility and understanding of the questions a pilot test was performed, which slightly changed the final questions used for the interviews. With each company, three to four, with a total of ten, interviews were conducted. All main interviews were between 45 and 60 minutes long.

Reliability was achieved in accordance to Malhotra (2004), since questions were asked in the order of the questionnaire, in line with the wording used in the pre-decided guide. Other than that, the interviews were performed in a manner that enabled the interviewees to explain and clarify their answers, if needed (Malhotra, 2004). All of the main interviews were made face-to-face. This was a decision that was made due to the fact that face-to-face interviews, in contrast to telephone interviews, give the interviewers an opportunity to study the interviewees' facial expressions and body language, which give the interviews another dimension (Bryman and Bell, 2010).

To get the most out of the interviews, both authors attended the sessions. This is due to the fact that it increases the possibility to contextualize existing insights when putting it in context with the data collected from the interviewer (Trost, 2010). Furthermore, if both interviewers observe and interpret data in the same way, it strengthens the interviewers' confidence in the findings (Eisenhardt, 1989). After approval of the interviewee, all interviews were recorded as recommended by Malhotra (2004) and Merriam (1994), so that the authors could focus on other aspects than taking notes. However, in every interview, one had the head responsibility of pushing the interview forward, while the other one had a more reflective position with the chance to take notes when necessary.

Since Big data is used in a great variety of units and in different manners from one company to another, there were no evident or straightforward way in which to choose whom to interview. This problem was solved by deciding to interview the people, that according to different representatives in each company, had the greatest insights in

Big data and how the respective company works with it, and thus should be of most suitability to answer the interview questions. All of these had key positions in their companies and they were all accustomed to working with Big data in various ways. According to Mitchell (1994), there are certain guidelines to follow when using key informants. These guidelines are; the respondents should feel that their roles or status provide them with more complete and specialized competence, and they should share the researchers' interest for the phenomenon. The researchers need to have information about the knowledge of the key informants, and how that knowledge is comparable to others within the same unit that the respondent works within. To get a more diverse and thorough picture, at least three professionals in each company were interviewed. This also added to ensuring accuracy in the information received.

4.4 Quality of Research

The quality of a case study lies much in the reliability and validity of it, something that many authors have recognized (Bryman and Bell, 2010, Yin, 1994, Merriam, 1994). However, Guba and Lincoln (1981), claim that for case studies, it is more important to look at validity than reliability.

Validity can be categorized into three different parts; internal, external and construct validity (Yin, 1994). Internal validity refers to how well a researcher actually measures what he or she claims to measure (Merriam, 1994). In other words, for this thesis, internal validity refers to how well the results of the interviews correspond with what this thesis is aiming at measuring. When it comes to case studies of this type, it is according to Yin (1994) very hard to secure internal validity since interviews reflect the interviewee's subjective version of reality rather than an objective truth. Merriam (1994) though presents another view and claims that a high degree of validity can be achieved in case studies despite the arguments of Yin (1994), as long as the interviewers acknowledges that reality is a set of different mental constructions and take the perspective of the interviewee into account when interpreting the findings of the study. To get as many perspectives as possible of the studied subject, and in that way improve the degree of internal validity, several people have been interviewed from three different companies. They have all gotten the same questions, and this was a choice made in order to allow for the comparison and confirmation of the results, over organizations and among employees within the same company. When the interviews were finalized and

transcribed, the interviewees, as suggested by Merriam (1994), got the opportunity to look it through in order to control facts.

The second category of validity is external validity, which refers to how generalizable the results of a study are beyond the boundaries of the executed study (Yin, 1994). However, Yin (1994) claims that external validity is not of the same concern for qualitative research as it is for quantitative studies. This is due to the fact that, as both Merriam (1994) and Yin (1994) argue, quantitative studies are based on statistical generalization while case studies instead rely on analytical generalization in an attempt to generalize and gain insights from specific findings. Generalizability is thus not needed in the same extent when it comes to case studies, since these are made to gain increased knowledge and understanding of something that is already known (Merriam, 1994). The chosen phenomenon was however studied by using different cases and different people in each case in an attempt to increase the external validity (Merriam, 1994).

The third category is construct validity. This category refers to the use of the right tools and measurements for the case that is being studied (Yin, 1994). According to Yin (1994), a researcher can improve the construct validity of its study by using multiple sources in the data collection phase. For this reason, several professionals were interviewed from different companies, as previously mentioned. Some of the data that was achieved during the interviews was later controlled with the sources that was presented in the literature review and with information found on the organizations' webpages.

Apart from validity, reliability is another aspect that Bryman and Bell (2010) recognize as a factor affecting the quality of a study, though not to the same extent as validity (Guba and Lincoln, 1981). The term reliability refers to what extent a researcher can repeat the study and achieve the exact same results as the first time it was executed (Bryman and Bell, 2010). In qualitative studies, such as the case study, this is though hard to obtain. This is due to the fact that case studies often involve interviews and the answers of interviewees are often a subject of change over time. To overcome this issue to the highest possible degree, the interviews were based on a standardized interview guide with pre-decided questions and their order, allowing the possibility of repeating the interviews (Merriam 1994). However, since the interviews were semi-structured all questions were open-ended and it could thus still be complicated to repeat the study with the exact same outcome.

5. Empirical Findings

The following chapter presents the results from the qualitative in-depth interviews that have been conducted within this thesis. As previously mentioned, three different companies have been interviewed in order to get a process perspective within the telecom market. The authors have chosen to present the empirical data that is considered relevant for the investigation of the thesis question. The results are divided into several main groups of findings and these are in their turn divided according to company. In order to improve readability and to simplify the comparison process between the companies, as well as secure the anonymity of the interviewees, each interviewee has been given a fictitious name.

Table 1. Companies and Interviewees

Ericsson	Tre	SVT	Gavagai
A1	B1	C1	D1
A2	B2	C2	
A3	B3	C3	
	B4		

5.1 Definition of Big Data
5.1.1 Ericsson

At Ericsson, three different persons were interviewed. All three presented a rather traditional view of Big data as great amounts of information that give real-time insights in customers' behaviors. Interviewee A1 concretizes the definition by listing four factors that shape Big data; size, speed, heterogeneity and value. However, A1 emphasizes that value is the most important factor in order to counteract a boomerang-effect, in which costs exceed created value. A3 defines Big data as a new technological step, in which one is able to collect and process data to a larger extent then before.

"The term Big data was born when the large internet actors arose, such as Google and Facebook." - A1.

"Big data consists of four factors; size, speed, heterogeneity and value." - A2

5.1.2 Tre

The general definition of Big data at Tre, as expressed by B1, is data that can be used to understand the customers' behaviors and allow Tre to act upon those. At Tre, B1 further explains, Big data is seen as an enabler and not a goal. Both B2 and B3 have been asked by the board to further analyze the concept and concretize the actual value that Tre can gain from it. This has been done in terms of a four-armed model, which constitutes of communication, KPI, NBO (next best offer) and monolithic customer view. These four initiatives all share the concept of wanting to add value with the use of Big data. B4 supports this view and stresses that in the definition of Big data, the value adding aspect is of great importance and it is enabled by the canalization of the great amounts of data that Tre possesses.

"It's about analyzing customer behavior and act upon it." - B1

5.1.3 SVT

C1 describes SVT's view of Big data as fragmented with large variations among different parts of the company. Common for all different definitions in the company is however that Big data consists of large amounts of data that can be either structured or unstructured. C2 who works with large amounts of data on a daily basis, and who is seen as one of the most cutting edge journalists within data research, thinks that there is a common mistake to define structured data as Big data. C3 believes that Big data is large amounts of data that in a later stage is used to analyze customer behaviors.

5.2 Integration of Big Data
5.2.1 Ericsson
5.2.1.1 Processes

According to A1 Big data is integrated in almost all processes at Ericsson, due to the large amounts of data that is circulating in the networks that they are providing. There are large incentives to work with Big data, since it enables Ericsson to analyze customer data and optimize their systems. A2 agrees with A1's idea of Big data as being part of the

majority of processes taking place at Ericsson at the moment, but since it is often used to, in a consolidating manner, look at customer behaviors, patterns etc., Big data has primarily become a crucial part when it comes to customer care and services. A2 also emphasizes that Ericsson has always been data-driven, which has resulted in that most of the processes are integrated with Big data today. However, A2 also states that many of the tools that are used today were not available some years ago. This has brought in a new sort of intelligence to most processes since Ericsson nowadays can look at data, which they earlier could not retrieve any valuable information from. As a result of this, A1 explains that Ericsson has started to focus even more on data analysis during recent years.

There are according to A1 Big data analytics programs that help them to overlook all sorts of information on a daily basis. A2 describes the development of Big data as being very palpable, and that the programs used within Ericsson have gone from being simple, with restrictions in terms of size of the data, to new programs, such as Haddop, which works better the greater the file size is, according to A2. There are two support systems at Ericsson called BSS and OSS, which stand for business support solution and operating support system, according to A2. BSS is a data warehouse solution in which the operators can find data within their networks. OSS enables operators to create and control network configurations when using Big data in a dynamical way. It is with BSS Ericsson finds new business opportunities, while OSS is more of an operating function. Furthermore, the operators that Ericsson works with put additional pressure on Ericsson to work with Big data.

A1 believes that Big data and the forthcoming of large IT-companies have increased the speed of development and creation of new products and services. This has indirectly affected processes and their development. Big data is not solely responsible for this progression but the whole IT-movement in large. A3 stresses the fact that Ericsson has started to use the database-managing program SAP, which most business systems are integrated with. The possibilities are great, but the software itself is too complex for most employees to use. The software enables Ericsson's employees to use the Big data collections that are created within the daily business, but as A3 mentions, the process is too advanced to be used in the everyday business. In the future, A3 believes that the systems will be simplified and the use of internal data will increase.

5.2.1.2 Internal Structures

According to A2, the growing use of large amounts of data within many processes at Ericsson, has not notably changed the internal structure of the organization. He does neither believe it will affect the structure of Ericsson substantially in the future, since he argues that Big data simply not is big enough of a business opportunity to have the power to fundamentally change the organization. However, A2 stresses the importance of keeping Big data as an integrated part of all divisions of the company where it can be valuable for the processes.

5.2.1.3 External Structures

A2 explains that Big data in some ways has changed Ericsson's external structures. Due to the growing importance of Big data, Ericsson has been forced to discover a completely new ecosystem of organizations and team up with many new partners. A1 agrees that the introduction of Big data has fueled a growing need of new relations and collaborations. An example of this is how Ericsson lately has started to look at top technological universities around the world to start collaborations in order to find people that are able to conduct research that Ericsson's own research team do not have time with. Ericsson is a large company with relatively low flexibility compared to many of the small companies in Silicon Valley, where most of the development within Big data take place. In order to compete with these, Ericsson has also been forced to establish many new relations with different IT-companies.

"The most obvious change in company relations, is that we have gotten to know a completely new ecosystem of partners" - A2

5.2.2 Tre
5.2.2.1 Processes

B1 explains that the digital division at Tre always has worked with large amounts of data. With the growing use of Big data he today however believes it has become increasingly important to link data from different parts of the company to get a uniform picture of for example the customer and its behaviors. B1 believes that there is no easy solution of how to integrate Big data in a company and its processes. He rather claims that it is

fundamentally about core processes and to use Big data to follow the customers in the customer lifecycle, and then adjust different processes accordingly. For example, in many cases this is in concrete terms done by setting up rules and guidelines for how to act in different situations based on information derived from Big data. Such rules could for example be that if the history of a customer shows that he or she has had a specific problem, a certain solution, product or service should be offered. Or if the system can identify that a customer that calls customer service has an iPhone, the system can give much more relevant response to the customer by only giving directions related to iPhones, for example. To be able to do this, a necessary condition is that the data is assembled in a good way so that one is able to group the customers in different segments.

B4 also underscores the importance of good structured data and claims that Tre has a well-organized system for their data, allowing the company to do far more than just use the data as a basis of segmentation. Today she claims that Big data plays an important role in many processes within the company, as for example processes related to marketing, finance and IT-development. B2 adds the importance of Big data in the analysis process of Tre's telecom nets and concludes that due to the data-intensive nature of Tre's business, almost all parts of the company uses Big data in one way or another. Although data has been a central aspect of Tre's business since start, B2 and B3 claim that they have noticed a growing focus on data and how it can be used to develop and improve different processes within the company since the term Big data was introduced in a broad scale.

5.2.2.2 Internal Structures

As stated above, both B2 and B3 argue that the introduction of the term Big data has led to a growing focus on how Tre works with data. Management has since they first came in contact with the term started to put more resources in trying to identify what more can be derived and used from the data that Tre possesses. However, they explain that this has not caused any major transformations of the organizational structure, but just a larger focus on data within most divisions. B1 though lately identifies a growing collaboration between different divisions within the company, something that he says might be an effect of the attempt to create a monolithic view of the customers, a process in which Big data plays a significant role. B4 supports this view and explains that a couple of years

ago the analysis of the data the company possessed was a part of customer service and the analyses were solely based on data from the existing customer base. This division was then detached from customer service and was made more independent in order to enable it to work with almost all parts of the company. B4 says that this might have been a consequence of that Tre's management team realized the value of analyzing data to a wider extent than the company previously had done.

5.2.2.3 External Structures

B1 describes that Tre has been forced to use new external resources and solutions in order to adapt to the new climate. Most of these resources are services that they have bought in from other companies, but they have also developed their own solutions. B1 says that they are not a large IT-company as Google, and therefore they do not possess the skills to fully develop all their solutions by themselves, instead they use a lot of external solutions. This however, has not made any large impacts on the external structure itself, but B1 claims that in the future, changes have to be made in order to adapt to the new market climate. B2 and B3 claim that they have not witnessed any major external restructurings, but do believe that they keep in contact with other companies to a larger extent than previously, since they want to know how others relate to Big data. B4 has not noticed any changes in Tre's external structures, but has instead felt greater impacts on an internal level.

5.2.3 SVT
5.2.3.1 Processes

C1 believes that Big data pervades most of the processes within SVT. However, C1 also believes that it is hard to define what actually constitutes Big data, as mentioned above. C2 argues that at SVT, Big data is today used in a rather limited manner. C2 claims that this type of data is mostly used in analysis processes connected to how users of SVT's internet channels behave at the company's different sites. C3 who is working specifically with the interactive part of SVT's digital advancements, claims that they today have greater tools to analyze how digital viewers behave. C3 looks at this as an improvement to previous years of not knowing their viewers. However, C1 still believes that the tracking that SVT uses on their digital users are far less advanced or intrusive than most other companies in their industry.

When it comes to journalism at SVT, C2 though mentions that data plays an important role in some cases. She illustrates this with the project "Valpejl", which was the first time SVT used Big data in a systematic manner for their journalism. For this project, SVT gathered information about 54 000 candidates that campaigned for the Swedish election 2010. Without these large amounts of data, this project could never have been realized, C2 explains.

5.2.3.2 Internal Structures

C2 believes that during the last years, much has happened with how SVT works with data. Five years ago she says that the data analysis function was very small and isolated from the rest of the company. Today however, SVT has a team of analysts that on a daily basis works with the analysis of data. However, she does not believe this is an effect of the growing presence of the term Big data, but rather a result of the fact that SVT today has better tools to analyze data of all types, both big and small. C1 agrees and says that the analysis function of course has evolved during the last years, but it is hard to actually link this to the introduction of the term Big data.

5.2.3.3 External Structures

C1 says that Big data has led to that SVT to a greater extent has created its own opportunities to analyze data in order to not be as dependent on other companies and their solutions. And with the tools and knowledge SVT today possesses, this is possible for most analyses. Previously SVT has always been dependent on the data information provided by MMS, a company that together with all other large TV-channels analyze a specific target group that uses special technology to track how and what people are watching in Sweden. MMS's services are nowadays less useful when a big part of SVT's total viewers are digital, which can be tracked through SVT's own servers. C1 finds the rapid development within the digital market, specifically digital television, has created a scenario in which market actors no longer have the same tools to evaluate ratings, performance etc. Therefore, C1 thinks that there is a need for a new consensus within the television market in order to prevent conflicts around which measurement tools and methods that should be used.

5.3 Value Creation From Big Data
5.3.1 Ericsson

According to A1, most internal systems use Big data with two primary objectives; in order to find solutions to existing problems or to find future businesses. In concrete terms, an example of how Big data helps Ericsson to find solutions to existing problems, is how it can be used to track how the traffic in the company's networks looks at a certain time. A1 says that in some cases, Big data is used to overlook weak internet connections, and evaluate the underlying problem. By doing so, Ericsson can exploit their resources in a better way and due to this lower the company's energy consumption.

Big data is also used to analyze how Ericsson's products work and how they are used. By analyzing parameters such as those, Ericsson can use the data to improve products, increase sales and find future business opportunities. Another opportunity and value addition with Big data is the possibility to automate processes, something that will be of great importance in the future, when even more digital devices will be connected to Ericsson's network, but also important today since it increases the efficiency of the company, according to A1. A2 agrees that Big data can be used to create better offerings to Ericsson's customers by contributing in the process of developing more intelligent and flexible products. This can in its turn, according to A2, lead to higher margins and larger market shares for Ericsson. With smarter services, some of the solutions that Ericsson creates for operators can be commoditized, since Big data enables greater flexibility. However, A1 explains that it is very important to always think about the cost of analysis and that one always has to weigh these costs against the potential value of working with Big data.

A3 says that the use of Big data also plays a significant role in the evaluation process of realized projects. By studying Big data, the company can follow up previous investments and changes, and evaluate the results of them with higher precision. A3 also states that due to the nature of Ericsson's business, innovation is of utmost importance. According to A3, innovation is about creating value from research, which is one of the reasons that Ericsson puts a lot of resources into Ericsson Research. As he puts it, innovation is crucial for Ericsson's revenues, and therefore, to be a world leader in their industry it is important to keep up the innovation pace.

"I would say that most companies that have data collected, have potential to use that data in order to improve their business or create new business opportunities." - A1.

5.3.2 Tre

B1 claims that the use of Big data has given Tre a much better understanding of its customers, which makes Tre able to produce better and more suitable products to its customers. This has, according to B1, lowered costs and increased Tre's profitability. B3 says that this, even though they have not yet fully been able to capitalize on the data Tre possesses, has led to greater gains in the business overall. B4 expresses the opinion that as long as one works with the available data in the right way, and especially if one does it better than the competitors, the company will be able to create value from it. She continues by explaining that for Tre, she believes Big data has created value in many different ways. First of all, she says Big data is a good base for working with Tre's existing customers. She explains this work is both about studying the customers behaviors and actions in order to be cost-effective in service, communication and solutions. It is also about finding new opportunities for revenues from this group by shaping offerings that fit them. Big data, she continues, can also be valuable for getting new customers, since it in much is a base for developing better products and offerings that exceed the offerings of the competitors.

"Big data has provided us with a much better understanding of our customers." - B1.

5.3.3 SVT

According to C1, the problem with SVT and their data collection is that most of the data is not used to its fullest potential. For example, the internet services that SVT provides do not track users, since they believe that it violates people's privacy. C1 clearly states that they have not been assigned to increase sales or future profit from analyzing data, and do therefore not proceed with such businesses. C1, understands the potential of the data that they possess, but stick to the guidelines given by the financial investors, which is the Swedish population and its government. However, C1 says that in some specific

cases Big data is used for marketing purposes. In these cases, SVT could for example buy social media services to target a specific group of people to enable individualized and efficient marketing. C2's role as a data research journalist is completely dependent on data collections, and even though she do not consider the data used within the research team to be Big data, C2 still believes that it has brought value to the company as a whole.

5.4 Ethics and Rights
5.4.1 Ericsson

As a large telecom company, Ericsson only owns a small part of the data that is used within their networks. A1 wants to point out that even though the majority of the data used belongs to the operators, Ericsson has strict policies for how the company can handle the data. A1 thinks that Ericsson always should strive for transparency in order to prevent personal intrusion. A1 also claims that most of the data is anonymized, and therefore Ericsson rarely works with personal information. When asked about his personal opinion considering who owns the data, A1 thinks that it should be a scenario in which the information is shared between both the consumer and the company, with the possibility to opt in and out. A2 states that Ericsson follows local and governmental regulations, and that they would never provide any service that could lead to illegal activities. Due to Ericsson being a global company with activity in many different countries, they always have to adapt to local rules and policies, according to A2. As A1 states, the majority of the data is owned by the operators, A2 agrees with this and says that end-user license agreements are conducted between the operators and their final customer.

"We always stay within local and governmental regulations in our businesses, and would never deliver anything that would enable illegal activities." - A2.

5.4.2 Tre

Since Tre's products generate large amounts of information through the usage of them, Tre have access to huge quantities of data. According to B1, this data is used in a way that he says is "carefully offensive". He states that there are of course a lot you can do with this data, however, it is important to always work on the customers' terms. People need to be able to trust in that Tre protects their personal information and that the company would never use it in an unethical way or sell it to a third part. To ensure this cannot happen, B3 explains that Tre has set up internal guidelines and rules for how the data can be used as a complement to Swedish laws concerning this area.

"We can never sell our customer data, since they have to be able to trust us."

- B1.

5.4.3 SVT

C1 says that SVT uses data from MMS, and for data research projects most of the data is provided from external open sources. The data provided by the MMS service is according to C1 ready-to-use, but they are allowed to adjust the data if they want to, but in such cases they have to ask for permission beforehand in order to prevent biased results. In terms of who owns the data, C1 states that HR and sales data are owned by SVT, but the data provided from MMS and other sources are owned by the original creators. C2 thinks that SVT has to be very careful of what they do with the data collected from their digital services. The data used in research journalism is mainly open source data according to C2, however, sometimes the data provided contains personal information, and that information is mostly not used since SVT believes that it is unethical to share that sort of information. An example of that would be open source information about politicians in the European Union, which SVT has analyzed recently. In that case, SVT decided not to present the personal information and instead focus on other variables that were of value. C3 who is responsible for most of the interactive digital solutions at SVT, puts a lot of interest in protecting the users privacy, and does also believe that the ethical perspective is something that will be of greater importance in the future.

"In terms of integrity and personal intrusion, SVT is very careful and proceeds slowly." - C1.

5.5 Creativity and Innovation
5.5.1 Ericsson

According to A1, when it comes to product and service development and introductions, a research team within Ericsson has the responsibility of predicting what should be done within a time frame of about five to six years. This process is partly based on the analysis of information about Ericsson's customers' expressed demands, but also through the analysis of Big data by studying the usage and functions of already existing products and services. Also, A1 states that the operators use many over-the-top services on their existing structures, which forces Ericsson to develop the structures that the operators are dependent on in a much faster pace than before. Therefore, A1 thinks that there is a new climate in which services develop more rapidly than ever before. A2 claims that the development of products and services is much more about the development and maturity of technology. A3 states that innovation is about creating value based on research and findings, that sometimes can be derived from Big data.

5.5.2 Tre

B4 explains that changes within Tre, both organizational and product-related ones, often are the result of the identification of an opportunity or a threat. She continues by explaining that this could well be done with the use of Big data. Analyses of this sort of data could lead to insights about market trends, customer usage or potential future threats concerning for example competition. B4 thus claims that Big data is an important factor in many development processes within Tre. B1 and B2 both agree and say that in the beginning of a development process of a product or service, the analytics team makes analyses to make an accurate profile of Tre's customers and from that derives hypotheses to act upon. This is in addition to the use of Big data done through surveys, experiments, tests and by tracking customer behaviors on for example the website. However, both B2 and B3 stress how pragmatic Tre is as a company. They explain that many changes within the company is just the result of trying out different routes and see what works and what does not. B1 adds that in his view, Big data within Tre plays a larger role when

it comes to directing marketing and adjust communication to the customers, rather than when it comes to product and service development.

5.5.3 SVT

When developing new products or services, SVT uses research data in order to find out what people are appreciating and missing, in combination with previous experience, according to C1. Based on recent research SVT developed the new digital TV-channel SVT Flow, which according to them was a missing piece for people in the younger ages. C1 claims that this development was mainly done through research and previous experiences. Furthermore, he adds that Big data played an important role when marketing the new channel. SVT is described as a slow-moving organization with visionary thinking according to C2. C2 agrees with the statement that they always use data as a foundation for decisions. Innovation is driven by people's willingness to make change and create better services or content, and to make more relevant creations, according to C3.

5.6 Future Effects of Big Data
5.6.1 Ericsson

In the future, Ericsson will be able to create products and services, in which database-management is incorporated in the actual solutions. This is part of a new way of thinking, according to A1, who believes that the future holds technical solutions that consider data to a greater extent than today. A1 also states that one should not focus too much on Big data as the phenomenon it is, but rather look at the value it will contribute with in the future. The problems with Big data in the future, are probably going to be traditional security and privacy issues, according to A1. Big data is mainly a possibility to be even more innovative in the future, according to A2, since Ericsson has always been an innovative company, this new technology will only embrace that existing capability. Based on that, A2 says that Ericsson in the near future wants to integrate Big data with the information created in the business structure, in order to optimize their customers networks. A3 believes that an increased use of Big data will lead to that more employees will be involved in the process of not only create and collect data, but also analyze it.

5.6.2 Tre

B1 says that the use of Big data at Tre is very much about improving the customer experience. Due to this, he believes that Big data will have a crucial role in creating and developing more relevant offerings to the customers, something that is beneficial both from a customer and a business perspective. With better methods and tools, he believes that the usage of Big data will contribute to automate processes and make the company much more intelligent in the future. B3 predicts that in the coming years, the role of Big data will be increasingly prominent, and he believes this will push Tre to go even further with the practical applications of Big data. Examples of this could be product recommendations and personalized offerings that are made possible through the increased knowledge about Tre's customers, that according to B4 can be derived from Big data. B4 explains that this is something that for example the music service Spotify has succeeded with in a great way. However, B4 also says that it is important to see that there is a risk with personalized customer recommendations made of historical data, since it can cause customers to miss relevant offerings, which they are not exposed to.

Both B2 and B3 also believe that the usage of Big data will be a valuable tool for unifying different parts of the company, as a good use of Big data requires that different units have access to the same data and work with it in similar ways. In Tre's perspective, B4 looks positively on the future effects of Big data. She has high confidence in Tre's business intelligence and analysts division and their ability of working with Big data. B4 says that this, in combination with the company's young and flexible structure, gives Tre good conditions to utilize Big data in a better way than their competitors. However, all four interviewees at Tre believe that if not utilized in a good way, Big data can be bring about great risks in the future. Examples of this are both privacy issues and the fact that too much analysis of current information may lead to wrong assumptions about the future, according to B4.

5.6.3 SVT

The future effects of Big data is dependent on which tools that will be available to work with, and if people accept the personal intrusion that follows an increasing use of Big data, according to C1. Since many of the Big data solutions require the use of personal information, that will be one of the main issues with Big data in the future, argues C1. He

thinks that Big data will have large impacts on society, but the level of usage of personal information will in much be decided by the consumers, since they have the decision power in terms of using it or not. C2 thinks that Big data will have another name in the future, since she believes that it today does not represent what it will develop to be. Aside from that, C2 states that the society has overconfidence in what Big data can achieve, and that non-commercial companies, such as SVT, do not benefit from Big data to the same extent as a sales company. However, SVT can use Big data in other ways, that help to explain what viewers want and look for. C3 states that there is an imminent risk with focusing too much on historical data, since it may have negative effects on new developments and prevent innovation. Previous history can naturally guide developers in the field of research, but one must always strive to find new things in life in order to create new ideas, according to C3.

5.6.4 Gavagai

According to D1, the greatest gains of Big data will be that companies of different types will get a better understanding of their customers, that will enable better solutions and more effective customer communication. Gavagai and other Big data companies have developed a technology that enables companies to analyze large amounts of text and get a profound understanding of what actually hides underneath it. This could be used in customer services and surveys, according to D1. Such usage would enable companies to instead of asking their customers generic questions, be able to analyze every single customer differently and find a more accurate opinion about the company. An example of that would be to ask "*What do you think in general of company X?*", instead of asking several questions about loyalty, quality and other typical questions used in surveys.

"When doing surveys these days, you seldom see open questions, especially in large surveys." - D1.

D1 is also of the opinion that if one measures something to a too large extent, the measuring could actually harm the process in itself. For example, by asking too many detailed questions in a survey, one raises the risk of getting false answers. And by making the questions too narrow, people sometimes give answers that do not correspond with

their actual views. This is something that D1 sees as a crucial problem with the marketing techniques that are used today, and something that D1 believes could be solved with the Big data analysis tools that Gavagai has developed.

> *"One question should be sufficient "What do you think?", but it is not possible to analyze that in a good way, yet."* - D1.

6. Analysis

This chapter analyzes the thesis results, using the theory in chapter two. The analysis is divided into eight sections, of which the five first analyze market representations, and the three last analyze innovations and the influence of certain actors. This division increases the understanding of the analysis and contributes to the shape of the coming discussion.

6.1 Big Data as a Representational Practice

As most of the interviewees have explained, Big data has caused changes in how their respective companies analyze many business-related factors, as for example existing customers, market trends and competition. Big data could thus be seen as a representational practice as described by Kjellberg and Helgesson (2007). Big data is in much a tool of measuring markets and by doing so, it produces market images that depict the market and how it works. This in its turn gives the people that work with Big data, as the ones interviewed in this thesis, guidelines and directions on how to operate in their market.

As expressed by B1, Big data has given Tre a much better understanding of the customers, something they actively use to guide them in their work. B4 further explains that Big data has showed the direction for finding new revenue streams when it comes to both getting new customers and to work with existing ones. As described in the previous chapter, Ericsson uses Big data to measure many aspects of their business. The market images they achieve from such analysis are often used as guidelines on how to identify existing problems and find future business. As the findings suggest, SVT does not use Big data to its fullest potential. As it is today, SVT seems to use Big data for analysis purposes within some areas, but due to the nature of the company, SVT is restricted in what sorts of analyses they can do. Furthermore, SVT seems to not always act on the results achieved from the analyses that actually have been executed. This could both be a result of not wanting to violate the consumers' privacy, but also because management never has encouraged the organization to increase sales and profit from analyzing data.

The authors believe that according to the findings, Big data is a new powerful representational practice, however the potential of it is used to various degrees between the three different companies. Both Tre and Ericsson actively work to let the measures and market images that Big data depict, guide the companies in how to operate in the

market. SVT does this to a much lower degree, which is partly explained by the factors mentioned in the previous paragraph. Another possible explanation could be that Tre and Ericsson possess much larger quantities of data and maybe also data that is more valuable or relevant for the companies to do analyses upon. It could also be that both Tre and Ericsson have adjusted to Big data and integrated it better in their organizations since Big data in much is a IT-related phenomenon and Ericsson and Tre are, in comparison with SVT, more IT-driven companies. Thus, SVT might lack some of the knowledge and technical tools to utilize Big data as a representational practice to the same extent as Tre and Ericsson.

The analysis above clearly specifies how representational practices are used and what sorts of results are achieved from using it. Concrete examples are given based on the extent of the interviewees' answers. However, representational practice is only one among other market practices that shape markets. To understand how Big data affects market dynamics, the theory suggests that one must study how Big data as a representational practice influences the other two practices that create and shape markets. This will be analyzed in the two following sections.

6.2 The Effect of Big Data on Normalizing Practices

If Big data can be seen as a representational practice it is also interesting to look upon how it has affected other market practices, such as normalizing and exchange practices, as described by Kjellberg and Helgesson (2007). The descriptions of the market that Big data provides to its users have an impact on normalizing practices since the institutions that set guidelines, rules and standards can get affected by them. In this case, these institutions are for example the companies themselves or the government. With the rise of Big data, all three companies have, as most interviewees explained, been forced to put up new internal guidelines and rules on how to work with this sort of data.

As A1 explains, transparency is of utmost importance when it comes to handling personal information about customers and consumers. Since the wrong use of Big data easily could lead to personal intrusion, Ericsson has created strict policies for how the company can handle data of different sorts. In this way, Big data has affected and shaped the internal standards at Ericsson by emphasizing the aspect of transparency.

Tre gives a similar picture of Big data's effect on internal policies. As stated by B3, Tre has created a set of regulations about how the company can handle this kind of information. This has, as he describes it, been done as a complement to Swedish laws. It is thus apparent that the increased use of Big data has put pressure on the company to adjust and develop the internal guidelines. B1 expresses that Tre could never sell their customer data, since their customers must be able to trust them. This is, as the authors see it, a concrete example of how the privacy issues, and the concern among consumers about the use of Big data, have created and shaped rules and standards within Tre.

The implementation of SVT's digital services has forced SVT to reevaluate their rules and guidelines for how to deal with personal information, in order not to intrude on their customers' privacy. With Big data being a part of digital services, this is a good example of how Big data has affected normalizing practices to this date. As the authors see it, the effect of Big data on SVT's internal guidelines and standards, will in the future much be dependent on the consumers' willingness of sharing their personal information with SVT.

Based on the rapid evolution of Big data during recent years, and the fact that an increasing amount of digital information is created each day, it is probable that the use of Big data will continue to grow in the future. The phenomenon of Big data as a representational practice will thus most likely evolve over time. This will have an effect on normalizing practices such as internal guidelines, market standards and national laws. Consequently, the companies studied in this thesis will have to keep on developing and adjusting their policies in the future.

6.3 The Effect of Big Data on Exchange Practices

Big data's role as a representational practice also impacts exchange practices within the market by measuring them and providing them with results and feedback. In this case, Big data works as a concrete and powerful measurement of for example how the exchanges between the three companies work, but also as a measurement of the companies' exchanges with other actors and the consumers.

As described above, A1 stresses the importance of transparency when handling Big data. Many of the interviewees in this study have also explained how Big data is used to evaluate previous investments, study the functions of their products and track user

behaviors. Therefore, if all actors within a market relate to and use Big data in the same way, Big data can be a strong tool for creating transparency within exchanges. This, however, requires common understanding of the data and common guidelines for how to make analyses from it. If actors have differing incentives, it is though probable that they will try to analyze and use the data in a way that is beneficial for themselves. This could cause imbalances in the market and make Big data have a negative effect on exchange practices.

Within Ericsson, the authors find clear indications of Big data affecting exchange practices. A1 mentions that Big data is mainly used in two perspectives, troubleshooting and finding new business opportunities. The authors interpret this as Big data being used when trying to find solutions for everyday problems at the company and to find new ways of doing business. This probably includes price strategies, distribution plans, marketing activities etc. In this way, Big data as a representational practice has a great impact on exchange practices at Ericsson, since it can be used to optimize many of the steps within exchanges in order to achieve better results. A2 gives a concrete example of how Big data has affected exchange practices within Ericsson. With the introduction of Big data as a representational practice, Ericsson has been pushed to explore a completely new ecosystem of organizations in order to stay competitive.

The use of Big data as a representational practice has also affected the way Tre works with their customers. According to B4, studying customers' behaviors and actions, affect how Tre as a company works toward their customers since data of this kind can help them be more cost-effective in service, communication and solutions, as she explains. In this way, Big data works as a good tool to optimize exchange practices within Tre.

At SVT, Big data has led to that the company is less dependent on other companies and their data analysis solution, since SVT now are able to conduct most analyses in-house. Earlier, SVT, along with most of the other actors within the market, used MMS's services for many analyses. C1 believes that the shift from MMS to a larger part of in-house analyses has created a scenario in which market actors no longer have access to the same information, nor the same tools to analyze it. Big data as a representational practice has in other words made many of SVT's exchanges more complicated.

As the authors of this thesis see it, Big data has affected exchange practices within all three studied companies, however in different ways. The interviewees at the three studied companies have showed signs of that Big data can affect exchange practices in both positive and negative ways. At this stage, it is though too early to say if Big data will mostly have a positive or negative impact on exchange practices in the future. This will in much be dependent on how the individual companies will continue to work with Big data in the coming years.

6.4 Performativity and the Shaping of Trends

Big data can be seen as a marketing tool since it is, as the empirical findings suggest, a way of measuring and depicting different aspects of the market. As explained by Kjellberg and Helgesson (2007) a representational practice, such as Big data, contributes to shape the market it depicts since it creates ideas about the market. However, as has been seen in this study, different companies can work with Big data in different ways and also interpret the results of the analysis of such data in various ways. In other words, since there is no institution that guides companies in how to work with Big data, it is hard to see any effects in a certain direction. This fact may diminish the role of performativity when it comes to Big data, giving the actors that specifically intend to shape the market greater power to do so. This, however, might evolve over time, when a greater understanding of the concept and the values it brings are acknowledged by others.

As Rinallo and Golfetto (2006) explain, trends within a market are shaped by these actors by using representational practices, such as Big data. In this study, there are however no signs that any of the studied companies have used Big data as tool in an attempt to shape their markets. As the authors see it, this may be an indication of that the chosen companies have not developed their work with Big data to such degree that they are able to do so.

Big data is, as D1 explains, a great base for analyzing how customers actually think and act, as opposed to what they express in surveys and studies. This idea could have great effects on the market and change how many actors see it today. If more companies would start to believe that the customers' actual thoughts and actions, which could be traced with Big data, are more important than the findings that could be derived

from surveys, these companies would most probably change direction and act more upon insights derived from Big data. This could result in products and services that suit the consumers' needs better, sharper marketing and lower research costs.

6.5 Sensemaking of Markets

As Anand and Peterson (2000) explain, the understanding of a market is in much dependent on the distribution and interpretation of market information. Big data can be seen as a large source of information about the market. However, as it is today, the actors within the market studied in this thesis seem to have different approaches to the gathering and analysis of Big data, causing the image of the market sometimes to be scattered. One of the reasons to why these actors have scattered market images is that they all have different incentives with the data gathering and analysis. They all work within the same market, but in different sectors, which is why it is natural for them to have dissimilar approaches.

As implied in the empirical findings, much of the work within the area of Big data is today connected to directly benefitting the own organization. But if looking in a future perspective, the studied companies' work with Big data is probable to develop and mature. This could lead to that actors within the market will share information to a greater extent, which in its turn could lead to an increased cognition and a more monolithic view of the market, giving the actors within it better structure and stronger connections.

C1 uses his own niche, the television market, as an example, in which there is a need for a new consensus considering the evaluation of ratings and performance for digital television. This is a clear illustration of how a market or an industry is dependent on market information. With Big data being a big source of information about the market, it is important that all actors within this niche share a uniformed view of the market and how to gather and analyze information from it, in order to reintroduce structure to the niche.

6.6 Big Data and Technological Development

As Arthur (2007) states in the article "The structure of Invention", technological development is divided into three stages; invention, innovation and diffusion. Based on

the interviews within this thesis, the authors find Big data to mainly be part of the first stage, invention and the third stage diffusion. The reason for this is that Big data can identify new needs or demands, but also work as a linkage between the identification of a new business opportunity, solution or idea and the realization of that finding. In terms of diffusion, Big data contributes with help when creating marketing and sales solutions for the innovation. When looking at the three different companies used in this thesis, the authors conclude that all of them strive to use the data collected in order to find new methods or solutions for different needs and purposes.

As A1 describes, information, usually in the form of Big data, from Ericsson's networks are often used to identify problems and dysfunctions within the networks and also to find new business opportunities. In this way Big data works as an identifier of needs and opportunities, and thus has a clear role in the invention stage of technological development at Ericsson. Furthermore, Big data is also used for studying the functions and usage of already existing products in order to be able to adjust them to better fit their customers' needs. In this way Big data also clearly works as a linkage between an identified problem and the adjustment of that problem. Since all employed at Ericsson have access to the SAP program, Big data is part of every employee's work. Therefore, all sections including research, development, marketing and sales, take part of the information collected within the company. One could therefore say that Big data also is a part of Ericsson's diffusion process.

Even though some of the interviewees within Tre indicated that Big data plays a larger role when it comes to marketing and communication, than it does when it comes to product and service development, there are some indications that Big data is also a part of the invention stage at Tre. B4 explains that Big data sometimes is used for identifying opportunities and threats, which could lead to both organizational and product-related changes. Since the insights that could be derived from the analysis of Big data can lead to such changes, Big data can well be said to be an important part of the invention stage of technological development at Tre.

At SVT, all of the interviewees agree that data is always used when developing new products or services within the company. They claim that when a need or purpose appears, they mainly use data in order to find solutions to satisfy it with. However, personal experience is something that is highly valued at SVT, which therefore also is

part of the development process. One thing that is for sure though, is that SVT uses Big data in their invention process. However, C1 claims that Big data is also used in the marketing process, which confirms that it is used in the diffusion process as well. C3 states that innovation is based on people's willingness to make change and create better services, this however is done through using Big data as the main source of information about the company and its viewers.

In all of the scenarios above, the authors find clear indications that Big data is used both in the invention and diffusion processes of technological development as described by Arthur (2007). However, between these two stages, one finds innovation, which is indirectly dependent on both. Therefore one can conclude that the innovation stage is affected by Big data in two ways, something that have been showed in all three companies studied within this thesis.

6.7 Big Data and Innovation

Since information in the form of Big data, as supported by the interviewees, often come from customers, external actors or internal units separated from the innovation division of a company, Big data fits the definition of an outside source of knowledge, as defined by Mansfield (1968). This sort of external information that Big data could be said to be, is crucial for innovation processes, according to Brock (1975), something that also finds support in the empirical findings of this thesis. However, in order for the three studied firms to fully capitalize on external information such as Big data, the firms' respective abilities to recognize the value of Big data, gather it and use it in a productive manner is important, since this affects the firms' innovative capabilities. This ability that as earlier explained is called a firm's absorptive capacity is dependent on several different factors, factors that vary between the three studied companies.

Ericsson is a producing company. As such, it has manufacturing experience, which according to Abernathy (1978) and Rosenberg (1982) gives Ericsson good tools for recognizing the value of new knowledge and for implementing new methods and ideas. Ericsson also has a high diversity of expertise within the company, which is another factor that impacts its absorptive capacity. As A2 mentions, Ericsson has several different collaborations within their research program, and has always strived to find the sharpest minds in the business. This has most probably affected Ericsson's absorptive

capacity, and might be an explaining factor for their successful technological development the recent years.

Both Tre and SVT are companies that also have great diversity among their employees' expertise, but not to the same extent as Ericsson. However, SVT for instance recently started the data research journalism section that C2 works at. This is a good example of creating a more diversified expertise that has lead to increased absorptive capacity and helped SVT improve their end product towards consumers. Since Tre is a relatively new company, the factor of previous related knowledge is hard to define. The company consists of many talented people that most probably worked for competitors before joining them. In terms of involvement in production, Tre has fewer productions to be involved in, compared to SVT who creates much of the content provided through their channel, making that factor more significant for SVT. Tre however, could due to the fact that it is a relatively new organization have other benefits that make them more responsive to external information. The organization is flexible and young, making new ideas easier to be introduced and integrated in comparison to the other two studied companies.

As described in the empirical findings, C3 raises the risk about focusing too much on historical data. This is in contrast to the theory about external information, since much of the external data that companies have access to is based on historical information. However, if focusing on relevant data and analyzing it in the right way, the usage of external data should, as the theory suggests, be beneficial for the company, according to the authors. What C3 refers to, might be the result of Big data being implemented to a hundred percent in the future, and not using other perspectives than previous history.

6.8 Big Data and Influential Actors

As indicated in the interviews, and specifically expressed by A1, Big data arose as a phenomenon at the same time as the large IT-companies became increasingly important and got more influence on the market. These were actors, such as Google and Facebook that had access to large amounts of data that they with the right tools could use to benefit their own organizations. Due to their strong clout, smaller actors within the market were affected by their actions and inspired by their work, causing the

phenomenon to spread. This is a clear example of how focal actors are able to affect other actors and shape a market, as described by Storbacka and Nenonen (2011).

Ericsson is, according to the authors, the actor with the largest clout among the three studied companies. Ericsson is significantly larger than both Tre and SVT and has a powerful position in the network due to lower competition than the other two companies face. This gives Ericsson better opportunities, in comparison with Tre and SVT, to affect the market and shape it according to its own preferences. As the focal actor of the studied chain, Ericsson has the power to influence the other actors and impose its ideas on them, with the help of its mental model and business model. For example, an increasing usage of Big data at Ericsson could well affect other firms within the market, such as Tre and SVT to follow. By developing its focal actor capabilities, Ericsson could improve its ability to influence market configurations and how actors within it look at different phenomena, such as Big data.

7. Concluding Discussions

7.1 Conclusion

The purpose of this thesis was to investigate how Big data affects innovativeness and market dynamics, through a case study of the Swedish telecom market. Three different companies were interviewed, one telecom company, one operator and a content provider. This was done in order to give the authors a process perspective of the market. Based on these interviews, together with previous research about Big data and relevant theory, the subject was studied and the research question was formulated. The thesis question that was sought to be answered was the following: *Since Big data by definition reflects historical patterns, how has an increasing reliance on it affected innovativeness and market dynamics?*

Based on the analysis in the previous chapter, and on the empirical findings found throughout the interviews, this chapter will present the conclusions that have been drawn as a result of the study. These will be discussed in the following three sections, which will also try to provide answers to the thesis question.

7.1.1 Big Data Affects Market Dynamics

With the basis in the telecom market, Big data has by this study been shown to be a powerful representational practice. In this study, it is clear that the three studied companies all use Big data in various ways and to different degrees. However, it is evident that Big data as a phenomenon has affected how these actors analyze information and measure different aspects of their business, but it has also changed how they see their own organization, their customers and their competitors. Furthermore, it has also clearly affected how these companies behave and act in certain situations.

With support from the examples and statements provided in the empirical findings, Big data as a representational practice has been shown to affect both normalizing and exchange practices within the studied market. With the base in performativity Big data has also proved to, to some extent, shape the market it depicts. As a representational practice, Big data thus has the power to influence and change market dynamics according to this thesis. However, to fully answer the thesis question, Big data's impact on innovativeness and innovation processes had to be analyzed.

7.1.2 Big Data Fuels Innovation

The authors have found that Big data has positive effects on innovation, from two different perspectives. First of all, the rise of Big data has significantly increased the accessible amount of external information for many companies. Since external data, according to the theory applied in this thesis, is a resource that fuels innovation, Big data could be concluded to have a positive impact on innovation.

Another aspect of Big data is that it affects two of the stages of technological innovation, namely the invention stage and the diffusion stage. Invention is affected by Big data in the way that Big data provides better conditions for good analyses within needs and demands. Diffusion is affected by Big data, since Big data increases the understanding of the customer base, and since it is a helping tool when performing marketing and sales strategies. Since innovation in much is dependent on these two stages, a positive impact from Big data on invention and diffusion could be concluded to have a positive impact also on innovation.

7.1.3 Focal Actors Will Shape the Future of Big Data

As Big data is a rather new and unexplored research area, and since this case study only could be seen to represent a snapshot of how Big data is used today, the findings within this thesis, and the conclusions presented above, should thus not be seen as absolute truths for the future to come. Rather, they should be seen as results and conclusions that very well might be subjects for change in the coming years.

As this thesis has indicated, in what direction these potential changes will go is very much dependent on how focal actors in different markets will look upon and use Big data in the future. By handling Big data in a certain way, these actors do not only have the power to decide the future meaning and importance of Big data, but also the power to influence the markets they are active within.

7.2 Strategic and Managerial Implications

In a managerial perspective, Big data has been shown to be a valuable tool for decision making and strategic planning. Big data, as the source of external information that it could be said to be, has according to the conclusions above also proved to be of great

value for innovativeness. However, in order for Big data to work as a catalyst for innovation, this thesis has shown the importance of handling Big data in the right way.

First of all, companies have to handle the collected data in an ethical way. As the empirical findings have shown, with the rise of Big data, all three companies had to adapt their rules and guidelines for how they work with data of different sorts. Companies pursuing to work with Big data therefore have to establish their own regulations for how to handle the collection, analyzes and application of Big data.

Secondly, the use of Big data could be quite costly, and in order to create value from it, companies have to figure out what they actually want to achieve from the use of Big data. As this study has shown, it is important that managers and decision makers within companies realize that Big data in such has no value, but the right processing and analyzing of it could have. Without this realization, Big data is likely to lead to increased costs, and no actual gains in terms of value for the company.

Furthermore, this thesis has shown how the use of Big data could have an impact on not only the company itself, but also on its business partners, competitors, customers and the market as a whole. In order to build a sustainable business with the help of Big data, it is important that this fact is acknowledged by managers and decision makers within all firms that strive to use Big data on a broad scale.

7.3 Critical Reflections

Being a qualitative study, an apparent drawback of this thesis is the generalizability of the findings and the conclusions. First of all, only one market was studied for this thesis. In this market three companies were chosen, and within these companies three to four employees were interviewed. In order to increase the generalizability, it would have been favorable to study other markets and industries, or at least interview people at a larger number of companies within the chosen market. One could also argue that more interviews in each individual case could have contributed to a larger generalizability. This could have given a more accurate view of how Big data actually is used in the three studied companies.

The specific selection of companies that were studied can also have had effect on the results. Ericsson is a unique company in the way that it is the only Swedish producing company in this market, and therefore there were no substitutes for Ericsson for this study. Tre, however, is a relatively young organization with a large share of young employees. These facts may have an impact on how the interviewees look upon a phenomenon such as Big data and how they respond to questions concerning the subject. SVT, in its turn, is a public company and thus differ a lot from other content providers within the same market. If the study was done using a commercial content provider, it is therefore likely that the answers to the interview questions could have been substantially different.

Regarding the theory applied, for this thesis the authors chose to focus on theories about market representations and innovation. However, with regards to the width of this subject and the fact that Big data affects so many parts of companies and even entire markets, there are a lot of other perspectives that could have been interesting to study this phenomenon through. To get a more comprehensive picture of Big data's effect on innovation and market dynamics, one could for example have studied the subject through organization theory to get a more thorough understanding of Big data's impact on internal and external structures. Another possible perspective could have been to go deeper into theories regarding marketing and advertising to see how Big data could help the spread of innovations in the diffusion stage.

7.4 Suggestions for Further Research

As Big data is relatively unexplored as a research area, there are many routes to take in order to study the subject further.

In this thesis, the authors have concluded that none of the three studied companies to this date have used Big data to intentionally shape the market they are active within. As of now, there are no published studies of what the effects of using Big data in that purpose could be. To find and study companies that actually intend to shape a market through the usage of Big data as a representational practice could thus be an interesting approach for future researchers in this field.

Another field that could be of interest to research further, is how the use of Big data will affect customer service in the future. As this thesis has touched upon, the use of

Big data connected to the analyzing of customer surveys and questionnaires will in much affect how companies and authorities evaluate their customers and their opinions. With the right tools, it is today possible to analyze great amounts of data, even in the form of pure text, and derive valuable insights from it. If such techniques would be applied on surveys and questionnaires in a broader scale, it is probable that it would affect many aspects of customer service in most industries. What these effects would more specifically be could be interesting to study.

As this thesis has indicated, it is probable that an increased use of Big data in the future will lead to a greater debate around ethics and privacy issues. With a growing interest among the public, and the incidents with the NSA, a further study in how organizations handle their Big data would be of value within the field. Another aspect to the matter is the issue of who owns the actual rights to the data used within the companies. A study of that would also be of value within the field.

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Appendix 1 - Terminology and Definitions

Big data: Datasets, whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze (Manyika et al, 2011)

Clout: The ability of an actor to influence the market configuration (Storbacka and Nenonen, 2011)

Concertation: A process where the major interest groups are brought together and encouraged to conclude a series of bargains about their future behavior, which will have the effect of moving economic events along the desired path (Shonfield, 1965)

Focal actor: A market actor wanting to influence a market configuration (Storbacka and Nenonen, 2011)

Marketness: The functionality of the market configuration (Storbacka and Nenonen, 2011)

Performativity: A notion that assumes that ideas about markets, but also marketing tools, take part in shaping markets (Callon, 1998)

Translation: The basic social process through which something – an idea, a rule, a text, a product, a technology or a claim – spreads across time and space (Latour, 1986)

Appendix 2 - Interview Questions

Introduction questions to the interviewee

- Age

- Name

- Sex

- Time at the company

- Position at the company

- Previous employment

- Education

Main questions to the interviewee

- What are your primary duties?

- Can you describe for us how you define the term "Big data"?

- When did you first come into contact with the concept of Big data?

- In which parts of the company do you use Big data?

- Why do you primarily use Big data in these parts?

- How is Big data integrated into different parts of the company?

- How have these parts been affected by the presence of Big data?

- How do you think other parts of the company can be developed with the help of
  Big data?

- Do you think that Big data has created value for the company in general?

- What kind of values do you believe that this is primarily? Or why has it not
  created value?

- Has Big data influenced the structure of the company internally?

- Do you believe that Big data will influence the company in the future?

- How do you think the future will be influenced by Big data?

- Do you think Big data will mainly give rise to opportunities or problems for your
  company in the future?

- From an ethical perspective, how does your company look at Big data?

- What do you think of this approach?

- Who owns the rights to the data your company uses?

- Who do you think owns the rights to the data your company uses?

- Has Big data contributed to your company analyzing data in a larger extent than before?

- Has Big data changed or affected your company's relationship with other companies?

- What is the latest change that you have done within the company?

- What is often the basis for changes in the company?

- Have any of the changes made in the past, influenced your products or services?

- Have any of the changes affected your relationships with other companies?

- What do you think are the strengths and weaknesses with Big data?

- How do you proceed when you want to customize your products or services to consumers?

Appendix 3 - Interviewees

Ericsson

A1, 2014-03-07

A2, 2014-04-14

A3, 2014-04-29

Tre

B1, 2014-03-17

B2, 2014-04-03

B3, 2014-04-03

B4, 2014-04-08

SVT

C1, 2014-04-01

C2, 2014-04-04

C3, 2014-04-16

Gavagai

D1, 2014-03-20