BUSINESS ANALYTICS IN TRADITIONAL INDUSTRIES

– TACKLING THE NEW AGE OF DATA AND ANALYTICS

Bachelors thesis in Informatics (15 credits)

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Abstract

Decision-making is no longer based on human preferences and expertise alone. The era of big data brings up new challenges with business analytics for organizations that want a competitive advantage. Previous research shows that a lot of studies have been made on why this era is now crucial to organizations but not how they can adapt it. In this case study there is a glimpse of how a traditional organization with an old mindset can catch up on the new technological advantages. The purpose of this study is to understand how a traditional company in Sweden is affected by analytics and if it is valuable to them.

For us to be able to create our theoretical framework, we based our on peer-reviewed material but also technological and science blogs from key experts in the field. The material examines the most essential and crucial elements within the area of business analytics and data management. The theoretical framework has guided our work when formulating and refining the research question and the interview questions.

The results of the study clearly show that our case is on the right track with new development and projects, but there are still a lot of milestones to achieve before these are fulfilled. Issues within the company have to be solved and there is a need to modify and change the culture in the organization to a more data-driven decisive culture. The study gives a clear insight into the challenges that organizations have to face and overcome before making radical changes.

Keywords: Business analytics, big data, decision-making, business intelligence, data

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1 Introduction

The introduction chapter is the ground for the report and presents the background of big data and business analytics. The chapter continues with a problem discussion where earlier research in a wide range is brought up. The chapter closes with text on the research question, aim and the limitation of this work.

1.1 Background

For as long as mankind has existed there has been a power struggle between those whom see the long term benefits of technology and those that in the short term negatively affected by it as the opponent. From the wheel, the printing press, the computer to the internet and further. It has arguably changed people's lives for better or worse. And with technology constantly developing; especially in the current age, many things in society have gotten autonomous, with computers helping mankind with easy things like spellchecking to controlling robots building other robots; more and more things are getting automated. Looking to how technology is used in business and how it changes every day processes one can also see that the decision process is also getting automated, something that is done by collecting vast amounts of data and then analyzing it. Using data to help businesses in the decision process is however not a pretty new thing and one could argue that this have been done for as long as mankind has conducted business. This is something that has been conducted more or less automated since the rise of the computer. Business Intelligence (BI) is the process of collecting data to describe something, to gain basic knowledge about one's business (Duan and Xiong 2015). However automating managerial positions is a more sophisticated process than BI and here buzzwords like big data and business analytics (BA) comes in. Big data can be described as "A cute way of describing the idea of data processed at a massive scale and speed, where the trail thrown off by all of our varied digital interactions and experiences becomes the fuel for decisions, insights and actions" (Sorofman, 2013). Using data to make complex multi-dimensional decisions is not just a feat in technology. Taking power from what normally is seen as a human job giving that to a computer does change not just the life of those that used to be charged of making those decisions, but arguably change how we look at business, and definitely how it is conducted.

In this case study of Company X, a large Swedish company with a hundred years of experience in the food item industry one can through their senior managers see the evolution of big data and analytics, how the automation of managerial work is helping business, but also the pitfalls and concerns of embracing new technology. Going from a more traditional typically human driven organization to a highly technological is not an easy task with many risks utilizing technology but also the risk of not embracing it.

1.2 Problem

Several scholars are debating today about the vast amount of data that is collected and how the use of big data and business analytics can result in competitive advantage, innovation, optimize of core operations, and cost optimization. But the entry barriers and the challenges that organizations face today to be able deliver from these possibilities and benefits is not clear. The problem as we see it that arises from big data and business analytics is that organizations do not know how to use it, that data are gathered without a purpose, and the lack of understanding of data and new knowledge. One could see these problems as a bridge between how to use business analytics and gain benefits from it. However this is something that is still not fully built and understandable since it influences all operations and the culture

in the organization. By this we mean that organizations have to drive to a more data-oriented culture so that they are able to deliver from the possibilities that big data and business analytics brings. The problem statement in this report is that organizations and enterprises do know that business analytics is useful for the organization to reach competitive advantage, and innovation, but organizations choose to not trust data and what big data can bring together with business analytics. The culture that exists among most organizations today is that the culture is old and not as data-driven as research and new technology trends suggest. Problems that occur in organizations are that data are collected without purpose and meaning for the organization, and is a more of "just in case collection". According to Kiron, Ferguson and Prentice (2013) companies have all these data and they do not know what to do with them. It has recently been realized by organizations that collecting internal and external data can help to understand the different patterns of consumer activity. In the study made by Kiron, Ferguson and Prentice (2013) one respondent answered a question about the vast amount of data that was captured: "We are collecting mass quantities of data. However, there is no specific plan in place to actively utilize the data and only a vague concept of why we need it. In other words, there is no real plan. We are capturing data just in case." It is clear that the downfalls in organizations when adopting big data and business analytics are that goals, purpose, the how and why on this path have not been defined before doing so. The problems that occur when organizations have not clearly defined big data, business analytics, culture, and key functions are that organizations will gather data and store data without purpose. Data will not be defined and valued the same way throughout the organization. In other words, organizations are today gathering data just because of it, but do not know how to extract new knowledge with the possibilities of business analytics that can give a competitive advantage and stimulate core operations and strategies. Complex decision-making was before made on human judgment, but with the rise of big data and business analytics a new decision-making path has appeared. Early (2014) argues that for organizations to continue to develop and make better decisions, they have to understand how to adapt business analytics to all the data that is gathered. Human judgment and expertise is no longer the approach that the biggest enterprises rely on today. It is clear that organizations lack the knowledge of understanding how to benefit from this, downfalls from gathering more and more without a purpose for it. Without knowing what you want from the data, which knowledge you want to extract, and without a real plan for it, success will never see a glimpse of light. Even the openness of change has to be recognized throughout the organization, if the organization is not ready to change their culture, which is what analytics will do to the organization, they will not succeed with the adoption of analytics (Kiron and Shockley 2011). The main problems today with big data and business analytics is that data has to be understood by all key individuals, everyone who is working with data, analytics and those who use the new knowledge has to understand the data, all the way from the source. Changes in the organizational culture has to be made, data need to be seen as a key function, and key individuals need to trust the data, and base decisions on this, otherwise it all has been for nothing.

1.3 Purpose

The purpose of this study is to investigate how a traditional organization rises to the challenge of data and business analytics. The purpose is to gain a greater understanding of how a traditional industry is adapting to the evolution and challenges of business analytics and how they can gain value from business analytics in the organization. The study aims to generate new theory for a single case.

1.4 Research question

Research Question:
How are business analytics valuable to organizations in a traditional industry?

1.5 Limitations

When researching how organizations are adapting to the new analytical technologies it would be interesting looking to more companies, as well looking more into the technological aspects of adaptation. How these seemingly new technologies are used in a broader spectrum and the effect they bring upon similar organizations that uses them. However with the time and cost constraints that exist upon this work that is not possible thus; we will not discuss the technical issues and the specific software within business analytics.

2 Theoretical Framework

This chapter describes important concepts and meaning within big data and business analytics. The chapter starts with an introduction of earlier research and then explains parts about business analytics and big data so there is a deeper understanding of its meaning. After that follows a framework about data-driven culture. The chapter ends with how big data and business analytics can be valuable within organizations.

2.1 Earlier research

Organizations are today gathering more and more data, and data are getting more complex and bigger. Due to this, organizations have lost the paths from gaining value from all the data that is collected. They are now collecting this vast amount of data without knowing what to do with it. Because of today's big data, which is data that are complex and big, organizations can now apply business analytics to a wider range of operations. Before the invention of computers, information was collected manually and documented via papers. This method allowed for a very limited amount of data that could be generated and analyzed. As organizations then started using computers, manually collecting data became a bottleneck as more and more techniques were developed for automatic data collection. And this is where big data comes to be. Duan and Xiong (2015) describe big data as an all-encompassing term for any technique to handle large data sets". This comes with the challenges of capture, store, transfer and share that are related to system infrastructure, but also searching, analyze and visualize that are related to analytical methods. In addition to this, different kinds of data raise new challenges to both of these aspects. According to Early (2014) the part of analytics that is predictive, has existed for a long time and is nothing new to organizations and enterprises, for example the insurance industry has always been about predictive analytics. Continuously, it is argued that almost every decision that is made by decision-makers and senior leaders in business relations is predictive. However, why organizations are just realizing the benefits and possibilities with business analytics is because of big data. As defined, it brings business analytics to a wider range of operations within the organization. It is argued by several scholars that business analytic investments can result in created value for organizations, but in the current state it needs deeper analysis. Arguably that resource allocation processes and resource orchestration processes are a part of the roles of the organizational decision-making process and it is underpinned on how organizations can create value with the use of business analytics. This established a need to be better understood for organizations to be able to create value from it (Sharma, Mithas & Kankanhalli 2014). According to Mithas, Lee, Earley, Murugesan and Djavanshir (2013) it is known that enterprises have a hard time or do not know how to make complex decisions that will result in business advantage. The usage of big data shows that it can actually make these complex decisions. However, if a "radical shift or incremental change" is represented by big data and business analytics is still a debate. These new capabilities that are leveraged by developing new strategies are still in an early stage.

According to Hopkins, LaValle, Balboni, Kruschwitz and Shockley (2010) *"Companies are becoming more data driven in ways that are new, raw and – in many cases – untested. And now so are we: We are trying something new by letting the data come first, without a lot of editing or parsing"*. It is argued by Hopkins et al (2010) that today's organizations are in an inconsistent sate of mind, organizations are overpowered by the vast amount of data that is collected. The inconsistent state that appears in organizations makes it hard for executives to understand how they can benefit from analytics because they do not understand it and they struggle with how to use it to be able to accomplish business results. Hopkins et al (2010) describes organizations that are analytically sophisticated, which means that they are most

likely to adopt new analytic techniques twice as more than organizations that are in the beginning of the analytical journey.

2.1.1 Business analytics

Business analytics can be classified in terms of three different types of analysis, as Descriptive, Predictive and Prescriptive analytics. Descriptive analytics takes available data to describe what is happening, for example visualizing search terms by popularity in regions and by time using Google Tends. Predictive analytics is using past data to forecast the future, which is routinely used throughout all aspects of business. Prescriptive analytics uses past data together with a decision model, to reach an actionable recommendation (Vahn 2014). Even if these three different types exist, Power (2015) argues for Retrospective instead of Descriptive, and defines each type of analysis differently. Power (2015) defines the part of Retrospective as tools that are manipulated using historical data and quantitative approach; this is used for inferences on the future and to understand the different result and patterns. He agues then for that this is the part of business intelligence. Power (2015) continues with describing the part of Predictive analytics, and his meaning of it is to understand the future with usage of models and different scenarios that appears from historical data. He also defines the meaning of the word Predictive as 'looking forward' and 'making known in advance'. Furthermore, Power (2015) defines the last part of business analytics as Prescriptive, this part he agues is where organizations should use their real-time data, that they think might trigger future events in the organization. The real-time data has to be planned, and be quantitative analyses. The part of Prescriptive analytics is that it recommends actions to be made. Furthermore, even if these different definitions and manipulation techniques of business analytics is somewhat alike, they still differ in definition. In our understanding Power (2015) has take the real meaning and the manipulation of data with these business analytics technologies.

According to LaValle, Lesser, Shockley, Hopkins and Kruschwitz (2011) organizations must understand how the use of analytics can improve their business. The lack of understanding is the biggest downfall within organizations today. Followed by Marshall, Mueck and Shockley (2015), which states that organizations that are seeking to innovate, big data and analytics have become crucial. Even if many scholars argue for how crucial business analytics and big data are for organizations that tend to innovate, re-orient their organizational culture, asset new knowledge, or obtain more value and insight, it is easier said than done. According to Mithas et al (2013), as much as 55 percent of big data projects fail because it was never possible for the project to reach it is objectives, others are not completed because the outcome is not clearly defined.

Furthermore, Mithas et al (2013) argue that for organizations to be able to leverage business analytics and the potential of big data they must synchronize their capabilities and strategies. Sharma, Mithas and Kankanhalli (2014) argue that business analytics and other related technologies that can help an organization to 'better understand their business and markets' and 'leverage opportunities presented by abundant data and domain-specific analytics'. Further, they argue that the positive outcome that can be gained from an analytic insight, are the value that is added to day-to-day operations and future strategies. Early (2014) argues that predictive analytics have existed for a long time and is nothing new to organizations and enterprises, for example the insurance industry has always been about predictive analytics. Continuously, it is argued that almost every decision that is made by decision-makers and senior leaders in business relations is predictive. However, regardless of the time line of business analytics existence, the data that organizations use and is relevant to organizational

intelligence is becoming diverse. The data can be aggregate, raw and amorphous, or more micro-level, defined and highly specific (Bhimani 2015).

2.1.2 Big data

Companies are today gathering a vast amount of data, and because of this there has been a significant change regarding capturing of data, retrieval, and storage. The datasets that are collected are now too large and too complex for traditional data-process systems to handle (Power 2014). According to researchers at IBM, the marketing term big data is described as having four dimensions; volume, velocity, variety and veracity. Followed by Gartner (2013) big data are defined as 'High-volume, high-velocity and high-variety information assets that demand cost-effective innovative forms of information processing for enhanced insight and decision-making'. Further, Vahn (2014) argues that big data are the core of operations at several big companies such as Google and Facebook. Moreover, the power of big data and analytics to solve business challenges and produce innovation has recently been realized across industries and organizations. Big data and business analytics is becoming a bigger criterion for enterprises that want to gain value that will result in competitive advantage. However, big data as a term is thus only useful if data are used in analysis, but have limited use as a label in research and for managers. Roberts (2012) argue that this is because big data is a marketing term and not a technical one. Roberts (2012) argue that using terms such as unstructured data, machine data and process data to be more practical than big data in research and practice. No matter the definition of big data, data are still data and in all of its complexity, even though many vendors often oversell technological opportunities. This is something that has happened with big data and analytics. This leads to that managers and organizational leaders can get disillusioned (Sorofman 2013).

Big data analytics are usually performed with specialized software tools like applications for predictive analytics, data optimization, data mining and forecasting. These processes or software tools are collectively separate; however they are very integrated functions of big data analytics (Taranu 2015). Continuously, the advances in big data analytics have allowed scientists to quickly decode human DNA and which gene that might be most likely to be responsible for some diseases. It also allowed trying to calculate which ads you are most likely to click on when surfing the Web. With data being so capable it is important for organizations to re-evaluate their approach to big data, including storage management and analytics as data are growing so fast and with the rise of unstructured data calculated to account for 90 percent of data today (Taranu 2015).

Organizations are able to draw benefits from big data, which means that they are able to act before competition on data insight (Bhimani 2015). Followed by Kiron, Ferguson and Prentice (2013), which argues that analytics is much more than gaining benefits and insight from big data and hand over those insights to decision-making people. The organization itself has to revision their analytical approach simultaneously so success can be achieved in long-term in a data-driven innovation. According to Bhimani (2015) new enterprise forms are trigged by novel technologies and that they depend on shifts of information appraisal to create added corporate value. However, to be able to "drive business value from data and information", which is dependent of the capacity of organizational processes. Continuously, influence, organizational power, and lines of authority have been redefined by the assessment of big data. Behavioral and political organizational consequences arise with the use of big data for enterprises to direct their enterprise activities. According to Marshall et al (2015) the potential for technological capabilities to generate competitive advantages is something that the most successful companies understand. These technological capabilities that those

companies apply are business analytics that they adapt on big data to create new knowledge and new potential capabilities that can result in a better strategy infrastructure and competitive advantage.

2.1.3 Data-oriented culture

According to Kiron, Ferguson and Prentice (2013) why organizations implement analytics and use these to extract new knowledge out of data are to drive business decisions. When the outcomes of new knowledge are to drive change, it is not divided to those who are in the hence advisable place to drive change. Kiron, Ferguson and Prentice (2013) state that *"A data-driven decision culture is at it is beginning of being developed across the organization. It will be effective only if it is being embraced at all levels and everyone is empowered to access it"*. In a study made by Kiron and Shockley (2011) they found that at an enterprise level, a data-oriented culture has three key features:

1. *"Analytics is used as a strategic asset."*
2. *"Management supports analytics throughout the organization."*
3. *"Insights are widely available to those who need them."*

An organizations culture is about the practice, patterns, norms, and behaviors within the organization that is divided among aims and beliefs. Some organization do have a culture from the beginning, and usually more often than not, but an organizations data-oriented culture is developed over time. In a study made by Kiron and Shockley (2011) where they conducted a survey, which more than 4,500 managers, business executives, and analysts were respondents to this survey. The transformation of the organization to become more data-oriented, and one of their respondents said: *"What I am seeing from an organization perspective, is more of a focus on understanding what the data are telling us in order to use resources in the most efficient and effective way possible. People would have hypotheses or strategies that they would want to pursue through numbers. They would quantitatively analyze them, but for the most part, unless there was a glaring difference between the hypothesis and the analytics, people would pursue their strategies as long as they were compliant with our legal and regulatory requirements. That is pretty much going away. Because we are at a point where we can not ignore any data telling us the effectiveness of our business strategies."*

Furthermore, Kiron and Shockley (2011) argue that for organizations to succeed with competitive advantage they have to move to a more data culture and be in a creation to a data-oriented culture. However, organizations have to stand out on more competencies than only analytics; they have to stand out in competencies such as analytics expertise and information management. Furthermore, if the organization is not successful and lacks a strong technique in both competencies, critical support will arise in any data-oriented culture and will be highly vulnerable economic change, as well as organizational change. However, Hopkins, LaValle, Balboni, Kruschwitz, and Shockley (2010) argue that organizations cannot succeed with analytics without any cultural change. They argue that the traditional companies of the 20th century have a hard time to find the right way with cultural change. Information flow, decision-making, and experimentation has to be more centralized in the organization, it is critical that in order to share information, data has to be regulated.

2.1.4 Business analytics and big data's value in organizations

There is little to no debate about the importance of big data and analytics today and how they can be used to support the strategic goals of an organization. However there is not any consensus so far in how to best organize analytics and core processes within the organization they must support. Grossman and Siegel (2014) have developed an organizational framework for this reason to integrate IT, analytics and business knowledge using four questions.

1. *"Does the organization view data and analytics as a key function of the organization, similar to the way that finance, information technology, sales and marketing, product development, etc. are viewed as functions of the organization? Analytics must be perceived as valuable to the business units in order for it to be integrated into operations.*
2. *Is there a critical mass of data scientists? Without a critical mass of data scientists, there is insufficient domain knowledge to address all the problems of interest. Also, there is not deep enough knowledge of the analytics infrastructure to obtain or create the needed data and to manage the data that is obtained. Finally, there may not be deep enough knowledge to deploy statistical and data-mining models in operations.*
3. *Are there data scientists with sufficiently deep knowledge of the business unit domains? Without such knowledge, it is difficult to build models that bring value to the business unit. Deep knowledge and complex business problems tend to spawn specialization. It is important for an analytics group to include a mixture of data scientists, some of whom are generalists and others who are specialists.*
4. *Is there an adequate analytics governance structure? A governance structure helps stakeholders make decisions that prioritize big data opportunities, obtain the required data, deploy analytical models, and support measurement of the business impact of the models."*

The way organizations create and capture data has changed the way we live and conduct business. This change is gaining momentum with business leaders, analysts and academics. It reflects a change that we are on the edge of an analytics revolution that may change on how organizations are managed, as well as change economies and how societies are operated. Kiron, Ferguson and Prentice (2013) surveyed together with the SAS institute in 2012, and 2500 employees with a majority being executives of some sort were asked questions about the use of analytics in big data. In this survey 67 percent reported that the organization they worked at were gaining a competitive advantage with their use of analytics. Within this group they identified several companies that were using analytics both in getting a competitive advantage, but also to innovate. These organizations constitute the leaders of the "analytical revolution" and vary in size and across industries using different business models. However, one thing combines them and it is their attitude towards analytics and Kiron, Ferguson and Prentice (2013) grouped this into three characteristics that were found among these organizations:

1. There is a belief that is wildly shared among data analytical positive respondents that data are a core asset, and that it can be used to enhance all parts of an organization such as daily operation, customer service, marketing, and strategy.
2. They use more data more effectively for faster results.
3. Senior managers support the idea of analytics and feel compelled to shift resources and power to those whom can make data-driven decisions and embrace new technology and ideas to make those decisions easier.

A study made by MIT Sloan Management Review together with the IBM institute for Business Value LaValle et al (2011) resulted in new ways of the use of analytics and different paths to reach insight and value from core operations. This study demonstrated that three new levels of analytics capability emerged, Aspirational, Experienced and Transformed. Continuously, each of these levels represents and describes a certain organization in their development and adoption of analytics. Aspirational are organizations that are the furthest away from their analytic goals and achieving these, Experienced are organizations who have some analytic experience, Transformed are organizations that have significant experience and

these organizations are able to across a broad range of operations adapt analytics that obtain value and insights. Moreover, for each category that an organization is a part of has different motives, functional proficiencies, business challenges, key obstacles, data management, and analytics in actions of how they should adapt their analytics and how the organization can be improved. Followed by this, LaValle et al (2011 p. 25-29) advocates five different recommendations that organizations should focus on and follow to succeed with analytics. These are (1) *"Focus on the biggest and highest value opportunities"*, (2) *"Within each opportunity, start with questions, not data"*, (3) *"Embed insights to drive actions and deliver value"*, (4) *"Keep existing capabilities while adding new ones"*, and (5) *"Use an information agenda to plan for the future"*.

Sharma, Mithas and Kankanhalli (2014) argue that insight and value from data do not appear automatically because of the adoption of business analytic tools. They argue that they appear through active processes of engagement between business managers and analysts who are using business analytic tools to discover new knowledge in the data. Importantly, processes for decision-making and existing structures are those places whereas these engagements take place. Moreover, improved performance gained through the use of business analytics, organizations must better understand the insight generation process so that they better can understand how the use business analytics actually can lead to improved performance. Continuously, Sharma, Mithas and Kankanhalli (2014) argue that current business analysts and managers need a better understanding of how existing routines, decision-making processes, and organizational structures affect the ability to generate insights. There is an abundance of easily accessible and inexpensive data to support decision-making in organizations. But using data in supporting decision-making is not a new phenomenon and it falls under business analytics. However, in big data the information is so vast, and one can collect much more information about any relevant element in decision-making (Vahn 2014). Stated by Early (2014) in terms of human judgment and expertise, which was until the last decade the way that business decisions used to rely on, is no longer a fact. Because of the entrance of big data it is now argued that predictive analytics can be applied to processes of wider range in enterprises (Early 2014). In a study made by LaValle, Lesser, Shockley, Hopkins and Kruschwitz (2011) organizations and senior leaders are still wondering if they actually gain full value from the existing information in the organization and how to obtain value from big data and analytics in better ways. Continuously, Bhimani (2015) argue that for enterprises to reach the core of enterprise strategic processes the large base of operations of data has to be retrieved, analyzed and interpreted so that concomitant decisions can be to a sufficient degree significant. Furthermore, influences on strategic processes are the rise of more technologies for the collection of data, processing and storage equipped to address big data issues. If enterprise structure can be defined by strategic pursuits, then conformant shaping is required by the deemed information flows. Effective strategic action is likely to have a faster growth when enterprises' decision-making is based on big data and is manifested through networks effects.

As we move into a society driven by big data, a lot of the ways we think about the world will change, but despite much hype and promise of big data one can say that today's big data will just be tomorrow's data. If we are to achieve anything near to what the marketing term big data claims, Kiron, Ferguson and Prentice (2013) argue that it will need to become a key basis of competition and to underpin new waves of innovation, productivity and consumer surplus. Analytics in big data is not just about generating insights and get these to the right people. Sustaining the long-term success it is necessary to continuously revise analytical approach so that new insights can lead to more competitive advantage and innovation. In short:

"Organizations need to find new ways to apply analytics to refashion the advantage the gain from data" (Kiron, Ferguson and Prentice 2013). Those companies who are in the forefront of analytics have developed a supporting mindset about analytics and the use of data across organizational activities such as making real time decisions. The forerunners tend to view data as a core asset, believing in the possible and are open to new ways of thinking. As a contrast those companies that are not in the forefront tend to use analytics as a cost reducing measurement, followed by increasing customer understanding and an acceleration of the development of new products.

In a study carried out by Marshall, Mueck and Shockley (2015) decision-makers and senior leaders within organizations take analytics to the next level and make it a value creation. It is argued that leaders and decision-makers in organizations use three different main strategies to be able in an effective way combine analytics and innovation, these are: data quality and accessibility is promoted excellent, analytics and innovation is a part of every role, and building up a quantitative innovation culture. The study showed that 36 percent of organizations that use big data and analytics within the process of innovation and in terms of outcome of revenue growth and operating efficiency are on the right path of beating their competitors. The ever-growing opportunities that are being leveraged by innovation to collect new data in a combination with external and internal data with the usage of applying big data and analytics to exceed competitors is what the leading organizations are investing in. According to Kambatla, Kollias, Kumar, Grama (2014) enterprises are just only starting to realize the potential for improved efficiency with the use of big data and business analytics. Many executives focus on how to gain more value from data, but for many companies this is something that emphasizes the wrong issue. According to Kiron, Ferguson and Prentice (2013) they are missing the key relationship between data and value: *"the connection between how much data is valued and how much value data can deliver".* The authors argue that the more data are valued, the more value data can deliver. And this is not only about investing in big data but also creating a culture where power confers analytics and how decisions get made. On the other side of the spectrum we have organizations that are analytically challenged. These can be associated with terms such as data deficiency, weak information value chain, a lack of collaboration and no "burning platform".

It is argued by Bhimani (2015) that big data adds an analytics property to current organizational capabilities, where the outcome possibilities form a variety of strategic reorientation. Further, it is stated that configurations of information pools in a wider manner gives big data challenges to enterprises, information pools such as social and economic, structured and unstructured, formal and informal, past and present. The potential of organizational data engagement is multiplied many times by big data. big data has direct influences on enterprise strategy processes and the shaping of it. Sharma, Mithas and Kankanhalli (2014) argue that for decisions to have value to operations and the organizations themselves, they need the have certain criteria. These criteria are 'quality' and 'acceptance'. The first refers to achieving its objectives and that if a decision is capable to reach this. The second refers to subordinates and other stakeholders, and if the decision is acceptable by them. How, where and when are the words that organizations face today, when they are asking themselves about analytics. This revolution of analytics is in a very early stage (Kiron, Ferguson and Prentice 2013).

3 Method

This chapter motivates and describes our approach to the research, how we have conducted it and accomplished it. The purpose is to give the reader an understanding of the methods and designs we have used in collection of data and the methods we have used in our analysis.

The purpose of this study is to investigate if business analytics has valuable to organizations in a traditional industry, which in the end will provide several recommendations and suggestions to the organization how they can befit from business analytics.

For us to collect data, we have to use a specific research method technique. The research method has different instruments that are specific for that method, for example questionnaire or interview. According to Bryman and Bell (2015) a research method is also connected with different research designs and the specific type of research design that is being used in the research should reflect the different parts of the research process in priority.

3.1 Research approach

In this research a qualitative research approach has been applied, the method qualitative research is a general and accepted method to use according to Bryman and Bell (2015). The purpose with this study is to find how and in what way business analytics is valuable to organizations in traditional industries. This investigation is carried out from senior managers and executive's perspective at the case study organization. Qualitative research offers the researcher to gain a wider and deeper understanding of relationships and patterns (Yin 2009). With the usage of qualitative methods gives our participants more freedom and flexibility to give detailed feedback on their perception of the reality and experiences (Bryman and Bell 2015). A semi-structured interview is a suitable approach to investigate the participant's perception and experiences of the asked questions and gain data around this. This research has only been conducted with the use of qualitative methods. Factors that cannot be measured or directly observed, qualitative data are collected to reach further knowledge about the participant's perception and experiences in this case study organization. Bryman and Bell (2015) argue about these factors that include feelings, thoughts, intentions, and behaviors. These factors are important because the questions we asked our participants are not only about knowledge about data management and business analytics, but also their perception of it, their thoughts, intentions with data and business analytics.

A qualitative research strategy answers the research question in the most appropriate way according to Patel and Davidson (2011) that describes a qualitative research strategy means that the researchers have focused on collecting "softer" data. Patel and Davidson (2011) argue that the choice of research method is concerned with the problem statement and what the researcher want to investigate. If the questions that is being asked is where? How? What are the differences? Then the research should take a statistical methods and a quantitative approach according to Patel and Davidson (2011). But if the problem is to interpret and understand peoples perceptions and want answers to questions such as; what is this? What are the underlying patterns? Then the researcher should use verbal analysis methods according to Patel and Davidson (2011).

3.2 Case description

The company we chose as our case in this research is Company X. The company is a big enterprise in Sweden and is Sweden's biggest distributor and has the biggest market share in Sweden. The company is located in Malmö and Gothenburg, Sweden. The company has total

revenue of 2437 million Swedish crowns and has 1500 employees. The company produces dark bread, light bread, pastry, Swedish toast, hamburger buns, and hotdog buns. The company's headquarter is located in Malmö, and is where are the decisions is made. We interviewed executives within economy, IT, marketing, and finance. The executives within each field was interviewed and asked the same questions, during the same circumstances except one executive, which was interviewed over the phone and was recorded with the help of a Jabra speaker. We visited the company's headquarter in Malmö to interview our four participants for this study. Regarding the participants' privacy and the organization's privacy to keep the given information anonymous, we have chosen to call our case study organization for Company X and all the participants will be called executives or managers in the result part and analysis part, to keep their identities anonymous. We chose to have the organizations identity and the participant's identity anonymous because of the sensitivity of the collected samples and data, and so that the participants could feel secure and safe to answer our questions. During our data collection we have made sure that all the participants have been fully informed about the purpose of the study, what will happen with the information they give out, and that they are anonymous during this study.

3.3 Research design – Case study

Yin (2009) describes five different kinds of research strategies: experiments, surveys, case study, histories and an archival analysis. A case study approach can be described with questions such as how, what, and why. Selection of research strategy, with consideration to the research situation a case study have been selected as strategy to this study, and Company X as a case. The research made in this study is therefore mainly directed to the single case of Company X. The main reason for choosing Company X as the case is because to see how it works in a big traditional company, and discover how they continuously keep up with the constant evolving and fast moving market and how implementing new technologies help to keep up and stay ahead of the competition. Moreover, we got a better understanding of the constant struggle this company has with a rich history that now needs to change and reinvent itself to stay current in this revolution. This research aims to gaining a deeper understanding of how and in what extent that business analytics is valuable in traditional industries and in this particular case.

We started off choosing to do a case study of a single case of the company, Company X. We made contact with this organization through the organization's CEO (Chief Executive Officer), who was happy to help us to connect with key individuals and other executives in the organization that are working with business analytics and data in some extent. After it was decided by written agreement between us and the CEO that we were allowed to conduct a case study at their company, we made contact with the key individuals and executives that the CEO recommended that we should talk to.

3.3.1 Data collection method

Case study data collection – Literature Review

To answer the question to this case study, we began with a focus on current research within the area business analytics and data management, using this as a base to develop our research and the continuing process of this thesis. At the beginning, the research was concentrated on getting a comprehensive understanding of the specific topics in our research. These topics include business analytics and big data in enterprises and organizations, what is business analytics and big data, where does it work, why does it work, and why it is so crucial for business today. Researching this we found that we had several questions concerning not what business analytics entails but how it is applied in a real world scenario. A lot of research

focused on analytically inclined organizations that were being in the forefront of the "analytical revolution" according to Kiron, Ferguson and Prentice (2013) and the dos and don'ts not in business analytics. But we found little on the real struggle many elder organizations had on catching up on the latest technology trends. We found that our case has an old culture and business mind set not completely on pair with successful business analytics frameworks proposed in many researches. For us to be able to build up our theoretical framework, we mainly used us of Google Scholar and University of Borås search engine Summon. Both of these are search engines we used to find relevant theoretical and academic articles in our research area. We used the keywords big data, organization, business analytics, decision-making, business intelligence, and data to get relevant articles to this study. We also used technological blogs and the Gartner network to get relevant articles and research in this area. From the search of academic articles we found that MIT Sloan Management Review had done a series of business analytics and big data surveys together with IBM, that we used as a fundamental base.

When the reviewing of literature was done, and had a more specific direction of what the problem was, and other related information in that area was supported. We started off with developing our theoretical framework that was based on the academic article and research that was collected. After that we started to design a semi-structured questionnaire that had the theoretical framework as a base.

Case study data collection – Designing a semi-structured interview

The approach we had for us to design the semi-structured interview guide, the usage of the collected literature was necessary to take into account. For us to be able to ensure that our interview questions and topics covered the most important aspects of our study we created our interview guide according to Bryman and Bell (2015) recommendations and also according to Yin (2009) recommendations within case study research. Bryman and Bell (2015) and Yin (2009) describe how an interview guide is developed in best ways. According to Yin (2009) asking good and relevant questions in case study research *"requires an inquiring mind during data collection, not just before of after the activity"*. We had to have the ability to ask and airs good questions, which is a prerequisite for any researcher in case studies. When we started to develop our interview guide, we started with deciding briefly which topics that was the most critical to answer our research question. After this approach we dug a little bit deeper, developing questions within each topic so that the interview had some structure but still having freedom to be evolved and develop the answers in its own way.

When designing our interview guide we chose to do a semi-structured interview because we wanted to see how each key individual saw and described the organization in terms of how they work with data management and business analytics, but also to see if the goals, analytical thinking, understanding and other aspects are something that exists through the whole organization. Semi-structured interviewing gives a good freedom of how the interviewee wants to formulate and develop the answers. Interviewing key individuals with decisive responsibilities allowed us to understand the driving factor behind the case's business analytics, what works and what has not worked in this process. We chose to implement a semi-structured interviewing with our participants because we wanted to keep it on a relaxed basis and keep it on a conversation level, since the participants is not so used be interviewed in this manner, we thought it was best to have the interviewing in a less formal way. We used an interviewing guide with topics and questions to be covered when conducting the semi-structured interviews. This allowed us to ask questions upon the basis of the interviewee's answers that we picked up during the interview. We chose to target the sample we wanted,

which is a purposive sample since we wanted to target interview executives from several key positions. To answer our research questions we took a purposive sample within our single case, gathering information by conducting semi-structured interviews with executives from several key positions. Collecting this data allowed us to "*better understand the information infrastructure and culture within the organization"(Yin 2009 p. 56).* The goal during our interviewing was to keep a rich dialogue with the respondents and to be able to encompass the evidence.

3.3.2 Data collection analysis

The data collection analysis is a fundamental part of this thesis; the data analysis is mainly required to support the outcome from the interviews. Literature review and interviewing has been the approaches used to data collection in this work and they are all very helpful to understand how valuable business analytics is in this case, how data are supported in the organization, and how each executive see analytics and data and the managements of this in the organization as whole.

Case study data analysis – Analyzing a semi-structured interview

The interview guide that was developed was not sent to the participants before the interview. We chose to not give them a heads up on what to answer on the questions. We chose to do it this way because we felt confident that the questions that we asked, are questions that they should be able to answer, considering their position within the company. The participants only got to see and hear the questions during the semi-structured interview. After the interviewing was done, key words from the interview and the audio recorded files was collected. Since the interviews was audio recorded gave us the possibility to transcript these interviews to text transcripts. This means that four interview guides were filled up with answers from each interviewee.

Qualitative method analysis that is recommended when analyzing interviewed data has several steps according to Bryman and Bell (2015). When analyzing our collected data we followed these steps that Bryman and Bell (2015) recommends. When analyzing our data collected throughout semi-structured interviewing the first step is to start with transcribing the audio-recorded interviews. This turned out to several pages of text from the interviewee's answers. After this we followed further instructions made by Bryman and Bell (2015) and made a quick and short index of the transcripts and made field notes and keywords during this. Furthermore, these keywords and field notes are called "coding" according to Bryman and Bell (2015).

While reviewing the transcripts and field notes we made marginal notes on data that was significant. By using coding when analyzing and reviewing the transcripts we were able to bring forth index of terms, this approach is highly recommended by Bryman and Bell (2015) and we chose to follow theirs recommendations in the analyzing of our data. When the coding was done, five main areas arose from the coded data. These are:

1. The evolution of future data
    - This section describes the results whereas the company sees itself in the future, regarding data and analytics, and how the attempt to take up on the challenge that the evolution of data brings.
2. Analytics as a strategic asset
    - In this part we outline the results from the study on how and if the company is using analytics as a strategic asset. It involves if they are using analytics in a

strategic manner for future decision relied on data and how they are applying it in the organization.

3. Managerial support of analytics
    - In this section we describe the results regarding if there is any managerial support for the use of analytics, if executives feel and think it is necessary to use it, and how they want to use it.
4. Availability of insights
    - In this section we clear out the results whereas if there is an availability to gain insights in the organization, for the future and new knowledge.
5. Data management
    - In this section we state the results on how the company is operating with their data management, and their view on it.

When the coding was finalized and five thematic areas arose form the coded transcripts, we started to analyze these themes in a thematic analysis, recommended by Bryman and Bell (2015). This type of analyzing data where thematic areas appears from coded data are called according to Bryman and Bell (2015) thematic analysis. We chose to use this kind of analysis because we wanted to create theory from the collected data. Even if this is a case study of a single case, and that an intensive analysis of a single case, with a thematic analysis approach, the main reason was to create theory for the research question. Even if this type of theory does not apply to generalization in the area, it is still interesting to investigate how it works in an organization as Company X.

3.4 Evaluation method

To be able to evaluate the quality on research papers and articles that we have used, the quality has to meet certain criteria. Yin (2009) recommends four different tests, each with its own tactic within a case study research, depending on phase of the research the tactic occurs; these are:

- Construct validity
- Internal validity
- External validity
- Reliability

In our case study we chose to use Yin's (2009) recommendations with construct validity, internal validity, external validity, and reliability.

3.4.1 Construct validity

To be able to represent construct validity in the results, Yin (2009) recommends three different tactics to approach it. These are the following: use multiple sources of evidence, establish chain of evidence, and have key informants review draft case study report. The first two take place in the data collection phase and the last one in the composition phase. In our case study we chose to have the key informants review draft case study report to be able to increase the construct validity in the report, which means after we were done with the transcripts from the interviews we send each one out by e-mail to the informants so that they could confirm the information that had been said during the interview and secure that nothing was wrong with the collected data. We chose to not send out our interview guide ahead to the participants because the case study is concerned with a focus on contemporary events.

3.4.2 Internal validity

In the internal validity part Yin (2009) recommends four different tactics to reach internal validity in a study. These are the following: do pattern matching, do explanation building, address rival explanations, and use logic models. All of these tactics that Yin (2009) recommend take place in the data analysis phase of the study. In our case study we chose to do pattern matching. We chose to use relying on theoretical propositions as a strategy in the analysis of the data and then use pattern matching as an analytic technique. The pattern matching technique use empirically based patterns with a predicted one (Yin 2009). If our empirically based patterns actually match with a predicted one and the patterns co-occur, our results will help to strengthen its internal validity.

3.4.3 External validity

In the external validity part of a case study, Yin (2009) recommends two different case study tactics; these are use theory in single-case studies, and use replication logic in multiple-case studies. Both of these take place in the research design part and we chose to use theory in a single-case. According to Yin (2009) external validity deals with different problems, but the main one is about the contiguous case study and if the findings in the study is generalizable beyond it. Yin (2009) argues that several critics has debated that case studies within a single-case often represent a poor basis for generalizing, but most of these critics are concerned with survey research since the sample is supposed to generalize to a larger universe.

3.4.4 Reliability

In the reliability part of a case study, Yin (2009) recommends two different tactics for the study to have reliability, these are to use case study protocol, and develop case study database. These tactics occurs in the data collection phase and we chose to use a case study protocol so that the study would have more reliability. A case study protocol is the same as an interview guide according to Bryman and Bell (2015). This was used to be able to minimize the biases and errors in the study (Yin 2009). We used a case study protocol so that other investigators would be able to replicating the study, which means conducting the same study all over again, but with its own outcomes and conclusions of the study.

4 Results

Company X is a big enterprise in Sweden, located in Malmö south of Sweden and Gothenburg southwest of Sweden. The company had a total revenue of 2473 million in 2015, and has around 1500 employees, and is Sweden's biggest distributor. The company produces dark bread, light bread, pastry, Swedish toast, hamburger buns, and hotdog buns. The company has production in both Malmö, and Gothenburg with there headquarter located in Malmö. The persons that we interviewed for this study is four different executives, that work in different departments within the company. We interviewed executives within economy, IT, marketing, and finance. The executives within each field was interviewed and asked the same questions, during the same circumstances. Company X is using several different systems for their data collection, manipulation on data, and analyzing data. In their business intelligence part the company is using Qlikview, TM1 – sales forecasting, and Cognos controller. The business intelligence part has direct connection to the company's data warehouse. Besides the business intelligence part of IT the company is also using different business applications such as MS Dynamics AX (Finance, customers, suppliers, invoicing, fixed assets, inventory, purchasing, and MPS), OPTO (invoice scanning and approval, management of agreements, archive for invoices and product costing), VUDIA (production planning, Logistics, vehicle DB), Handheld terminals (HT-server, administration tools, forecasting, routing and mobiONE gps, CRM), HR (Agda salary, Agda time, Adato), General (domino). In the company's IT infrastructure they have Server Operating Systems, Active Directory access control, VPN, Firewall, TSM-backup, WM-ware – server virtualization, SAN-storage Area Network, Exchange, Sharepoint, MS Office. All three parts of the company's IT, business intelligence, business applications, and infrastructure is integrated and has access to the data warehouse in some extent.

4.1 The evolution of future data

In this section we present the result regarding the company's view on the future of the evolving process within data management and analytics. Where they want to be, where they want to grow, and the challenges they see themselves facing. Company X has a strong vision and will to develop within the company. There is a willingness and need for better data. The organization has a very clear understanding of what needs to be done. The main problem that is in need for assessment and integration is the organization's processes. The current processes in the organization are not fully integrated, as they want it to be, which shows a miscommunication between departments and executives. Development and projects within departments is unknown to the others in some extent, which makes it harder for them to reach for help from other units when needed. Executives want the silo way of thinking on data to disappear from the organization since it does no good. There is also a need for change among those in the thinking of *"we have always done it this way"* mentality.

The major problems within the organization when it comes to data are the external data sources. These sources forcing the company to trust the data that is bought from external sources such as retailers and other organizations for market data, sales data, category data and more. In the past, the company has received numbers and data that are incorrect from their external sources. There is also a low level of collaboration between the company and external sources, such as retailers that is not willing to give up data about their products. This is something extremely desirable for the organization that they want to achieve. But there is also a cultural issue where information is not taken to heart among some managers, not looking to how their decisions might affect their coworkers, or just bluntly ignoring the stated facts, sub-

optimizing several processes on the way. But as the organization keep evolving these "bottle-necks" are slowly disappearing and catching up to current technologies. There are still many issues to combat, making a better governance structure for analytics, to make better and informed decisions.

4.2 Analytics as a strategic asset

In this part we outline the results from the study on how and if the company is using analytics as a strategic asset. It involves if they are using analytics in a strategic manner for future decision relied on data and how they are applying it in the organization. It is clear that the company is using different business intelligence operations to do manipulation on data, such as Qlikview, TM1 – Sales forecasting, and Cognos controller. These BI applications have direct connection to the company's data warehouse. The problem that the company had three years ago, was that they have always relied their strategic assessment on internal data, and the argument for this was "it has always been done this way". Why the company has not changed their way of using data for a more strategic manner is unknown. However, the company realized three years ago that they wanted to do better decisions on data, with the help of analytics, and move from human judgment to a more data based decision-making for their strategic assessments. One manager argues for the way they have used gut feeling for decision-making in the earlier years, and that these decisions is made on sales data, and different kinds of marketing data. Further, decision-making has only been made on gut feeling in the company for this kind of data. The company can argue for that the people in charge for these decisions have done an incredible work, since the data collection purely have been internal data, and without relying on analytics for the strategic assessments. One executive described his arrival to the company and what the fact was on decision-making then:

- *"When I arrived at Company X a few years ago, the main problem was then to make better decisions based on data instead of human judgment and gut feeling".*

Acting without information comes up several times in the interviews, and could be seen as a systemic issue, one manager whom seems to be somewhat frustrated says:

- *"[…] Gut feeling still influences decisions and it is not always based on the new knowledge that I brought, can be really frustrating. I can show an analysis on that a certain approach will not work, and then they choose to do it anyway."*

Today the company is collecting internal and external data, and using internal and external data together to apply analytics operations. However, the company does not apply analytics and data in the wide range that it can be view as a core function of the organization. The company does not even view it this way, even if some executives feel that data and analytics needs to be a core function of the organization for them to be able to apply analytics, gain new knowledge and make better decisions on data so it is beneficial for the strategic assessment. However, even if the view on data are debating within the company, on what kind of position it should be, they do consider some of their functions and systems as business crucial. One executive argues that these systems that are considered as business crucial is those that relies closely to their production.

Since there is no view of analytics as a core operation, it may be more involved in operations as the company goes forward. Something that has changed the company, the last years is that the view on analytics and data, the view is now that is should become a core operation, maybe not as important as finance and production but no the less important. The importance of

moving to a more data-driven culture is recognized throughout the organization, to be able to do better decision based on data than on human judgment and expertise. This is something that is fairly new to the company, and the movement is going forward even if decision-making is not only based on data. It has been realized that there is a need for better data and better decision-making based on data. One executive described the decision-making process as this:

- *"I think, experiencing that 'it is not my area' and that we have a structure that is more organizationally bound than bound to processes. You take that data or information that is important for you, for example when working with campaigns, instead of looking at production making, and make sure that there is room in the production for that product. You start a campaign but you do not have the capacity for it, and then when trying to solve this, some other product might get pushed out instead of making sure you have the capacity and you make a production collision. Instead of looking across the organization, sometimes decisions are just made, not thinking about how it could affect other parts of the organization".*

Executives think that there is a combination if you decide using analytics or gut feeling. They like to see their tools as a way to support their decisions, but then it can be something else that makes one go against the analytical systems. The analytics definitely help the executives and other key individuals, but as of now they are a bit simple, so the organization should try to combine them with other tools to get more dimensions out of it. Executives feel that they are in need of more data and sophisticated tools. The analytical tools the organization use on daily basis to improve operations; executives feel that there is always room for improvements. The primary issues are that changes and improvements is always wanted, and they a desired fast and quick so it usually as something and roll it out before it is totally completed. The organization wants to make sure that current processes are working on the level they want before starting a new development project.

The governance structure is a part where the organization has been working a lot on, but there is still a lot that is needed to be more structured and to work with. Cooperation within the organization is according to executives quite decent, but there are some issues between processes, how decisions are jointly executed. Silo thinking is something that exists in the organization, key individuals are only looking at their own, and do not see how their decisions affect across the organization, this is something that the organization want to improve. The current silos in the organization that still exists are living their own lives; which are noticeable in the organization when updates are made in the enterprise resource planning system. The data that is updated does not match what smaller subsystems say, there is data inconsistency in the organization.

4.3 Managerial support of analytics

In this section we describe the results regarding if there is any managerial support for the use of analytics, if executives feel and think it is necessary to use it, and how they want to use it. The company has some support from executives when it comes to analytics. Few executives feel at the knowledge they have about analytics and data do not get the fully support from others. From one executive's perspective, what it is that is not working from the supporting part of analytics is that the support is there, but the understanding is not. It happens that individuals within the organization is analyzing numbers and data that one does not know where it comes from, the source. During this process a lot of questions pop-up about the content and what is means. The executives mean that there is a support for analytics and

working with it, but the knowledge about it and the understanding of the whole process from data source, to input, to analytical tools, to new knowledge is not supported throughout the organization. The problem is identified, as lack of knowledge among those working with the data and those with the possession of the knowledge is not always heard. The organization has an awareness of the need for analytical tools for them to access new knowledge and get competitive advantage, but the plan to get there is not yet accomplished. This shows an attitude to further develop the ease of use in analytics in the organization, but at the same times when interviewing other executives it become apparent that what one say, and what one do is not always the same as an executive puts it:

- *"Sometimes I feel confused about who makes the decisions one funny thing that I have experienced it that I can get confused and wonder when my boss say one thing about the result and the new knowledge we gained about for example a product that is not doing good in a certain market area, and then acts another way".*

4.4 Availability of insights

In this section we clear out the results whereas if there is an availability to gain insights in the organization, for the future and new knowledge. There is a need for sufficiently deep knowledge about analytics and data output are something critical. To have knowledge about the business own unit's domains, and that the awareness exists in the whole organization and that everyone in need of the analytics has the knowledge to understand it. In Company X, most brand managers, controllers, key account managers, and fieldworkers as well as regional managers work a lot with analytics and the insights gained through new knowledge. There is a huge knowledge in the company about the way to go. They are aware of that they have a lot of work left when it comes to process development and integration of units so that they can be able to synchronize these. The company is in a need of making sure that those in work within a process understand that the whole process and that they have all the information they need. The company has a lot to work with when it comes to their different processes and mostly to gain the information about their part of the process. Executives within the company are aware that not everyone understands the whole picture with the analytics, and that they can be better on that. For example the external analytics and information that is being sent out has to be taken down to a much lower level than the internal one so that it can be understandable. The organization had to skip analytical results and information that contained English words, and other fancy words. There is a clear understanding among the organizations executives that the lack of understanding of data, analytics, and analyzes among managers exists. Executives describe it as a time aspect, the longer you are within the organization, the more managers and other key individuals learn about it and its inner workings. But it is clearly that it is always a risk that someone can get too focused on their work and understands this, but the company is a big and there are several departments, but there is a case of trying to reach the bridge between the gaps. Within organization there is always a risk that one gets too focused on their own area and see things very one dimensional, one works in one area alone, and as long as ones deliver in that area the rest does not matter. Executives hope that they will have process owners do that there is someone to make sure that the knowledge is spread-out so it will be less sub optimized.

One executive thinks that over the years there has been a lot of focus on how it went, and how it went last year, that kind of information feels irrelevant. It is like treading water; the information is not used proactively like the organization should. All the data about market, sales and other daily business processes should just go without any problems or issues, it

should be business as usual, the organization should not have to look at it the way they do. There is a need for better data sources than are being used today and different data to generate better insights in the organization, as one executive says:

- *"We need to understand what is going on around us, internally and externally, and know what it is that affects it; this part is a little bit trickier. I do not know how many times we have taking out reports and analyzed them using different analytic tools during wage week; this phenomenon is so weird to me. We do not sell more products during wage week, and I have no idea why people around me think that we do. They see the data and the results, but they do not believe the data, we do not sell more during wage week and that is a fact".*

4.5 Data management

In this section we state the results on how the company is operating with their data management, and their view on it. The data management within the company has a clear structure. The company is today gathering data that has no clear goal in the organization. The data collection that is made of data that they simply choose to not interpret with analytical tools is only being stored with no purpose. Doing this, even if executives are aware of it that the do not use it, they chose to not act upon this. The choice of not use the data that is collected is because it is taking too long time for the organization to wash the data so that it can be useful. Their data warehouse is mainly where the data are being stored in the organization. The kind of data that the company collects from internal and external sources is sales data, production data, reclamation data, and data from maintenance system, salary data, staffing data, employee data, financial data, campaign data, and billing data. Not all of this data go into the organizations data warehouse, they can chose if they want to put in data from external sources into the data warehouse or not, it depends on the purpose of the collected data.

They can also chose to only temporarily store the data in the data warehouse. All the data that the organization is collecting to their data warehouse has a clear purpose and goal because there is a demand on that data. In general, they are gathering a lot of data that they do not use, and one executive wonder a lot of times what they are going to use the collected data for, why they are collecting it. According to one executive:

- *"You always think when you are designing systems that it is good to have all this information and data that you are collecting, but the truth is, it is not. Is does not matter which company it is, I think everyone is collecting a vast amount of data that they do not use because it is good 'to have or just in case'".*

The importance of the collected data for day-to-day operations is somewhat crucial since some of the collected data like market data and sales data are of high importance to daily operations. But there is currently a problem within the organization, which we discovered that they have to wash all their data. The process where the organization tries to wash the data and trying to go back to the source system where the input is so the whole chain does not get affected by it. The ERP system (Qlikview) has both pros and cons according to executives. When updates are made in the ERP system, silos that are living their own lives is noticeable, the data does not match what a smaller subsystem says. There is a belief in the organization that there has to better understanding among individuals about the data input. The general impression in the organization about the data management and data are that the understandings of data are missing and that is not generated throughout the organization.

The value that the company is able to extract from the collected data, the organization is trying to be more and more exact with the data to be more precise in the work, especially when key data are presented to other departments. There is a feeling of value to the organization's all departments of the new knowledge extracted from data; all the departments always have use of this to some extent. But if the new knowledge that is delivered to each department actually comes to use, is unknown. Even if there is a mismatch among the processes when is comes to valuable data management, there is still a high function on data quality in the IT department. The IT department is the one, which is able to secure data in the best way and make sure that the qualities of the data are of a high standard. This is why it is important for the whole organization and, that everyone understands the data and the data source so that data management can be carried out thoroughly, this is essential.

The importance's of that data are transparent and shows several aspects are a key in the company. It is important with transparent data so no matter who looks at it, it is the same information; it is a need for "openness" no matter to what kind of information that someone might look at. It is important in the organization that executives have access to the same information. Something that has become much better within the organization is the access of data. Before there was a lot of restricted data, and that is something that is still partly true in the organization but is much better today. At the company today there is a much larger group of personnel that can access the relevant information, and it is the same information that others are looking at, no matter where and at what level one might be in the organization.

5 Analysis

In this chapter an analysis has been made on the theoretical framework and the results material. The structure of the analysis is in a thematic way from the results material and analyzed together with the theoretical framework, how is the case different from theory and why it might be different. The structure is similar to the result chapter where every main subject is treated separately to make it easier for the reader to understand the content. This chapter is the foundation for the conclusion in our research question.

Companies are gathering more and more data today than just a few years ago. A vast amount of data needs to be structured, analyzed and stored, something that is becoming more and more complex. This is what marketers could refer to as the big data revolution (Kiron, Ferguson & Prentice. 2013). As technology and trends shift faster than many companies do, it seems like the companies struggle with keeping up with new technology. But it is not only about having the latest tech to be relevant as we understand from what Sharma, Mithas and Kankanhalli (2014) argue, but there is also a need to change the organization with these trends, something that insight and value from data does not appear automatically Adopting business analytics tools, but is a process that is actively engaging managers and analysts. At our case at Company X, how the "Big Data revolution" is affecting businesses, and how they struggle to keep up with new ever-changing technology and trends. In our interviews we find that there used to be a lot of uninformed decisions, something that for the company is changing ever so slightly every day, looking at the organization there is a struggle of changing from an older mind-set to adapt to new trends and technology such as big data. A manager told us that

- *"We want to integrate as much as possible in the same portal so that you can go in and gain access to as much as possible, and that is something that we have worked with a lot in the company".*

Interviewing executives within Company X we can see an organization where old meets new and the evolvement of new technology and how this not just affects daily operations, but the business culture as a whole, changing traditions and managerial values, giving us a case and an insight how the "big data revolution" might affect all of us.

5.1 The evolution of future data

It can be interesting to see what Company X is doing right now, but also where they are trying to go, as the technologic of big data and analytics is evolving so do other organizations. Looking at Company X's goals and attitudes toward their own future may give a glimpse also on how it does look like today as one could argue that how we look at things today affect how we will look at tomorrow. Big data projects that do not have a clear defined goal and tangible cases are often less likely to gain long-term value as many endeavors don't succeeded or are not completed. But projects like this can give a tremendous opportunity to transform their operations and better understand their customer base to better serve them and innovate in their markets. Looking at the journey of becoming an analytical practitioner, it's a hard struggle, and need to be based on sound approaches (Mithas et al. 2013). Changing the culture and work processes is not something that is done in overnight, and is something that is much harder than developing new technologies, and the expertise behind analytics (Kiron and Shockley, 2011). These five aspects correlate to that of Kiron and Shockley (2011) where they found three keys features of successful Data Analytical practitioners; *"1, Analytics is used as a strategic asset, 2, Management supports analytics throughout the organization, 3,*

Insights are widely available to those who need them" (Kiron and Shockley 2011, p. 60). This is something that also correlate to Grossman and Siegels' (2014, p.20) framework questions to integrate business analytics; 1, "*Does the organization view data and analytics as a key function of the organization, similar to the way that finance, information technology, sales and marketing, product development, etc. are viewed as functions of the organization? […]"* 2*," Is there a critical mass of data scientists? […]"* 3*,"Are there data scientists with sufficiently deep knowledge of the business unit domains? […]"*4*, "Is there an adequate analytics governance structure? […]"*. When analyzing the collected data, we get a top-down view of the inner workings of Company X and how they adopt data management and business analytics.

5.2 Analytics as a strategic asset

Looking at analytics and how it is used in Company X, research is an important tool to understand how this evolving technology is affecting businesses and employees alike. Before the computer data and information were collected and analyzed manually, but with the introduction of the computer this became a bottleneck. As this technology got refined, and as it continues to develop challenges capture, store, transfer and share that are related to system infrastructure, but also searching, analyze and visualize are related to analytical methods. In addition to this, different kinds of data raise new challenges to both of these aspects (Duan and Xiong, 2015) When looking to Company X, one does not just get an insight on how analytics are used today, but also a flashback of the organizations history, and future. An employee working with analytics told us during our interview:

- *"When I arrived at Company X a few years ago, the main problem was then to do better decisions based on data instead of human judgment and gut feeling".*

Seemingly Company X and its managers are often acting without information. This does not mean though that using "gut feeling" or intuition is wholly a bad thing, finding a balance between analytics and intuition is something we can see at most analytical practitioners and innovators (Kiron, Ferguson, and Prentice 2013). While Early (2014) argues in terms of human judgment and expertise, which was until the last decade the way that business decisions used to rely on, is no longer a fact, because of the entrance of big data and analytics. As Early argues that it was a decade ago that decision was relied on human judgment and that is no longer a fact, Company X can be seen as a company that is behind on the analytical approach. Since the company has started their new approach three years ago developing their analytics, data warehouse and other tools to manipulate on data. However, the company's strategic assessment is contributed with the collection of internal and external data, but the trust for data as a base on decision-making is not fully relied on. Furthermore, Kiron, Ferguson and prentice argue for that decision-making is a balance between analytics and intuition, this does clearly not exist within the company. Company X, still rely a little bit too much on human judgment and expertise, such as gut feeling, instead of trusting the data. This can be seen as the decision-makers that are involved do not have the knowledge to understand the data and the support analytics has for strategic assessments (LaValle et al. 2011). The company is fully aware of that seeing analytics and data as a core function in the organization is important, and is something they strive for. However, the more the organization trust analytics and the value it can bring, the more value can be adapted to their strategic assessment.

5.3 Managerial support of analytics

The value of data are nothing that appears automatically just because of the adaptation of data and analytics, Sharma et al (2014) argue that value appear through the active processes of engagement between managers and analysts who are using business analytic tools to discover new knowledge in the data. Looking at the attitudes among our interviewees and the attitude they perceive among other managers one can see how analytics is valued as, more data are valued by managers, the more value it usually can deliver. This does not, however just about monetary investments in data and analytics, but also conferring power to and creating a culture where analytics is a part of the decision process (Kiron, Ferguson & Prentice. 2013).

Managers feel though sometimes that they do not get the support they want from other departments as well as from higher up the hierarchy. This have been recognized through that an outcome from analytics shows that a decision should be made in a certain direction, but higher executives chooses to ignore what the data and new knowledge tells. This can be seen as ignorant behavior within the organization, since managers do not get to know why the decision was made in an opposite direction from the work that was made. As Marshall, Mueck and Shockley (2015) describe decision-makers, as they are those in possession of taking analytics to the next level, and are also those responsible for making analytics and new knowledge the value creation in the organization. From this it is clear that Company X does not fully rely on analytics and data, executives higher in the hierarchy cross lower managers in their analytical strategies. This can be connected to Kiron, Ferguson and Prentice (2013) argument about those executives and managers are missing the key point on the relationship between data and value. They argue that the more data are valued, the more value data can deliver. This is something that does not exist between managers and executives on different levels in the organization.

For the organization to be able to deliver value from data, data need to be valued the same way throughout the whole organization. This can be argued with that Company X is only on the beginning of understanding and realizing the support and potential analytics and data management can bring. Continuously, Company X is in a transferring sate, going from human judgment to a more data-driven decision-making. This means that understanding of analytics is not fully integrated between managers, executives and decision-makers, which is their biggest downfall today (LaValle et al. 2011). Results from that the support and the trust of analytics and data are not fully integrated in Company X is that research might be done and then not supported. The support for new knowledge, data and managers is something the organization has to strive for. Without the support, how can the organization receive value from analytics that it brings? It is important to generate better insights as well as understanding them, as good insights lead to better decisions. Acknowledging this and building a decision structure allowing for understanding and generating insights allows can lead to under covering new revenue and reduce costs throughout the organization (Sharma, Mithas & Kankanhalli 2014).

5.4 Availability of insights

Understanding how Company X works with the data they collect and the availability to those in the organization that are in need of said data. That is to understand how the insight that data deliver and how analytics are used for improved performance within Company X. Relationships between data and analytics as well as human insight is key to unlock new knowledge that can help in influence the decision-process and gain value for the organization (R. Sharma et al. 2014). The need for sufficiently deep knowledge about analytics and the data output is something critical, to have knowledge about the business unit’s domain, and

that the awareness exists in the whole organization and that everyone in need of the analytics has the knowledge to understand it. In Company X, most brand managers, controllers, key account managers, and fieldworkers as well as regional managers work a lot with analytics and the insights gained through new knowledge. In the company there is an understanding on where they do need to go to realize the potential of data and analytics, there is however compared to what need to be done and what is done a difference. When synchronizing work processes and projects are having issues where there is not enough insight to their own processes making some analyses mute as they can't be used because of a conflicting process. And even when this is not the case, through the discovery managers are complaining about not understanding what the new knowledge is saying. This leads to analysts needing to make their own analytics easier to understand, something that is good leading to a better insights through the organization, but this is something that is not completely working in this case, where educating and breeding a culture of analytical understanding could arguably be better as this is a time consuming effort stealing valuable resources from analysts improving and making better analytics available.

5.5 Data management

It is important that one distinguish the state of ones data, and what and what one is and not doing with it (Kiron, Ferguson & Prentice. 2013). According to Early (2014) managing data are a key that organizations must apply and be willing to methodically understand. La Valla et al (2011) recommends that to succeed with analytics one should "Within each opportunity, start with questions, not data" When looking at Company X it was important to look on the state of their data and how they derived that data to avoid issues and data deficiency as this according to Kiron, Ferguson and Prentice (2013) a characteristic for analytically challenged organizations and in the journey of becoming an analytically efficient organization this is something that is in need to be addressed.

So as companies are gathering more data today than just a few years ago. This data need to be structured, stored and analyzed, something that is becoming more and more complex as the gathered data grows in size and complexity. This growing data and the part of analyzing the gathered data are often described as big data (Kiron, Ferguson, and Prentice. 2013). And as technology trends shift and evolve faster and faster, it is not enough for organizations to have the latest technology to have a competitive advantage. Sharma, Mithas and Kankanhalli (2014) argue that there is also a need of change throughout the whole organization to be able to take an advantage of new technology. For many organizations there is need for a cultural change, in how managers think about technology, and how employees collaborate. Company X is a traditional organization within the food industry with more than a century of practice, culture and traditions. With this in mind following the development of new technology can be challenging something that we could see from our interviews with four executives from the organization. The value business analytics brings through data are something that does not appear directly, but is an active process engaging managers and analysts (Sharma, Mithas and Kankanhalli. 2014). When analyzing our data we divided the data into five aspects, to better understand how Company X is working to integrate business analytics into their organization. *Analytics as a strategic asset, Managerial support of analytics, Availability of insights, Data Management* and *The evolution of big data;* This to assess different aspects of technical availability, attitudes and plans for the future of Company X's big data integration.

6 Discussion and further research

This chapter is a discussion on the findings in the analysis, and conclusions of the research question. The chapter discussion several aspects of the case, connected to theory and the drawbacks of the case. The chapter ends with suggestions for future research.

Looking at Company X one can see an evolving organization trying to keep up with technological advances. Company X has a long history and a firm business culture and traditions on how things should be done, where there is a mindset of doing things the way it has always been done. When introducing new technologies into the company it creates a friction, where culture and processes is needed to be changed, and adapted for a new business climate. Going from as Kiron, Ferguson and Prentice (2013) describes it an analytically challenged organization to an analytical practitioner is not an easy task. What data to collect and what to do with that data to create value is in Company X's case a hard task to complete. When looking to the theoretical framework Company X does not live up to the standards, failing at several points. Kiron, Ferguson and Prentice (2013) also note that organizations have to understand what they want to do with the collected data before collecting it. This is an approach that has not fully been working or been integrated into Company X's governance structure and data management. Complex decision-making is still relied heavily on human judgment and expertize in the organization in a way that can result in a downfall if they do not rise up to the new technologies and the analytical challenge. This does not however mean that Data and analytics is not utilized within Company X these assets today, are a valuable resource in the case of Company X, but they are not fully integrated throughout the organization. There is an old mindset to how things should be done, which has resulted in data inconsistency, data redundancy, a lot of question marks about how different departments operates and a headache for the executives trying to further the technological advances within the organization.

Why Company X has not realized the potential and the revolution that comes with data and analytics may stem from different opinions on where to go in the future. Interviewees' mention several times that processes and other operations are mismatched both in information flow, data, analytics, projects, and trust in data. It is made clear through the interviews that individuals on all levels throughout the organization have lack of knowledge when it comes to understanding data, data sources, analytics and what it brings to the organization. There seems to be a feeling from those executives interviewed with the expertise knowledge of data and analytics are not being heard. The fact as one interviewee pointed out is that something needs to change, and that they have a need of going more to a data-driven culture to be able to gain full value of collected data, as many don't fully understand nor respect the capabilities of good utilized data analytics.

There are also issues within the company with external data, and the collaboration between departments using it. Units are collecting data without thinking about why, how, what should the data bring, leading to a lot of redundant data and data that managers have trouble extracting value from. There are also communication issues in this area, data analysts or data experts are not informed or asked about the collected data before a unit brings it in to the system, and may not have to full knowledge about data management and analytics. This results in that a lot of data needs to be washed before it can be used and bring new knowledge to the organization, sub-optimizing the new knowledge process. The data that needs to be washed is too time-consuming for Company X, which means that more data are collected than

can be used is stored, costing the organization not just money but also valuable time utilizing much more needed data that gain could possibly give greater value to the company.

If analytics are to bring value to Company X, more than it already does a cultural overhaul is needed to achieve this analytical challenge. There is also the need to integrate all of the processes as one respondent told, as with their current collaboration culture there is often a lack of oversight with managers and senior managers being more inclined focusing only on their part of the chain, not seeing how their actions affect other parties within the organization. There is a need to have a higher level of communication between departments but also throughout the chain of command to gain a better collaboration culture, something that would help no matter if data analytics if fully utilized or not as streamlining would arguably help the company no matter how data are used. During the decision-making processes key individuals need to get more familiar and understanding about data so that they are able to trust it, as well as to be more knowledgeable about the rest of the organization. Understanding how the decision-making process actually is affecting other departments is an important tool for senior managers not just for streamlining collaborations but also to see what data are needed to gain better value from their analytics. However, business analytics is valuable to the organization in some extent, but can be even more when they overcome the barriers the currently facing.

Questions marks are however still not straightened as whether the organization needs to take down the analytics on a lower more understandable level especially when it concerns external sources in the organization. There is a opinion that everyone involved with analytics has to understand the data, the new knowledge, the source and everything that comes with it, and if the recipient of the data that are to analyze it don't understand it that resource is mute as it would not be utilized. There are a few challenges ahead for Company X, but they are on the right track to rise to the analytical challenge. Looking at their progress and how they rise to the challenge of the data revolution one can see an evolving organization, with many obstacles ahead regarding data management, how they utilize current data as there is much more that can be done with what Company X already got. There are changes needed to be done within the organizational culture, managers, and employees alike need to better communicate and gain better understanding and to better value others work, as of now many don't have according to our interviewees' a full understanding of how their work affect others making overt tramps on others work, standing in the way in a way that can cause unnecessary costs and time consuming processes or hard solved scenarios that are needed to be fixed by other parties than the one responsible. Educating managers in analytics progressing to a more data-driven decision process can in the case of Company X prove to be very useful as when looking at the Company X. As a whole some managers don't trust the data given to them, going fully against good data and analytics. While Kiron, Ferguson, and Prentice (2013) argue that using intuition combined with data are a trait of analytically competent organizations, they do however find a balance where one don't take over too much, this is especially true when the data analytics capabilities is not as sophisticated. Regarding this there is still a need when looking to Company X to be more trusting in the data and analytics to rise from an analytically challenged organization to become an analytical user.

Looking at this case one does not only see how Company X is affected but one can derive the collected data and apply it on other organizations, deriving value from data is a complicated process that affects the whole organization from small processes to its business culture, being aware of how it affects company X and its likes may hopefully help other organizations to further develop and embrace technology. Organizations in the same industry or with similar

mind-sets as company X might have similarities with the company. Organizations that operate and have the same culture of thinking on data and the business processes in general can also benefit from data the same that Company X do, and will do in the future. Further, organizations in general that is trying to take on the analytical challenge, and are new to this might struggle the same way as other companies.

When looking at this case study of Company X, many questions arrive, looking to the support around analytics is great, but does not give the whole picture, questions of how and exactly what they do with data are touched upon further research into this subject would be of interest. Data and analytics is a complex topic that is constantly developing, and while the support and culture around it might be seen as a base of succeeding within the subject might not guarantee it. Having good technical solutions and processes is also important; even if the support would be fully institutionalized the tools might not exist in a way that true value can be derived. Further researching analytical methods would give a better understanding in how organizations like Company X face the challenge of big data and analytics. It could give a better tool from its research understanding how organizations may or may not adapt to new technologies such as business analytics and a better overview of what data to collect for similar industries and how to utilize said data to derive more value from a more technical standpoint.

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Appendix

Interview Guide

Interviewee:	Interviewer:
Location:	Interview duration:
Date:	
Objective:	Reminders:

Agenda:

Introduction
Background
Overview of interview.
Topics that will be covered
Permission to record
Summary
Questions from interviewee
Closing

Organization

- *How does your organization view data and analytics as a function of the organization?*
- *How does the collaboration culture work? Does it exist between units within the organization?*
- *How does the information flow work between software and units within the organization?*
- *How does the formal hierarchy look like?*
- *How does the informal hierarchy look like?*

Data management

- *What kinds of data are collected?*
- *What are the goals with the collected data?*
- *Who works with the collected data?*
- *Who collects the data?*
- *Does the collected data influence day-to-day operations?*
  -If yes, how?
- *How is the organization working with the data?*
- *How does the organization gain new knowledge from data?*
- *How does your department gain value from data?*
- *How much influence does data and new knowledge has on decision-making?*
- *Do you think Big Data is a critical part of your work?*

Analytics and business intelligence

- *How many are working with analytics in the company?*
- *Do these have sufficiently deep knowledge of the business unit's domain?*
- *Do you think that the analytic tool that you use on a daily basis improves your department?*
- *Are the capabilities and strategies synchronized throughout the organization?*
- *Does business analytics help you to make better decisions?*

University of Borås is a modern university in the city center. We give courses in business administration and informatics, library and information science, fashion and textiles, behavioral sciences and teacher education, engineering and health sciences.

In the **School of Business and IT (HIT),** we have focused on the students' future needs. Therefore we have created programs in which employability is a key word. Subject integration and contextualization are other important concepts. The department has a closeness, both between students and teachers as well as between industry and education.

Our **courses in business administration** give students the opportunity to learn more about different businesses and governments and how governance and organization of these activities take place. They may also learn about society development and organizations' adaptation to the outside world. They have the opportunity to improve their ability to analyze, develop and control activities, whether they want to engage in auditing, management or marketing.

Among our **IT courses**, there's always something for those who want to design the future of IT-based communications, analyze the needs and demands on organizations' information to design their content structures, integrating IT and business development, developing their ability to analyze and design business processes or focus on programming and development of good use of IT in enterprises and organizations.

The **research** in the school is well recognized and oriented towards professionalism as well as design and development. The overall research profile is Business-IT-Services which combine knowledge and skills in informatics as well as in business administration. The research is profession-oriented, which is reflected in the research, in many cases conducted on action research-based grounds, with businesses and government organizations at local, national and international arenas. The research design and professional orientation is manifested also in InnovationLab, which is the department's and university's unit for research-supporting system development.

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