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Strategic Alignment of Business Intelligence
– A Case Study

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Abstract

This thesis is about the concept of strategic alignment of business intelligence. It is based on a theoretical foundation that is used to define and explain business intelligence, data warehousing and strategic alignment. By combining a number of different methods for strategic alignment a framework for alignment of business intelligence is suggested. This framework addresses all different aspects of business intelligence identified as relevant for strategic alignment of business intelligence: *technology, organization, processes, people* and *strategies.* Using the framework to analyze the strategic alignment of business intelligence of an organization will result in the identification of potential alignment gaps. These gaps can be considered as potential areas of improvement. By addressing these areas an organization could improve their alignment and also increase the value of the business intelligence investment.

The case study of the Swedish gambling and lottery company Svenska Spel is used as an example in order to apply the theoretical framework and identify gaps in alignment. The study shows that Svenska Spel is not completely mature in their business intelligence approach. They have a solid architecture and the skills of their architects and developers seem to be adequate. But due to lack of a strategy for business intelligence and poor governance of business intelligence and data warehouse Svenska Spel might be facing problems with their business intelligence in general and their data warehouse in particular.

Svenska Spel would almost certainly have large benefits if they:

1) Create a business intelligence strategy.

2) Work with aligning this strategy to both the business strategy and IT strategy.

3) Implement a governance model including responsibilities for business intelligence.

These actions will lead to a more aligned business intelligence process and this will in return lead to a number of benefits for Svenska Spel.

A more general conclusion of this study is that it can be useful for organizations to develop a business intelligence strategy and align it to the actual organizational requirements, constraints, issues and implications. Another conclusion drawn is that it is vital to understand that alignment is a continuous process that needs to be implemented in the organization. If it is implemented successfully it secures long-term strategic alignment.

The results of this thesis can be useful for an organization in order to comprehend the different aspects of strategic alignment of business intelligence that needs to be addressed in order to be successful.

Keywords: strategic alignment, business intelligence, data warehouse

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Table of Contents

ABSTRACT **2**

ACKNOWLEDGEMENTS **3**

1 INTRODUCTION **5**

1.1 BACKGROUND 5
1.2 PURPOSE 6
1.3 SCOPE AND DELIMITATIONS 7

2 BUSINESS INTELLIGENCE AND STRATEGIC ALIGNMENT: A LITERATURE REVIEW **8**

2.1 BUSINESS INTELLIGENCE 8
2.1.1 Data Warehousing *8*
2.1.2 Customer Relationship Management *12*
2.1.3 Data Mining *13*
2.2 STRATEGY FOR BUSINESS INTELLIGENCE 13
2.3 STRATEGIC ALIGNMENT 15
2.4 STRATEGIC ALIGNMENT OF DATA WAREHOUSING 18
2.5 STRATEGIC ALIGNMENT OF BUSINESS INTELLIGENCE 22

3 CASE STUDY – SVENSKA SPEL **24**

3.1 BACKGROUND AND HISTORY 24
3.2 STRATEGY 25
3.3 BUSINESS INTELLIGENCE 26
3.4 STRATEGY FOR BUSINESS INTELLIGENCE 27
3.5 STRATEGIC ALIGNMENT OF BUSINESS INTELLIGENCE 28
3.5.1 Generic Alignment *28*
3.5.2 Strategic Alignment Model *28*
3.5.3 Strategic Alignment of Data Warehousing *29*

4 DISCUSSION AND CONCLUSIONS **32**

4.1 DISCUSSION AND CONCLUSIONS 32
4.2 FURTHER RESEARCH 34

5 REFERENCES **35**

5.1 LITERATURE 35
5.2 METHOD LITERATURE 36
5.3 WEB PAGES 36

APPENDIX A – RESEARCH METHODOLOGY **37**

METHOD USED 37

List of Figures

FIGURE 2.1. CONCEPTUAL IMAGE OF BUSINESS INTELLIGENCE/DATA WAREHOUSING ARCHITECTURE.
FIGURE 2.2. CONCEPT OF FULL ALIGNMENT.
FIGURE 2.3. STRATEGIC ALIGNMENT MODEL.
FIGURE 2.4. STRATEGIC ALIGNMENT OF DATA WAREHOUSE
FIGURE 2.5. THEORETICAL FRAMEWORK FOR STRATEGIC ALIGNMENT OF BUSINESS INTELLIGENCE.

1 Introduction

More or less all organizations and companies have to some extent a strategic direction for the activities they perform. The strategic direction is used in order to develop the long term overall objectives. Different companies have different approaches to the strategic development process. There are also differences in how organizations align their different functional strategies with each other.

In a competitive global environment, the importance of having the right information at the right time in order to make well informed decisions has increased. One way of achieving this level of flexibility is by implementing a business intelligence solution. Business intelligence in its technical form, i.e. as a data warehouse, is often mentioned as a strategic asset within an organization. But at the same time business intelligence and data warehousing is traditionally discussed from a technical point of view. Most organizations have processes for reporting, analyzing information and making decisions. These processes are often implemented with some kind of technological support. Having good organizational support for business intelligence is a matter of providing a solution that is aligned to the overall strategy, increasing income, decreasing overall costs and enabling the organizations capabilities of making well informed decisions.

Organizations also have to face the challenge of prioritizing investments. Information technology in general and business intelligence and data warehousing in particular are only two of many different potential investment areas. Those two parts constitute both sides of a complex equation that demands knowledge, insight and cooperation in order to make the right choices and get the most out of each investment.

1.1 Background

In 1997 I started my professional career working for a company providing technical consultancy services in the area of business intelligence solutions, mostly data warehouse related. At this time these technologies were quite immature. New innovations and new functionalities were developed at a rapid pace. Focus was clearly on different technical solutions and the technological support that could be developed. The leading authors on the topic were Ralph Kimball and Bill Inmon, both developing the terminology and solution framework.

In the present day focus still lies on a functional and technical approach to business intelligence and data warehousing. Development is fueled by a number of software vendors and some of the larger companies have positioned themselves in the market through buying smaller companies. SAP bought Business Objects (PC World), Microsoft bought Pro-Clarity (Microsoft[A]) and IBM bought Cognos (Reuters). One reason to this market consolidation is that the total market of business intelligence is growing rapidly; another reason is that business intelligence for several years has been ranked high as a prioritized area by CIO's in different surveys (Gartner[A]). This implies that business intelligence and data warehousing are important areas for the software vendors to address.

The theoretical concepts of business intelligence and data warehousing have been refined and further developed by Kimball, Inmon and other authors. Mainly from a technological viewpoint, but also factors covering implementation have been addressed (Inmon et al. 2001; Kimball et. al 2008).

The idea of using a strategic approach when developing support for business intelligence within an organization, such as a data warehouse or a solution for customer relationship management, is nothing new. Even though there have been some research and some authors and organizations talking about the importance of having a strategy for business intelligence it is not widely spread. (Bhansali 2010;Kimball et. al 2008;Raab 2000)

Strategic alignment of IS/IT to an overall strategy is a topic that have been discussed by various authors; Luftman & Brier (1999), Hendersson & Venkatraman (1993). The concept of strategic alignment can be regarded as a way of implementing an overall organizational strategy that runs through the whole organization with the purpose of having all different parts working towards achieving the same goal. Strategic alignment of business intelligence and data warehousing to the business strategy is not as widely discussed. Although Bhansali (2010) published a book on strategic alignment of data warehousing, there is room for further research in this direction.

The company chosen for this case study is *Svenska Spel*, a Swedish gambling and lottery company that will be described in more detailed in chapter 3 (Case Study – Svenska Spel). Svenska Spel has since 2002 implemented a number of different business intelligence solutions. Therefore the company's business intelligence approach can be considered rather mature. Svenska Spel has a wide range of products sold both online and by retailers which implies that different kinds of requirements need to be addressed within the organization. One example of this is that Svenska Spel in order to address the increasing competition on the market has initiated a loyalty program. This increases the demand on business intelligence within the company and especially the customer relationship management processes.

Alignment of business intelligence in a wider perspective is an interesting area to investigate. As mentioned in the introduction many organizations have some kind of business intelligence support and also that business intelligence is considered a strategic resource but is addressed from a technological perspective.

1.2 Purpose

The purpose of this thesis is to compare the theoretical views of business intelligence and strategic alignment with the actual situation of an organization in order to investigate:

1. *To what extent is the organization aligned with its strategic goals and how is such alignment being executed – that is: what does the organization do to make its business intelligence support its strategic goals?*

2. *How is alignment of business intelligence achieved?*

In order to fulfill this purpose a number of questions must be answered:

1- What are the strategic goals of the organization?

2- What are the (strategic) goals of the business intelligence of the organization (if any)?

3- How does the organization work with business intelligence?

4- Does the outcome of the business intelligence support the strategic goals?

5- What activities (if any) are performed in order to make business intelligence support the strategic goals?

6- Are these activities (if any) planned?

Answering these questions will let us know if the organization has strategic goals to align business intelligence with. And also what these goals are and what business intelligence produce for the organization and if this output supports the strategic goals. Finally we will be able to see if alignment – whatever it consists of – is planned or just a random consequence of the organizations movements in general.

A more detailed discussion regarding the methodology used for this thesis is available in Appendix A.

1.3 Scope and Delimitations

The thesis will contain a theoretical overview of business intelligence. The focus will be on strategic alignment of business intelligence rather than implementation of business intelligence. Also the more technical aspects of information technology, information systems, business intelligence and data warehousing will only be discussed briefly.

The concept of strategic alignment in this thesis focuses on strategic alignment of business intelligence. This means that even though strategic alignment of IT is a part of the thesis it will only be briefly described. Definitions and terms will be elaborated further in the thesis based on the theoretical material gathered. Other topics related to business intelligence, such as competitive intelligence will not be included.

This thesis has the following disposition: Chapter one describes the background, purpose and problem description of strategic alignment of business intelligence. Chapter two contains the concepts of business intelligence and strategic alignment based on a literature review. Chapter three contains a case study of the company Svenska Spel. Chapter four contains discussions and conclusions. Chapter five contains the different references used for the study. The research methodology is discussed in appendix A.

2 Business Intelligence and Strategic Alignment: A Literature Review

This chapter defines and describes the underlying concepts of business intelligence, data warehousing and strategic alignment by doing a literature review. The definitions and descriptions serve as the theoretical framework to indicate what relevant dimensions to consider when conducting an analysis of strategic alignment of business intelligence.

2.1 Business Intelligence

The term “business intelligence” has several different definitions. One of the original uses of the term is to be found in the field of data mining pointing to the possibilities to use predictive analytics (Agosta 2000). Business intelligence can be used in the context of competitive intelligence and competitive analysis as defined by Hamrefors (2002). A relatively common definition is that business intelligence consists of several different components aiming to provide an organization with data and information used to analyze and manage the processes within that same organization. This definition is close to the BI/DW (business intelligence/data warehouse) definition presented by Kimball et al. (2008), see next section. It is also used in various books and articles published the last couple of years. Some definitions have clear links to information process theory notably with the term: ”Corporate Information Factory” (Inmon, Imhoff & Sousa 2001). Also several suppliers of information system (IS) business intelligence solutions, like Microsoft (Microsoft[B]), SAS (Sas) and Oracle (Oracle) are using the term with this wider definition usually linked to the use of information technology.

The definition that will be used consistently throughout this thesis is a based on business intelligence as a collecting term of all aspects that contributes to the overall business intelligence environment within an organization. This definition includes several aspects such as: *technology; organization; processes; people* and *strategy*.

2.1.1 Data Warehousing

The business intelligence process consists of different systems, applications and sub processes (Kimball et al. 2008). As mentioned earlier one of the foundations of business intelligence is the process of data warehousing. Some examples of the benefits of data warehousing: *decision support; data mining; customer management; data integration; data analysis;* and *improved efficiency*. (Bhansali 2010)

As stated in the previous section, “business intelligence” addresses a wide range of different components. One of the primary components is the “data warehouse”. It can be considered as the fundamental solution for many of the other business intelligence components. (Kimball et al. 2008) Even though it is possible to implement business intelligence in an organization without a data warehouse, the presence of a data warehouse evidently simplifies the overall business intelligence implementation. An organization can benefit from a data warehouse in several different ways: (a) improved business user productivity; (b) reduced burden on transaction systems; (c) improved business decisions; (d) improved operations (Kimball et al. 2008).

A data warehouse is not a product, it is architecture (which means that it implies organizational issues on top of technical ones), it is not an application it is a process (it means that management of human resources are associated to management of data) (Agosta 2000). A data warehouse

differs from an operational system (Bhansali 2010). The definition of a data warehouse is not completely unanimous; however the differences between the different definitions tend to be reduced. The two leading definitions are stated by authors Ralph Kimball and Bill Inmon (Kimball et al. 2008; Inmon, et al. 2001). The gap between them is mainly due to the scope of the data warehouse. Kimball's view of a data warehouse is a system built by a number of different processes with the purpose of serving the users at different levels with decision supporting information: *"..we consistently use the phrase 'Data Warehouse/Business Intelligence' (DW/BI) to mean the complete end-to-end system"* (Kimball et al. 2008, p10). Bill Inmons definition is more focused on the fact that a data warehouse consists of historical data: According to Inmon et al. (2001) a data warehouse is a subject-oriented, integrated, and time variant, and non-volatile collection of aggregated and detailed data used to support the strategic decision-making process of an enterprise. Both these authors have together with a number of co-authors written several books on business intelligence, data warehouse and related topics. Over time their definitions have been more refined and the difference is not that large, rather it is about addressing different parts of the problem domain. As stated earlier in this chapter, this thesis will use the wider definition of the term business intelligence.

The detailed process of business intelligence and data warehousing can vary from organization to organization but there are some main parts that more or less every organization needs to address. The data warehousing process can be divided in a number of building blocks. The purpose of the process is to transform and integrate data from an organizational into useful information (Kimball et al. 2008; Bhansali 2010). Looking at the different parts of the data warehouse conceptual architecture there are five main blocks:

1- Source systems

2- Extract transform load (ETL)

3- Enterprise data warehouse (or data warehouse)

4- Applications

5- Metadata

Figure 2.1 shows an overall conceptual image of business intelligence/data warehouse architecture.

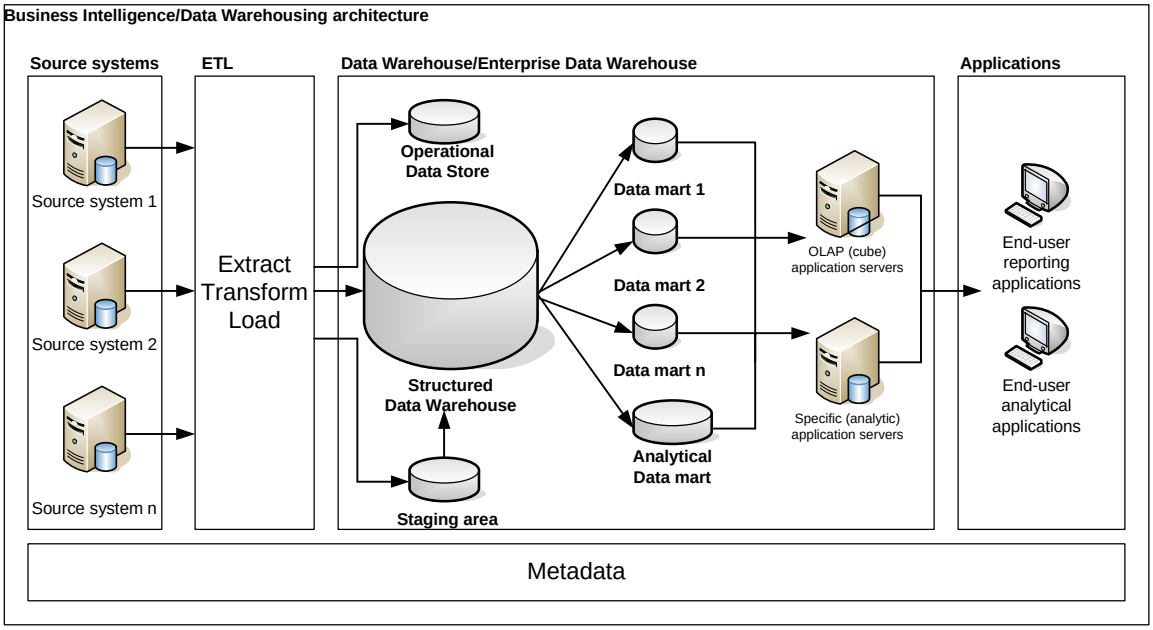

Figure 2.1. Conceptual image of business intelligence/data warehousing architecture.
Source: Adapted from Kimball et al. (2008); Inmon et al. (1999) and Bhansali (2010).

Source systems

A source system can be any other system in an organization or an external system (Kelly 1996). The source system holds data that either are required or have the potential of being required in the future. Examples of source systems are: transactional or operational system; finance; salary; etc. It can also be an external system that has useful data, e.g. a system providing exchange rates or stock information.

Extract Transform Load

The ETL process is an important part of the data warehouse process. It enables data from the different source systems to be extracted or collected, transformed into a common and useful format and structure and then loaded into the data warehouse (Kimball et al. 2008; Inmon, Imhoff & Sousa 2001). Different software vendors have developed different tools to support different parts of the ETL process. The tools available today enable the creation of routines without the need to do any programming. The code is generated in the background, and the tool also provides documentation of the process.

The ETL process consists of three main tasks: *extraction; transformation;* and *loading* of data. The process can make use of different methods, such as a staging area or an operational data store. *Extraction* of data is the first task and the purpose is to get data from the source systems and make it available to the data warehouse environment. Data is made available to the data warehouse process either by being exported from the source systems or collected directly from the underlying databases. (Kimball et al. 2008). Data can be exported or collected with different periodicity, once daily is a common interval, but it can also be either more or less frequent. *Transformation* of data consists of two sub processes; cleaning and conforming. Both these sub processes have the purpose of raising the quality of data. This can include operations like conversions, removal of inconsistent data (Kimball et al. 2008). Often data quality issues can be traced back to the source systems, due to different circumstances it is sometimes not possible to correct the errors at the source. In these cases it is the responsibility of the ETL process to handle the problem (Inmon et al. 1999). *Loading* the data into the data warehouse is the final step of the ETL process.

Depending on where the final destination of the data is different methods can be used for the loading process. This process is well defined and the objects that receive the data are well prepared in order to store data in a consistent and conforming way (Kimball et al. 2008).

Enterprise Data Warehouse/Data Warehouse

The enterprise data warehouse or data warehouse consists of several different parts: staging area; operational data store; structured data warehouse; and data marts of different kinds. Each of the parts fulfills different roles in order to provide the business intelligence functionality that is required. Staging area can be used in order to simply the ETL process and at the same time also simplify quality control and increase transparency. And operational data store is an area that enables access to operational data in a real-time or close to real time fashion. This is useful especially if the operational systems have performance issues or if there is a need to combine the raw operational data with refined data from the data warehouse (Kimball et al. 2008).

A structured or normalized data warehouse is the place where the lowest level of data in the data warehousing process is stored. Usually data stored in a relational database in a normalized fashion. The use of a database management system enables consistency controls of data and this can increase the quality of data in the data warehouse (Gonzales 2003).

There are different ways to structure a data warehouse. As with all system engineering it is important to separate conceptual and physical models. The conceptual model describes the relationships in business terms and the physical model uses descriptions suited for the actual implementation environment. There a number of different ways to model a business process. Regardless of which method is used this model needs to be transformed into a physical model suited for the data warehouse architecture. Data on a low level need to be stored in a consistent and solid fashion in order to be transparent and address future demands and requirements (Kimball et al. 2008). The main purpose of this structure is to provide a sound environment for control and data quality. This structure can be rather complex and is usually not suited for reporting by end-users.

The definition by Inmon et al. (2001) of a data warehouse can be broken down in order to explain the different parts. Each and every part of the definition contributes to a specific aspect of the term: *Subject-oriented* as opposed to function- or application-oriented suggest that the business terms are used as base for the data model, e.g. Sales, production, finance etc.; *Integration* is an important part of a data warehouse, in order to provide complete information for an organization all available data should be included and integrated in order to be useful for different applications.; *Time variant* means that all data in a data warehouse need to be connected to some kind of time dimension in order to be useful. One of important attribute of a data warehouse is the ability to store historical data.; *Non-volatile*, the data in the data warehouse should not be modified or updated, instead only new data should be added in order to be able to provide accurate historical information over time.; *Summary and detail data* implies that a data warehouse contains detailed data as well as aggregated data, this can be implemented by using data marts. (Kimball et al. 2008; Inmon, Imhoff & Sousa 2001)

The structured data warehouse is usually based on a somewhat normalized structure. This structure is as mentioned earlier focused on achieving control and quality on the data that is being loaded into the data warehouse. Another component of the data warehouse are the data marts. The purpose of a data mart is quite the opposite since focus is on extracting data with good performance. A data mart is usually denormalized which means that data has been aggregated in different ways. There are several different ways to implement this, usually data from the data warehouse is duplicated and stored in a new structure (Inmon et al. 1999; Inmon, Imhoff & Sousa 2001).

Data marts are often subject-oriented which means that they contain data related to a certain area or context. Data should with no exceptions origin from the data warehouse (Inmon, Imhoff & Sousa 2001). A data mart can be created in order to support a specific application, but it can also be implemented in order to support several different purposes. Also several different data marts can be used together (Inmon et al.1999; Inmon, Imhoff & Sousa 2001).

Applications

In the business intelligence environment a number of different applications can be available. These applications are suited for different types of user and can be more or less advanced and dynamic. The basic concepts of applications are static reports that are updated and published with a given interval. A more developed concept are the dynamic reports. These enables the user to execute the report with given parameters and hence the possibility to control both layout and what information the report should contain (Kroenke 2000).

Another type of application is called On Line Analytical Processing or OLAP application. OLAP is an expression often used together with the term "cube". A cube is a multidimensional, often pre-aggregated collection of information with the purpose of creating reports and performing analysis (Kroenke 2000). A cube consists of a special type of data mart that enables the user to drill from a high to a low level and also group data in different ways. There are several types of OLAP applications that stores data in different ways, but this is hidden from the end-user (Kroenke 2000).

The data from data marts can also provide data to a specific purpose, an application, another system or a user with specific needs.

Metadata

Metadata is a central term in the data warehousing process. Kimball et al. (2008) describes it as *"Metadata is the DNA of the data warehouse, defining its elements and how they work together"*. Traditionally metadata has been described as "data about data", a definition that is rather wide an inexact. A more extensive definition of metadata is *"..all the information that defines and describes the structures, operations, and contents of the DW/BI system."* (Kimball et al. 2008). There are different kinds of metadata both technical and business metadata. Technical metadata is used to provide documentation and increase transparency in the data warehousing process. Business metadata is used as business rules and describes data from the different processes within an organization. Sharing metadata drives flexibility, increases quality and efficiency (Inmon, Imhoff & Sousa 2001; Kimball et al. 2008).

2.1.2 Customer Relationship Management

One example of a function of business intelligence is customer relationship management (CRM). CRM is a set of processes that addresses various issues regarding contacts and relationships with customers. Even though software vendors offer CRM systems, CRM is a process. CRM can be regarded as a wide approach to create, maintain and extend current and new customer relationships. One implication of using a wide approach is that the process of CRM can be divided on several different business units within an organization (Andersson & Kerr 2002). It is common to use a system for CRM, such a system is developed to support the process of customer relationships. These kinds of systems are usually built with a data warehouse as base (Eriksson & Hultén 2001). The CRM process is built on collecting data of either current or potential customers. By using this information, different kinds of analysis's can be performed and knowledge about the customer behavior. This knowledge can be applied to the marketing process in order to increase marketing efficiency (Andersson & Kerr 2002).

2.1.3 Data Mining

Data mining (sometimes called “knowledge discovery” in databases) is a process that is applied on large amounts of data in order to create knowledge. The patterns and knowledge discovered are used as input to the decision process. Data mining can be used in several areas, one common area is supporting customer relationship management by customer segmentation (Delmater & Hancock 2001).

Within an organization there are historical experiences and knowledge available. There is also knowledge about the present, even though it is more volatile. On of the purposes of data mining is to create knowledge about the future, this knowledge can be considered hypothetic. This is achieved by using a number of different statistical and mathematical models and algorithms. Depending on the problem to be solved different methods are applicable, for more complex problems a combination of methods can be used. (Delmater & Hancock 2001).

2.2 Strategy for Business Intelligence

Reflecting on the previous section it is visible that even though Inmon, Kimball and other authors cover a quite wide range of business intelligence and data warehousing, the main focus is still on functionality from a technological perspective. This leaves other aspects like business intelligence strategy and strategic alignment of business intelligence open and unaddressed.

Organizations invest a large amount of resources in implementing business intelligence, but usually focus is on functional and technical approach to business intelligence and data warehousing. Not many organizations explicitly discuss the strategy behind business intelligence (Bhansali 2010). Business intelligence is a way for an organization to deliver strategic information to the whole organization. The main purpose to have a strategic approach to business intelligence is to make certain that the implemented process will be consistent in supplying information and decision support over time. (Bhansali 2010; Kimball et al. 2008) The impacts of not having a strategy for business intelligence are visible in several different ways. Many organizations have implemented several different solutions for business intelligence: this reduces efficiency, drives cost and provides a lower level of support for the organization. These organizations have duplicated people, competencies, technology and processes. (Bhansali 2010;Gartner[B])

Data warehouse strategies can be defined in different levels, everything from high level statement to more hands-on guiding principles. The purpose of having a strategy for business intelligence is to provide governance, steering and control over the business intelligence process. A business intelligence strategy should incorporate business as well as technical aspects. Some of the different aspects of business intelligence that should be addressed in a strategic document include: vision; definition of business intelligence; definition of e-intelligence; architecture; and organizational aspects. Also aspects like security; marketing/promoting and sponsorship could be included (Raab 2000).

The strategy for business intelligence within an organization should address a number of different factors in order to be successful (Bhansali 2010; Raab 2000). The factors that influence the success of a data warehouse can be divided into four broad categories: organization; user; technology and data (Bhansali 2010).

Organizational factors

The organizational dimensional factors that influence the success of business intelligence and data warehousing are: *size of the organization*, where sizes can drive complexity but also increase the

amount resources that can be assigned for business intelligence; *management support*, support from top management is a crucial factor in order to make certain that capital, personnel, internal resources and standards can be assigned and decided to support business intelligence and data warehousing (Bhansali 2010; Kimball et al. 2008); *team skills,* are important in order to provide the organization with effective data warehouse solutions; *organizational barriers,* internal politics and differences between departments and functions; *organizational support*, the need to focus culture and efforts; and *champions,* people that actively promotes business intelligence and data warehouse within an organization. (Bhansali 2010)

User factors

The user factors are important, without users the business intelligence solutions are ineffective. The factors identified by Bhansali (2010) are: *user acceptance* is based on the users attitude to the system and the ease of use of the applications; *user satisfaction* is a strong factor that is based on user benefits of the solution; *user participation* includes factors such as user capabilities and user training. Another important aspect of the user dimension is the number of users of the business intelligence solutions (Bhalsali 2010).

Technology factors

The process of building business intelligence solutions such as data warehouses is complex. The *complexity* in the business process can have technical implications, especially in large scale implementations. One way of handling the complexity is to break the implementation down in smaller parts by using *prototyping* in order to facilitate a user integrated approach. Another challenging factor is *standardization* that can be used in order to reduce technical complexity and also points of integration. *Population* of the data warehouse is important in order to provide useful information. *Adaption* of the technical solution to changing environments, both inside and outside the organization is an important factor to address (Bhansali 2010; Kimball et al. 2008).

Data factors

One of the single most important underlying data factors is *data quality*. One common reason to unsuccessful data warehouse implementations is bad data quality (Bhansalai 2010). Different types, representation, format, definitions and metrics of data make data quality aspects a central question. Also different stakeholders in the process of information and data are important to address. The same data can be interpreted in different way by different users, this can lead to mistrust among the users since the data may be perceived as inconsistent (Bhansali 2010; Kimball et al. 2008). Data issues that need to be addressed include: completeness; consistency; credibility; and objectivity (Bhansali 2010).

There is no generic business intelligence strategy that can be used by all organizations. Even though there are similarities between different business intelligence strategies, there is a need to adapt the strategy to actual organizational requirements, constraints, issues and implications (Bhansali 2010).

2.3 Strategic Alignment

Strategic alignment is not a new concept. It has evolved during a number of decades, the same goes for strategic alignment of IT. There are a number of influential theories that incorporate strategic issues with IT implementation in organization such as Business Process Re-engineering (BPR) and Business Process Management (BPM). The importance of alignment have been a shown and discussed the last three decades (Luftman & Brier 1999).

General theory of alignment presents a vertical and horizontal alignment. Vertical alignment is about spreading the strategy to the people within an organization. The purpose is to provide direction and get people involved. Horizontal alignment is about aligning processes to the customers. The purpose is to make the whole organization strive to fulfill their customer's requirements. When alignment is achieved in both these dimensions a dynamic relationship exists between all four elements, this is called full alignment as shown in figure 2.2. With full alignment the organization will be get adaptability, resilience and agility (Labovitz & Rosansky 1997).

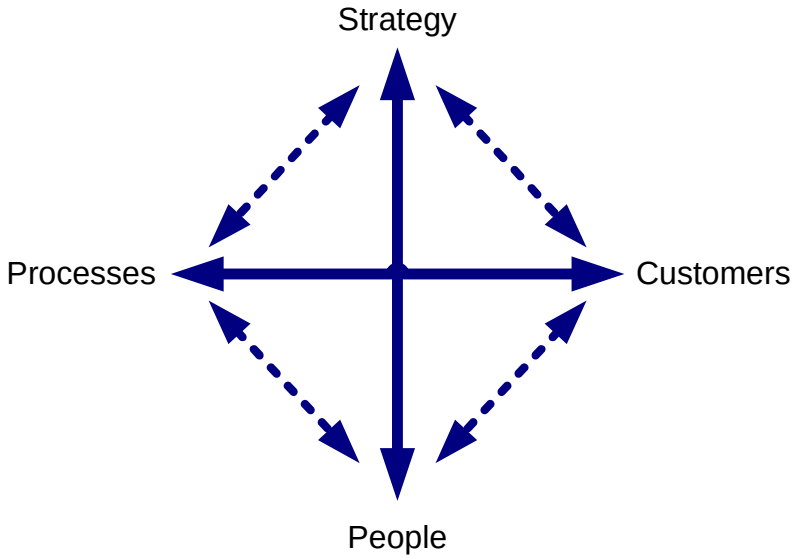

Figure 2.2. Concept of full alignment.
Source: Adapted from Labovitz & Rosansky (1997).

The main thought behind alignment of the IT strategy with the business strategy is to make certain that IT in an organization will be able to support overall business objectives, goal and needs (Luftman & Brier 1999).

Several authors have identified the evolution of strategic alignment; First focus was IT planning, allocating the right resources to IT and automation of processes. The next step was IS planning, focus on systems and cross-functional integration. The third era identified focused on strategic alignment in a dynamic and changing environment, the business strategy is not regarded as stable. (Bhansali 2010)

Luftman identified twelve components of alignment (Luftman & Brier 1999). These components include are divided into four domains:

1- *Business strategy* contains the business scope, which includes products, services, customers, markets and business environment. Also the governance model is addressed how the organization is steered and the different competences within the organization.

2- *Organizational infrastructure* contains the administrative organization; different models for example centralized federal etc. It also contains the organizations different operational activities and the organizational skills linked to human resources.

3- *IT strategy* consists of technological scope which is the IT/IS within the organization, system competencies for the whole organization and the governance model of IT.

4- *IT infrastructure* is the overall IT/IS architecture and the processes that keeps the infrastructure running, also the skills of the IT personnel available.

The strategic alignment model developed by Henderson & Venkatraman (1993) addresses alignment of the different domains, see figure 2.3. This model has been the basis of much of the strategic IT research (Avison et al. 2004).

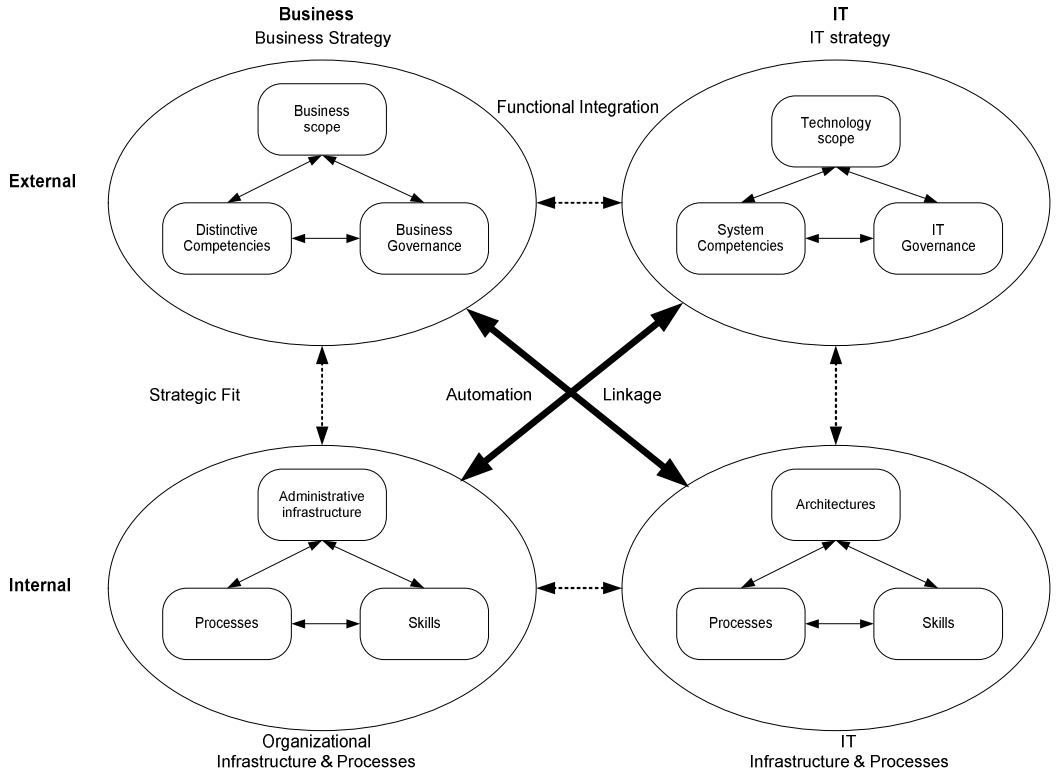

Figure 2.3. Strategic alignment model
Source: Adapted from Henderson & Venkatraman (1993).

Hendersson and Venkatraman (1993) and Avison et al (2004) suggest that neither strategic nor functional integration alone is sufficient to align the domains within an organization effectively. Instead alignment is achieved through a combination of:

1- Functional integration, which is integration between the business and IT domains

2- Through strategic fit, which interrelates external and internal domains

The strategic alignment model addresses internal as well as external factors. For example the IT strategy should address both internal factors such as architecture and external factors as how the organization is positioned in the market place. The model supplies a structure that can be used in order to comprehend how alignment between business and information technology. In addition to the model there are also four mechanisms of alignment: *value management; governance; technological capacity; and organizational capability*. These mechanisms are useful in order to investigate and understand alignment in general and alignment of business intelligence in particular (Bhansali 2010).

Strategic alignment is not a onetime effort. It needs to be implemented in the organization as a process. This process can be implemented by using a six step approach: *set the goals and establish a team*; *understand the business-IT linkage*; *analyze and prioritize gaps*; *specify the actions (project management)*; *chose and evaluate success criteria*; *sustain alignment*. (Luftman & Brier 1999)

There are alternatives to the theories and models presented here, however they are quite similar and address more or less the same issues. One disadvantage with the strategic alignment model is rather theoretical and that it lacks operational examples of how to achieve alignment. Alignment is a dynamic and complex task that takes time to achieve and sustain (Bhansali 2010; Luftman & Brier 1999).

2.4 Strategic Alignment of Data Warehousing

A conceptual model for strategic alignment of data warehousing was introduced by Bhansali (2010). This model contains a number of critical factors that facilitate the alignment between data warehouse strategy and business strategy; these factors contribute to a successful data warehouse implementation. The five main factors are:

1. Joint responsibility between data warehouse and business managers
2. Alignment between data warehouse plan and business plan
3. Business user satisfaction
4. Flexibility in data warehouse planning
5. Technical integration of the data warehouse

These factors consist of different components that are used to build alignment and contribute to the success of the implementation of data warehouse. An outline of the model is presented in figure 2.4.

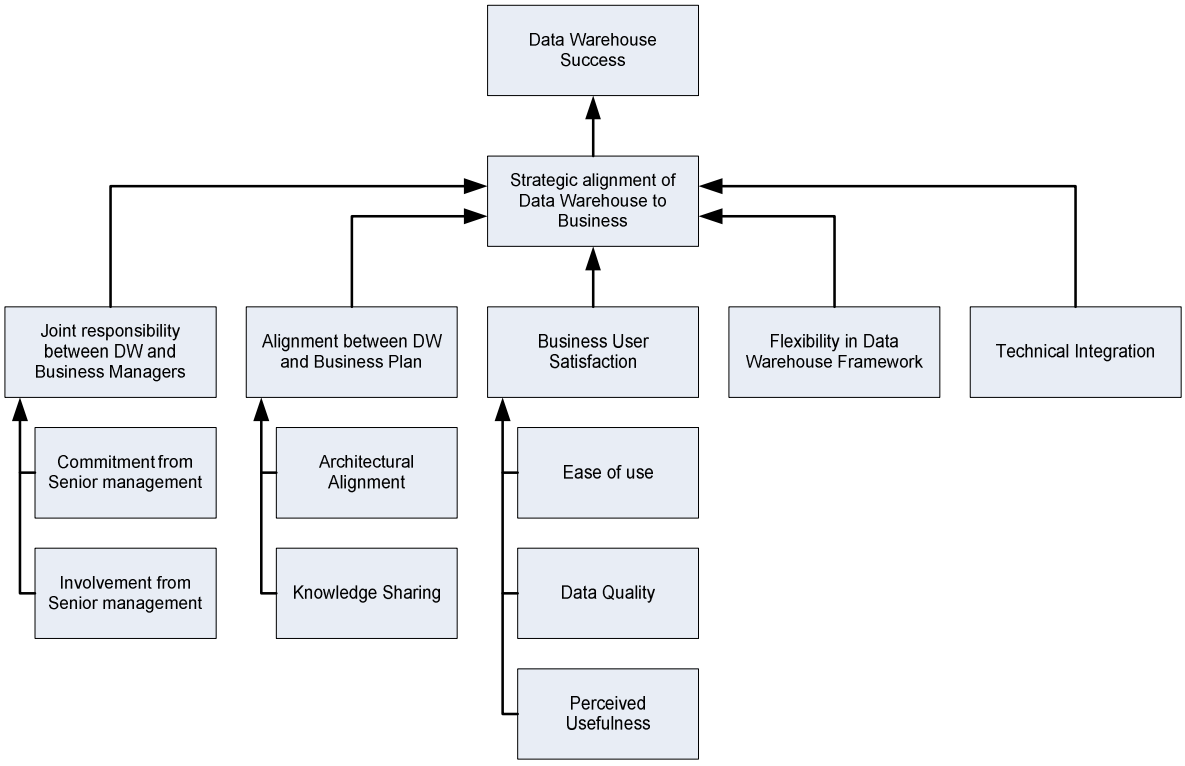

Figure 2.4. Strategic alignment of data warehouse
Source: Adapted from Bhansali (2010).

Each factor of the conceptual model can be broken down and explained in more detail, which provides operational and pragmatic guidance.

Joint responsibility between data warehouse and business managers

It is important for the managers of an organization to communicate the strategic direction within the organization. Since alignment is a complex process, the understanding and commitment from top management can contribute to success of the data warehousing process.

This factor can be divided into several different attributes among these are commitment and involvement from senior management. In order to get alignment between the IT strategy and the business strategy both business and IT managers need to be able to cooperate. Both of these manager groups need to take responsibility to achieve alignment. This can be implemented in an organization via partnerships and by having business people working on the technology side and IT people working on the business side (Bhansali 2010). By raising the overall awareness of business intelligence and data warehousing in the organization, requirements can be expressed with more accuracy (Kimball et al. 2008). Also if the data warehousing team increases their overall business knowledge the solutions can be developed in a business minded fashion. Recruiting right team members to work with the data warehousing process and that supports the organizational culture and values is important. Another important attribute is to have the right business intelligence and data warehousing management. Competence is crucial, this includes knowledge about: business, information technology and of course business intelligence. Also building strong relations and frequent communication with other parts of the organization encourage and support the data warehousing team to build relationships. All these aspects will lead to reducing the alignment gap (Bhansali 2010).

Having commitment from business management can be a challenge and historically many business intelligence and data warehouse projects have been driven by the IT department. One way of obtaining commitment is to build a business case, where both the IT and business side work closely together. The business case can also help in obtaining a strong mandate from senior management. This is a success factor especially in order to solve issues like: standardization; resource allocation etc. (Bhansali 2010)

Involvement of senior management can be accomplished in different ways. One efficient way is to have a sponsor or a champion wither among senior management or a person close to senior management. A champion can influence management and people within the organization by: *promoting projects; providing information; provide resources;* and *give political support*. (Kimball et al. 2008; Bhansali 2010)

The concept of collaboration between different functions or departments within an organization regarding data warehousing is an important aspect of strategic alignment. This is even more important in the context of an enterprise data warehouse where more or less all information of an organization is to be involved. The use of multiple data sources is essential in data warehousing and this complexity can easily lead to issues with data quality if the organization has a low grade of collaboration. (Bhansali 2010).

Alignment between data warehouse plan and business plan

The overall strategy of an organization should have impact on the whole organization. This includes the business intelligence and data warehousing strategy. This kind of alignment can be achieved by synchronizing the business plan with the data warehouse plan, this is accomplished by having an integrated planning process (Bhansali 2010).

The output from the strategic process with an organization can consist of; mission, vision, goals, business plans. All these documents can provide the data warehousing team with a direction of how to design and implement the date warehouse (Bhansali 2010). Aligning the data warehouse

plans to the business plan creates synergies and added value to the business. In order to facilitate this management both on the business and IT side need to play an active role. The activities needed range from building relationships and sharing knowledge to integrating plans (Bhansali 2010).

There several different factors that influence the data warehousing process, among these are: *business perspective*; *technology perspective; IT preparedness; external opportunities; business needs; present IT infrastructure; and future IT infrastructure.* Combing these different aspects is a challenge that needs to be mastered in order to have a successful data warehouse implementation. These factors are dynamic in different extent; this means that they should be addressed by a continuous process (Bhansali 2010).

The data warehouse strategy and long-term vision contains strategic objectives, long-term gains and organizational control over the process. This alignment supports governance and cultural aspects of the data warehousing process, but also for example architectural and data integration issues (Bhansali 2010).

Business user satisfaction

There are different kinds of requirements that need to be fulfilled in order to have a successful data warehouse implementation: system requirements; business requirements; information requirements; functional requirements; and user requirements. The requirements consists a combination of the organization's data warehouse strategic and operational requirements (Bhansali 2010).

Users of business intelligence and data warehouse solutions have requirements of getting consistent and correct information at the right time. Meeting this requirement is essential to a data warehouse solution. By enabling the right people to get the right information at the right time a data warehouse can support and add value to the decision process within an organization. A more evolved data warehouse solution can be capable of creating competitive advantages. However alignment is important in order for this to be successful. Another important issue connected to user satisfaction is the governance of the data warehouse and ultimately how ownership and responsibility of the data warehouse is organized (Bhansali 2010).

In order to be able to meet the requirements they need to be well formulated clear and concise. This put focus on the process of requirements gathering, which must be well developed in order to handle complex requirements of information needs within the organization. (Bhansali 2010).

Business user satisfaction is closely linked to meeting user requirements, but it is also linked to the business user expectations. In order to be able to handle both requirements and expectations from the business users it is vital to identify the stakeholders of the data warehousing process. The dialog with the stakeholders is important and the main topics of discussion are data and information. It is also important with user participation and user training. The user's experience of the data warehouse is vital to the overall user satisfaction (Bhansali 2010).

Flexibility in data warehouse planning

Both internal and external factors will change over time and this will have impact on strategies on all levels. In order to handle the changing factors planning of the data warehouse environment must be flexible. It is important to understand the mechanisms of changes and what impact they will have on the data warehouse. The architecture of a data warehouse needs to be flexible over time. (Bhansali 2010)

Without a flexible approach to both internal and external factors the data warehouse can be obsolete and stop providing benefits to the organization. This implies that design and architecture of the data warehouse is essential, the different architectural and technical aspects described earlier in this chapter should be designed in a flexible way. This means everything from source systems via ETL process to applications servers. Bhansali (2010) identifies a number of different technological aspects that need to be addressed: the database; application middleware; tool integration. It is important to implement solutions that provide scalability; high availability and robust manageability (Bhansali 2010).

However flexibility can lead to conflicts in the data warehousing process since flexibility can cause limitations in other areas, these conflicts need to be managed in the data warehouse governance process (Bhansali 2010).

Technical integration of the data warehouse

There are four management methods for execution and evaluation of different aspects of strategic alignment. These methods are: (1) *value management*; (2) *governance*; (3) *technological capacity*; *and* (4) *organizational capability*. Data warehouse have substantial technological components and technical integration of these are important in achieving full alignment of data warehousing (Bhansali 2010).

1- *Value management* is about ensuring that an investment in IT an organization makes delivers the expected value. It is clear that investments in IT itself doesn't create value, on the contrary; selecting technology for its own sake can be a bad decision that will be costly. In order to make certain that the investment in IT will be profitable business and user requirements should be addressed (Bhansali 2010). Even though the IT is aligned there is a risk connected to larger investments in technology for a data warehouse. The risk consists of the possibility that the IT department will have problems in configuring and deploying new technology. Also the opposite case can be considered a risk, meaning when there is not sufficient technology available for the IT department to handle the requirements. (Bhansali 2010)

2- *Governance* is concerned with specifying where in an organization decision rights regarding the IT activities of the data warehouse should be placed within the organization. This is not the everyday operational decisions, but rather strategic long-term decisions. As discussed earlier this process should involve mangers from both business and IT side in order to be efficient. (Bhansali 2010)

3- *Technological capability* is a question of having a process that creates the required IT capabilities to support the business strategy. A data warehouse can have a positive business impact if it is well-integrated with the rest of the organizational systems. (Bhansali 2010)

4- *Organizational capability* is a question of having a process that supports and provides the personnel required in order to run the data warehousing process. The skills of the data warehouse development team are a major success factor of the data warehousing process. Skills are required in all the different areas, everything from technical competence to management and governing skills. (Bhansali 2010)

2.5 Strategic Alignment of Business Intelligence

Strategic alignment of business intelligence is not as commonly discussed as strategic alignment of information technology. However the usefulness of strategic alignment of business intelligence and data warehousing should be considered important, especially since there is a high number of unsuccessful business intelligence implementations.

Business intelligence is as stated earlier in this chapter not only a technical solution or a system. It consists of more components than that. This implies that strategic alignment of business intelligence is achieved by a combination of aligning both the process of business intelligence and data warehousing. It consists in aligning the information technology solutions for business intelligence and data warehouse with the overall business strategy.

In order to address these multiple alignment issues a composite framework is required. The framework that will be used as research model for this thesis is created by combining the different models discussed earlier. The different models are tightly linked and they overlap in some extent. The combination of models is necessary due to the fact that business intelligence is complex and consists of several different aspects. The combination of models is shown in figure 2.5.

Figure 2.5. Theoretical framework for strategic alignment of business intelligence
Source: Adapted from Labovitz & Rosansky (1997); Henderson & Venkatraman (1993); and Bhansali (2010).

The generic alignment theory by Labovitz & Rosansky (1997) that was presented in section 2.3 (Strategic Alignment) will be used in order to facilitate the overall alignment aspects, such as business specific areas like customer relationship management and product- and service development.

Since data warehousing is a fundamental part of business intelligence the model proposed by Bhansali (2010) will be used as the primary model. This model covers the data warehouse alignment and in many aspects also the alignment of business intelligence. This is due to the versatility of the different factors mentioned in section 2.4 (Strategic Alignment of Data Warehousing).

Even though these to alignment models cover many aspects, it still leaves some room regarding the technological aspects. For the technological and IT/IS strategic aspects identified by Luftman & Brier (1999) parts of the strategic alignment model by Henderson & Venkatraman (1993) presented in chapter 2.3 (Strategic Alignment) will be used. This will provide more extensive coverage of both internal and external factors, such as the functional integration between the business and IT as well as the relationships between external and internal domains.

This composite framework addresses all different aspects of business intelligence identified as relevant for strategic alignment of business intelligence: *technology, organization, processes, people* and *strategies.* Using the framework to analyze the strategic alignment of business intelligence of an organization will result in the identification of potential alignment gaps. These gaps are to be considered as areas of improvement. By addressing these areas an organization could improve their alignment an also increase the value of the business intelligence investment.

3 Case Study – Svenska Spel

This chapter describes the company chosen for the case study of this thesis, Svenska Spel. It also contains observations and analysis of Svenska Spel in relation to the theoretical framework presented in chapter 2 (Business Intelligence and Strategic Alignment: A Literature Review). The different aspects regarding strategic alignment of business intelligence that were identified in the previous chapter will be addressed.

The collection of data at Svenska Spel has taken place over a six-year period of time. During this time the collection of data was not conducted explicitly with this thesis as a defined goal. However the information and experience collected during this period is extensive. The reasons for choosing Svenska Spel and the methodology used for the case study are explained in more detail in Appendix A.

3.1 Background and History

The Swedish gaming and lottery market is regulated and all companies operating in the market are doing it with a permit from the government. Svenska Spel is the largest gaming operator in Sweden with its market share of approximately 55 percent, other operators are Aktiebolaget Trav och Galopp (ATG) with 20 percent market share and NGO games and lotteries with 16 percent market share (Svenska Spel 2010).

Svenska Spel is owned by the Swedish state and started in 1987 with the merger of AB Tipstjänst and Penninglotteriet AB. Headquarters is situated in Visby on the island of Gotland and the mainland office is situated in Sundbyberg. The purpose of the company is to provide gaming and lotteries to meet the Swedish consumer interest. In the directives from the owner it is emphasized that business is to be conducted in a responsible way. This means that all forms of gambling should be designed in a way that minimizes the problems of gambling.

Svenska Spel offers products in a wide range of categories and in the product portfolio the product categories are: sports betting; number games; lotteries; and poker. Examples of products are: Stryktips, Måltips, Lotto, Keno, Bingo, Oddset and Triss. The company also has a monopoly situation on video lottery terminals at restaurants called Vegas. Svenska Spel is also the only operator in Sweden that is allowed to have casinos with international rules. There are four casinos under the name Casino Cosmopol in Sweden at the moment situated in: Stockholm; Gothenburg; Sundsvall and Malmö.

In 2006 Svenska Spel was allowed to have Internet poker in their product portfolio. This was relatively late compared to many of the competitors. However after only a couple of months of service, Svenska Spels poker site had more users than the closest competitor. It is notable that Svenska Spels poker is for Swedish players only.

In 2009 the gross gaming revenue was more than 22 175 million SEK and the operating profit was 4 921 million SEK. During the year the average number of employees was 1748 for the entire group (Svenska Spel 2010).

The market situation for Svenska Spel depends on the product segment and distribution channel. As mentioned earlier the lottery and gambling market in Sweden is regulated by the government. In some segments and channels Svenska Spel has a monopoly situation with no competition while in others the competition is harder. Competition is especially hard for betting and gambling using

Internet as distribution channel. In this segment there are a number of companies that operates in the Swedish market from outside the Swedish borders, both inside and outside the European Union. Thanks to their geographical location they can use Internet in order to provide their products to Swedish customers without the need of permit from the government. However these companies are not allowed to advertise in Swedish media, they can still advertise via Internet and TV channels originating outside Sweden. There are numerous examples of companies of this kind, among these are: Pokerstars, Unibet and Ladbrokes.

One way Svenska Spel uses in order to address the competitive market situation is by offering their customers a loyalty program. The company has approximately 1.25 million customers holding the loyalty card: ”Spelkortet”. In order to be a customer via Internet it is mandatory to use the loyalty card, but it can also be used at agents in order to enable services like personal offerings, discounts and monitoring of winnings. During 2010 the loyalty card was somewhat renewed and modified in a step towards a more complete loyalty program where customers can use Spelkortet in all gaming forms and distribution channels (Svenska Spel 2010).

3.2 Strategy

As stated in the previous section Svenska Spel has a mission directive from its owner to provide gaming and lotteries to the Swedish public. During 2009 Svenska Spel got a new CEO and started a transformation of the company’s strategy. This will lead to the implementation of a new organization and strategy during 2010.

The strategic process of Svenska Spel is based on the company’s vision, mission and value base. Different staff and business units and have strategic processes that are adapted to the different business functions. At lower levels in the organization the strategic work is not as clear and there are units that do not have an explicit strategic process at all.

Continuity in the strategic process is achieved by annual reviews of functional strategies, reviews can also be conducted if internal or external factors change. One example of this could be if new objectives are stated from the owner, another example could be if new legislation becomes reality.

The different levels of strategies are: overall strategy; staff and business strategies; and functional strategies.

Svenska Spel has on the top level defined their mission, vision and value base. The new mission statement is: *“Svenska Spel sells positive gaming experiences for the general public, such that we fulfill our mandate from the owners, aim for world-class gaming responsibility, and provide our employees with personal development, work satisfaction and a meaningful job.”* (Svenska Spel 2010)

At the same time work was initiated striving to renew the value base of the company and also modify the overall strategy. The previous keynote: *“responsibility ahead of profit”* has been changed into: *“consideration for our customers with continued strong profitability”*. The foundation of Svenska Spels strategy is built on the balance between offering attractive games to consumers and doing this in a responsible and secure manor. (Svenska Spel 2010)

The strategy is built with the following objectives as a base:

“Customer – create a unified image of the company, so that customers meet the same Svenska Spel regardless of gaming form or distribution channel. Build on customer needs and gaming experiences and develop more tools that help customers keep their gaming under control.”

"*Responsibility* – improve public opinion, and measure and monitor it with specific target figures; spread knowledge about the risks involved in gaming and how products and channels can be developed to promote healthy gaming."

"*Profitability* – maintain ongoing strong profitability, improve cost-effectiveness; clear division of responsibility."

"*Employees* – be an attractive employer and a strong brand; create clear, monitored goals for employees."

The value base at Svenska Spel is divided into three different key statements:

"Gaming pleasure and Working pleasure - We spread positive gaming experiences and enjoy our work."

"Consideration and Profitability - Our consideration for people and the environment leads to long-term profitability and sustainable development."

"Action and Reflection - We make smart decisions on a daily basis in line with our objectives and values."

The value base enforces the vision and mission statements and provides guidance on how to conduct work within the organization (Svenska Spel 2010).

3.3 Business Intelligence

Svenska Spel has a large number of different IT/IS systems that support different parts of the business process. The systems regarded most important are the systems that handles the gaming transactions (transactional systems). These systems can be considered the heart of the company's IT/IS operations. Security, reliability, performance and redundancy are key drivers for the development and operations of these systems. Other central systems are: the Internet poker; the lottery platform; the master system for information about customers; the gaming administration system; and the platform that handles the different kinds of gaming clients. Some of the systems are standards systems, however many of the systems especially the transactional systems are developed and maintained "in-house". There are different reasons for this, one being that internal development gives solid control over the key drivers previously mentioned.

All of Svenska Spels customers that uses their loyalty card either online or at retailer are included in the data warehouse. Customers that play at Casino Cosmopol and video lottery terminals are excluded from the data warehouse. All products available on-line and at retailers are included on a detail level. Casino products and products in video lottery terminals are only available on a higher aggregation level.

The ETL process is implemented using standard tools with scripting abilities. The transactional systems serve as source systems that provide the ETL process with all gaming data. Data is also gathered from a number of other systems and in some cases also external data sources, e.g. to validate postal codes. No explicit staging area or operational data store are used, instead temporary tables are used to facilitate the ETL process.

The data warehouse is implemented in line with the thoughts from Inmon and co-authors (1999; 2001) regarding a structured normalized data warehouse. The lowest level of data is transaction based, however all attributes of a single transaction is not available within the data warehouse,

e.g. the different lottery numbers a customer have chosen is not included. The structure of data is a combination of the structure from the source systems and terms from the business processes.

Svenska Spel has no metadata repository to provide transparent documentation for the whole data warehousing project. Different parts are available, but there is no consistent metadata approach.

There are two main categories of data marts: *generic* and *specific*. The generic data marts are based on a dimensional star scheme structure. There are around 25 different star schemas available for different user categories. Many of these are used as foundation to generate OLAP cubes. A single data mart can provide information to several OLAP cubes. The specific data marts provide information to a certain application. One example of this is that analysts within the company have a data mart for customer analytics and customer segmentation. Another example is that the customer campaign system relies on a specific data mart in order to be able to provide customer campaign information. The information in these data marts is aggregated and the terms and definitions can differ from the generic data marts.

Within the company there are several different business intelligence applications available. Some of theses are parts of the data warehousing process others are integrated into other systems and some are more stand alone. The most fundamental application is the "A&B-portal ("Analysis & Decision portal") that contains reporting and analytical functionality. For many of the business intelligence users this is the main way to get access to reports and OLAP functionality. Other applications are: the financial reporting system; the sales support system; and the retail support system.

The customer relationship management system fundamentally consists of a system that serves as customer master in combination with a campaign system that provides services regarding customer relation management.

Data mining and analytics at Svenska Spel is automated in some applications. Automated data mining is available in an application that gives customers the opportunity to monitor the gambling habits. Manual analytics are conducted by a number of employees provide statistical and analytical services. They use special software and conduct different kinds of analysis. The data usually originates from the data warehouse, but can also be from other sources, e.g. external surveys.

3.4 Strategy for Business Intelligence

As mentioned in section 3.2 (Strategy) there are different levels of strategy at Svenska Spel. The IT/IS strategy which can be considered a staff/business strategy consists of a number of statements:

- *Effective delivery process with a release based delivery plan*
- *Effective processes for project management and project implementation*
- *Effective process for system maintenance*
- *Stabile IT operations*
- *Develop and secure the infrastructure*
- *A target focused methodology*
- *Increased efforts in a more effective test process*
- *Implement EPM (Enterprise Project Management) as support for governance and follow up of projects, resources and reporting*
- *Communication inside and outside IT*
- *SLA (Service Level Agreements) in place before the business planning and budget process*

The strategy of the development department is closely linked to the IT/IS strategy. Since development of IT and IS are central tasks it is closely connected to relating tasks such as project management and IT operations. Also all development projects are managed in cooperation with the business.

The unit called ”Analys- och Beslutstöd” (“Analysis and Decision support”) is the business intelligence and data warehouse unit within Svenska Spel. It is organized within the IT and IT/IS development department. At this level there is no explicit strategy available, there are no specific long-term goals and no functional strategy. There are project plans (for some projects), pre-study documents and functional specifications and requirements. This documentation is used for the daily development and maintenance work is focused on delivery of specific functionality.

Svenska Spel has neither a formal nor an informal strategy for business intelligence. On a functional level there is no strategy and no guiding principles regarding data warehousing available. Without a strategy for business intelligence the different success factors for business intelligence identified in section 2.2 (Strategy for Business Intelligence) have not been explicitly addressed.

3.5 Strategic Alignment of Business Intelligence

As discussed in the literature review section 2.5 (Strategic Alignment of Business Intelligence) a composite framework is required in order to address the multiple alignment issues. By applying the suggested framework from figure 2.5 to the case study of Svenska Spel a gap analysis can be conducted.

3.5.1 Generic Alignment

Starting with the overall alignment at Svenska Spel and looking at vertical alignment it seems like the company only partly succeeded in spreading the overall strategy to the people within the organization. One way this is shown is that the IT/IS strategy is not aligned with the overall strategic base of the company. Arguably the IT/IS strategy is broken down and presented on a lower level, but there should be at least some parts that could be mapped to the overall strategy, for example the customer or employee dimension. The horizontal alignment is a bit better off since the customer dimension is crucial and there are several processes and systems within the company that are customer centric. In this sense the IT/IS strategy could be considered more aligned since the purpose is to secure operations and by that also the customer experience. As discussed in section 3.4, Svenska Spel doesn’t have a business intelligence strategy; this implies that there could be processes that aren’t fully aligned to the customers.

3.5.2 Strategic Alignment Model

A brief analysis using the *strategic alignment model* shows that the *business strategy* is in order and the strategic process is implemented, however since the overall strategy isn’t visible on all levels there is room for improvement. The *functional integration* between the business and *IT strategy* isn’t complete. This can also be concluded by using similar reasoning as with the vertical alignment. The IT governance have room for improvement, there is no overall IT governance process in place. There are also some issues with the *strategic fit* between IT strategy and the infrastructure and processes, mainly due to lack of governance regarding the data warehouse and *IT infrastructure*. The problem being that the IT platform that is being used is on the verge of being outdated and there is an unaddressed need for an upgrade. Also there is an alignment gap between IT and internal *organization infrastructure* where the governance of business intelligence is unaddressed.

3.5.3 Strategic Alignment of Data Warehousing

Applying the model for strategic alignment of data warehousing on Svenska Spel by addressing the five main factors that contribute to a successful implementation:

Joint responsibility between data warehouse and business managers

Within Svenska Spel the governance model of business intelligence and data warehouse leaves room for improvement. As stated earlier there is no explicit strategy available there are no specific long-term goals and no functional strategy.

The strategic direction is not communicated clearly as shown by the analysis of vertical alignment. The commitment from management is mixed; there is *management support* available in some extent. Management is interested in developing specific business applications to support the customer relationship management process. There are *champions* on different levels of the organization, both from business and IT that try to spread the word of the business intelligence and business intelligence initiative. They also try to build bridges within the organization in order to eliminate barriers. The management commitment for the data warehouse can be considered rather weak. One reason being and there is no clear focus on the business intelligence process. No business case regarding data warehouse have been developed and no follow up of invests have been conducted,

Cooperation between managers from both business and IT could be better. There are other areas where this cooperation works better. The main problem is that no manager takes responsibility of the complete business intelligence process. The data warehouse manager has no real mandate to drive development issues.

The data warehouse development team consists of a mixed of experienced people that have worked with the company for between 5 and 15 years and less experienced people that have worked for 1-3 years. The business knowledge of the team varies but the overall business knowledge is on a high level. The competence of the team is also mixed; with some people having a high competency and others are building their competences. Due to the number of years the team have worked within the company the relationships with the rest of the organization is good. However the communication could be more organized and frequent. Also the knowledge about business intelligence in the rest of the organization is rather low, but it is increasing.

Different departments within Svenska Spel are working together in projects and this works quite well. The data warehouse isn't governed in a project and as stated earlier there is no governance model for business intelligence.

Alignment between data warehouse plan and business plan

As described in section 3.5 Svenska Spel has no explicit formal or informal strategy for business intelligence. On a functional level there is no strategy and no guiding principles regarding data warehousing available. Hence there is no synchronization between the business plan and data warehouse plan. However there is still input to the data warehouse team and this input comes through the different development projects that are running in the organization.

The alignment that is accomplished is implicit rather than explicit and there is no process in place that ensures alignment. Knowledge sharing between business and IT and business and the data warehouse team has improved since the data warehouse team got representation in most of the development projects. Knowledge sharing between IT and the data warehouse team is sporadic, especially concerning both present and future infrastructure.

There are no long-term goals defined for business intelligence at Svenska Spel, there is also weak organizational control over the business intelligence and data warehouse process.

Business user satisfaction

There have been several different projects with the purpose to solve the user needs, but since the overall governance of business intelligence makes it difficult to implement the users have less patience. An example of this is that the same users have been participating in defining similar report structures for different projects. Also the lack of ownership for the business intelligence process is a problem that users suffer from; with out a clear mandate several issues remain unhandled. This can be exemplified with the inability to decide what key terms and definitions that should be used in the reports and analysis.

The business requirements are fulfilled in some extent, the limitations are often due to other processes not being able to fulfill their part. The information available in the data warehouse is not complete from an enterprise data warehouse perspective. Some data is missing as described earlier. Work with *data quality* is a high priority, but this is mainly driven from the data warehouse development team and is not fully recognized throughout the rest of the organization. Especially other parts of IT have issues with data quality and not fully grasping the situation.

There are initiatives to increase *user acceptance* and *user satisfaction*, these are driven from the IT-department. One way of achieving this is by using *prototyping* as primary method of developing end-user applications.

There are examples of creating business opportunities from the business intelligence solution. But these requirements and discussions are rare and the business users are having problems to understand all possibilities. Business intelligence provides added value in some extent but there are several different areas where even more value could be added to the business.

User participation consists of cooperation with the data warehouse development team to simplify the process of gathering complex requirements. Users requirements are fulfilled in some extent and the dialog with important stakeholders make certain that changing requirements can be handled. User training are conducted when new functionality is introduced and for new users of the systems.

Flexibility in data warehouse planning

The data warehouse is modeled in a flexible way, the use of a normalized data warehouse component and combine it with generic and specific data marts provides an adaptable solution. In certain areas the flexibility of the data model have lead to more complicated processes than initially necessary how ever in some cases this has saved lots of development time when requirements have changed.

The knowledge about internal and external factors that has an effect on the data warehouse is mixed. Sometimes new aspects are communicated late which in some cases can lead to problem with data quality or even lead to operational problems of the data warehouse.

One potential problem concerning flexibility is the time frame when the data warehouse is populated. This frame is getting smaller and this can potentially lead to conflicts what information that should be prioritized.

Technical integration of the data warehouse

The technical platform used for business intelligence at Svenska Spel is a combination of older and newer technology. The initial investments in the data warehouse were moderate. The customer relationship management solution was a bigger investment. One problem with this investment is that the customer relationship management system relies highly on the data warehouse solution which is older and operates on a different platform. The investment was strategic and it brings value to the business in the form of bringing the customer process closer to the core business. This is achieved by adding the possibility to communicate with specific customer segments and give them special offerings.

The aged solution regarding information technology used for the data warehouse is mainly software related. By not investing in software licenses a couple of years ago Svenska Spel now face the situation where the system used will be discontinued in a couple of years and a new system must be bought.

4 Discussion and Conclusions

This chapter contains discussions and conclusion drawn from the work with this thesis. It also identifies a number of topics of future research have been identified.

4.1 Discussion and Conclusions

By comparing the theoretical views of business intelligence and strategic alignment with the actual situation from Svenska Spel this thesis has shown both in what extent the organization is aligned and how alignment of business intelligence is achieved.

A framework for strategic alignment of business intelligence was presented and it consists of a combination of different alignment models in order to comprehend the complexity of business intelligence. Even though the models used covers alignment in different extent, they all contribute with their specific perspective.

The framework addresses several different aspects of business intelligence identified as relevant for strategic alignment of business intelligence: *technology*, *organization*, *processes*, *people* and *strategies.* Using the framework to analyze the strategic alignment of business intelligence of an organization will result in the identification of potential alignment gaps. These gaps are to be considered as areas of improvement. By addressing these areas an organization could improve their alignment an also increase the value of the business intelligence investment.

When applying the framework to the case study of Svenska Spel the analysis shows that the company has alignment gaps regarding several important components that are fundamental in aligning business intelligence to the business strategy.

The case study shows that Svenska Spel is not completely mature in their business intelligence approach. They have a solid architecture and the skills of their architects and developers seem to be adequate. But due to lack of a strategy for business intelligence and poor governance of business intelligence and data warehouse Svenska Spel might be facing problems with their business intelligence in general and their data warehouse in particular.

The transformation work in progress mentioned in chapter 3 (Case Study – Svenska Spel), makes it is difficult to discuss the future strategic process and future strategies. However the transition to the four strategic areas identified in the overall strategy should probably have impact on both the IT and business intelligence strategy. Without goals and a comprehensive strategy for business intelligence Svenska Spel will probably continue to struggle with their data warehouse implementation. Also the need for guiding principles regarding data warehouse development is eminent.

Svenska Spel would almost certainly have large benefits if they:

1) Create a business intelligence strategy.

2) Work with aligning this strategy to both the business strategy and IT strategy.

3) Implement a governance model including responsibilities for business intelligence.

These actions will lead to a more aligned business intelligence process and this will in return lead to a number of benefits for Svenska Spel.

Svenska Spel has come quite far in their work with business intelligence without achieving alignment between business intelligence and business. The benefits they would gain by working with improving the alignment of business intelligence are probably considerable.

Relating this knowledge to other organizations; that either are in a similar situation; or perhaps haven't reached as far as Svenska Spel has; implies that these organizations can have even more substantial benefits from alignment of business intelligence. These benefits can include reduced costs and more efficient processes, but also better prerequisites for the business intelligence to create added value for the whole organization.

One conclusion of this study is that it could be useful for organizations to develop a business intelligence strategy and align it to the actual organizational requirements, constraints, issues and implications. It is of great importance that the strategy is implemented in a way that it addresses the whole business intelligence process. One way of achieving this is to break down the business intelligence strategy into operational guiding principles. These guiding principles steer different levels of the business intelligence process, everything from governance to actual architecture and implementation of the different data warehouse components. The principles provide important input for the managers, architects and developers of the data warehouse environment. In order to be comprehensive the principles should (at least in some extent) address all different aspects of business intelligence and data warehousing.

Another conclusion drawn is that it is vital to understand that alignment is a continuous process that needs to be implemented in the organization. If it is implemented successfully it secures long-term strategic alignment.

The results of this thesis can be useful for an organization in order to comprehend the different aspects of strategic alignment of business intelligence that needs to be addressed in order for a business intelligence initiative to be successful.

4.2 Further research

Further research connected to this topic could be research that leads to the development of a method to assess the maturity of strategic alignment of business intelligence within an organization. This is a challenging task since many of the aspect of alignment are hard to quantify. Another research project that could be interesting is to focus on a specific aspect of alignment, for example management support and involvement, and conduct a wider study on several organizations.

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Appendix A – Research Methodology

This appendix is describing the method that has been used for this thesis. The purpose of this thesis calls for a combination of different methods in order to provide results. The approach used is built on a foundation of a theoretical literature review combined with a case study of a company.

Method Used

There are several ways to conduct a project of this kind. During the planning phase of the project different research methods were evaluated. The collection of data for this thesis has been conducted in two ways: by a literature study and by a case study.

As main approach it was decided to use a literature study to create a theoretical framework and apply this framework to either a number of different organizations or on a single organization. A number of organizations call for a survey approach and the respondents should to cover a wide range of different types of companies, of different sizes, acting in different areas of business. The single organization approach calls for a case study, which should be on an organization that uses a wide range of business intelligence solutions and could be considered mature in their business intelligence approach and at the same time isn't to complex in its organization, e.g. multinational.

Reading literature is an important part during the whole research project (Svenning 1999). In the initial phase a vast amount of time is spent on reading and getting an overview of an area or problem domain. Different kinds of literature provide guidance in what have been done in the field of research. By conducting a literature study, problems and tasks can be narrowed down and useful definitions, theories and frameworks can be identified. (Svenning 1999).

Relevant literature for the literature study has been collected in several different ways; searching the Internet, searching in library databases, discussions with colleagues, looking at references used in book and articles. The literature that have been used can be divided in to two main areas; literature about strategy and strategic alignment and literature about business intelligence and data warehousing, some articles and books address both these areas.

After reading a number of books and articles and getting more oriented in the subject area of business intelligence and strategic alignment, the conclusion was that the problems of measuring or capturing the behavior of strategic alignment in a survey is very difficult. One reason being how the participants in the survey interpret the questions and the different answer alternatives. Another being that it is hard to capture any underlying processes that the questions do not address explicitly. As described in the literature review authors like Bhansali (2010), Labovitz & Rosansky (1997) and Luftman & Brier (1999) suggests that strategic alignment need to be examined in-depth on several different levels in an organization. After taking these aspects into consideration the decision was to continue using case study as method for this thesis.

Case study has been used as a method for a long time within certain areas, in management studies it has been used in order to analyze decision making processes with in companies (Eriksson & Wiedersheim-Paul 1999). In other areas of research e.g. natural science observations are focused on quantifiable empirical measurements and calculations in order to create impendency from the researcher. In the area of social science this is hard to achieve the same kind of precision without involving the researcher. However the case studies demands access to a wide range of data and information of the process that is investigated. The results depend upon the understanding the

researcher has for the collected material and whether or not it is relevant (Eriksson & Wiedersheim-Paul 1999). A case study can be performed during a shorter or longer period of time. The researcher collects relevant information and material from one or several different situations or events. Different kinds of data and different kinds of methods to collect data can be used, such as interviews and observations (Svenning 1999).

The company chosen for this case study is *Svenska Spel*, a Swedish gambling and lottery company that will be described in more detailed in chapter 3 (Case Study – Svenska Spel). The main reason for choosing Svenska Spel is that the company since 2002 has implemented a number of different business intelligence solutions. Therefore the company's business intelligence approach can be considered mature. Svenska Spel has a wide range of products sold both online and by retailers which implies that different kinds of requirements need to be addressed within the organization. One example of this is that Svenska Spel in order to address the increasing competition on the market has initiated a loyalty program. This increases the demands on business intelligence within the company and especially customer relationship management processes. Also the company only operates in Sweden which reduces the complexity and makes it easier to grasp the full context of the business.

Another reason for choosing Svenska Spel is that it enables a way to reduce the problem of not fully take hold of the complexity of the organization targeted for the case study. This is achieved since I already have extensive knowledge about the company because I worked there in different positions for a period of six years. Of course another company could have been chosen as case study for this thesis, however the limited amount of time for this project would impact the result and by choosing Svenska Spel the credibility and value of this study increases.

When a study is conducted there are mainly two different research methods available; quantitative and qualitative (Svenning 1999). The quantitative method usually has its foundation in statistics and mathematics. The qualitative method is used within social science such as sociology and equivalent.

The method chosen implies that this thesis is based on a qualitative approach and is built on interpreting and exemplifying by using Svenska Spel as an example, rather than quantitative measuring. The approach is chosen because it suits the purpose of the thesis: to investigate how strategic alignment is achieved. Combining the theoretical framework created from the literature study with a case study enables the possibility to make an in-depth examination of an organization. Of course there is a possibility to make subjective interpretations regarding the case study, however the theoretical framework is created with a high level of objectivity.

Data for the case study has been collected in using participant observation. Participant observation has it roots in traditional ethnographic research. The objective is to gather data and learn how a process or equivalent is carried out. To conduct a study by participate implies constant changes between; observing, listening, questioning and lead. The researcher is in the middle of the actual events and at the same time a participant. The gathering of information can be open with a defined purpose (Svenning 1999).

The collection of data at Svenska Spel has taken place over a six-year period of time. During this time the collection of data was not conducted explicitly with this thesis as a defined goal. However the information and experience collected during this period is extensive. In some cases there are documents (such as plans and specifications) and notes available in some extent. There are number of advantages and disadvantages when using participant observation (Livesey). A brief comment regarding these connected to the actual circumstances of the work with this thesis:

Advantages: High-quality first hand information was gathered and the internal structures of Svenska Spel have been examined from different positions. A vast amount of information is available due to the long period of time for information gathering. The personal experience has grown extensively during this period of time. Since the researcher was a part of the organization it is a fact that the true organizational behavior was examined.

Disadvantages: The potential difficulties to adapt to and learn the culture of Svenska Spel was addressed due to the vast amount of time spent in the organization. There is always a problem of not being able to generalize the results of a study, this fact is important and this may have an impact the conclusions drawn of this research. The problems of getting access to people at different levels within Svenska Spel were dealt with by the different positions held during the study. The problem of not having the skills needed to participate and understand cannot be considered and issue since there were an actual employment situation. The same argument can be used for the potential "observer effect"[1] and also the fact that the study was not explicitly communicated among the co-workers.

[1] The "observer effect" sometimes also called "Hawthorne effect" from Elton Mayo studies of the Hawthorne factory of the Western Electricity Company in the 1920's. This effect acknowledges the possibility that the presence of the observer and the fact that people know that they are observed can influence their behavior. (Svenning 1999; Livesey).