



**Aalto University
School of Business**

Business intelligence support in sales management

Why and where do BI systems fail to support sales executives in decision making?

Master's Thesis
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31.10.2016
Information and Service
Management

Approved in the Department of Information and Service Economy 16.12.2016
and awarded the grade _____

ABSTRACT

Objectives of the Study

To do a research on why and where BI systems fail to support decision making in sales.

Academic background and methodology

I chose this topic as I saw there was no earlier research on this specific field and due to research partner company who had their own interest in this area. Case study methodology was chosen as it was convenient way to get information from the people involved in sales strategy.

Findings and conclusions

Availability and quality of data is the most significant issue that arise from this thesis. Data issues must be handled before more sophisticated applications of BI can be considered to take in use.

Keywords

BI, sales, decision making, data quality

TIIVISTELMÄ

Tutkimuksen tavoitteet

Tutkimuksen tavoitteena on tutkia miksi nykyiset Business Intelligence systeemit epäonnistuvat tukemaan päätöksentekoa myynnin johdossa.

Academic background and methodology

Tämä aihe on sikäli kiintoisa, koska aiempaa tutkimusta siitä, miten myynnin johtamisen parissa työskentelevät kokevat Business Intelligence systeemien tuen ei juuri ole olemassa. Lisäksi yhteistyökumppani Bynfo Oy oli kiinnostunut aiheesta ja kaipasi käytännönläheistä näyttöä tästä tutkimusongelmasta. Case-tutkimus oli mielestäni paras tapa saada tietoa niiltä päättäjiltä, jotka toimivat yrityksissä myynnin johdon tehtävissä.

Findings and conclusions

Case-tutkimuksessa oli yhteensä 8 eri yritystä ja haastateltavaa. Suurimmaksi ongelmaksi nousi datan saatavuus ja laatu. Haastateltavat olivat samoilla linjoilla siinä, että datan saattaminen kuntoon on ehdoton edellytys sille, että hienostuneemmat analyysityökalut voidaan ottaa käyttöön.

Keywords

BI, myynti, päätöksenteko, datan laatu.

TABLE OF CONTENTS

1. SISÄLLYSLUETTELO

ABSTRACT.....	ii
TABLE OF CONTENTS.....	iv
LIST OF FIGURES	v
LIST OF TABLES	vi
2. INTRODUCTION	1
2.1. Aim of the research	2
2.2. Research questions	3
3. Literature review	5
3.1. Business intelligence and knowledge management	6
3.1.1. Business intelligence road map.....	8
3.1.2. The benefits of BI	11
3.1.3. From raw data to business intelligence	12
3.2. Sales strategy and management	16
3.2.1. Nature of customer relationships	17
3.2.2. Sales reporting.....	20
3.3. Sales BI framework.....	21
4. Methodology	22

4.1.	Research paradigm	22
4.1.1.	Realism paradigm	24
4.1.2.	Triangulation on reality.....	25
4.2.	Case study research.....	25
4.3.	Introduction of case study and 8 companies involved	26
5.	Findings.....	26
5.1.	Challenge of getting quality data	28
5.2.	Mutual interest in supply chain data exchange	29
5.3.	Answering to two research questions based on findings from interviews	30
6.	Summary	34
6.1.	Future Field of Study	37
7.	References	37
8.	Web references:.....	39
9.	Interviews.....	39

LIST OF FIGURES

Figure 1	Analytics Maturity by Gartner.....	4
Figure 2	Business Value and Complexity Framework by Gartner	5
Figure 3	Hosseini et al. 2010 Evolutionary Stages of Data Mining	7

Figure 4 Watson (2009) BI Environment	8
Figure 5 Star Schema Watson (2009)	10
Figure 6 Business Intelligence Benefits Watson (2009).....	12
Figure 7 Thierauf (2001) An Effective Business Intelligence Framework for a Typical Company	14
Figure 8 Thierauf (2001) Relationship of Intelligence to Various Levels of Summarization	15

LIST OF TABLES

Table 1 Bradford (1999) Salesperson roles	18
Table 2 Sales BI Framework.....	22
Table 3 Research Paradigm Sobh and Perry (2009)	23
Table 4 Sales BI Framework.....	27
Table 5 Data Sources	32

2. INTRODUCTION

Pirttimäki (2007) has concluded that in today's knowledge oriented business world, which is changing and evolving with fast pace, the need for holistic BI-systems is greater than ever before. Business intelligence (BI) has been an emerging trend on the field of business research even though it is just an umbrella term that covers numerous terms, tools and practices beneath. The core contribution of BI is to enhance business managers' decision-making capability and effectiveness by refining data into information and later into knowledge. Knowledge is information in action meaning that managers can use that information to adjust or change the current business processes and activities. So instead of just storing the company wide transaction data, the modern BI aims to turn that data effectively into information that can be then used by managers to make decisions that increase customer experience, customer profitability, market share and finally company bottom line.

Even though BI systems have spread widely among companies during the past decade, Riabacke et al. (2011) estimated in their study that 50%-70% of BI systems fail to fulfill the promises and fail already during the implementation phase. Moreover, when observing the BI systems already implemented and fully working, there are serious problems related to the integration of BI information as well as to decision-making processes. The study showed that there is room for significant development in the current BI domain. In many cases, the company's objective has been just to make BI system work as a stand-alone system without considering the context and business processes. Organization allocate too little attention to understanding business processes and how BI could create additional values there. Both Riabacke et al. (2011) and Pirttimäki (2007) found out that the common trend in Finnish and Nordic companies has been to overemphasize the technological part of BI leaving business process and human element with less attention. After all, the primary contributions of BI system are better decisions that create value and justify BI investments.

When it comes to the BI system support for decision-making, both Riabacke et al. (2011) and Pirttimäki (2007) found out that implemented BI systems do not fully meet the potential and fail

to deliver promised goals. Results indicate that the perceived value of BI system is not in its ability to support decision making as organizations do not know how to use it for decision-making support. After all, better decisions are the gains of BI system that managers compare against significant monetary and human resource investments.

2.1. Aim of the research

My research questions aim to analyze whether the current BI-applications are supporting sales managers' decision-making and to what extent the decision are based on information compared to those decision made on pure gut feeling. Aim is also to find the areas of development in current BI-applications and address them based on conducted interviews among sales managers. This area of BI has not been studied before, but Pirttimäki (2007) studied the utilization of BI-tools in large Finnish companies and found out that in 2005 the top management was using BI-tools in 91% of interviewed companies. However, some of the interviewed respondents said that the current BI-tools do not meet the actual demand.

The motivation behind this paper arises from many sources and opinions of business professionals on the field of business intelligence and analytics (BI&A). To begin with, Chen et al. (2012) founded out that BI&A and related analytics have gained a significant attention in the academia and business communities during the past two decades. Amount and volume of data is increasing rapidly creating a need for business professionals who have deep analytical skills to conduct comprehensive data analyses on their domain. Moreover, *IBM Tech Trends Report* (2011) listed business analytics as one of the major trends in 2010. Chaudhuri et al. (2011) stated that cost of data has declined significantly durin the past years lowering the cost for companies to acquire date and refine it to achieve competetive advantage against rivalries. They also saw that there is a constant pressure to shorten the time lag between data collection and actual decision making which has created an incentive to find new innovative BI technologies.

The aim is to analyze the current state at which the companies are and what are the future insights for the development in the area of reporting and business analytics. The purpose is to

evaluate through the interviews what are the business opportunities for the companies in the near future and what it takes from BI systems to seize these opportunities. It is also interesting to see what barriers are possibly hindering the utilization of these business opportunities and how BI could help to overcome problems and to capitalize opportunities existing in companies' business environment.

Another interesting aspect for the research is the point Pirttimäki (2007) discovered and that is a tendency to overlook the human elements in BI-projects. According to her, the most BI-projects are tech driven and focusing on hard technological part of the BI and paying less attention on the soft side. This problem has also been the main factor why managers feel the BI-projects haven't been as successful as anticipated. Jeng and Dunk (2013) found the same phenomena when studying the relationship between successful ERP implementation and knowledge management. Their main conclusion is that successful ERP-system provides an effective and convenient flow of information in the organization that is a base of knowledge management.

2.2. Research questions

In this paper, my goal is to answer following questions by first conducting literature review for background and then following up with a case-study method in which I conduct series of interviews among sales executives. In this paper I will answer to the following questions:

1. Are the current BI systems providing enough support for sales executives in decision-making?
2. What are the biggest areas in sales where BI fails to provide information for the support of managerial decision making

My core interest in this research is to find out, how well the current BI-systems support managerial decision making in sales managers role in large Finnish companies and what kind of development requirements do the future business opportunities set for BI-systems. My goal is to evaluate the role of business intelligence applications in sales management and study how well those applications support decision-making. While technology is something that helps companies

to size business opportunities it is also just a tool. A substantial understanding of business environment and its requirements is needed before considering which technological solution should be purchased. As mentioned before, companies tend to think that BI systems alone solve problems and provide gains automatically.

As Pirttimäki (2007) discovered, that the Finnish companies have been concentrating a lot on technological vendors and the solutions they offer. To realize the full potential of BI-solutions the company who is considering purchasing one of them should first analyze its own business and business environment in order to reveal what are the major requirements for the technology and then evaluate the offerings on BI systems provided by vendors.

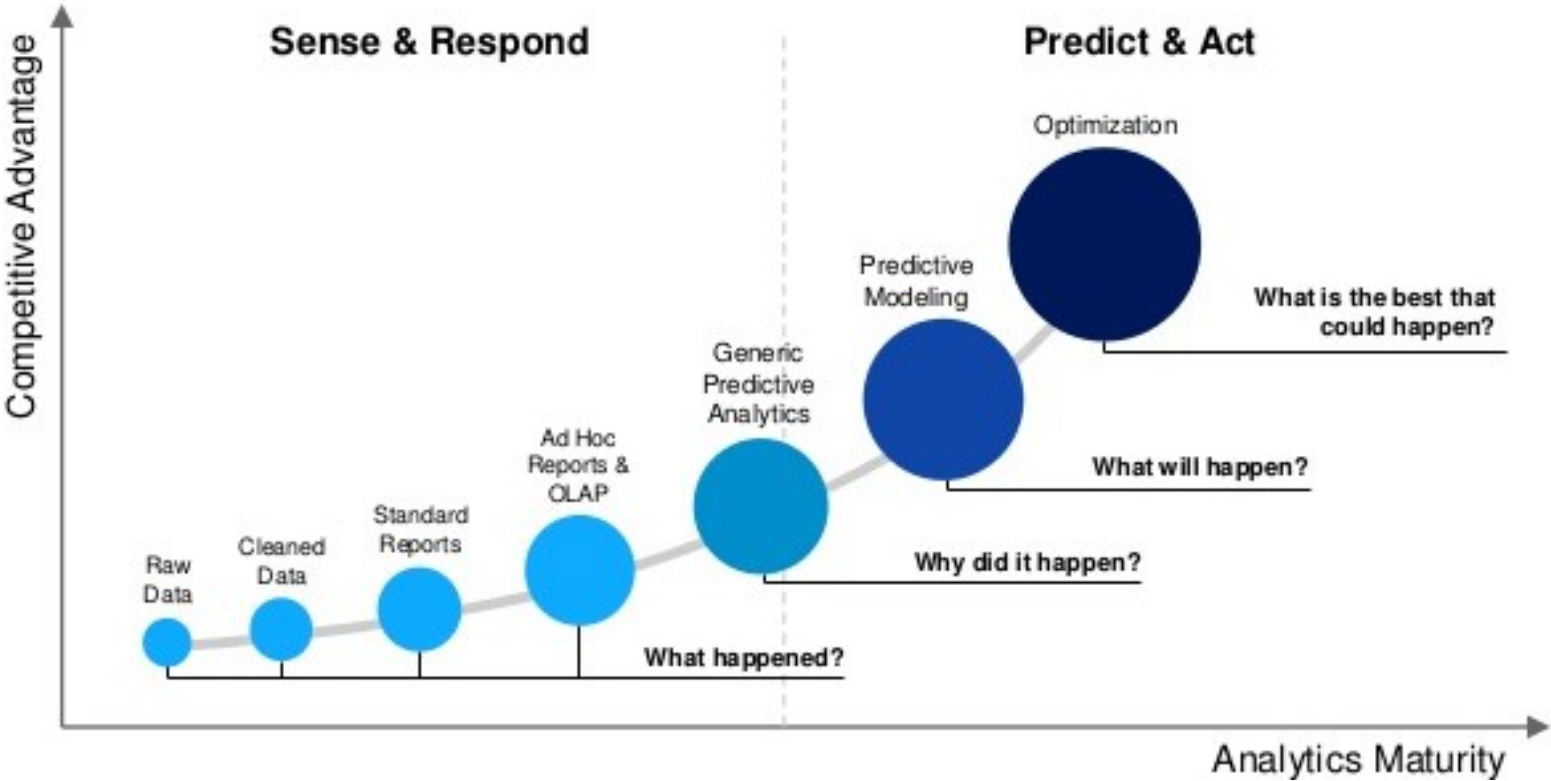


Figure 1 Analytics Maturity by Gartner

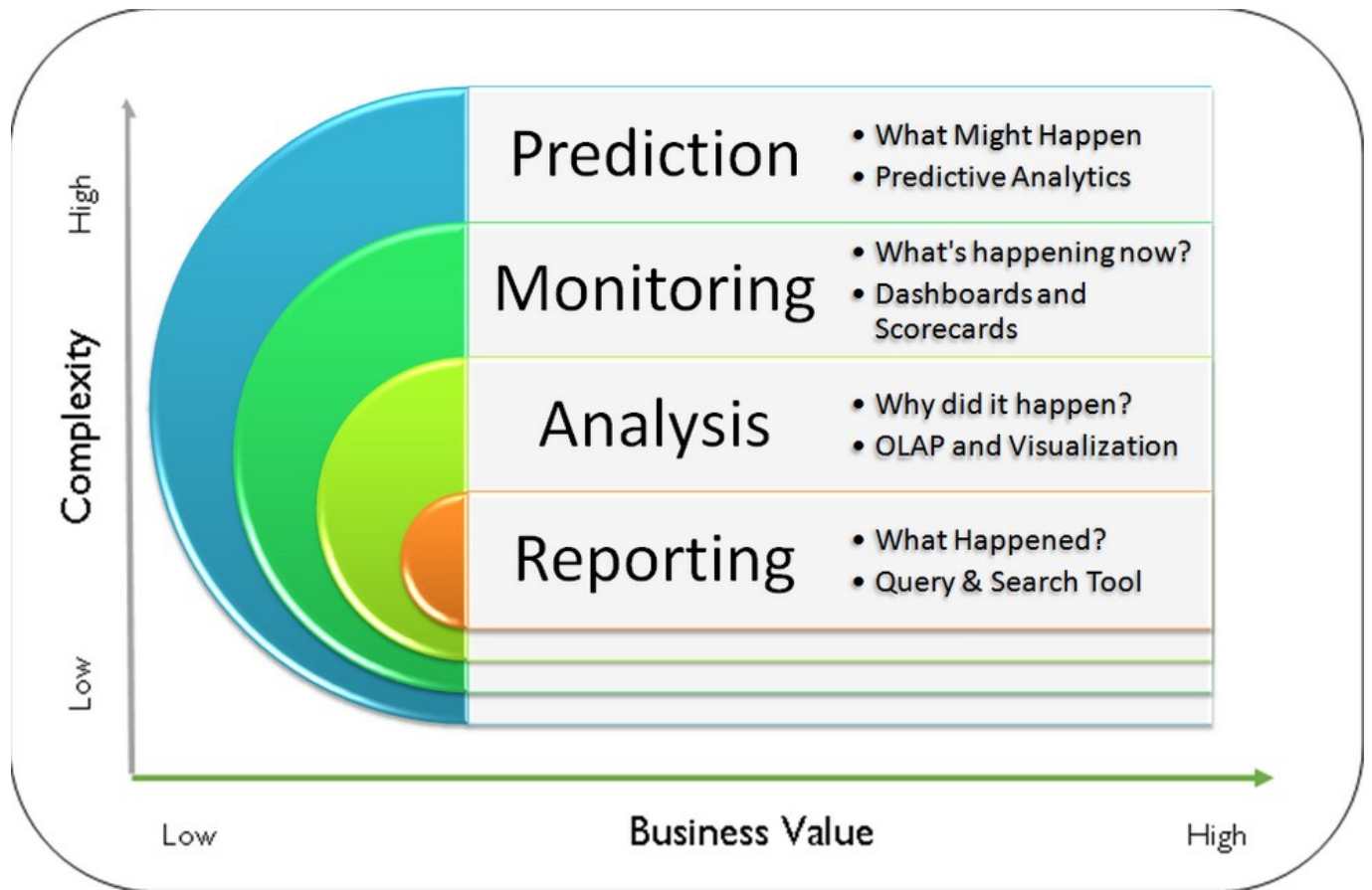


Figure 2 Business Value and Complexity Framework by Gartner

3. LITERATURE REVIEW

The literature review section has two major parts. First, I am going to I will discuss about the nature of BI solutions and the process of refining raw data into knowledge. I will introduce common terms and framework related to BI systems and discuss about the evolution of BI. The second part deals with sales management and sales strategies and presents the most relevant findings from the existing academic literature.

Literature review section has multiple purposes. First of all it provides an academic base for the further analysis and clarifies the most commonly used terms and methods, which are relevant to this paper. The second implication is the template that academic frameworks provide as they will be used to analyze and interpret the findings of company interviews.

3.1. Business intelligence and knowledge management

In this section of the paper, I am going to define the core terms related to the research and explain how they link to each other. Some terms do overlap with each other causing some complexity but I try to avoid it by highlighting the core of each term and its key message.

Business Intelligence (BI) is an umbrella term that covers skills, technologies, applications and practices that help an organization to acquire a better understanding of its commercial context. BI combines architectures, tools, databases, analytical tools, applications, and methodologies. To conclude, BI transforms data to information, information to knowledge, knowledge to decisions and finally into action (Rud, 2009). In this paper BI is the leading concept used and other concepts work as sub-concepts to BI.

Business analytics (BA) can be defined as an application of various advanced analytic techniques to data to answer questions or solve problems in order to increase decision making effectiveness and efficiency. BA are not a technology but more like a group of approaches, organizational procedures and tools used in combination with one another to gain information, analyze that information, and predict outcomes of problem solutions (Trkman et al. 2010).

“Gartner has seen a significant increase in the importance placed on analytics to achieve business goals and provide a competitive advantage. Due to the impact of the major trends we refer to as the Nexus of Forces (social, mobile, cloud and information), we see new user demands from new and more extensive sources of information combined with more powerful analytic capabilities (see Figure 2) to provide additional insight opportunities. However, traditional approaches will

not support IT initiatives to achieve analytic excellence or enable users to leverage the insight. Organizations continue to express an interest in increasing their use of established and emerging styles of analytics, including: descriptive (reporting, dashboards and scorecards); diagnostic (online analytical processing, interactive visualization, descriptive modeling); predictive (statistics, predictive modeling machine learning); and prescriptive (decision/mathematical modeling, simulation, optimization), because of their significant potential to create business value and competitive advantage. Many IT functions have yet to transition to a suitable organization to support business analytics. Gartner's 2014 research agenda will help leaders transition to the business analytics organization required to help grow and transform the business while continuing to meet tactical needs.” Gartner, 2014

Evolutionary stages of data mining				
Stage	Business question	Enabling technologies	Product providers	Characteristics
Data Collection (1960s)	“What was my average total revenue over the last five years?”	Computers, tapes, disks	IBM, CDC	Retrospective, static data delivery
Data Access (1980s)	“What were unit sales in New England last March?”	Relational databases (RDBMS), Structured Query Language (SQL), ODBC	Oracle, Sybase, Informix, IBM, Microsoft	Retrospective, dynamic data delivery at record level
Data Navigation (1990s)	“What were unit sales in New England last March? Drill down to Boston”	On-line analytic processing (OLAP), multidimensional databases, data warehouses	Pilot, IRI, Arbor, Redbrick, Evolutionary Technologies	Retrospective, dynamic data delivery at multiple levels
Data Mining (2000)	“What’s likely to happen in Boston unit sales next month? Why?”	Advanced algorithms, multiprocessor computers, massive databases	Lockheed, IBM, SGI, numerous startups (nascent industry)	Prospective, proactive information delivery

Figure 3 Hosseini et al. 2010 Evolutionary Stages of Data Mining

3.1.1. Business intelligence road map

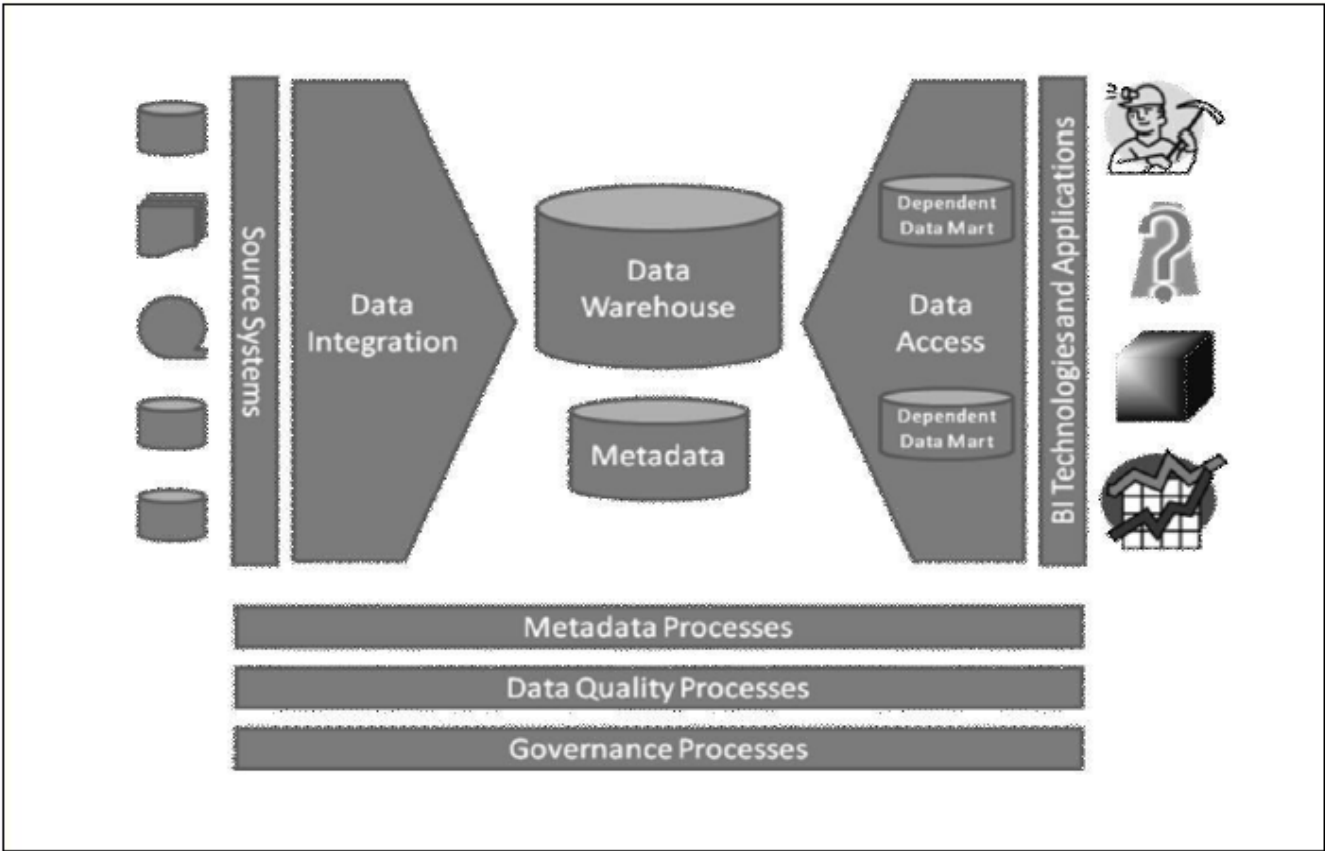


Figure 4 Watson (2009) BI Environment

Watson (2009) used a generic map for BI environment to describe the key entities and processes that are essential for a fully accomplished BI-system. For a reader this framework is a basic introduction tool to get familiar with the components that are part of a BI-system. In order to get the terms clear they need to be defined properly as I am going to use them later on in this paper. Chaudhuri et al. (2011) also presented similar kind map for BI, but they included also mid tier servers (enterprise level search machine, data mining – and reporting servers) as well as front end applications. By front end application they meant dashboards, ad hoc reporting queries and spreadsheets that support decisions makers directly solve business related problems.

Data integration is the process that collects data from various source systems, transforms it into a standard data form and then stores it into a company data warehouse. This process has previously been called ETL (extract, transform and load) as data has been extracted from the source systems, then transformed into standard data form and finally loaded into data warehouse. However, Watson (2009) criticizes the ETL term based on the some cases where data is extracted and then loaded and finally transformed making it ELT rather than ETL. So that is why I will use the term *data integration* rather than ETL for this specific process.

Data warehouse is the core element of the BI-system and serves as a data bank for the data needs of the company. After the analysis of the company data needs is completed the data loading process starts from the company sources (sales data, customer data, etc.). *Dependent data marts* are built to support functional or dimensional data need for specific need and purposes. For example, sales department might have different data needs than c-level executives and thus different data marts for different purposes should be designed and constructed. Data marts import the data from company wide data warehouse leading to the situation in which single truth on data is maintained and no inconsistencies should exist. Chaudhuri et al. (2011) mentioned that the trend over the past years has been to architecture low cost data platforms that can process much larger data amounts than traditional data warehouses. This is an answer to digitalization that is constantly increasing data available, phenom know as a “Big data challenge”.

Dependent data marts store data according to either star schema or multi-dimensional format. In a star schema data model the fact table is at the center of the star and the dimension tables are portrayed as the points of the star.

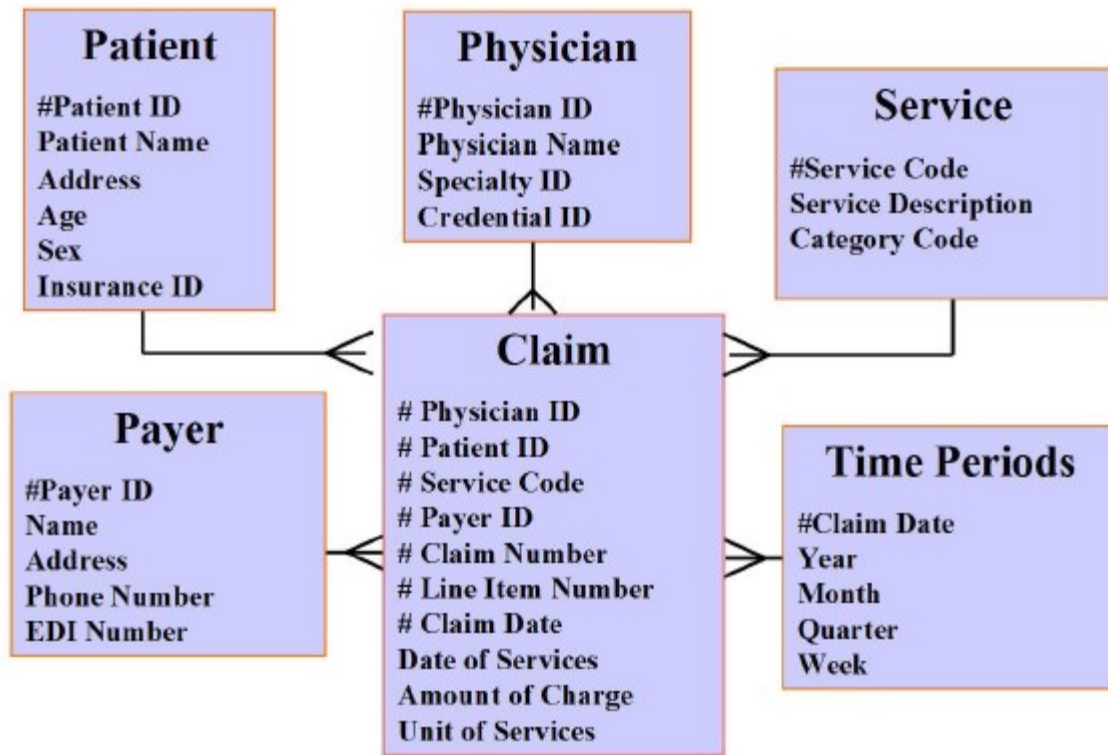


Figure 5 Star Schema Watson (2009)

Meta data can be considered as a supplementary data that support the information need of a person or entity that is using the data from company wide data warehouse. For example the IT personnel need to know what data is stored in warehouse or mart, data models (star schema etc.) and data refresh schedules Watson (2009).

Data quality. Typical data quality problems are related to causes such as missing data, dummy values, multipurpose fields and reused primary keys. The most effective way to prevent these data problems to occur is to fix them in data sources. This might be a time consuming process to conduct since the company departments that are responsible for data inputs might need some

convincing on why to put some effort to fix data problems in their areas. Data quality issues should be fixed or otherwise the whole reliability of BI is questionable and it fails to support managers in their decision making processes. It is important to notice that the user of data set the level for data quality. In other words zero-defects or complete accuracy is not what is usually required, often it should just be accurate enough for the purpose the data is used (Watson (2009). Chaudhuri et al. (2011) stressed the importance and pay off of the data quality applications that detect data quality issues and ensure data integrity in BI system .

BI Governance. BI Governance can be observed from the three different scopes. At the strategic level it helps to make sure the BI efforts are aligned with company strategy. At the tactical level aim is to ensure that BI projects are on time and schedule. Finally at the operational level, it addresses data quality and metadata issues.

3.1.2. The benefits of BI

Before going into more detailed benefits of BI for companies we should take an overall point of view to current global business environment where the amount of data is rapidly growing and actions must be taken with an ever increasing pace. Sahay and Ranjan (2008) stated that in order to survive in global competition companies have to develop their BI systems to support their decision making processes so that the required actions can be made on real-time based on accurate information. Based on this I would like to highlight BI's role as a necessity for running a global business rather than considering BI as an additional tool for managers and executives.

Watson (2009) introduced a simple framework to portray the possible benefits of BI for a company. Some of the benefits are relatively easy to measure and some are more or less challenging to prove with numbers. The other nature of BI benefits is locality as the benefits may occur on a global level within the company or be only locally noticed.

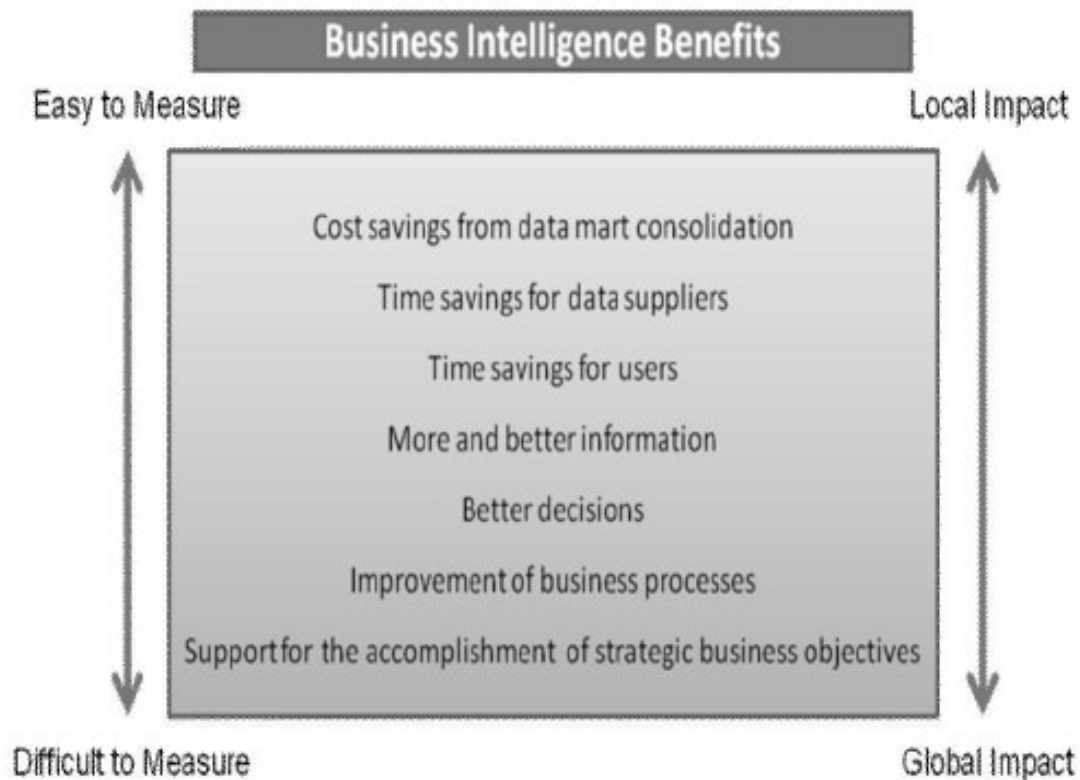


Figure 6 Business Intelligence Benefits Watson (2009)

Measuring the BI benefits is not always straightforward but certain principles exist. For example, if the aim is to improve some specific business process the company, with the possible help of consultants, sets a key performance indicator (KPI) for the process to measure its current performance. Then the next step is to start improving the KPI rate by developing the aspects of the chosen process. The use of KPIs allows managers to measure performance improvements and connects BI action to the company bottom line.

3.1.3. From raw data to business intelligence

“Data becomes business intelligence when it is in the hands of decision makers who know what to do with it” Thierauf, 2001.

Collecting and storing raw data is only the first step to support decision makers in the company or organization. Today's competitive business environment is not just about collecting data and actually, the lack of data is not usually the problem as in most of the cases companies do have data about their customers. The crucial question is what to do with data and how to use that data to gain competitive advantage. To make it simple, companies do have data about their customers. However, the core question is who is able to utilize and refine that data into business intelligence and moreover into competitive advantage, market share and finally into profits.

Thierauf (2001) has introduced a framework of an effective business intelligence system for a typical company. This figure aim to create an understanding on how to integrate company wide data, information and knowledge in order to support decision making.

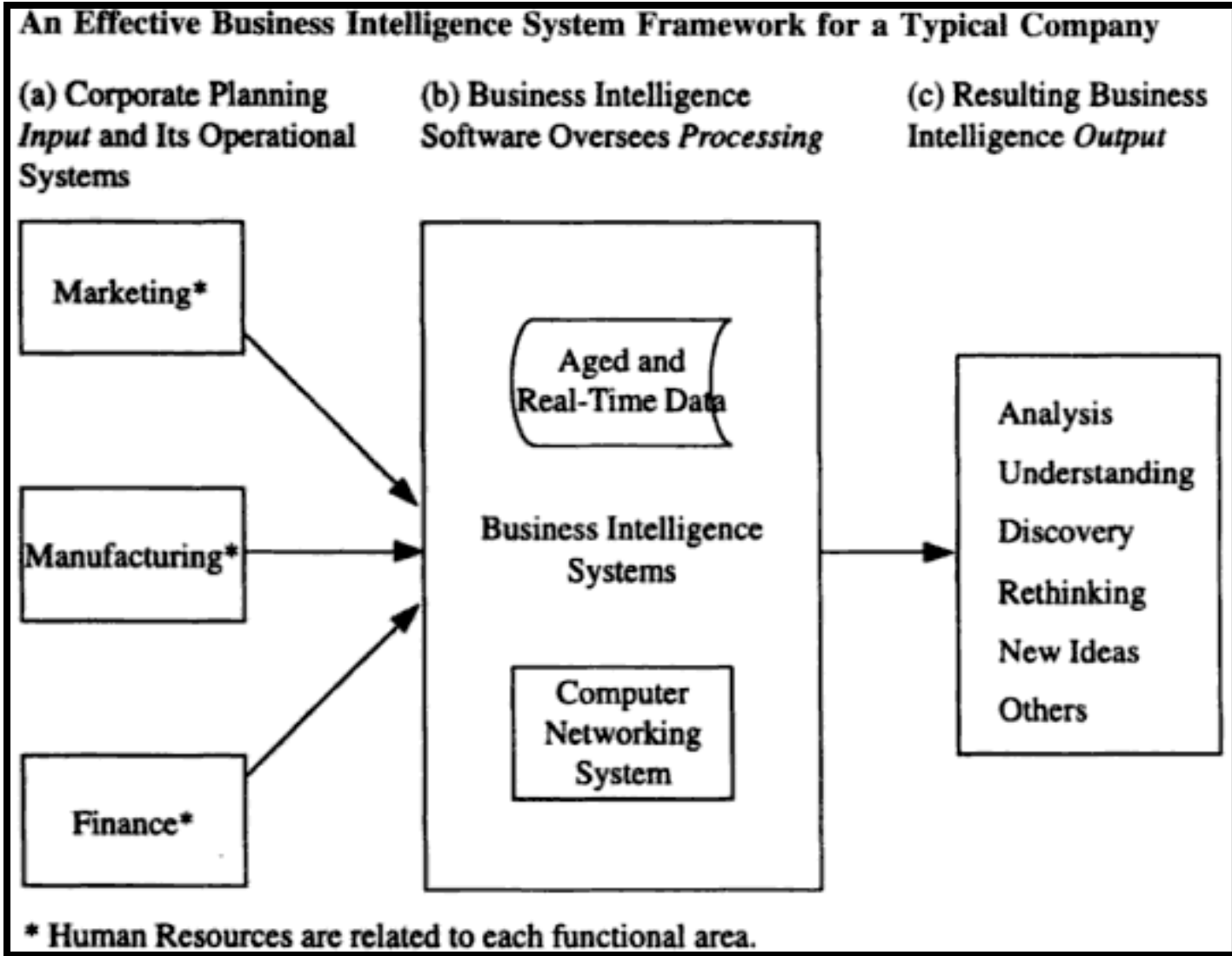


Figure 7 Thierauf (2001) An Effective Business Intelligence Framework for a Typical Company

The following figure explains also the path how data is transformed into intelligence that supports managers to take right actions to steer business into a right direction. The framework has three layers as the section A represents sources for data inputs that are loaded into a business intelligence system, section B. Between these two sections (A and B) there is ETL process that was explained earlier in this paper. In section B happens the analysis and processing of raw data into business intelligence outputs that are shown in section C.

In order to understand the transformation process in which raw data turns into intelligence Thierauf (2001) also clarified the terms data, information, knowledge and intelligence and portrayed how these terms are related to each other. In this paper I will only consider data, information, knowledge and intelligence levels too remain brief. I also believe that these four levels of summarization are enough to demonstrate the consolidation of raw data, giving it a meaningful context and finally making it actionable intelligence that is useful for managers.

Relationship of Intelligence to Various Levels of Summarization				
Level of Summarization	Definition	Problem Importance	Decision Approach	Nature of Problem
Truth	Conformance to fact or reality	Vital	Consensus	Structured to unstructured
Wisdom	Ability to judge soundly over time	Critical	Consensus	Unstructured
Intelligence	A keen insight into understanding important relationships	Extremely broad	Advisory	Unstructured and semistructured
Knowledge	Obtained from experts based on actual experience	Major	Advisory group	Semistructured
Information	Structured data useful for analysis	Major to minor	Advisors	Structured and semistructured
Data	Unstructured facts	Minor to trivial	Individual	Structured

Figure 8 Thierauf (2001) Relationship of Intelligence to Various Levels of Summarization

Data represents a heap of unstructured facts and for managers it might be relatively hard to utilize raw data. It is typical that the more data there is the harder it becomes for data users to use and analyze data “as it is”. On the next level there is *information* that is structured data useful for analysis and it has some sort of a context. *Knowledge* is information that has been obtained through actual experience by managers. Knowledge is created through the consolidation of

information and has been evaluated by several business professional to get approved as a knowledge. Thierauf (2001)

Intelligence. Inside the company resides a lot of information about the customer and company internal operations. Who are our key customer? What is the key indicator if the customer is planning to switch to other product/service provider? What are they most crucial operations for value proposition? Typically only very few and selected people in the company have had knowledge to answer these questions causing fragile dissemination of knowledge within the company and among employees. These days this knowledge combined with relationships to company external factors is called intelligence. The term intelligence acknowledges internal knowledge and the connections it has to external stakeholders. With the current business intelligence systems this intelligence can be stored in a way that it can be accessed by and delivered to whomever needs it. The company wide pool of intelligence serves as a significant source of competitive advantage

3.2. Sales strategy and management

Now that the common business intelligence solution and architecture terms and frameworks have been introduced the next step is to analyze company sales function and to identify those areas where BI solutions aim to provide support for decision making. As the primary focus area in this thesis is company sales function and BI solution support there, the terms should be defined before starting a deeper observation. The crucial terms here will be sales strategy, sales management and the elements of sales function.

Sales strategy is quite general and generic term and depends highly on context, but to be brief, it refers to that plan how company aims to create additional value by selling products or services to potential customers . Wikipedia, 2014 describes sales management as a business discipline that focuses on the practical applications of sales techniques and the management of a firm's sales operations. It is an important business function as net sales through products and services sold as well as the resulting profit drive most commercial businesses. These two parameters are also typically the goals and performance indicators of sales management. Weitz and Bradford (1999)

studied sales management as well and concluded that sales management activities are dependent on the sales strategy and on how company aims to do business with their customers, e.g. from short term deals to partnering.

As the aim of this study is to analyze the level of support to managerial decision making in sales that the current BI solutions provide, company sales function has to be divided into specific areas to see, where the BI solutions are able to deliver according to promises and where they fail to do so. The special are of interest are those business elements in sales where the current BI solutions fail to deliver information that could be used to make better decisions. Previous studies (Pirttimäki 2007; Riabacke et al. 20011) have especially identified problems related to strategy making in sales where BI solution have tendency not to provide sufficient information causing vague support to managerial decision making in that area of sales function.

My aim in this study is to shed more light to these information gaps, address them in more detail and finally create a framework that gives more understanding to in which element of sales BI systems do not deliver information enough and what are the reasons behind. Framework is created based on previous studies and industry analyses, then tested in case interviews and finally modified to better suit to practical use. Framework will have three major elements within – sales strategy,

3.2.1. Nature of customer relationships

I am now going to analyze sales management depending on the nature of buyer-seller relationship as the sales management activities vary based on the nature of relationship. Weitz and Bradford (1999) explained the transformation in the roles of salesperson through the four eras – production, sales, marketing and partnering- that are shown in the figure below. During each era salespeople have had different roles and activities that have been essential pursuing their goals. Each era has also a set of skills and knowledge required to satisfy the needs of each era's circumstances. It should be mentioned though that even though roles and eras have developed with the time each of the roles have been present in each era. To be more specific, partnering

might be the current era, but the other three roles – production, sales and marketing- do still exist and have their place nowadays.

Table 1 Bradford (1999) Salesperson roles

**TABLE 1
Salesperson Roles**

Era/role	Production	Sales	Marketing	Partnering
Sales force objective	Making sales	Making sales	Satisfying customer needs	Building relationships
Sales force orientation	Short-term seller needs	Short-term seller needs	Short-term customer and buyer needs	Long-term customer and seller needs
Critical tasks of salespeople	Taking orders, delivering goods	Convincing buyers to buy products	Matching available offerings to buyer needs	Creating new alternatives by matching buyer needs with seller capabilities
Activities of salespeople	Making sales calls and informing customers about the firm's offering	Influencing customers using a hard-sell approach	Influencing customers by practicing adaptive selling	Building and maintaining customer relationships Organizing and leading a sales team Managing conflict
Role of salesperson	Provider	Persuader	Problem solver	Value creator
Focus of sales management (selection, training, motivation, evaluation, and compensation)	Individual salespeople Emphasis on efficient resource allocation and motivating salespeople to work harder	Individual salespeople Emphasis on efficient resource allocation and motivating salespeople to work harder	Individual salespeople Emphasis on selection and training to improve ability and motivating salespeople to work smarter	Sales teams and leaders of sales teams Emphasis on the selection and motivation of teams and developing leadership and conflict management skills in account managers

Production. Production role relates to a situation where competition is relatively limited and supply of goods or services is greater than demand. Salespeople focus mainly on short-term need of the company. Focus of sales management in this era is to effectively allocate sales resources for products and regions and to motivate salespeople to push harder and make more sales calls

rather than to improve their already existing skills via training. Business intelligence might be helpful here when deciding the territories for salespeople to work and in call planning process.

Sales. Sales role aims to enhance and stimulate the demand of company products by aggressively selling and promoting them to the potential customers. In sales management it is vital to identify the personal characteristics of sales force as the person with an aggressive style is the most suitable for this role.

Marketing. In this role salespeople consider the need of both sides, their own company's and customer's and try to fit these needs into a commercial deal. Even though role of salesperson is here considered as a problem solver in figure the tools to solve customers' problems are limited to those products and offerings the company can provide. Hence, the key goal here is to make the sale, not to increase customer's profitability. The role of sales management in this era is to create an urgency for salespeople to be more customer oriented and smarter in sales wise. Employee training and motivation are the key activities to secure these goals.

Partnering. The key characteristic in this salespeople role is long-term relationship with the customer. The attitude towards the customer's needs is to respond to them by creating additional value by creating totally new alternatives from seller's capabilities. This is the major difference to marketing role where seller is tied to already existing alternatives and no new ones are offered to the customers. From the perspective of sales management the focus is on selecting, training and motivation of sales team rather than individual people. The competitive advantage in partnering is the unique relationship between the seller and buyer, which raises from the activities that are aimed at increasing the pie rather than dividing it. Investments are done collaboratively and therefore competitors have hard times in trying to duplicate the unique relationship. In partnering role there three distinctive issues to consider: (1) managing conflict of interest and incentives between seller and buyer, (2) long term goals versus short term sales and (3) incentives among sales team- team vs individual perspective. Due to the existence of two parties there will be conflict of interest in relationship between them and salespersons task is to manage that conflict by influencing the buyer to take actions that are in the line with seller's business goals. However, both parties should first try to ensure that the relationship is beneficial

for them and then pursue objectives and goals that benefit primarily the relationship, not individual party. Sales management orientation in partnering focuses on sales team and ensure that the circumstances are allowing team to reach its full potential. Weitz and Bradford (1999)

Despite the all positive aspects of partnerships, one should also notice the less favorable ones. Anderson and Jap (2005) wrote that close relationships do not always equal to good relationships. Joint ventures for example have a failure rate between 30-50%. In a close relationship partners, over a time, will learn the strengths and capabilities of each other decreasing the value of relationship. It was also found out that the more cozy partners feel in the close relationship the more sensitive they are to criticize and bring up the issues within the relationship increasing the conflict rate. It should also be noticed that the goals and interests of the parties do change over a time and no relationship, in business context, should be taken as granted. Business relationships do require maintenance, investment and attention over the time in order to stay viable.

3.2.2. Sales reporting

The purpose of sales reporting is to keep track with activities done by sales force. Effective sales reporting ensures that people and teams can be evaluated by numbers and that managers can observe how the given sales objectives are achieved on both personal and organizational level. Typically, companies do compensate sales force based on their results and without accurate reporting systems this compensation is not objective and fair. At the organizational level, the data sales force collects and reports is an input for strategic planning conducted by executives. In addition to what company internal stakeholders require from sales reporting, there are also plenty of external ones, who desire to have information from sales department. Investors might especially want know on real time what is going on the market and how sales figures are developing and whether or not there are changes in sales forecasts. All these diverse requirements set pressure for sales reporting that should satisfy the needs of many stakeholders. Wotruba and Mangone (1979); Wikipedia, 2014

In today's business world it is not always enough to utilize only so called backward-looking sales reports but also those reports than try to forecast what will happen in the future. As Hosseini et al. (2010) also stated, the contemporary reporting is forward-looking and tries to

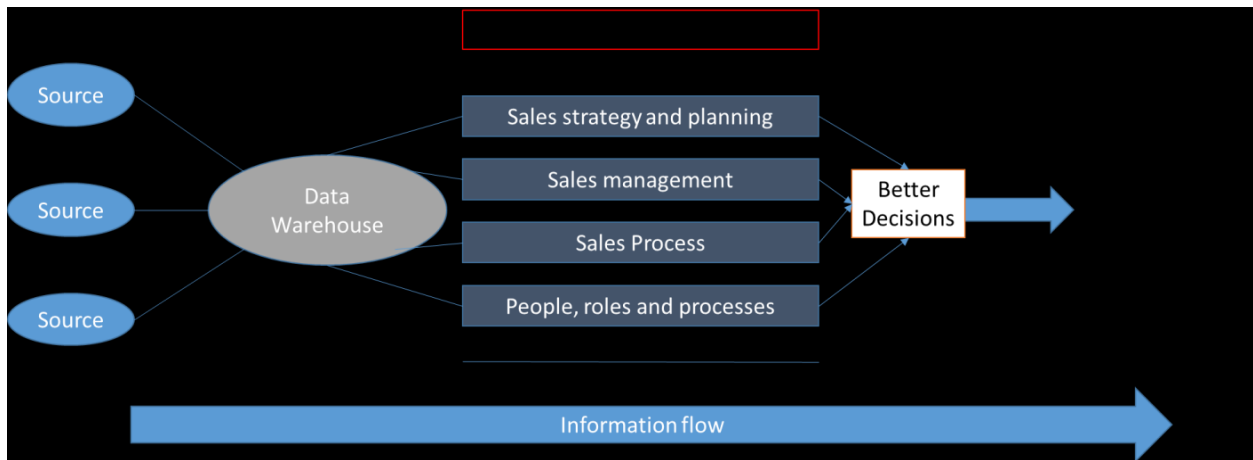
answer such a questions as “what will happen next month, next year etc.” BI systems as well as modern reporting have two distinctive attributes, they should be updated on real-time and be predictive. Yet it remains unclear how much are these tools used by managers and how significant is their role for managers when they are doing decisions.

3.3. Sales BI framework

In order to bring structure and usefull insight into my thesis I wanted to create a tool that could help me to organize interviews and would allow me to understand precisely where the problems of BI occur in sales related activities. Frameworks always help to structure one’s thinking and they help people to get a holistic viepoint to discussed topic. The basis of my own framework is a combination of framework called “Sales maturity model” offered by auditing and consultancy company EY. Then I brought in the typical struture of a BI systems and combined these two into Sales BI Framework. My initial purpose was to see which parts of sales function do have problems benefiting from BI but as we see later the problems with BI were often more substancial and related data quality and data availability which are up stream phases in my framework and come before actual applications that sales function could utilize.

During the interviews Sales BI framework worked as a story line throught the meeting and clearly helped interviewed managers to stick to topic I wanted to discuss. I initial idea was to use fours elements of sales, portrayed in Sales BI framework, as sub heading later on this thesis but data quality problems were such a significant and mutually agreed problem among managers that much of focus is put on that instead of sales function elements.

Table 2 Sales BI Framework



4. METHODOLOGY

4.1. Research paradigm

For a researcher it a common and typical decision to make whether to use quantitative or qualitative methods in his or her research. The main difference between these two methodologies is that the quantitative methods use number and large sample sizes to test existing theories whereas qualitative methods use words and meaning to build theories. Depending on the case, some academics suggest the usage of both methods in a research but quite many choose to use only one method in their research. The usage of two methods could be justified as the two may result into results that are contradictory and do not necessarily produce answers that could easily be transferred into a single “truth” of the observed problem. Sobh and Perry (2006)

Quite surprisingly, for apprentice researchers at least, methodology is only one of the three elements of research paradigm and should have excessive amount of attention. The other two elements of research paradigm are ontology and epistemology. Ontology refers to reality and epistemology is the relationship between researcher and reality. Methodology consists of the techniques the researches uses to analyze reality. Paradigm itself can be described as the “basic belief system or worldview that guides the investigator”. Sobh and Perry (2009)

In the following figure are the four basic paradigms of science. Following table (Table 3 Research Paradigm) helps reader to understand the differences among the paradigms by using the three elements of paradigm – ontology, epistemology and methodology.

Table 3 Research Paradigm Sobh and Perry (2009)

Element	Paradigm			
	Positivism	Constructivism	Critical theory	Realism
Ontology	Reality is real and apprehensible	Multiple local and specific “constructed” realities	“Virtual” reality shaped by social, economic, ethnic, political, cultural, and gender values, crystallised over time	Reality is “real” but only imperfectly and probabilistically apprehensible and so triangulation from many sources is required to try to know it
Epistemology	Findings true – researcher is objective by viewing reality through a “one-way mirror”	Created findings – researcher is a “passionate participant” within the world being investigated	Value mediated findings – researcher is a “transformative intellectual” who changes the social world within which participants live	Findings probably true – researcher is value-aware and needs to triangulate any perceptions he or she is collecting
Common methodologies	Mostly concerns with a testing of theory. Thus mainly quantitative methods such as: survey, experiments, and verification of hypotheses	In-depth unstructured interviews, participant observation, action research, and grounded theory research	Action research and participant observation	Mainly qualitative methods such as case studies and convergent interviews

Business is part of social sciences where direct causal link very seldom exists. In other words, it is hard to find evidence for the cause and symptom, but the consequences are heavily dependent on the context of observation. Therefore, in order to understand reality researcher has to make some triangulations, framing, to depict the reality and understand it. Researcher has to also

understand the limitation of his or her research and state the weaknesses of the chosen methodology. Sobh and Perry (2009)

The context is a significant factor in the field of business and it can be evaluated via four Ps – place (where), period (time), people and process. These four Ps cause variation to cause-effect relationships studied and it is hard find direct causalities between studied causes and effects. In this kind of situation realism paradigm is appropriate choice as it allows researcher to triangulate perceptions and use multiple sources to create of an understanding of reality that is true enough to answer the research questions. It should be noticed that in realism method one negative result that is against the found logic does not mean that the whole mechanism is wrong, but that context may have intervened and caused the negative result. Researcher may have done the research accordingly but the complex reality that is behind the context may cause outcomes that do not support the researcher’s mechanism. Moreover, realism should be asking why the result has been found, since the results are just a collection of samples from much larger reality that cannot be observed or measured. Sobh and Perry (2009)

4.1.1. Realism paradigm

In my research, the reality in which the companies operate is very complex and thus direct causalities and cause-effect relationships are hard to find. Industry, nature of seller-byer relationship, sales managers personality and organizational culture all form a context to my survey and have effect on interviewed person’s opinions and preferences. Therefore, realism paradigm is an appropriate way to approach the research questions and it will give me a chance to structure the research and triangulate found results to create a model that depicts reality well enough. The possible research methods are now case study and convergent interviews. To guarantee in depth analysis and holistic understanding on research question I will take 10 cases and conduct one interview per case. The purpose of case interviews is to collect data and try to find underlying mechanisms and meanings that could explain the reality. In addition, prior theory reported in literature review is an additional evidence that supports empirical findings from the case study interviews. Prior theory works as a group of perceptions, which will clarify the imperfectly apprehensible external reality by triangulating that reality. Sobh and Perry (2009)

4.1.2. Triangulation on reality

The idea of triangulation is only applicable within realism paradigm as it assumes that there is only one single reality in contrast to constructivism and critical theory, which assume there are several realities co-existing. Triangulation aims to provide a family of answers that covers reality's several contexts and complexities. For instance, in case study researcher conducts interviews and asks same questions each time to see if the interviewees answer with the same perceptions. It is not unfamiliar that the answers for the same question might be slightly different among cases, but it should not be considered as a failure of research but rather as a way to understand and explain the complexities that define the reality. In other words, data analysis in realism research should focus on "reasons why" type of questions that explain the reality.

4.2. Case study research

Technical definition of a case study has two elements. The first element says that a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context. Moreover, a case study is especially useful when the boundaries between phenomenon and context are not clearly defined or evident. The second part of technical definition of a case study states that case study copes with the technically special environment where there are more variables of interest than data points. One individual result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion. The result is also built on prior theoretical propositions to guide further data collection and analysis. This twofold definition cover all phases of a case study research: logic of research design, data collection techniques, and specific approaches to data analysis. (Yin, 2009)

Previously there has been quite a lot criticism toward case study as a research method (Yin, 2009; Flyvbjerg, 2008). The most part of the criticism has been dealing with the fact whether a case study is a suitable research method or not as well as saying, that case study can be only a preliminary part of a research and that it cannot be the primary method for gathering data and turning it into results. Despite the criticism, case study methodology has its place in science, especially in situations where complexity of observed phenomenon is high and context of the observed phenomenon has a significant role. In this type of situations, the cause-effect

relationships are hard, even impossible, directly to isolate from the context and thus, case study is a valid choice to explain the observed phenomenon as it answers questions such as “why” and “how”.

4.3. Introduction of case study and 8 companies involved

As this study was assignment given by a Finnish consulting company they had their opinion to say what companies and why should be included to case study. After few meetings we decided reach out to large public Finnish companies knowing that getting an interview would be difficult. Many potential interviewees were too busy to say yes and some companies had policy not to take part in student’s thesis interviews. After building a list of potential companies and potential people to be interviewed in those companies I started to send emails in order to book a meeting with a target person. In total I sent approximately 30 interview requests to carefully analyzed target group and after some back and forth negotiations I was able set up 8 interviews meaning that the response rate was ~27%.

In interview I had my list of fixed questions that I asked from everybody to get answers that are comparable and help me to make some conclusions afterwards. All interviewees were recorded and then documentet in text form as a Word-document. After transcribing interviews I created a consolidation file in excel where all the answers to a specific question were put on same row to enable convenient comparison among answers. Consolidation of answers also helped me to get a good overview of all interviews and see logical findings from data.

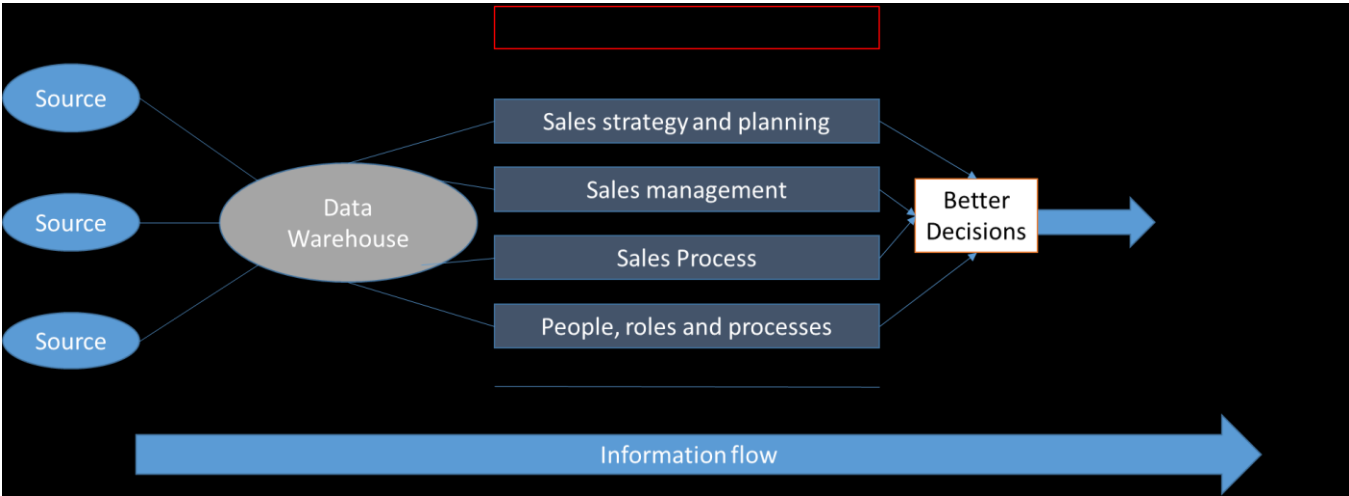
5. FINDINGS

For this case study I interviewed 8 executives and sales managers in order to create a holistic understanding on how current BI systems and analytic tools support decision makers so that they can understand their business, especially sales function, better and thus make better decisions. To organize interviews and to create structured view to challenges executives and managers face in decision making I created a framework that brings together the BI systems and sales function. Framework’s purpose is to create better understanding on challenges in sales function that BI

systems don't provide enough support. All 8 interviews were also structured around the framework to enable comparison of answers and challenges in sales function that executives addressed. I am also going to organize this part of my thesis around framework. Despite the fact that interviewed companies operate all in different industries there were mutual challenges they faced when trying to lead sales through information based approach.

I used EY's Sales Maturity model as my influencer to create a suitable framework (see Table 4 below) that serves my study and combined the best parts of that maturity model with the structure of BI system that was discussed before in literature review of this paper. Combination of these two frameworks helped me to structure interviews, asks detailed questions from interviewees and finally to compare findings to make general assumptions about challenges sales managers meet.

Table 4 Sales BI Framework



I conducted interviews by going through all four elements of sales and by asking whether managers felt that they get the required information they want to support their decision making.

From all the interviews, the most significant challenge was getting correct and rich data from customers or from the companies that represent interviewed company and sell their products to end customers. This was especially the case with companies who do not sell directly to their end customer and are thus lacking the direct interface for data collection.

“We would like to know if a single customer is part of a bigger entity like a company or university. This way we could understand bigger picture and notice if a group of individuals is unhappy with our service level”. Sales executive, Company 3.

“We cannot use Nielsen cashier data from retailers anymore. That data would be helpful as it showed actual prices and amounts of products sold. That data would help us to bench mark ourselves against our competitors” Sales executive, Company 4.

“Who makes decisions in customer organization? We feel it difficult to get to meet the right people. Our message will be unclear if we do not know who to approach and middlemen deliver our offers” Sales manager, Company 6.

“There are cases where even the end customer does not know what they want to buy. If they do not know it, how could any BI system know?” CEO, Company 7.

All interviewed managers and executives agreed that no BI system can fully replace human nor provide perfect information to fully support decision making. Two main reason for that are lack of quality data and the second is that almost all executives and managers said their current systems and BI solution are not user friendly enough. In other words, they found them too complex to use or too time consuming for the hectic environment where sales activities usually happen.

5.1. Challenge of getting quality data

Almost all interviewed persons mentioned problem with getting the right data that is useful for decision making but also reliable and possible to access. Companies who can collect and refine data within their own organization have more options to organize their BI system but real problems occur when data need goes beyond company borders and requires cooperation with

customers or suppliers. Managers and executives struggle to find ways how to convince other organizations to organize their data in a way that benefits all stakeholders in supply chain. In addition to stakeholder communication and joint interests in data management technology can cause problems if sellers and buyers systems do not communicate together at the level executives would need them to do. As one of the executives told me, the interface between two different systems can be so weak and inappropriate that critical data is lost during the process.

“80% of our total sales come through agents and representatives who sell our products and services to end customers. We would like to know the things our end customers value and are ready to pay extra for. Our strategy is to be premium service provider and not to compete with low prices. But the problem is that essential data is lost in transaction between sales representative and our company leaving us with minimal information of end customer’s buying behavior.” Sales executive, Company 3.

Price of data can also be a factor when executives consider BI systems and data they want to include in systems. Executives have to be sure that value they get out of data is higher than costs allocated to BI system, including price of initial purchase, maintenance and cost of data purchased from a third party.

“Nielsen data which is based on real products sold in grocery stores costs around 100 000 euros a year. That is a significant cost and it is not easy to say for sure how much value we can drive out from that data and turn it into profits. Now we do not use that data source. It could be useful but it is hard to predict.” Sales executive, Company 4.

5.2. Mutual interest in supply chain data exchange

As we have noticed not all companies do business with the end user who uses product or service the company has been creating value for. Distance from the end user causes difficulties when it comes to availability of data and a chance to collect as well as refine data for executives so they could use it for competitive advantage. Consider a supply chain and companies within. Do they all have the same desires to get quality data and incentives to invest a lot of money and effort in it? That is a difficult question to answer and according to interviewed executives a company not

in direct contact with end customer has desire to persuade other company who sells directly to end customer to deliver quality data to other companies in that supply chain to guarantee maximal understanding on end customer's buying behavior. Supply chain could establish a mutually agreed strategy to collect data and invest in BI systems where they can exchange data and information. Sales executive from Company 3 mentioned serious challenge in more aligned data exchange inside supply chain:

“We have 90 000 travel agencies and other resellers who sell our services. We can easily decide about our own systems and technological solutions. But how to convince others? There is the big question to solve. We have launched our own customer loyalty system in order to collect data from our customers, but outside the Finnish market only very few customers have signed in. Also the campaigns and special offers we have tailored based on data from loyal customer systems have been very generic with little or none individual touch.”

As it is in many areas of business, mutually shared incentives are the key to success and yet companies struggle to overcome the challenge. Currently effective data collection and exchange among supply chain members remains a serious challenge based on my interviews but still, I see there is the biggest potential to create value because of understanding why and how end customer makes a buying decision. Tailored offers for an individual potential or already existing customer will have a clear edge over mass produced offers in future. That requires all companies involved in BI system investment see value in BI that not only covers the invested money but also gives an advantage against competitors.

5.3. Answering to two research questions based on findings from interviews

At this point of my thesis it is good moment to take look back to beginning of this research where I asked the two main research questions. The whole purpose of doing interviews and conducting literature review was of course to provide answers to these questions. Moreover, I personally have great interest in how BI systems can help executives to develop their businesses

as too often I have noticed that people assume technology automatically to solve business problems without deeper analysis of those problems and understanding them. According to my own experience at this stage of my professional career, sales pitches of technology vendors have tendency to overlook customer's own effort in process of reaching those goals set for BI project. Before an organization can adopt BI system they have to ensure they have quality data to be utilized and they know what they want to measure as well as what KPIs need to be established.

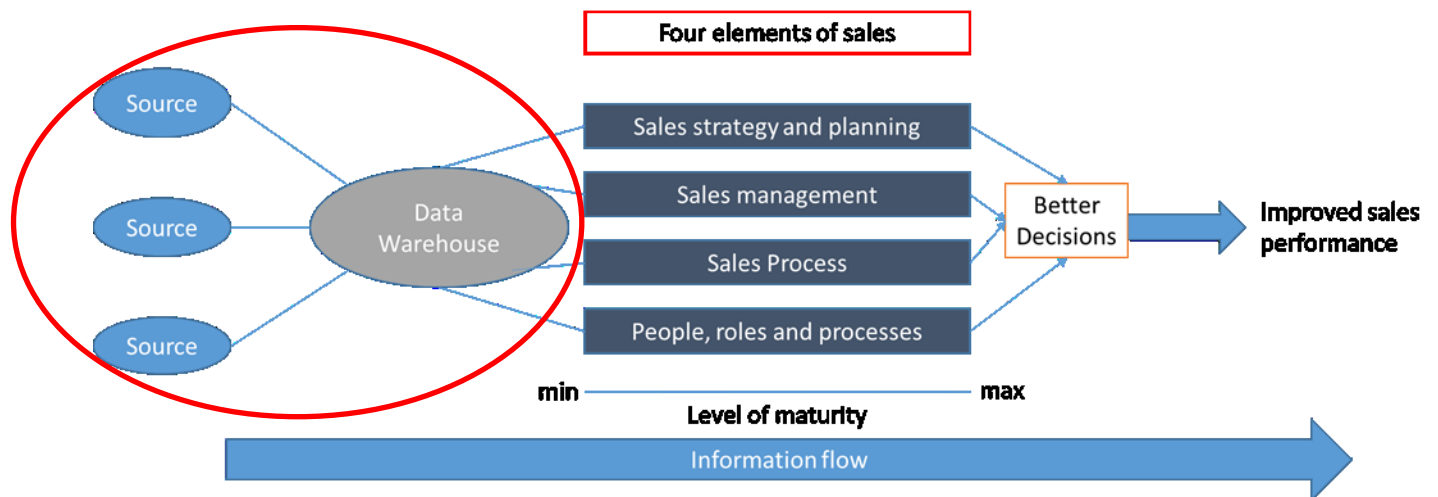
1. Are the current BI systems providing enough support for sales executives in decision-making?
2. What are the biggest areas in sales where BI fails to provide information for the support of managerial decision-making?

Based on the 8 interviews I did with executives and sales managers I see that the first questions is easier to answer. Consensus finding from the 8 interviews was that BI systems do support sales executives in decision-making, but the biggest challenge is to actually have high level BI system in action. The main reason for not having BI support was lack of proper data. Companies did not either know how to get right data or they were not sure what data to collect or buy. Mutual was that all interviewed companies wanted to understand their customers better, including their buying criteria. Struggle to get the right high quality data was so serious that interviewed persons were not even sure how to improve their situations as they might have had upper level vision but the clear steps toward that vision were missing. The need to understand customers was even greater among those companies who were selling service, not physical goods, due to lack of stock. Services naturally cannot be stored and production of a service as well as consumption do happen at the same time and customer is always involved in production process. Company in service industry cannot adapt to changes in demand by having stock like companies in production business can do. One of the interviewed companies in production business said (CEO) that they currently have work for one month only and that they can only wait for next orders to arrive.

The second research question tries to specify those areas in my Four Elements of Sales framework in which BI system fails to provide promised support for decision-making. As my conclusion from the interviews, lack of quality data has been the mutual factor for all eight

companies in a process of understanding their customers and their underlying desires related to buying behavior (see Table 4).

Table 5 Data Sources



Why is data then so difficult for these companies? Next I will try to collect all the problems related to data quality and availability that came up during the interviews. After addressing these problems, I aim to draw conclusion and make some general level suggestions in order to bring meaningful insights to the reader of the struggles companies have. After analysing carefully all interviews the problems related to data can be categorized as follows:

1. Does not know what data to collect and utilize
2. Knows what data to utilize but cannot access it
 - a. data is within a company
 - b. data is outside of a company
3. Does not know how to utilize data
4. Data is too expensive effort or money wise

There are no simple solutions for these 4 common problems that would fit to every company interviewed or in general. As one of the executives (Company 1) said at the end of our interview, “More and more information is available to managers yet it is less than perfect. Technology works well with basic business structure but the more complex the business structure gets the harder it is to measure and therefore managers do not get all the information they would like to have to make right decisions”. It also appears that increasing distance from the end customer and number of middle men in supply chain have a negative effect on quality sales data availability. Sales executive at Company 3 was frustrated and he mentioned that data they get through their sales representatives is weak and basically useless for more demanding customer analysis. Company 3 also has thousands of sales representatives reducing their negotiation power against them and therefore better data exchange is hard to pursue.

During the interviews I also noticed the certain level of skepticism towards the hype around BI systems and results that are promised. One could argue that it is typical to sales professionals to stress the importance of gut feeling when making decisions instead of being very analytical and using technology as support for decision-making. Many interviewees had also negative experiences from previous IT systems which were felt difficult to learn and use. The same lack of user friendly user interface was seen as a problem with current BI systems and applications which reduced willingness to utilize those technologies.

The role of gut feeling versus information driven decision-making was a topic that constantly caused debate and all interviewed people had strong opinions in this matter. Company 1 executive said that “there must be a balance between acting on the right time and gathering enough information. You can't wait for perfect information. One has to make decisions in imperfect circumstances. You have to be consistent with direction and message as you communicate to other employees and colleagues within or outside your organization. Organization doesn't respond if you change direction all the time. There must be direction where to go and manager has to lead employees toward that direction consistently”. Interviewed persons saw gut feeling as something manager builds during the time he works in sales. Gut feeling can be seen as an intuitive skill that can only be achieved through experience and hard work. Gut feeling is extremely important when quick action must be taken under limited time span. All interviewed

agreed that gut feeling is important to them and information based decision-making has its limitations, lack of time being the most significant one. Sales manager in Company5 had slightly different thoughts “ Company has to be able to tell workers the importance of data collection and why do we have to create these reports because they all take some time of from actual sales work. Gut feeling is great, but when I am reporting to my boss it does not help as I need data and numbers to justify my case. Data visualization is something I would like to use more as it saves time by making my message clear and people will catch my point easier”.

6. SUMMARY

BI support in sales management was relatively challenging topic for a thesis as there was a lot of articles of either sales or BI but not so many on both of them. I was especially interested in the opinions of BI users who are looking for clear results from BI, in case sales managers and executives. The theory and definitions of BI are necessary in order to understand the basics, but for me even more intriguing is the actual support decision makers receive. Personally, at my current company where I work, we are in the middle of starting our own BI project and therefore the actual results, cost savings or new business opportunities, are in my interest. My target was to get high quality interviews from the people are responsible for business development and revenues and to whom BI is a mean to achieve something rather than a stand alone technology which true value is unknown. My sponsor in this thesis was Bynfo Oy, a small management consulting company that is specialized in information based management and reporting development. They were interested in some specific companies and their current status so for Bynfo my thesis served as a market study, even if limited due to relatively small sample size.

In literature review I build motivation for the actual empirical case study of 8 companies. Riabacke et al. (2011) and Pirttimäki (2007) both came to a same conclusion that there are still significant areas of development in BI adoption process and same need for improvement was identified by the 8 interviewed sales executives and managers. Case study method provided essential addition to current academic studies and indicated that data is the most difficult part of

BI and caused serious struggle to all interviewed companies. As mentioned, data related problems can be categorized as :

1. Does not know what data to collect and utilize
2. Knows what data to utilize but cannot access it
 - a. data is within a company
 - b. data is outside of a company
3. Does not know how to utilize data
4. Data is too expensive effort or money wise

Data related problems cause serious challenge to the whole BI ecosystem as data lies in upstream of BI ecosystem and next phases of ecosystem will suffer if data is inadequate. Defected data will basically ruin all the potential gains from BI system and the whole investment would be in vain. Lesson learned from this is that companies should first start by checking their data and if it meets the reporting requirements and is usable for BI. Data sources such as payroll, CRM, HR-systems etc. are typical data providers for BI datawarehouse and those sources' ability for ETL process must be ensured before any bigger investments in BI. Next I will take a closer look to these four data related problems which were identified during interviews.

Interviewees who did not know what data to collect have lot to do before they can even consider BI system, or more precisely, to benefit from it. Data needs are very company and industry specific so it quite difficult to make any general level suggestions how tackle the problem. Company should think what information is useful in sales development, where this data is located and how to collect, store and finally refine data into an information.

In the second problem type the interviewed person knew the data he wants to utilize but could not access it. In most of the cases the data was within a company, but in some it was outside and is located within another organization. In those cases where data was within a company but not accessible it was not that it is impossible to get that data but that the cost and effort was seen as significant whereas benefits were unclear causing executives to hesitate whether it is worth the effort to start collecting data. One company was really struggling because essential customer data could be collected only through their sales representatives and agents who had the direct contact

to end customer. This problem can be tackled only by highlighting the benefits which data would bring to whole ecosystem , rather than benefits to a single company within ecosystem.

Third problem type was very common among companies in the sense that they all had some data but many were uncertain how to use it to get competitive advantage, especially when significant cost or/and effort was required for data usage. Many interviewees were familiar what area of sales would be beneficial to understand better but they did not have actual plan how to start exploring that area. Manager in Company 8 said they have collected data for two decades, but did not see how to utilize it in sales. He was worried that they could not track reclamations well as every country organization has its own IT systems which do not communicate with each other. He did not have clear understanding on how his company observes its customers and if there are some follow up calls for unsatisfied customer who are in danger to leave. He mentioned also difficulties in getting reports on time and effortless as current system was inconvenient to use for him. Company 8 sells technical products which require training for sales persons so that they can explain the product to customer and thus most of focus in sales management is put in education and less to data based information seeking. These two aspects of sales do not need to be substitutes to each other but with limited time and resources it is understandable for companies to focus their energy to process they feel are their core competencies.

The fourth problem type was partially already discussed and conclusion is that even if executives would assume that some data could provide useful insights they do not see it worthwhile compared to the effort required. Again negative experiences from previous IT systems that were promised to enhance performance in sales have significant impact on sales executives and managers by molding their current attitude towards BI systems. This phenomenon is also a challenge for technology vendors and BI consultants who need, in cooperation with customer, to build solid business cases where benefits of BI exceed invested money.

6.1. Future Field of Study

As data quality problems got surprisingly significant role in this research it would be tempting to dig deeper into that topic to understand better the underlying fundamentals that cause these problems. Even more rewarding would be to do a comprehensive case study on how companies have tackled these data problems and draw conclusion so that other companies considering BI system would benefit from those findings in order to avoid similar mistakes. However, this would require much more time and skills than can be expected from an average thesis worker.

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9. INTERVIEWS

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2. Clay Dunn, Vice President / North America, Huhtamäki, 3.9.2014 (phone interview)
3. Juuso Rautalin, Sales Manager, Elisa, Helsinki 10.9.2014
4. Ilkka Auvola, Sales executive, Olvi, 1.10.2014 Helsinki
5. Jarkko Mölsä, Head of Sales, Panalpina, 14.10.2014 Helsinki
6. Jukka Vakula, Head of Sales, Technopolis, 31.10.2014 Vantaa
7. Pekka Rantamäki, CEO, Teknos, 10.11.2014 Helsinki
8. Michael Björkman, Head of Technical Sales, Vacon, 7.10.2014

Numbers do not correlate with Company references I use in this thesis. This is to protect identity of sources.

