Drilling down into Business Intelligence
- A study of implementation obstacles

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Preface

We would like to thank all the participants of this thesis, including Jan Lindvall, our supervisor, the interviewees, providing their time and knowledge, our peers for great feedback and our beloved ones, for the support and encouragement.

_________________________  ________________________
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Abstract

Even though the development of business intelligence is moving forward rapidly, a substantial number of organizations are yet to implement business intelligence. Therefore, this thesis aims at investigating what internal organizational obstacles that could be hindering the implementation of business intelligence and how these obstacles could be overcome. In order to answer this, the Technological Acceptance Model combined with the notion IT identity, is used as the theoretical framework. This thesis is of an interpretivist nature and data was collected through qualitative, semi-structured interviews with six experts within the field of business intelligence, consisting of consultants and business intelligence managers. The identified obstacles could be connected to employees’ perceived usefulness being too low in relation to the perceived non-pecuniary cost. The proposed solutions aims at raising the perceived usefulness and lower the non-pecuniary cost through different methods presented in this thesis.

Key words:
Business Intelligence, Implementation, Technology Acceptance Model, IT Identity, Perceived usefulness, Perceived ease-of-use
Sammandrag


Nyckelord:
Business Intelligence, Implementering, Technology Acceptance Model, IT Identity, Upplevd användbarhet, Upplevd användarvänlighet
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1. Introduction

In May 2014 the Hong Kong based venture capital fund Deep Knowledge Ventures elected a new member to their board of directors, a computer named VITAL. Through high frequency trading algorithms VITAL would be able to handle large amount of complex data and therefore contribute with its own vote in decision makings regarding investments along with the other human board members (Wile 2014). All companies might not be ready to incorporate a machine as a decision-making board member, but the trend shows that companies in general tend to include more data and data generated analyzes in their decision making, such as Big Data Analytics (McElheran 2016).

Big Data was the main buzzword in the IT industry in the year of 2013; by that time it was presented on the peak of the hype cycle presented by Gartner (2013). This breakthrough of Big Data has increased the data’s impact significantly. The main cause being the three major characteristics of Big Data, more exactly its volume, variety and veracity (McAfee 2012). The reason behind the increasing amount of data generated is explained by the new generation of smartphones, sensor and other everyday used technical innovations (Yen & Keynak 2015). Furthermore, new technologies have made it possible to store and access the Big Data more easily and cost efficient than before, making it one of the most important competitive aspects among today's companies (ibid).

However, the data itself, is useless if the people supposed to use it do not know how to create business value out of it. That is why the analysis of data becomes important in order to make efficient and value driven decisions based on them (Spillane 2012). An umbrella term for technologies that have been used to improve and optimize decision making through the access and analysis of data is called Business Intelligence (henceforth, BI) (Gartner IT Glossary 2016). BI can therefore help individuals back up their arguments with the analyzed data or even make their decision based on the analyzes provided. Even though using BI may seem like an obvious choice for most companies, in order to, for example, predict sales, make effective advertisement and investments, the number of companies using BI is not represented in the way one could expect in today's technological company culture. Hence, the BI market keep growing by companies trying to adapt and implement BI (Gartner.com 2014). A common challenge for companies who want to implement BI in their organizations tends to be the non-technical factors of the company such as engaging its employees to become more
open to the changes BI will bring (Moustakerski 2015). Williams & Williams (2007) also pointed out the difficulties for organizations to adapt their operational process and decision making process in order to take advantage of the potential value that BI can bring.

Hence, the majority seems to agree regarding the theoretical potential of using BI to create business value through improved decision making throughout the entire organization (Ranjan 2008). However, many organizations are still facing great challenges ahead, in the process of implementing BI and those who have implemented BI may still struggle with getting the system to be used throughout their organizations (Viaene 2008). Even though there is potential business value to be gained from BI, there are internal organizational obstacles that hinders the implementation. The reasoning above leads to the research question of this thesis:

*What can be the internal organizational obstacles in the implementation of business intelligence and how to overcome them?*

### 1.1 Disposition

The disposition of this thesis is as follows. First of the theoretical framework is presented containing a review of the area of BI followed by the technology acceptance model and IT identity. Thereafter, the method chapter describes how the thesis was conducted in order to answer the research question, and why certain methods were employed, with their inherent advantages and disadvantages. Following the method chapter are the empirical findings. The empirical findings are divided into four subchapters, which are the main themes extracted from the information gathered from six different interviews. The findings will then be analyzed with the help of the theoretical framework. Conclusively, an answer to the research question is presented, containing the observed obstacles and proposed solutions, with suggestions on further research to the thesis.
2. Theoretical framework

This chapter will begin with introducing the concept of BI, with a brief look back how the concept came to being. Thereafter, a brief account of the concept and usage areas of BI will be explained, to provide the reader with an understanding of what is being investigated. Thereafter, the Technology Acceptance Model (TAM) will be introduced and explained, which will act as the ground pillar of the theoretical framework. Following this, the notion of IT-identity will be presented and finally be connected to TAM.

2.1 Business intelligence

2.1.1 The birth of business intelligence

Data driven decision support systems has been around since the first system was developed in the mid 70’s by Richard Klaas and Charles Weiss at American Airlines (Power 2004). A brief decade later developers at Procter & Gamble created what is thought to be the first BI-system which was a decision support system that linked sales information and scanner data (ibid). Even though Procter & Gamble built what we today would recognize as a BI-system, the term itself was not established until 1989 by the Gartner group. BI is an umbrella term describing several methods and concepts used to streamline decision making by using data-driven support systems (ibid). As the concept of data warehousing began to spread in the 90’s it allowed companies to access larger quantities of data to use in the BI-systems (ibid). Walmart, a company that adopted the trend of data warehousing in its early years had by 1995 access to 5 terabyte of data which increased to over 20 terabytes by the two following years. Later on in the 2000’s, business analytics was introduced as a further complement to BI. Finally, in more recent years Big Data with its characteristics of huge volume, variety and velocity has contributed to improve the possibilities of BI even further and that is the state which we find BI in the recent decade. (Chen et al. 2012).

2.1.2 The concept and opportunities of business intelligence

In short, BI was concluded by Negash (2004) as follows: “BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers.” Furthermore, BI is described as the providing of actionable information delivered at the right time, to the right
receiver for the right purpose (Parek 2007, p. 24). By combining storing, gathering, accessing and analyzing business data, organizations can improve the process of decision making (Shaw 2011). The usage of BI is therefore used for varying objectives among several industries. Retail industry may improve the accuracy of forecasting, manufacturers can improve inventory planning and telecommunications can increase customer profiling and segmentation just to name some advantages that BI can contribute with (Olszak & Ziemba 2006). Hence, the objective is to improve the accuracy and speed of the input for the decision maker, facilitating managerial work and by that increasing the overall organizational performance. This value generated by the use of BI in an organization is described as BI success by Isik et al. (2013). The definition of BI success differs between companies depending on the organization. The desired outcome of the BI may be lowering costs, improved efficiency or really anything else that favors the companies to its competitors. However, to measure the gains from using BI can be problematic since the purpose of using it differs from case to case and it is up to the companies themselves to determine when to consider BI success to be achieved. In general, BI success is achieved when positive value can be correlated with the use of the BI in a desired way. (ibid)

One of the major changes to BI systems in recent times is related to the changes in the structure of the data used by the systems. In the past BI usually had to handle structured data. However, as technology advanced so did the data with it and today's reality is that BI systems now have to analyze qualitative as well as quantitative data (Sukumaran & Sureka 2006). The qualitative data refers to data to be found in text image or sounds which means it cannot be used in usual mathematical calculations, creating a whole new level of complexity to the BI systems. Along with the more complex data the volume of it is also continuing to grow and is expected to expand at a rate of more than 30% every year (Manyika et al. 2011). Even though some sectors such as financial, retail and wholesale are predicted to get more use out of this ‘Big Data’ than others, the fact still remain that data problems are shown to be the most common objection to companies using advanced BI-systems in all industries (Isik et al. 2013). Increasing data complexity is a common problem in today's companies’ management of BI (ibid). However, the complex data would not be a problem if the company was facing problems to implement BI in the first place, since there would not be a system to handle the data. As Gartner (2014) reports the adaption of BI is growing by the number of companies that implements it. What is holding companies back from using BI, along with other new technologies, can be depending on how it is received on an individual level. If the people
forming the organization will not see the meaning of new technology it simply will not be used. How people relate and react to changes in technology will now be discussed in the following segments.

2.2 Technology acceptance model

In the late 80’s Fred D. Davis presented the article *Perceived usefulness, perceived ease of use and user acceptance of information technology* (1989), which investigated individual's willingness to embrace new technology. The main concepts that explain the individual's attitude was found to be the user's perceived ease of use (henceforth, PEU) and perceived usefulness (henceforth, PU). Davis made the observation that if a technology was perceived as both easy to use and useful it would form a positive attitude towards the technology which would lead to a more likely situation of actual using it. A model was then created to describe this relation and was named the Technology Acceptance Model (TAM).

![Figure 1. Technology Acceptance Model (Davis & Venkatesh 1996).](image)

2.2.1 Perceived ease of use and perceived usefulness

In the early research leading up to the first version of the Technology Acceptance Model, Davis studied the attitude of 152 users regarding the usage of e-mail. To identify the users PEU as well as PU a set of 14 different questions were asked to the 152 test objects regarding frustration experienced when using the technology, perceived flexibility and other aspects that might affect the usage. (Davis 1989) The results of the 14 questions was brought together into 10 variables each representing the PEU and PU of the electronic mail and showed a strong correlation for all ten variables (ibid). In a second study presented later in the article the PEU and PU was again tested and concluded, this time into six variables where five out of six showed an even stronger correlation compared to the 10 variables in the first test. The six
explaining variables of the PU consisted of the factors (1) work more quickly, (2) job performance, (3) increase productivity, (4) effectiveness, (5) makes job easier and (6) useful. Since users’ incentive to use new technology primarily comes from what the system can perform for them the PU was argued to be of strong correlation to successfully introduce a system to a new user. As for the PEU the six variables were (1) easy to learn, (2) controllable, (3) clear and understandable, (4) flexible, (5) easy to become skillful and (6) easy to use. The variables of the PEU concluded that the easier a system is to interact with and operate, the more time could be allocated to other activities. (Davis 1989)

Several researchers have been testing Davis’ results of the PEU and PU of new technologies. In a replica study created to test the variables used by Davis correlation was again shown between the variables and the PEU and PU (Adams et al. 1992; Dasgupta et al. 2002). Hence, both Davis and other researchers testing his model has shown significant results in order to describe individuals’ behavioral intention in terms of perceived ease of use and usefulness.

2.2.2 Behavioral intention and actual use

As proven, both the PEU and PU had positive impact on the attitude towards using a new technology which is the first step towards an actual use. Davis (1989) shows that the PU had a slightly higher impact than PEU on the next step of the model, behavioral intention. Further findings regarding the PEU and PU that Davis (1989) made was the linkage between the two concepts. It was shown that the PEU was directly affecting the PU but not the other way around. This is shown in the TAM and makes sense when considered in a practical scenario. A system that is of no use won’t be interesting no matter how easy to learn just for the PEU alone. However, a useful system with a low PEU creates the incentive to be learned due to the fact that it will improve the user’s output by using the system.

2.2.3 Related models

With time, the Technology Acceptance Model has been developed and adjusted by many researchers including Davis himself. Other models that has been created out of the TAM is TAM2, an extended version of TAM that categories the external variables into social influence such as subjective norm, voluntaries, image and cognitive instrumental processes such as job relevance, output quality etc. (Venkatesh & Davis 2000). There is also the Unified Theory of Acceptance and Use of Technology which describes the correlations
between aspects like gender, age and experience together with performance expectancy, social influence and effort expectancy to explain the usage behavior of technology among individuals (Venkatesh et al. 2003). Another extension of the original TAM is TAM3, a model created to explain the attitude and intention of usage of new technology, focusing on IT-implementation from an organizational point of view. TAM3 is an updated version of TAM2 with more external variables, mostly related to the individual's experience of handling a computer, taken into consideration (Venkatesh & Bala 2008).

In this thesis we have chosen to use the original TAM as our main theoretical framework. The main reason for this choice is that we want to be able to freely identify the external variables that becomes relevant for the companies and individuals in our thesis. We argue that a use of any of the above mentioned extended versions of TAM with specific variables explaining the attitude and intention to use new technology would restrict our research in an unwanted way. Many researchers have also pointed out the deficiency of restricting the acceptance of technology by normative components that do not reflect a wider societal context (Lee, 2006).

2.3 IT identity

As mentioned above, BI has been developing continuously on a large scale since it was first officially named by the Gartner Group. However, new technology is not always smoothly integrated and used as planned by organizations. A lot of the complications can be explained by the TAM where the PU and PEU can challenge users from ever experience the preconceived efficiency that the BI was intended to contribute with. As Lee (2006) points out, an external variable that the TAM itself does not emphasizes all that much is the social identity of the user of the technology. Psychologists has shown a significant relation between an individual's self-identity and several behaviors. Self-identity was studied in the context of technological acceptance and shown to have a valid influence on the TAM by Lee (2006). Michelle Carter and Varun Grover (2015) later conceptualized the term IT identity as *the extent to which a person views use of an IT as integral to his or her sense of self*. The term was described to, accordingly, be the cause of one’s behavior but on the same time be the consequence of the person's experience of information technology (henceforth, IT). The dimensionality of the concept of IT identity is in the article brought down to the three
Descriptive terms: relatedness, emotional energy and dependence which helps describing the perception of individuals’ relation to IT (ibid).

The relatedness of IT identity is described as the dissolving boundaries between the user and the IT creating a feeling of connection between the putative user and the technology (Carter & Grover 2015). Research has also shown the relatedness towards IT by the fact that the term ‘who am I’ is for many integrated with the more career related ‘what I do’ which nowadays includes the use of IT for many professions (Lamb & Davidson 2005). Accordingly, users could create a sense of relatedness by a self-identity strongly rooted in the use of technology or by subjective norms influencing the attitude towards IT (Lee 2006). Further, Carter and Grover (2015) propose that an increased relatedness of IT will lead to an increased use of IT and consequently vice versa.

*Emotional energy* describes the emotional attachment and enthusiasm towards using the IT. By thinking of using, or actually using the IT the emotional energy can be expressed by a confident feeling from the individual (ibid). This energy can also lead to more positive attitude towards new technology other than the IT that was the original cause of the emotional energy (Hackbarth et al. 2003). Thereby, like the relatedness an increase in emotional energy can fuel the positive attitude towards new technology and increase the willingness to use similar or new solutions in the future. Likewise, those who experience a low grade of emotional energy from using the IT in question will have less tendency to step out their comfort zone when it comes to new technology next time (ibid).

The third and final descriptive term of IT identity dependence is referring to what degree the individual rely on the IT. Whether it is in social life as social media or in a job environment such as an BI-system, IT usually plays a big part and making people depend on it (ibid). Therefore, the IT identity is very much formed by the dependence. Either an environment is created where one perceives him or herself as an ‘IT person’, and is therefore dependent on it, or else that person have chosen not to include IT to the same extent in the private life and profession and is therefore not either relying on it to the same extent (Lamb & Kling 2003; McMillan & Morrison 2006). Like the relatedness, a person can thereby choose to create an environment with a high dependence of IT and other technology hoping to form an increased emotional energy and relatedness (Carter & Grover 2015).
2.4 Application of the theoretical framework

As the reviewed literature are consequently emphasizing the individual's relation towards new technology there will likely be explanations to be found in several concepts for the same question. To investigate the obstacles of implementing BI the theoretical framework will consist of the above presented concepts and model. The TAM aims to capture the user's perception of usefulness as well as ease-of-use of new technologies, such as BI. IT identity focuses on how the social aspect, through the terms relatedness, emotional energy and dependence, affects the PU and PEU of BI. Hence, this composition aims to provide a complete theoretical framework in order to capture the obstacles of implementing BI and how to overcome them.

3. Method

The following section will present the methodological choices and the underlying reasoning behind them will here be presented. First, the interpretivist research approach will be explained. Secondly, the data gathering section will present how and why semi-structured interviews were conducted. Operationalization and role of the researchers will here also be described. Further, the analytical method presents how the data gathered is analyzed.

3.1 Research approach

This thesis aims to investigate the obstacles in the implementation of BI. To do this, the thesis takes on an interpretive research approach, with guidance from Walsham (1995) as well as the article’s extension in the form of Walsham (2006). This approach is taken since the thesis aims to understand how the participants sees the implementation of BI, i.e. their interpretation of the reality of the implementation of BI. Hence, to answer our research question this is suitable, since we are looking to understand deeper meaning; using a quantitative method is not sufficient since we want to understand the attitudes and feelings of individuals.

3.2 Data gathering

To collect the data needed to answer the thesis’s research question semi-structured interviews were conducted. Accordingly, a number of prepared questions were created. There were two main reasons why semi-structured interviews were deployed: Primarily, to be able to
understand what views and opinions the interviewee has for the implementation of BI systems there is a need of get a complete picture; to find a deeper meaning in the interviewee’s answers it was likely that follow-up questions would be needed. Adding to this, the interviews were held in an informal way in order to be able to explore the opinion and feelings of the interviewee. (Saunders et al. 2016, p. 394)

As this thesis employs a qualitative research method it is difficult to obtain external reliability, i.e. the degree to which our study can be replicated, since it is impossible to retain the exact same social setting. (Bryman & Bell 2015, p. 400), However, this is obtained to some degree through stating the methods used and how they have been utilized.

The data recording consisted of recording the interviews through the use of an audio-recording device. The interviewees were asked beforehand for their consent in us recording the interview. Verbatim transcription of the audio-recorded material was made in a partial way, meaning that only parts that could possibly be of relevance to the thesis was transcribed, for example neglecting parts that were strictly technical and completely irrelevant to our thesis. Furthermore, the partial verbatim transcription was also made in duality and compared, to decrease the risk of not transcribing possible relevant parts.

3.2.1 Selection of interviewees
To select interviewees for this thesis a purposive sampling strategy was used, i.e. the research question guided us in selecting interviewees who would be of relevance to our research question. (Bryman & Bell 2015, p. 430) To answer our research question we sought to interview persons with wide experience of BI implementation with an emphasis on having a good overview of the non-technical side of BI implementation. Moreover, we sought to gain a selection of interviewees who had an insider’s view or an outsider’s view of the implementation process. For the insider’s view, we chose Swedbank. Swedbank has been working with BI for a significant period of time and, due to being a large organization, is continuously implementing new BI solutions across the organization. Thereby, we could investigate how the implementation process of BI and its occurring obstacles was handled at Swedbank. Three interviews at Swedbank were conducted consisting of employees from Swedbank’s BI unit, labeled in this thesis as BI-specialists. Combined with the BI-specialists’ insider view, three interviews with consultants implementing BI provided the outsider’s view. This outsider’s view contributes with experience of implementing BI into a wide range of
companies with varying experience of BI. Thereby two consultants from Sogeti and Acando were selected along with the national sales lead of Qlik, one of the leading companies of the BI industry today according to Gartner.com (Josh 2016). These are labeled as BI-consultants in this thesis.

The sampling method to gain participants from Swedbank was snowball sampling, where we first contacted a person within the BI unit, who referred us to a second interviewee. The second interviewee then referred us to the third and final Swedbank participant. Even though snowball sampling may produce a sample with a bias (Bryman & Bell 2015, p. 434), this was the most suitable method to gain access to more interviewees, both in the aspect of talking to the right person within such a large organization as well as, by being referred, increasing the likeliness of receiving further access. We started off with interviewing the BI Project Manager who referred us to the BI Service Owner. Both of these were working in the same BI unit. The latter referred us to the BI Service Manager of the Risk Group, working directly below the BI Service Owner in the hierarchy.

The participants from IT-consultant groups Sogeti and Acando, as well as BI software producer Qlik. These participants were sampled through a mixture of criterion sampling and snowball sampling. (Bryman & Bell 2015, p. 439) We contacted several firms that fulfilled the first criteria, being that the firm had to work with BI. In this first contact we stated the purpose of our study and asked for being referred to someone suitable, i.e. using snowball sampling. When then being referred we controlled that the potential interviewee would be in line with our interviewee criterion: being involved in the non-technical aspect of the implementation of BI in other organizations. This criterion was set so the interviewee would be relevant to our research question. If so, a meeting was organized.

Further on in this thesis the interviewees will be referred to as BI-specialists and BI-consultants, where the BI-specialists are the people working with BI within a company, in this case within Swedbank, and the BI-consultants to be the interviewees from Sogeti, Acando and Qlik. Hence, the sample size of this thesis consists of six participants, which in terms of limited time, access and scope of this thesis could be seen as adequate. Even though more participants always could provide with additional insights, we saw a small marginal benefit of adding further participants in relation to the mentioned constraints we had.
Table 1. List of participants

<table>
<thead>
<tr>
<th>Title</th>
<th>Company</th>
<th>Role</th>
<th>Interview #</th>
<th>Type</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI Service Owner</td>
<td>Swedbank</td>
<td>BI-specialist</td>
<td>1</td>
<td>In person</td>
<td>1 hour</td>
</tr>
<tr>
<td>BI Project Manager</td>
<td>Swedbank</td>
<td>BI-specialist</td>
<td>2</td>
<td>In person</td>
<td>1 hour</td>
</tr>
<tr>
<td>BI Service Manager</td>
<td>Swedbank</td>
<td>BI-specialist</td>
<td>3</td>
<td>In person</td>
<td>2 hours</td>
</tr>
<tr>
<td>National Sales Lead BI solutions</td>
<td>Sogeti</td>
<td>BI-consultant</td>
<td>4</td>
<td>Telephone</td>
<td>1 hour</td>
</tr>
<tr>
<td>Pre-sale Manager</td>
<td>Qlik</td>
<td>BI-consultant</td>
<td>5</td>
<td>In person</td>
<td>1.5 hour</td>
</tr>
<tr>
<td>Head of Strategy and Business Technology</td>
<td>Acando</td>
<td>BI-consultant</td>
<td>6</td>
<td>Telephone</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

3.2.2 Interview setup

All the interviews started off by stating the frames for the interview; its duration, possibility for the participants to be anonymous and under what form the interview would be held as well as the aim of the interview (Lantz 2007, p. 57). All of this was stated in previous e-mail correspondence and thus was repeated at the start of the interviews. We also stated that they, if requested, could take part of the study’s result, if requested. The interviews were conducted primarily face-to-face except two interviews which were conducted by telephone. All of the interviews were conducted in Swedish.

3.2.3 Operationalization

The questions that were created for the interviews were inspired by the thesis’s theoretical framework, the Technology Acceptance Model and IT identity, but with a focus on the implementation on an organizational level rather than on an individual level. The questions sought to understand the implementation process and the obstacles during that process - from the step where an organization decides whether or not to implement it, to the step where an implementation had occurred and see what made it successful/unsuccessful. Hence, an interview guide (Appendix 1) was created with questions based on the implementation
process and the theoretical framework. The implementation process was divided into two steps - before and during implementation. At each of the two steps we created questions based on the thesis’s theoretical framework’s key elements; perceived usefulness, the perceived ease-of-use and IT identity. The questions in the interview guide acted as a guideline of what needed to be answered rather than what needed to be asked. Where applicable, follow-up questions were asked to retrieve more detailed explanations.

3.2.4 Role of researchers

We tried to be a “neutral” observer, as stated in Walsham (2006), meaning that the participants of this study saw us as not aligned with the organization and having no incitement of making money such as consultants, as well as being perceived as having no strong views of processes, systems or people in the organization being investigated. This effort of being neutral observers is in our case solved through being merely students writing their dissertation, which should not be too frightening for employees. Furthermore, we will take the role of an “external researcher” as described in Walsham (1995). This means we, in contrast to the opposite “involved researcher”, used only formal interviews without being “active” with the study’s participants. Being more involved provides the opportunity of gaining more depth in the study. However, being more involved also means that it has more effect on the participants’ behavior which is a clear disadvantage. Even though the advantages might outweigh the disadvantage of being an involved researcher, it has the obstacle of gaining that kind of deep access from the organization being studied as well as the time needed to “go deep”. Therefore, out of research economical limits in terms of time, combined with hard-gained access this study uses the “external researcher” role.

3.3 Analytical method

To understand the problems encountered when implementing BI in a successful way a strategy of analysis was needed. The strategy consisted of data screening and theming. The data screening was made through screening out the parts relevant to the thesis. The content in these parts were thereafter labelled and put into themes. The data screening and the theming were made in solitude to improve internal reliability through this triangulation method. (Patel & Davidson 2011, p. 107) The derived themes were thereafter compared and put together into final themes that are presented in the empirical section which thereafter were analyzed.
4. Empirical findings

In this section data gathered from the interviews is presented by highlighting the observed obstacles and possibilities in the implementation of BI. The findings are divided into four main themes extracted from the interviews which constitutes the following sections (1) realizing the value of BI, (2) an internal change, (3) a top-down approach and (4) the needed resources. Quotations from the interviews will be used in order to concretize the information presented.

4.1 Realizing the value of BI

In order to start the process of implementing BI the interviewees agreed on the importance of starting with acknowledging the value that BI can bring to the company. At Swedbank this realization of value was generally confirmed, and had been for many years, throughout the organization. However, the usage and understanding of BI varied between the departments and users. The consultants on the other hand had more concrete examples of companies that was further down the process of using BI. As the customers for BI-consultants varies so does the knowledge, acceptance and usage of BI itself. Often the case for consultants was to start from the very beginning by identifying the company’s challenges and how BI could be the way to overcome them and by that making the company realizing the value of BI.

“If you look back in history, when we had horses instead of cars, and you wanted to move faster you thought of giving the horse better oats. You couldn’t even think about any other possibility, such as the car. The same is with BI; if you have worked with Excel and fixed reports then it is hard to see the possibilities with BI.”

- BI-consultant, Interview #5

Even when the need for BI could be pinpointed by the consultant and the value became clear to the customers, the outcome in whether they would pursue with an investment was still uncertain. The reason to this cautious attitude could according to one of the consultants often be explained by historical reasons. It would not be the first time some sales person came into the manager’s office and claimed to have the solution to the major challenges that the company was facing. It is not that companies today lacks systems to work with and even less do they see such major problems with the current system that a heavy investment in a new
technology is needed. Getting a new system (such as BI) could be perceived as meaning a lot of energy consumption for whomever implementing it and then they rather stick with what they got.

“Sometimes when we see that there is business value in adding our BI system, the organization is not too keen in getting new systems, it becomes a liability, humans are a bit lazy by nature. They get a new system and that is a pain in the ass.”

- BI-consultant, Interview #5

4.1.1 Stating the obvious

In order to get the attention in a company and get the chance to explain the value of implementing BI a convincing case was needed. Both the BI-specialist and BI-consultants expressed the need for concrete examples on how BI can be useful in the company. Depending if there’s a certain department or the whole company that is targeted different approaches may be variously useful in each specific case. There was an agreement from all our interviews that showcasing with real examples was a good way to visualize what impact BI could have. The examples however need to be relevant to the person being the target of the persuasion process, a HR employee needs to be presented with how recruiting could be improved, a CEO needs to know what margins can be shrunk and thereby improved the company's result. The core concept is that in order to realize the value of BI one must be presented to what difference BI would do in practice.

“There is a few challenges when it comes to interpret the usefulness in companies not working with BI today. There is a lack in awareness of how much time that is being spent on handling reports and information which is totally pointless since that could be completely automated with a BI-system.”

- BI-consultant, Interview #4

4.1.2 The need for education

If BI is accepted to the extent that its getting the needed financing and the company decided to start implement it there are still several obstacles to be dealt with. The BI-consultants expressed that education is important. Both Swedbank and the consultants expressed the need for education both before and during the usage of BI. People won’t use a system no matter
how useful it seems if they do not know how to use it. A system might be used, but to make sure it's being used in the right way and for the intended purpose education is of great importance.

“When you implement something, you have to continuously manage it. Sometimes there are 70% that pretty much haven’t used the system and then it could be a question about education, that we haven’t educated the users enough.”

- **BI-consultant, Interview #5**

Whether there is a company completely new to working with BI or a more experienced one the need for education shines through in the interviews conducted. While the need for education can seem more obvious for a company which is more inexperienced with BI, working with BI is an ongoing process that constantly develops the need for new features. Hence, education is as important for the more experienced company, like Swedbank. By prioritizing education, the company prevents misunderstandings and inefficient use of the BI-system as well as hopefully creating a desire for further improvements and features.

“The reports that is being used today is easy enough to use, there is a not a lot of “self-service” to be done. However, there is options to adjust which columns to use and how many columns to use and that function I believe there is only about 10% of the users that understand. Even though most users might not need the 20 standard columns of the report they run it like that just because of the lack of knowledge of how to optimize it to their own needs.

- **BI-specialist, Interview #1**

4.2. An internal change

Implementing BI often changes the processes of how organizations work. The newly implemented BI might take over some tasks that employees formerly have performed manually, it might change the structure of who is responsible of the information and who reports to who. Both the consultants and the BI-specialists put an emphasis on getting everyone aboard during the implementation process to get the most successful result. Consultants concurred also on some influencing characteristics, such as whether the company was an old or young company. It was put forward that younger companies lack the “legacy” of old companies, a legacy consisting of hierarchy and which are less accepting of change.
“Information is power. ‘I have my reports and you have yours, let it stay like that.’ I think that kind of thinking is quite common. However, I think “younger” companies don’t have that problem to the same extent, they don’t have the legacy that old organizations have.”

- **BI-consultant, Interview #5**

As stated above, consultants saw one hindrance in the implementation of BI was that as BI could make information available to more people in the organization, the employee who was responsible of the information lost his or her power if an implementation happened.

4.2.1 Getting all aboard for the BI-train

There was a consensus among the interviews that it was essential to get those employees that would be affected by the implementation involved in the process.

“It is critical that everyone is involved in the implementation process of BI. That could be involving workers at the assembly lines for example, by letting them come with suggestions. Then they feel they have contributed to implementation and are therefore more keen on using it.”

- **BI-consultant, Interview #4**

It was also proposed that there was a need to change the mental mindsets of employees on all levels. An example of this old mindset was that one person prepared a report, then delivered it to the top management who takes a look at the report and, if having any questions regarding the delivered report, they ask the provider of the report. This is a very slow and reactive way and it was suggested that BI can contribute with a more proactive way, where top management can see the same report at the same time as the former provider and they can drill down in the data without having to ask the former provider. One consultant saw a problem with the immaturity of some companies in terms of BI. Even though he wanted to talk analytics, and even companies such as IBM wanted to talk about the next step such as cognitive systems, he knew he had to take the company one step at a time on the BI road. Even though he knew that BI analytics could bring more value to a company he recognized that it was better to start with simpler BI to make them accustomed.
“You need to have support from the bottom of the organization, so we do several activities there. At the same time we speak about how this can affect the people at the C-level - ‘What’s in it for me?’ they ask themselves.”

- **BI-consultant, Interview #5**

As seen in the statement above, which other consultants mentioned as well, it is essential to get everyone aboard across the organization. This was also seen from the interviewees from Swedbank. They said that they are confident that the top management believes in the need of BI throughout the organization, otherwise they would not have invested approximately a billion Swedish kronor into a huge BI project. However, even though the top management believes in BI, they explained that you need to get the end-user to use it. One way of accomplishing that is through having a good internal salesperson that could sell in the value of BI to the end-users.

“The most important thing is the people involved. You have to be dedicated about it and when a dedicated person starts to work with the BI, that’s when things starts to happen. Along with dedication you have to be a great seller to get people around you to realize the value”

- **BI-specialist, Interview #3**

4.2.2 Am I needed anymore?

It could be extracted from the interviews that the implementation of BI could be a threat to some employees. Either that they lose power of information or that they see their role becoming obsolete. This is sometimes an obstacle when there is an informal gatekeeper; a person who is in control of the current systems of reports is sometimes the person that also will be the one who initially is responsible for deciding whether a BI system is needed. Since this might affect their own power of information in a negative way they are likely to object to any need of a new system.
“You might find yourself in situations where there is someone who can influence who you can get in touch with further on in the organization. It could be a person who is an expert on reports but with this new BI tool that person’s role would be non-existent. And this could be pretty sensitive stuff. Sometimes these people are the gatekeepers and they have the power of who’ll you met.”

- **BI-consultant, Interview #5**

Further on, there could also exist a resistance to use the new system because of the know-how and expertise a person might have gathered during the years of using an old system. That person can see no added benefit with a new system, but in reality, it might be beneficiary to the whole organization because it enhances other employees’ capabilities.

“You might have become really skillful with the old tool and you think ‘I can do all these analyses with the tool we already have!’, and that might be true. However, with the new tool there might be ten other users who can become equally skillful with the new tool, which would be valuable for the organization, but the already skilled user might see no personal advantage with the new tool.”

- **BI-consultant, Interview #6**

### 4.3. A top-down approach

It was obvious from the first interview that there is a need for a person within the organization with a drive for BI, to succeed with the implementation of BI. However, it could not be done without someone at the top. Both the interviewees from Swedbank and the consultants shared the view that to get BI into an organization you had to have a strong person somewhere on the top of the organizational hierarchy to be able to take a decision.

“You need a person who has a passion for BI but you also need a decision-maker”

- **BI-consultant, Interview #6**

This might seem obvious that you need someone with decision-making power to go through with the implementation. However, the key here is that the person needs to be on the top level of management for an BI implementation to be successful. There was a consensus among the interviewees about the need to make the implementation into something on an organizational level, rather than being on department level.
4.3.1 The place to be

Both the BI specialists at Swedbank as well as the consultants thought that if you wanted to implement BI successfully, you needed to have the unit responsible for BI close to the top. The reason for this was partially to be able to be close to the real decision-makers but more significantly to make it a comprehensive change throughout the organization. If it would be set-up as a side-project it would stay as a side-project and not have the appearance of it being a key part of the organization.

“In an organizational perspective I think the BI-unit should be close to the management in order for it to be successful”

- BI-specialist, Interview #3

Even though there was a consensus that the best way to implement BI was to implement it throughout the organization some of the interviewees recognized that this was not always possible. The way BI was spread throughout the organization was then through inspiration coming from those departments who had succeeded. However, the downside with this was indicated to be that if one department chose one BI system and another department chose another there could become an internal quarrel, a system vs. system fight, which would not be beneficial to the organization.

“Others began to see that we could push out our system to others. If we can use it, they should use it as well they thought.”

- BI-specialist, Interview #3

4.3.2 Driven, dedicated and devoted

When implementing BI, being something intangible with an unknown potential to most, there is a need of having someone who acts as an active ambassador for the system, who will push through individuals’ internal resistance and the barriers of organizations. This person needs to have an internal drive and passion for the system:

“A great deal to make successful implementation of BI is to have a strong ambassador of the upcoming change, one that is really passionate and engaged about the change.”

- BI-consultant, Interview #4
Because the implementation of the system can bring about big change through the organization, and as stated previously, it can bring about big resistance towards the new system. As stated by one consultant:

“You need to have an application owner, who has this as their opportunity to shine, if they’ll make the BI implementation work. If you don’t have anyone with a drive for this, then it is pretty hard to take this forward.”

- **BI-consultant, Interview #5**

Providing the incentive for an employee within the organization increases the likelihood of the implementation being successful. Some of the interviewees stated that when they have seen it fail it was because there was no real owner, no one really in charge for the implementation.

### 4.4 The needed resources

As for all new technologies, resources are needed to fund the investment and BI is no exception in that aspect. However, investing in BI is not just a monetary investment which was stated several times throughout our different interviews. Disregarding all the above mentioned challenges of implementing BI into a company, the fact of its cost in pecuniary terms (money) and non-pecuniary terms (such as time and energy) is always going to be present. Though, with the perception of the BI being an investment rather than a burden helps motivating the needed funding and one of the consultants stated that it could frankly be the silver line of whether the company succeed with their BI or not.

“Most companies agree with the potential BI can have in their business. But at the end of the day this is a big organizational change that’s need to be done to implement a BI-system and adjust daily process like reporting and monitoring. This takes a lot of time, energy and money which makes it harder to prior this project over other changes that also needs to be done.”

- **BI-consultant, Interview #5**

The initiating implementation cost is not the only thing that may incur high costs when it comes to BI. Most BI providers charges the using companies per license (user) and the cost for BI thus increase by the number of employees using it. While this may seem contradictory
one must also realize that an added user of BI is hopefully added value to the company. Therefore, the goal of the provider and its customers is usually the same, getting every employee to use the system in order to sell more licenses but also to maximize the potential of the BI at the particular company.

“We are paying a lot of money for the product and we want it to be used. We got 6000 active users but paying licenses for around 8000 potential users, so there is quite a large spread that we’re still paying for. We want everyone with an available license to use the product since it contributes to the efficiency of the bank to make more money which is the whole purpose of using the BI in the first place.”
- **BI-specialist, Interview #2**

If a decision maker sees the added value BI can contribute with and as well a good investment money-wise, then it seems logical that the investment will be made. However, there might also be a non-pecuniary cost for the decision-maker in terms of time and energy. The time and energy required by this person might overweigh the benefit it might give him/her. This would add to the workload for said person even though it lessens the workloads for others. As one of the interviewees said: “*Man is inherently lazy*”.

5. Analysis

In the previous section the empirical findings were presented through the observed four themes. In this section the theoretical framework is used to analyze the findings, starting off with a discussion of the perceived usefulness and perceived ease of implementing BI. The analysis will thereafter be divided into two chronological steps; before and during the implementation.

5.1 Perceived usefulness and perceived ease of implementing

Implementing BI in an organization equals implementing BI to the employees that it affects and implementing it into their mindsets. For whomever it is, there must be a clear advantage of the implementation to each person that outweighs the non-pecuniary cost. Perceived ease-of-use can be seen as a scale from easy to hard. In terms of perceived ease of implementing, it can be seen as how easy or hard it will be to implement the new system into the organization.
But it should also be seen as how high the non-pecuniary cost of the implementation will be to the individual since organizations consists of individuals; a manager could see the cost as the energy and extra hours they have to put in, the analyst might see the loss of power as the cost and the person responsible for the IT might have a pride in the current system that would be lost to that person's professional identity. Hence, to make a person accept the implementation the perceived usefulness of implementation must be big enough to justify the non-pecuniary cost, which may vary regarding of the person’s relatedness towards IT. With a high relatedness to IT the non-pecuniary cost is likely to be lower than in the contrary with a low relatedness and high cost. The characteristics of a successful implementation are first of all that the BI system gets implemented. The second is whether the users are using it. These two characteristics are variables depending on the implementation process.

5.2 Before implementing

The first step is obviously the most crucial - without it there is no second step. In the eyes of the one who wants to implement BI there are a few things to consider; Firstly, the person who needs to be persuaded about the idea of BI for an implementation to take place needs to be considered. That person’s advantages and disadvantages of the implementation should be considered as well as the company’s. The most influential aspect found in the interviews was the need for companies to realize how BI could bring business value and make operations more efficient. As Davis (1989) stated with the TAM-model a perceived usefulness is what affects the user the most when it comes to new technology and whether to use it or not. Both the BI-consultants and the BI-specialists emphasized the importance of creating a vision of what BI could accomplish for the person that needed to be persuaded.

For certain employees the implementation will be perceived as a negative change no matter what. However, if it is a valuable investment for the company then there will be other persons within the organization who will find the implementation worthwhile. It could be argued that managers closer to the top of the hierarchy are more in-line to the company’s objectives and goals since managers usually are assessed on the company’s performance, whereas employees further down the organization could for example be assessed solely on cost management. In the latter case there could be an inclination to only focus on keeping cost low rather than seeing the value an investment would generate. Therefore, it is important that the right people gets involved in the implementation process.
Companies entirely new to BI needed to be presented the benefits of BI over their current way of working and even then things like cost of investment, managerial attitude and technical knowledge could still complicate the process. Needless of the company’s experience of BI the person initiating the change was agreed in the interviews to be of importance. This “initiator” provides to the perceived usefulness in two ways; Being passionate and believing in something could be seen as an indication of usefulness and secondly, to initiate a big change in a company is likely to require a lot of energy, derived from this passion.

However, the word of someone at the top of a hierarchy in an organization weighs heavier than if the initiative comes from down below. Therefore, an initiator at the top of the hierarchy has a greater chance of succeeding. As the TAM-model is based on an individual user level the outcome of the PU is merely affecting the outcome for the user himself. However, in this study a high PU of someone like a CEO could be shown to have an impact on an entire company and whether a BI investment would be made or not. The way to achieve a high PU varies throughout different companies but alike the studies of Davis (1989) the insight of a system perceived as useless in terms of creating value to the company would be of no interest no matter how easy to learn or easy to use it might be.

5.3 During the implementation

When the usefulness of BI can be considered as perceived by the key persons in the process to implement the system several of the obstacles has been overcome towards working with BI is accomplished. Nonetheless, the rest of the organization need to get into the same mindset in order to successfully getting the BI implemented on all levels. Here, two aspects are key. The first one is to implement BI together with the employees; they should be able to have their say and opinions how it should be formatted. This is key in two ways, firstly because the employees will be the users, and the users have first-hand knowledge on what would be useful which, consequently, increases the perceived usefulness. Secondly, by involving the employees they feel as a part of the implementation rather than forced upon it which lowers the resistance of implementing it; it will not feel as a burden to the same degree since they are already involved. The second aspect is to have proper education regarding the new BI. This will increase the perceived usefulness through demonstrating what is possible and increase the perceived ease-of-use as they learn to utilize the BI.
As the consultants proposed a younger company has less problems with accepting this new way of working with BI. As the IT-identity is the extent to which a person views use of an IT as integral to their sense of self this might also be more applicable to the employees of a younger company, which has been born into the IT-era. Further, the IT-identity could also be what prevents BI to succeed in a company. A person with low relatedness to BI might see the system as a threat rather than an opportunity. As pointed out in the interviews “information is power”, the increased availability of information as an effect of BI may cause controversies among the different roles in a company, as a former owner of information loses that power.

Regarding the emotional energy there was some contradictions to what was found in the interviews. As previous research proposed a previous positive interacting with IT would encourage the user towards using a new system. However, both the BI-specialists and BI-consultants described how the experience and knowledge of an old system often could be a reason of not wanting to change the way of work into working with BI. Also in this matter where the comfort of working with an old system would prevent BI to succeed, explaining and concretize the usefulness of BI was the key to convince those persons.

Having an initiator that is passionate about BI might not be something that could be taken for granted. If this does not exist, there should be a person with a long term responsibility of the BI and thus creating an incentive for this person to make the implementation succeed. By making the perceived usefulness of implementation for a person substantial enough for that person to overcome obstacles might be the key for the implementation to be successful.

6. Conclusion

This thesis aimed at answering the question: What can be the internal organizational obstacles in the implementation of business intelligence and how to overcome them? By looking at the problem through the theoretical framework of the Technological Acceptance Model along with the notion of IT identity, both before and during the implementation of BI, this thesis looks at the implementation problem in a new way. The obstacles identified could be connected to employees’ low perceived usefulness in relation to the perceived non-pecuniary cost. The main obstacles identified were as follows: (1) Not realizing the value; (2) Not having a person that is clearly responsible and (3) Not getting the right people aboard.
However, to overcome those obstacles could often be done with the right approach. Solutions aimed at raising this perceived usefulness and lower the non-pecuniary cost through different methods. The three main suggestions, which can also be the solutions to common obstacles occurring when implementing BI are as follows: (1) Concretize the value to be gained from implementing BI and how it outweigh its non-pecuniary cost and getting the users to agree with it; (2) Adapting the organizational structure and work roles as needed, using a dedicated initiator together with maintaining a strong internal support both before and during implementation and (3) Preferably the implementation is initiated, or at least strongly supported by the top level management of the implementing company. The study conducted in this thesis has thereby presented common obstacles hindering implementation and in the extension usage and value gaining from BI as well as ways to overcome them.

6.1 Further research

As the field of technology is constantly moving forward the research of obstacles to implementing new technology will always be of interest. The next big thing to contribute to BI will likely be the increased use of mobile devices and the amount of ‘self-service’ which will shift the power of information even more than before. Also the distinction of companies’ size, national heritage and age are interesting aspects to further investigate in the relation to implementing new technology.

To address the question of implementation difficulties further the views from different roles in a company could contribute with new perspective to the question of matter. For a deeper knowledge on the practical shortcomings that might occur during the process of implementation a case study conducted at a company implementing BI would also contribute to the validity of this thesis.

Future research could also explore the role of the initiator deeper, as this research showed this person to be of substantial importance. Also, the role of the IT department could be more investigated in the role of BI implementation.
7. References


8. Appendices

8.1 Appendix 1. Interview guide

1. Can you describe the steps before an implementation can start?
2. What people are usually involved before the start of the implementation?
3. What obstacles are common before the implementation can start?
4. Is it always clear what value BI can deliver?
5. What people are usually involved during the implementation?
6. What factors make an implementation more difficult?
7. Are there any common factors that makes an implementation successful?
8. What are common factors making an ongoing implementation fail?
9. Is the implemented BI used throughout the organization?
10. Is there an agreed potential of BI:s usefulness among the users?
11. Is there any personal attribute affecting the attitude towards BI and other technology?
12. Who are the (potential) users of you BI?
13. What difficulties do the (potential) users claim?
14. What was the reasoning behind the investment of the BI?
15. What degree of education is needed in order to use the BI?
16. Where is the decisions of implementing BI made on an organizational level?
17. How much do you communicate with the user of your BI?
18. Have any roles in the company changed due to the usage of BI?
19. How is the general attitude towards new technology?
20. Is there an agreed potential of BIs usefulness among the (potential) users?
21. Is there any personal attribute affecting the attitude towards BI and other technology?
22. What are the major goals to be achieved by BI?