

# **Strategic capability through business intelligence applications**

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## Abbreviations

A-LOH-A	Allgemeine "Likelihood of Hospitalization"- und Ausgabenprädiktion
AMI	Access Markets International
AOKN	Allgemeine Ortskrankenkasse Niedersachsen
approx.	approximately
BaWü	Baden-Württemberg
BCG	Boston Consulting Group
BI	business intelligence
BICC	business intelligence competency center
BO	Business Objects
BSC	Balanced Scorecard
BW	Business Warehouse
CEO	Chief Executive Officer
CIO	Chief Information Officer
CIP	Continuous improvement process
CRM	Customer Relationship Management
DBA	Doctor of Business Administration
DMP	Disease-Management-Program
DWH	Data Warehouse
e.g.	exempli gratia (for the sake of example)
ed.	editor
eds.	editors
E-Proc.	electronic procurement
ERP	Enterprise Resource Planning

et al.	et alii (and others)
ETL	extract, transform, load
f.i.	for instance
ff.	following pages
GBL	Geschäftsbereichsleiter (head of business area)
GE	General Electric
GEK	Gmünder Ersatzkasse
GF	Geschäftsführer (business manager)
GPS	Global Positioning System
HBM	Harvard Business manager
HBR	Harvard Business Review
HTML	Hypertext Markup Language (for creating web pages)
IBM	International Business Machines Corporation
Inc.	Incorporated
IT	Information technology
KJ1	official statistic of statutory health insurance, premium accounting result
KM1	official membership statistic in health industry
KPI	Key Performance Indicator
Ltd.	Limited
MDK	Medizinischer Dienst der Krankenkassen (Medical Review Board of the Statutory Health Insurance Funds)
mp3	moving picture experts group 1 layer 3
NGO	Non-Governmental Organization
novem	novem business applications GmbH



OLAP	Online Analytical Processing
oscare®	operating system care (software solution for German health insurances)
p.	page
PDF	Portable Document Format
POT	Proof of technology
pp.	pages
PSM	propensity score matching
Q	question
RD	Regional director
RQ	research question
SAP	Systemanalyse und Programmentwicklung GbR ( <i>original</i> )
SAS	Statistical Analysis Systems
SPSS	Statistical Package for the Social Sciences ( <i>original</i> )
SWOT	strengths, weaknesses, opportunities, threats
TK	Techniker Krankenkasse
TM1	Table Manager 1 (system used to implement collaborative planning, budgeting and forecasting solutions)
UB	Unternehmensbereich (division)
UBL	Unternehmensbereichsleiter (head of division)
US	United States
vs.	versus
WIdO	Wissenschaftliches Institut der AOK

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## **Abstract**

This thesis analyzes the potential strategic capability that can be improved from the deployment of business intelligence (BI) applications. AOK Niedersachsen (AOKN), a German health insurance company in the north of Germany (Lower-Saxony), is used as the case study for primary qualitative research and analysis. For many years, information and data have been considered even “factors of production” for companies; but data and information have become more complex, requiring processing and structural analysis to get the needed transparency in the company. Data from different operational sources must be extracted and structured to provide information for management accounting employees, top management, and end-users throughout an organization. In the healthcare industry, BI systems have played a crucial role for decades. For organizations such as AOKN, the application of BI tools and technologies can create and support sustainable capability.

Several research questions are answered in this thesis through structured one-to-one interviews with different AOKN employees, and the resulting analysis of interview data. A qualitative approach to this case study is used, allowing the researcher to get in-depth information about a specific context. When case studies are conducted, the one-to-one interview is considered to be an optimal instrument and a significant source of evidence.

BI technologies and tools are classified within an appropriate conceptual framework which integrates the complex BI demands and structures of AOKN, identifying different components as part of the framework - systems infrastructure, data provision, reporting, and information receiver. The framework is further enhanced by four factors of a competitive advantage model drawn from existing literature to develop capabilities. The use and integration of BI technologies and tools in the strategy development process are then analyzed. Different BI tools, that have an important function during the whole strategy process, are recommended for each strategy phase. The final area of research examines the possible addition of new functions and solutions to current BI technologies and

tools to enhance the potential of these systems in gaining capabilities. Research findings encompass system access, report characteristics, and BI end users profiles and capabilities. To this end, a structured model gives examples of practical AOKN BI projects that have generated strategic capabilities for the organization. At the end, the conclusion chapter stresses the needs of contribution to knowledge (theory and practice).

## **Author's Declaration**

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed 

Date: August 2015



## 1. Introduction and company background

### 1.1 Project background

A sound knowledge of business, relevant markets, customers and competition are essential factors for any successful organization. Increasing complexity and uncertainty nationwide demand that businesses and governments continue to improve their ability to understand and anticipate change. In the past, companies made significant investments in business intelligence (BI) solutions in order to gather, analyze and share this information with top-level executives and decision-makers. Recent events and experiences suggest that the true driver of success comes from putting information and insight into the hands of many different users (IBM, 2010c). At the outset, users were unaware that data from operational systems is a significant organizational asset, which could later be leveraged for success, competitive advantage or capability (Davenport, 2007; Ranjan, 2008). Companies are most likely to reach desired business outcomes when many different business users can access complete, consistent, and trustworthy information (IBM, 2010c).

Like in other branches of the economy, information management and processing play a key role in ensuring transparency, profitability, and strategic orientations for health insurance companies. Operational data must be processed in order to control and measure the performance of company and its management. Effective and timely business information is recognized as being essential for organizations not only to succeed, but simply to exist in today's rapidly changing business environment (Lönngqvist & Pirttimäki, 2006). According to Pisello and Strassman (2003), the competitive advantage has shifted from companies that focus on implementing new technologies to those that employ technology to share, manage, and increase the level of knowledge throughout the organization. According to Puklavec (2001), emerging professional needs have led to changes in decision-making processes within organizations. Managers seeking to preserve

the competitiveness of their enterprises cannot and should not rely solely on intuition. Decision-making must be well-supported by information about events within the organization, and regulations as mandated by law. Organizations need reliable and well-integrated information systems that enable managers, analysts and other involved end users access to the information required for quality and effective decision-making.

Furthermore, the strategy development process plays a crucial role in the majority of organizations that operate within competitive environments. For instance, the CEO of Linde Group, described the classical strategy development process as thinking and acting in scenarios today (Balzer & Katzensteiner, 2011). Actions and decisions can be derived by using such scenarios. Potential risks to business processes should be examined. With regard to healthcare and its associated industries, a multitude of competitors exists. However, this market is basically a growth market because of demographic trends. For example, companies need flexibility and promptness to provide good customer service (Balzer & Katzensteiner, 2011).

Within the company, the potential of BI solutions and their impact upon many facets in the organization are recognized but it is difficult to continuously transform this potential into real business value. Information demands, data volumes, and user populations continue to grow exponentially (Miller et al., 2006). It will be necessary to give an insight into BI, define its objectives, and identify potential market relevant BI products for AOKN. New data structures and volumes, called big data management, will also be discussed to determine future data challenges. Therefore, the evaluation of IBM Cognos, a mainstream BI tool, and the official reporting system of AOKN, will be a central part of the research activity. The definition of strategy and examination of strategic fields of the company are also essential for a potential integration of BI.

Generally, the German healthcare system provides comprehensive insurance coverage and a broad array of health benefits. Typically, health services are paid through regular contributions and cover most inpatient and outpatient services, including maternity, and preventive care. As of July 2014, the system is comprised

of approximately 120 (dfg, 2014) independent public health insurance providers competing with each other, including eleven regional AOK health insurances. These are, for instance, AOK Niedersachsen (AOKN), AOK Bavaria or AOK Bremen. AOKN covers about 2.4 million people, as of October 2014 (AOK Niedersachsen, 2014). Figure 1.1 shows that about 85 percent of the population was covered for a ten-year period.

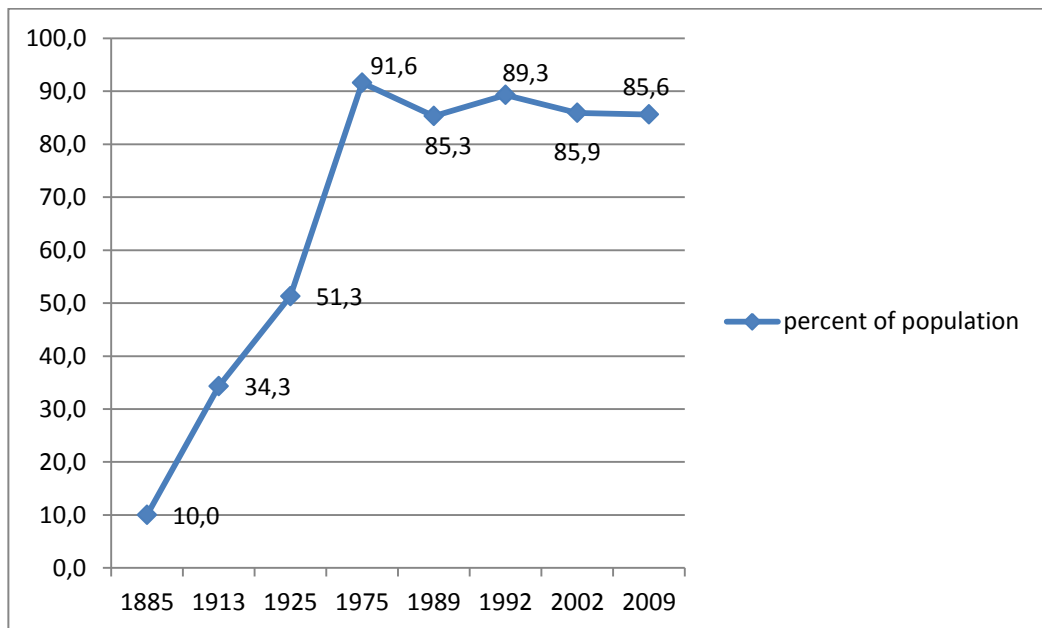


Figure 1.1: Population coverage by statutory health insurance (Federal Association of the AOK, 2012)

In order to ensure a basis for making strategic business decisions, data of patients, supplier or contract partners of AOKN must be collected and converted into valuable information. Moreover, the ability to convert masses of non-transparent data into useful information in the shortest time offers today's companies a significant capability. BI is one of the technologies that allows managers and end users to complete these tasks.

Chapter 1 introduces, in the first two sections, the research problem, aims and objectives. The health industry market with its BI use and the AOKN organization (market, IT dimensions) are discussed in Sections 1.4 to 1.6. Section 1.7 briefly outlines the overall thesis structure.

## 1.2 Research problem

Generally, BI information systems present themselves as new challenges for the healthcare industry. Within AOKN, the management accounting is undergoing institutional change. That transformation is a system change from Microsoft Office technologies to modern BI technologies and tools, which became necessary because of increasing data volumes and complexity. For AOKN, that transition initiated a change of tasks and functions for employees. Through the deployment of Microsoft products, management accounting employees are focused on creating reports to provide data with a high degree of technical knowledge and complexity. Because of technical efforts, management accounting resources could not be used for efficient management accounting activities. Currently, data base programmers are responsible for extracting, loading and transforming processes (ETL). Thus, management accounting employees have more time availability and opportunities to support top management in strategic questions. A further reason for the BI implementation is the ability of end users, such as top management, regional department managers or marketing directors, to develop individual data analyses using a consistent data model.

BI has been implemented based on AOKN's use of IBM Cognos as the official reporting system. With the help of this system, reports for every activity field can be developed to present a whole information system with key company ratios or trends, including health care management, hospital management, or Disease-Management-Programs ("DMP"). Therefore, this research is highly relevant for the company and offers in-depth expertise in BI applications for a highly competitive market-environment with the potential to improve strategic capabilities.

AOKN conducted a BI project in 2011. In order to further support and improve the BI process, top management should be made aware of the effects and impact of BI on their organization. Therefore, an important research topic is whether or not BI tools can be effectively used and integrated into the strategy development process. Can BI applications be enabled to improve corporate performance for top management, management accounting, and other end users in order to gain strategic capabilities? Thus, the practical implementation and respectively the use

of BI tools are important components in this process and have to be considered in this thesis as well.

### **1.3 Research aim, questions and objectives**

The research aim and purpose was derived from the need for the research as described above, which led to more specific issues that resulted in the design of the research questions (Creswell, 2009) as it will be mentioned in chapter 2. The research aim indicates the overall intent of the study and establishes the central direction for the study (Creswell, 2009). This process can be described by the following statement “why you want to do the study and what you intend to accomplish” (Locke, Spirduso, & Silverman, 2007).

The study will be of an exploratory nature. Little is known about specific strategic capabilities through BI applications deployment in health industry; therefore, an exploratory approach can be a well-chosen and helpful approach. Saunders, Lewis, and Thornhill (2009) outlined that an exploratory approach has value if one wants to seek new insights and explore an issue about which little is known. Thus, the exploration of strategic capabilities for AOKN will generate new ideas and approaches to enhance corporate performance and to make contributions to theory and practice of BI knowledge and information management. Thus, the research aim is the exploration and analysis of BI technologies and tools, and specifically the IBM Cognos products that constitute the mainstream reporting system in this health insurance company. This thesis will examine strategic capabilities through BI applications in terms of a classification within an appropriate conceptual framework, the integration into AOKN’s strategy development process, and additional functions and solutions of current BI technologies. This research focuses on the assessment of the capabilities of BI technologies and tools. It will explore which BI technologies and tools are currently used within AOKN, how they are used, how they can be classified, their interaction with the strategy development process, and how they might be developed and deployed in future. The overall question as to whether strategic capabilities can be developed and improved through BI applications deployment is addressed. More

specifically, three related research questions emerged in the preliminary research process of developing and formulating the thesis' title and the above described aim. These are very few practical examinations of BI products and BI applications deployment in the health industry. The analysis and assessment of IBM Cognos tools deployment is of relevance to other health insurance companies and even other industries.

- Can BI technologies and tools be classified within an appropriate conceptual framework?

BI technologies and tools should be identified as instruments that can potentially move a company into a more competitive position. An improvement in the value of an organization should be accomplished by generating, extracting, and providing relevant information and data to management in a structured and transparent way. Organizations should employ a variety of applications designed to fulfil needs throughout the user community, which ensures that relevant employees can work with a consistent set of data and collaborate with other employees. BI applications should be established at the control stage of the conceptual framework because they should be used for data and information generation at the recording stage. Afterward, the applications can then serve as decision-making and controlling factors. Therefore, a conceptual framework will be designed within which BI technologies and tools will be integrated.

- Can BI technologies and tools be effectively used and integrated into the strategy development process or not?

A decision-making process should play a significant role in organizations and can be supported through BI applications. Different opportunities of them will be essential for the decision-making process. Information should be revised and structured before making strategic relevant decisions. In AOKN there is no defined strategy development process; however, four strategic target fields will be seen as "given" business strategy.

Different models should be necessary to identify threats or weaknesses in certain individual business cases. Thus, management accounting activity forms and results can be interlinked in one controlling/ BI tool in order to effectively use and integrate BI tools into a strategy development process.

However, taking the strategy term into context, Porter (1996) argued that operational effectiveness is not strategy. Positioning, which was once at the centre of strategy, has been deemed as too static for today's dynamic markets and changing technologies. According to the new philosophy, rivals can quickly copy any market position. While operational effectiveness is insufficient, it is a necessary requirement for an efficient integration into the strategy development process (Porter, 1996).

- Can functions and solutions be added to current BI technologies and tools to enhance their performances for end users and top management to gain capability?

Management and activities within AOKN are oriented toward company goals. Capabilities should be achieved and improved through a balance of service, qualitative cost controlling, and efficient assignments of resources. One potential approach that could serve business strategy is the enhancement of prediction models to identify risk potential for specific diseases in time to intervene and develop appropriate measures and activities. These prediction models can be developed as a data mining workbench that helps the end user to build predictive scenarios quickly and intuitively, without programming. That means that BI end users can be involved in a computational process of discovering patterns in large data sets, simply managing great scopes of data. For a health insurance company, one business objective could be to have the capability of recognizing customer needs faster than the competition. The organization should be able to recognize market developments, and also to anticipate those developments in a timely manner in order to incorporate them into future strategies. Therefore, providing excellent customer consulting and exceptional customer service are necessities. That means enabling the user who can "coax treasure" out of unstructured data. However, the case study and interviews have to identify explicit functions and

solutions that could be added to current BI technologies and tools to answer this third research question.

The research objectives are stated as follows and emerged from defining the above described research questions. The research objectives will be achievable in the timeframe specified, achievable with the resources indicated and translatable into a realistic programme of work. The question will be whether strategic capabilities can be generated through BI deployment:

- To design and develop a framework to define and classify appropriate BI applications
- To explore and analyze the strategy development process and assess the process support capabilities and functions of BI technologies and tools
- To research the capabilities, or more specifically the strengths and weaknesses of BI technologies and tools with specific reference to their deployment in a live case study
- To assess how BI technologies and tools can be used to strengthen key strategic activities and ensure benefits delivery
- To generate a set of critical success factors for the ongoing development and future deployment of BI tools and technologies

#### **1.4 Health industry market, BI use and AOKN's market position**

In this section, the use of BI in the health industry market will be analyzed. Generally speaking, BI has not been fully implemented in wide variety of industries and organizations including those associated with healthcare, finance, the energy sector, etc. A survey showed that more than the half of consulted companies do not use BI solutions in their organizations, but the potential for BI implementation in the future is widely recognized (Widdig & Röttger, 2012). Many companies use BI solutions from Microsoft or SAP. The degree of brand awareness can be viewed as commensurate with the degree of use with reference to Microsoft or SAP solutions. As Figure 1.2 illustrates, the use of BI products made by IBM, Oracle, or QlikTech follow with a large gap (Widdig & Röttger, 2012).



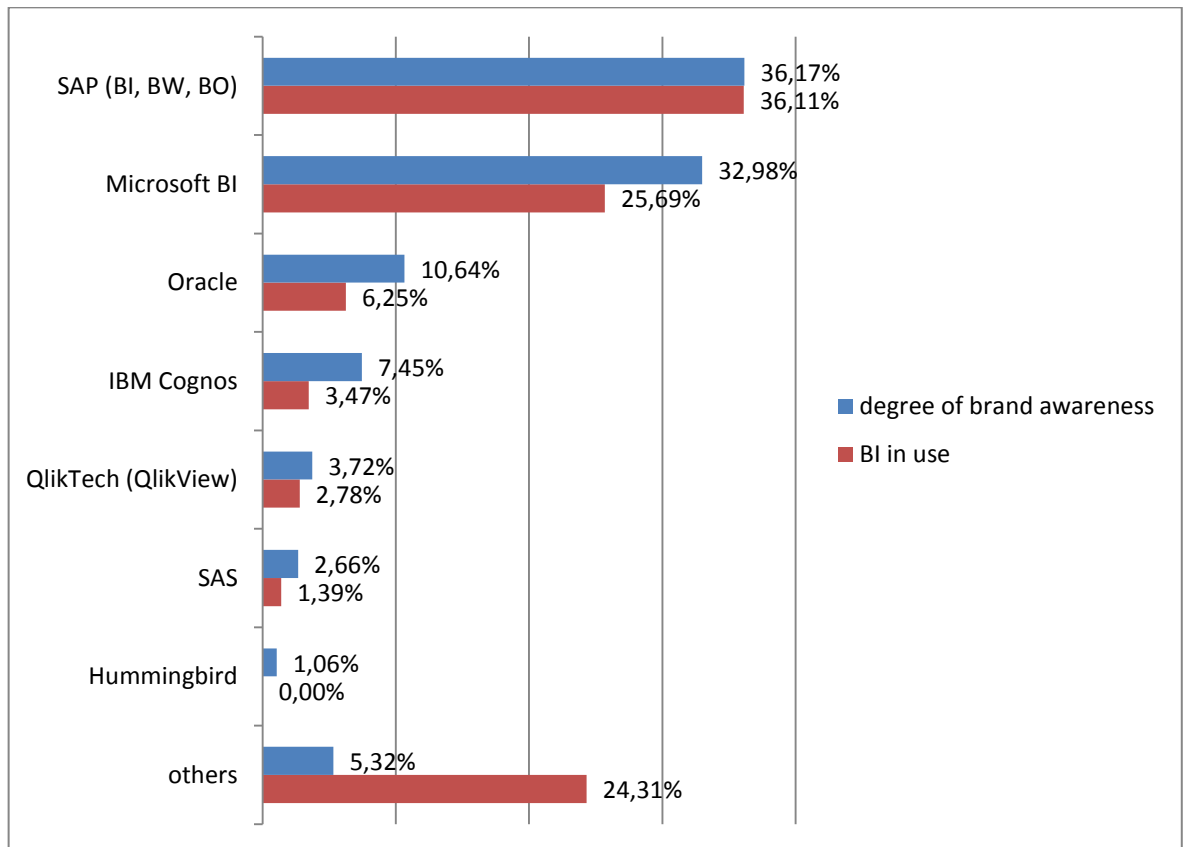


Figure 1.2: BI: degree of brand awareness and usage in different branches (Widdig and Röttger, 2012)

The introduction explained the importance of the use of BI in the healthcare industry. Data analyses are at the center of services for data management. Customer data should be provided and stored in a centralized data base. BI technologies and tools should illuminate previously unknown relationships within data sets. Those devices should examine data to generate ideas for the implementation of current health care programs and should show the potential for the development of new approaches to care and services for the health industry (Wiehr, 2011). Table 1.1 provides a select list of BI solutions and services purchasers and providers (Hildreth & Ament, 2009).

Table 1.1: Select list of BI solutions and services purchases and providers

Health organization	Vendor(s)
AGFA Healthcare	Accenture
Blue Cross Blue Shield of Florida	SAS
Blue Cross Blue Shield of Tenn.	IBM / Cognos
Blue Cross, Blue Shield of California & Massachusetts, Humana, Veterans Health Administration	EDS, an HP company
Centers for Disease Control	CSC / SPSS
Centers for Disease Control	SPSS / CSC
Columbus Children's Hospital	Oracle
Harvard Medical School, St. Jude Children's Research, CIBA, & Mutual of Omaha	Tableau Software
Health Net, Inc	Deloitte
International Federation of Red Cross & Crescent	Business Objects, an SAP company
John Hopkins Health System	Microsoft (Amalga)
St. Luke's Medical Clinic, Houston Infectious Diseases Associated	Global Healthcare Alliance
St. Vincent Health Systems	Siemens IT Solutions

In most cases, the information about BI use in German health companies is available via the Internet or other official sources. Many of the internet references are older, over five years ago. The outdated nature of the sources illustrates a need to examine the highly competitive healthcare industry and the individual information systems within companies to gauge attitudes toward information collection and potential strategic orientations using BI. Literature reviews and internal sources showed that BI solutions have been implemented in healthcare organizations only in isolated cases. The presence of BI architecture does not automatically imply that an organization will realize higher revenues or strategic advantages. The incentive to use BI architecture can be seen in its importance in supporting process standardization, data quality improvement, or process automation. Another significant issue is the importance of understanding what processes are most crucial for ensuring effective developments of strategic capabilities in the healthcare industry. Business management needs to understand the importance of BI applications, their respective processes, and the benefits to a company that chooses to adopt those applications (Richardson & Thompson, 1999). Internal research within the AOK system revealed an illustrative overview about its information system and reporting solutions as follows.

For instance, in 2007, AOK Hesse began to provide data and information in a pre-aggregated way. This change allowed end users to gain direct access on data bases. The focus is on increasing of query performance and data bundling in a data warehouse (DWH). Short response times for big data volumes are important as well and will be discussed in Section 2.1.2 (Talarczyk, 2009).

In 2010, AOK Berlin became a success story through the implementation of Cognos BI. This is documented in a case study by the software supplier “novem business applications”. AOK Berlin has also installed Cognos solutions for the composition of their DWH. Advantages were seen in platform independence, compatibility to SAP systems and the performance of Cognos. Management accounting can access relevant information and data via mouse click and provide them to business management (novem business applications, 2010).

Figure 1.3 shows information systems and an approximate use of BI in German health industry, in particular. The smaller circle stresses the use of BI and the respective products and systems use in the industry. The information and data are based on internal and online research and are not meant to be comprehensive. However, the use of BI in German health industry is expected to rise to 60 percent in relevant organizations (Internet researches, 2013, see Appendix Table 9: Information systems and use of BI in German health industry). Because the literature review and research revealed very few sources addressing BI use in the German healthcare industry, the information presented in Figure 1.3 is based on the preliminary investigation and is a general overview.

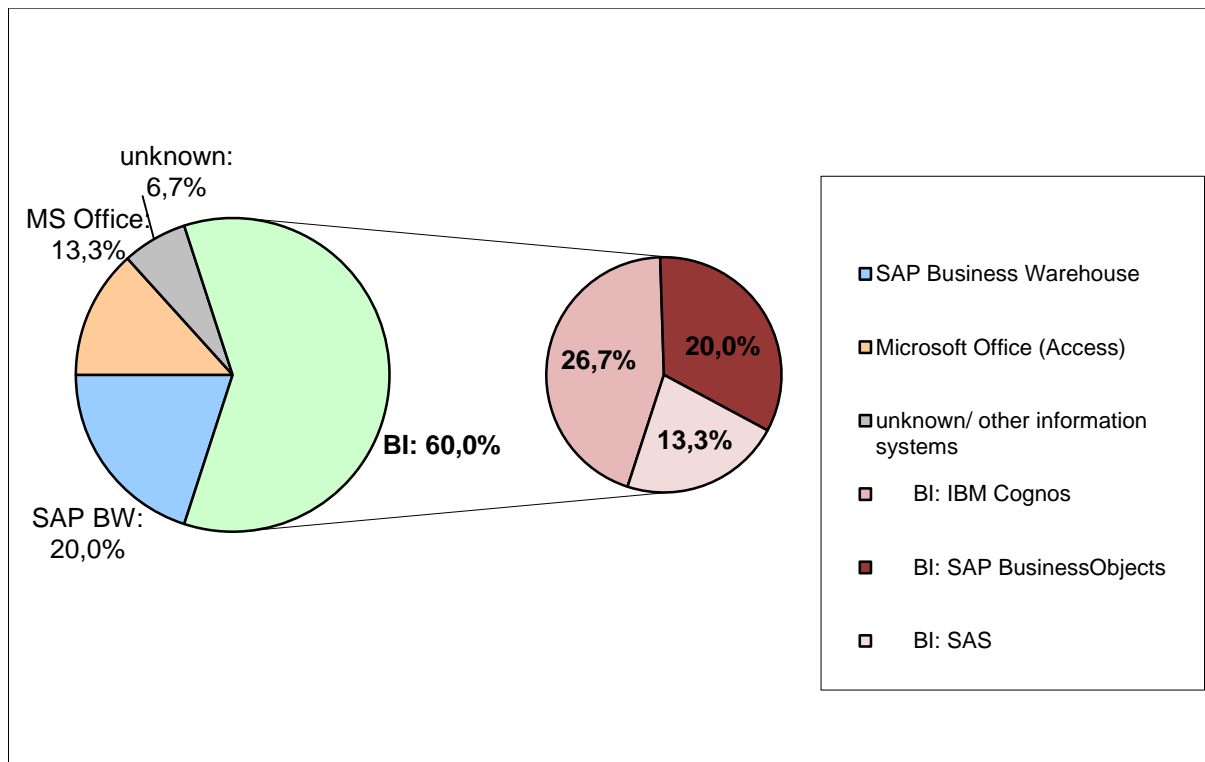


Figure 1.3: Information systems and use of BI in German health industry

In addition to the AOKs, other health insurance companies and the “AOK Systems”, as AOK’s own data and software house, prefer certain IT solutions as well. AOK Systems develops SAP-based, customized IT products for AOK and provides a broad range of services from IT advice and implementation to training and specialized support services. These services are augmented by expert consultations. AOK-Consult GmbH is AOK’s in-house management consultancy. In addition to advising on activities within Germany, it also arranges expert consultation for healthcare systems and offers advice to political decision-makers, health insurance funds and international health insurance projects (Federal Association of the AOK, 2012). AOK Systems focuses on the implementation of SAP BusinessObjects® (BO). It is designed to enhance the opportunities of reporting and analysis of the SAP operational system in an optimal way. BO is a centralized BI reporting platform based on SAP and non-SAP data. It offers multiple opportunities to analyze, revise, and distribute data from different sources. Thus, AOK Systems supports the customized BI development within the AOK community (AOK Systems, 2013). Gartner (2012) further defined the BI platform as a software platform that delivers certain capabilities like integration, information

delivery or analysis components. Some companies can be classified in the following matrix (Figure 1.4).

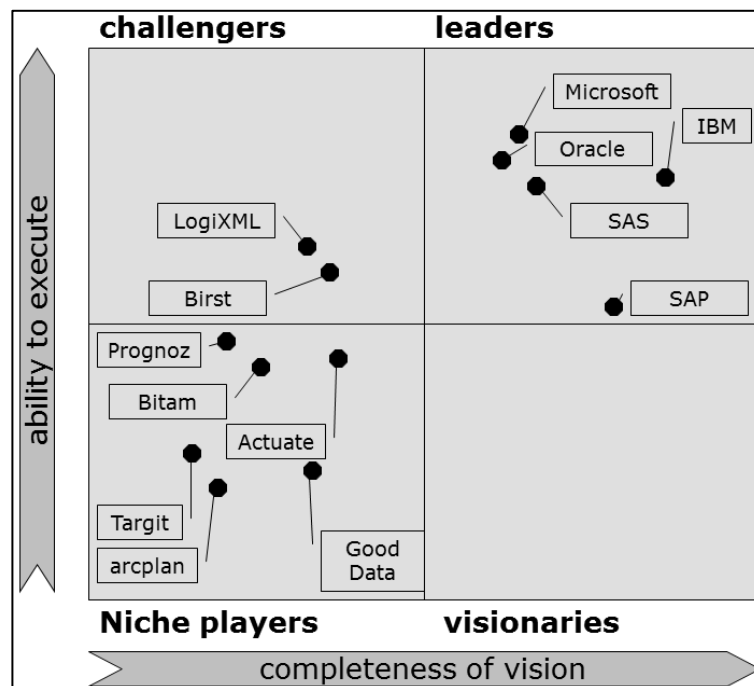


Figure 1.4: Magic quadrant for BI platforms (according to Gartner, 2013)

Therefore, it can be seen on the basis of Figure 1.3 and internal research, that almost 60 percent use of BI is currently identified in the German health insurance industry. However, AOK systems mandate the implementation of BI technologies in the AOK community as mentioned above. The specific products such as IBM Cognos or SAP BO can be selected by AOK individually.

The three biggest German health insurance companies “Barmer GEK”, “DAK Gesundheit” and “TK” were analyzed as well. Each of those organizations also implemented BI technologies as shown by online research (see Appendix Table 9). A deeper analysis about the current status of certain BI implementation within the health insurance companies was abandoned in favour of examining the origination of the use of information systems and BI. The researcher assumes that the implementation processes are ongoing based on reviewed project structures that are in the test or pilot phase with regard to BI components.

AOK Baden-Württemberg had some technical challenges with SAP. Challenges of data migration from previous information systems ended in an escalation with the SAP Corporation in 2012. Therefore, a continuous quality management has been implemented with SAP to ensure data quantity and quality. The consolidation of SAP products has not yet been finished and questions remain regarding the process. A planning component is also critical in order to present run-up planning or comparison of target and actual business results, but is missing from the system. Experts are rarely available at the market (AOK Baden-Württemberg, 2013). These points have to be discussed and clarified during BI recruiting and implementation as well.

Furthermore, the previous standard reporting systems like Microsoft Excel or Access are still in use. AOKN's management accounting has to verify and evaluate data sets using Microsoft if reports cannot be developed in Cognos because BI administrators must search for or create certain data tables. However, the professional divisions have urgent needs to analyze these data. Thus, Access helps management accounting to prepare relevant information from operational source tables to quickly provide it to management or other divisions. Due to these circumstances, a column for "Microsoft Office (Access etc.)" is mapped in Figure 1.3 as well.

In summary, the companies in the healthcare industry want to use BI to create success factors. The first steps are to collect internal and external data and then integrate that data into a modernized structured DWH. Publishing the right data is a required technique when using this technology (Kimball et al., 2010). The BI landscape in the healthcare industry is still at the beginning, but is becoming more accepted and appreciated.

### **1.5 AOKN as a health insurance company**

The case study company AOKN is a middle sized public corporation in the healthcare industry in Lower-Saxony, Germany. The brand "Gesundheitskasse" focuses on healthcare and prevention for customers and members.

As a locally operating healthcare company, AOKN's core business can be classified into two main segments: prevention and health, and health care and service. Prevention focuses on the individual consultation of customers in 120 service centers in Lower-Saxony and all contact channels to inform customers, resolve issues, and to update on their individual responsibilities. Prevention and health are also elements of the AOKN's brand strategy. AOKN offers many specific preventive programs including: nutrition guidance, cardiovascular care, managing back pain, smoking cessation, stress management and risk factors, chronic illness, patient information and consultation, healthcare, environmental factors, and others. This division of AOKN offers a large variety of preventive healthcare measures and provides benefits for individuals that become ill (AOK Niedersachsen, 2012).

The major financial, strategic and market dimension of AOKN will also be presented. As of 2014, the financial position and situation shows good condition; however, total expenses increased in 2013.

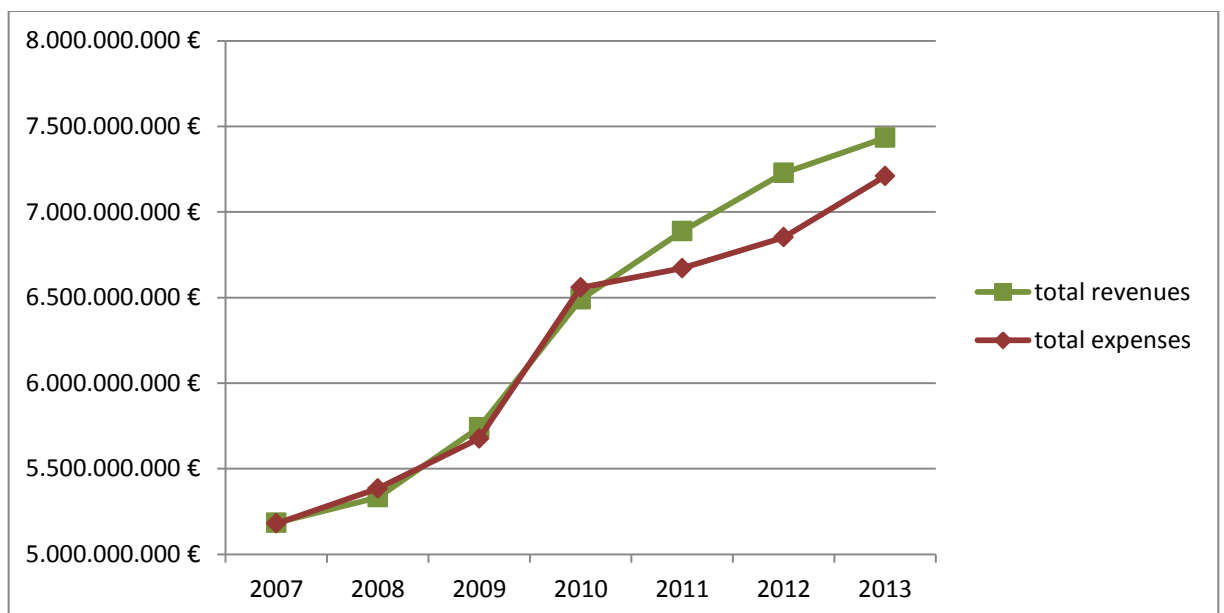


Figure 1.5: AOKN total revenues (in €) and expenses 2007 to 2013

Figure 1.5 illustrates AOKN's total revenues and expenses from 2007 to 2013 which stresses the positive financial development in the last years. At the same

time, customer satisfaction is below expectations and lags in comparison with the competition. Additionally, insurance relationships currently show a steady decline. Figure 1.6 first shows the insurance relationships development in AOKN.

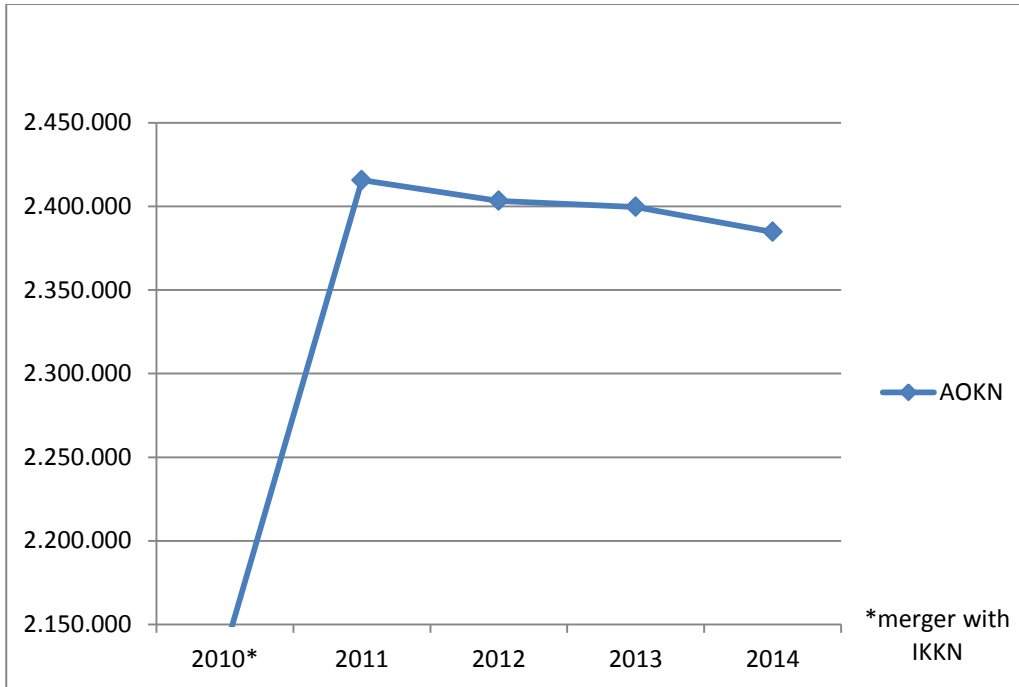


Figure 1.6: Insurance relationships development

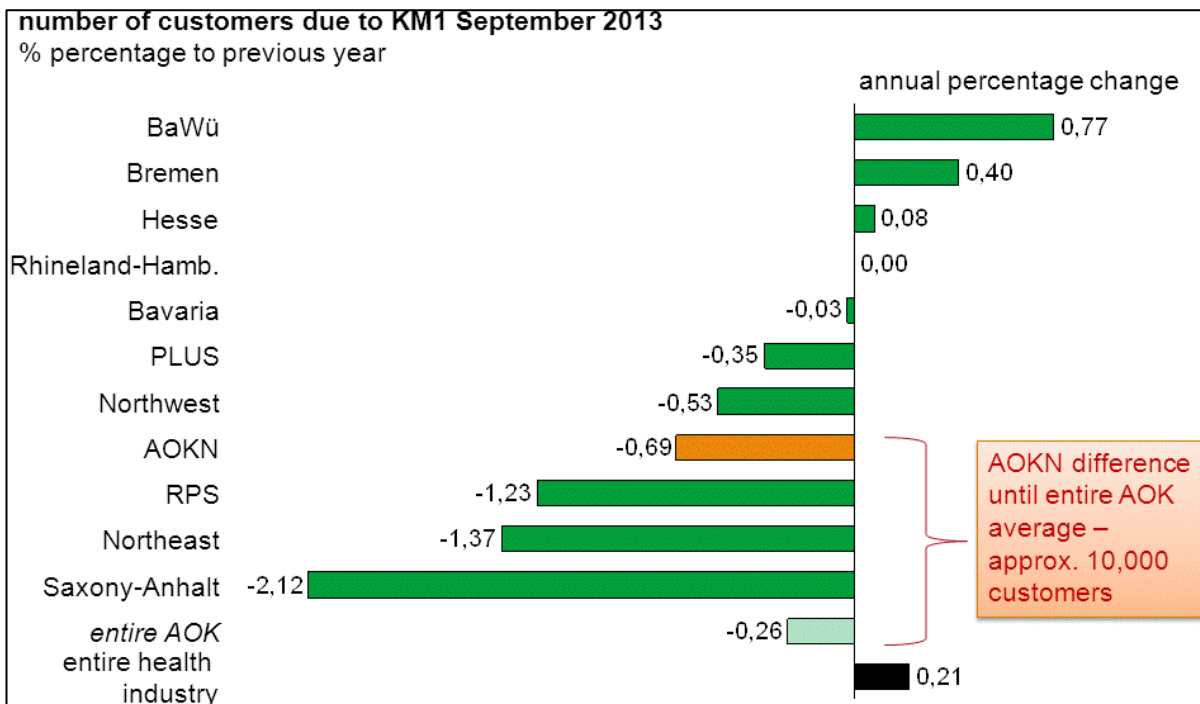


Figure 1.7: Number of customers and annual percentage change (KM1 September 2013) (AOK Niedersachsen, 2013c)



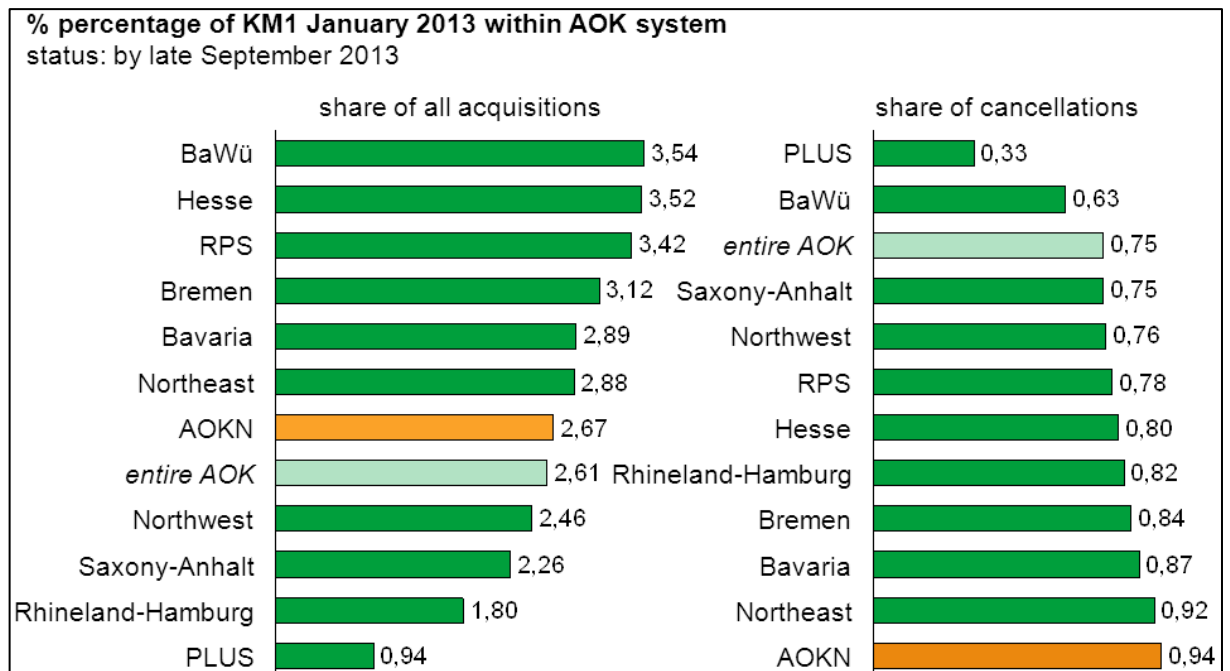


Figure 1.8: Share of acquisitions and cancellations within AOK system (AOK Niedersachsen, 2013c)

With regard to the statistics shown in Figures 1.7 and 1.8 that outline customer development and cancellations, the CEO of AOKN discussed the need for change and presented a planned implementation of a customer orientation focus process in autumn of 2013 that would begin in 2014. KM1 represents the official membership statistics in the healthcare industry. The KM1 development at AOKN is clearly behind the entire AOK average and healthcare industry development. If AOKN had a cancellation rate similar to AOK departments, it would have about more than 3,500 customers for KM1. While acquisitions show an increase of 2.67 percent, they include family insurance without any contributions. Therefore, it is only a quantitative expansion. AOKN's market position in the competition will be discussed further. Figure 1.9 presents an overview of the corporate challenges of AOKN on the basis of its business strategy using the four strategic target fields.

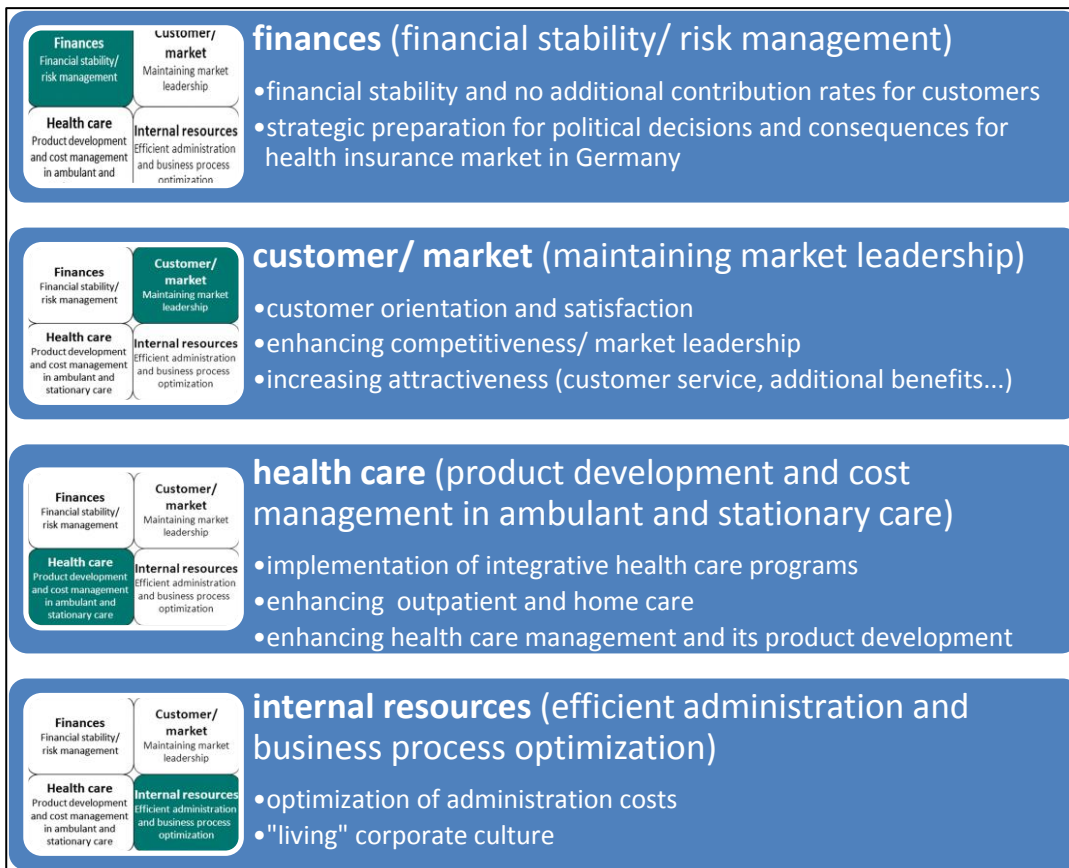


Figure 1.9: Corporate challenges as defined by the four strategic target fields (AOK Niedersachsen, 2012a)

Although strategy plays a crucial role, it is more frequently a process in flux and has become more customer-focused and less branch-specific. However, AOKN's competitive situation cannot be compared to the automobile industry because the overall right to exist is based on to supplying customers with health benefits in the German healthcare system, which is important to remember. The core message is that AOKN is the healthcare supplier in Lower-Saxony and that should be focused on in the organization. Certainly, a new product or even an award payout for customers of competitors can have negative effects on AOKN's cancellation or acquisition activities and success. However, often the contrary is the case (interview agent to CEO).

The statistics presented in Figures 1.7 and 1.8 can be helpful to analyze and understand the current customer needs. Therefore, AOKN has to be prepared and has to check their information system capabilities to react adequately. The purpose of the analysis will be to maximize value for patients and customers: to

achieve the best outcomes or product alternatives at the lowest cost. A customer-centered health care system has to be implemented based on the needs of the customer (Porter & Lee, 2013).

## 1.6 Organizational and IT dimensions

German social law is designed to protect employees and their ability to make a living. Employees in all five branches of social insurance are automatically covered by statutory insurance, which becomes active as soon as an individual begins to work. Those laws cannot be superseded by other agreements or contracts.

Financial stability will be necessary to invest in health care fields in the future to enhance the health market. Even under the circumstances of the NGO, AOKN's business cannot be as flexible as private economy but the company can focus on customers and set on the price as market driver (interview agent to CEO).

The IT organization and its dimensions will determine the technology context in AOKN. At the same time this should already provide the wider technology framework within which BI has been implemented. The BI framework will be designed in chapter 5. The IT organization can be illustrated in Figure 1.10.

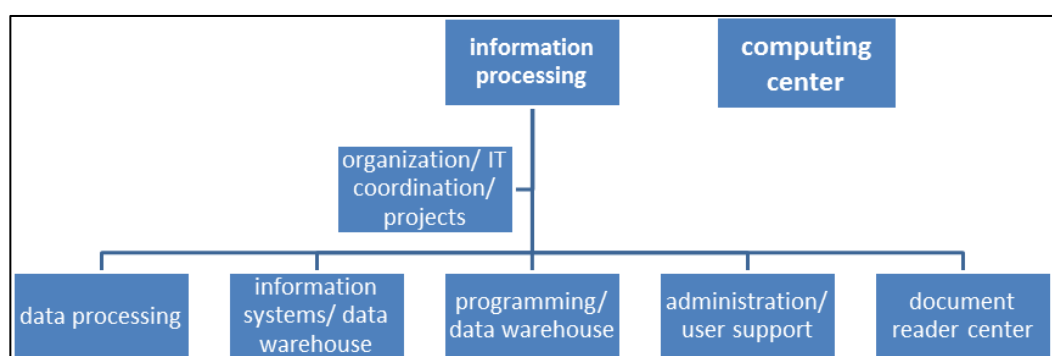


Figure 1.10: AOKN IT organization chart

The information processing department is organized into the following divisions: data processing, information systems/ data warehouse, programming/ data warehouse, administration/ user support and a document reader center. Thus, the

management and programming of the BI data base, the data warehouse, occurs mainly in this department. The computing center is an additional segment of the IT organization, but has no responsibility for DWH administration. The data warehouse administration is also an administration task within the AOKN management accounting department. The first design of the intersection of BI components with the IT department can be seen in Figure 1.11.

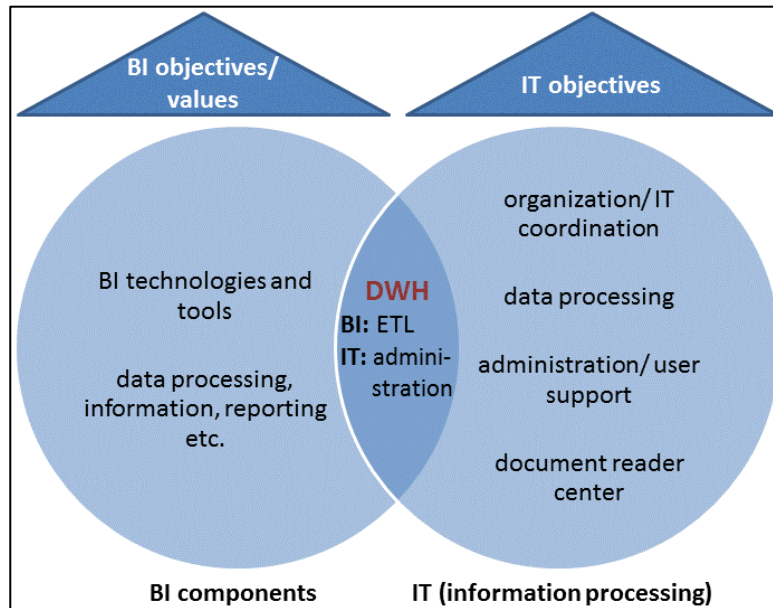


Figure 1.11: BI and IT infrastructure

The figure above shows the intersection of the integration of the DWH in the different BI components and IT processing department. The BI components include the DWH, the main BI technologies and tools, reporting activities, and/ or data processing. Thus, ETL data processing in the DWH will not be done only in the IT processing department, but is also integrated into the management accounting department which uses BI technologies and tools. This is illustrated by the intersection depicted in Figure 1.11. In this way, BI fits into this IT framework in AOKN. Different BI and IT objectives can also be generated. IT objectives will not be discussed in detail at this point. The contents and objectives of a BI conceptual framework will be primarily mentioned and analyzed in the context of the first research question (chapter 5 and 6).

AOKN uses “modern” data processing technologies for the best service in the operational business. The company focuses on innovative information and communication technologies that combine IT standards and data processing solutions in order to manage the numerous requirements of a health insurance company. The information processing department supports all business processes by using data processing solutions that meet specific requirements. The data processing spectrum ranges from complex operational systems such as SAP oscar, professional third party market solutions, and in-house developments. “Concrete” data processing solutions have to be identified and prepared for operational business through the computing center. This will be also done in the context of AOK nationwide IT strategies. The organization and development of the data processing as data warehouse administration is a crucial task of IT department. Table 1.2 presents an overview of the main operational and information systems that are currently in use.

Table 1.2: Main information and operational systems in AOKN

Operational system	Contents/ objectives/ performance	End-users in AOKN department	implemented
SAP oscare CRM	Customer relationship management, campaigns, cancellations, acquisitions / extensive entry masks and screens	market	Oct. 2006
SAP oscare claims	Customer claims, services / extensive entry masks and screens	market	Oct. 2010
SAP oscare PKM	Memberships, insurance times, tariffs etc.	market	Oct. 2011
AOK Systems "ARIADNE"	Integrated health care, optional tariffs calculation, DMP, dental doctors / web based application, long running times	doctors, market	Dec. 2002
AOK Systems "Rezept300"	Documentation and import of pharmaceutical documents and accounts/ examination of pharmacy accounts	pharmaceuticals	Jan. 2005
AOK Systems "Kompass302"	Documentation of adjuvants and therapeutic measures / documentation and simple analytics possible	health management "ambulant"	Mar. 2006
AOK Systems "ArZOS"	Doctor focused online system / web based application, adequate running times	doctors, health management "prevention"	Feb. 2012
Information system	Contents/ objectives/ performance	End-users in AOKN department	implemented
SAP "FI"	Documentation of financial accounting and booking	financial accounting, risk management	Oct. 1997
SAP "e-procurement"	Procurement tool	facility management	May 2005
SAP "BW", "HR", "OM"	SAP Business Warehouse to store and prepare corporate data for analyses (importing data from operational oscare systems); documentation of staff information; organization management/ bad performance, long running times	management accounting, organization and personnel controlling	2006
IBM Cognos	Reporting, analysis and planning product as AOKN mainstream tool / good performance since installation of server appliance "Netezza" in 2013	management accounting, doctors, health management "stationary", further professional business divisions	Jul. 2009
IBM SPSS	Software package used for statistical analysis (descriptive statistics, prediction for numerical outcomes and for identifying groups) / to be in pilot with pharmaceuticals, churn management and customer win-back	management accounting	tender in 2014
Panoratio	Explorative examination of different activity fields (doctors, hospitals, integrated health care, daily sickness benefit) / high performance and fast data preparation	management accounting, doctors	2007
AOK Systems "PSM tool"	Conducting propensity score matching (comparison group building to compare and evaluate different cost groups) / first time used for matching and evaluation of a health care program in April 2014	management accounting, health care management	2013
AOK Systems "Diana dashboard"	Benchmark analytics with standardized nationwide AOK data, analysis of health care / adequate performance	health care management	Jan. 2014

Table 1.2 depicts the main operational and information systems currently used and implemented in AOKN. The overall performance will be assessed as good by the researcher as “BI end user” with few exceptions. SAP BW is one of those exceptions. In particular, the performance of the information system is adequate because of the installation of a new server appliance “Netezza” in 2013. The main operational system is SAP oscar with its modules CRM, claims, and PKM that are the basis for the company’s documentation of customer information or activities. AOKN’s investment in BI systems from 2009 to 2014 is summarized in Table 1.3.

Table 1.3: Level of investment in AOKN BI systems since 2009

Period	Type	Total amount (€)
2009 – 2011	Contract conclusion / new licence model	421,000
2009 – 2011	Care new licences software	168,000
2011	Upgrading licences	27,000
2011	Contract TM1 (planning) including 1 year care software	94,000
October 2011	Follow-up contract for care software	107,000
2012	Upgrading BI software	30,000
2012	Overall costs care	92,000
October 2012	Procurement appliance “Netezza” (Puredata - 1)	171,000
December 2013	Procurement appliance “Netezza” (Puredata - 2)	367,000
2013 – 2014	Care costs “Netezza” (Puredata - 1)	64,000
2014	Care costs “Netezza” (Puredata - 2)	60,000
October 2013	Contract conclusion (BI Advanced, blended role until 2015)	262,000
until October 2013	Overall costs software care	92,000
since October 2013	Overall costs software care	66,000
2014	Overall costs software care	68,000
2015	Overall costs software care	69,000
costs of infrastructure	BI network, router, network link etc.	100,000
<b>Total</b>		<b>2,258,000</b>

The IT processing department provided this cost report of the AOKN BI information systems. From 2009 to 2015, the costs of BI systems have been

calculated as more than 2 Million Euros. Thus, a large sum of money has been spent on the BI information system and the preparation of information.

## **1.7 Thesis structure**

Chapter 2 maps the theoretical framework as literature review that is the foundation of the critical analysis of the existing literature relevant to the research topic. The main topics will be discussed: BI with its infrastructure, big data management and technologies and tools, and strategy development process, and strategic capabilities. A structured review of the current literature using current journals in the field will be introduced as well.

Chapter 3 presents the development of a provisional conceptual framework based on the literature review and the preliminary investigation of BI deployment in AOKN. That framework primarily serves to answer the first research question. The components data base, planning, technology, intelligence and the information dissemination within a company will be introduced as features necessary in designing a conceptual framework for AOKN.

The research methodology and design that will be used to answer the research questions will be presented in chapter 4. The research strategy, methodology, case study design, and data collection method will be discussed in sections 4.2 through 4.5.2. Ethical considerations will be addressed in section 4.6.

Chapter 5 presents the findings of the case study based on interviews with AOKN employees. The findings for each research question will be discussed.

Chapter 6 presents the proposition, design, and development of the new framework that is based on the findings of the case study and the literature review described in the previous chapters.



Chapter 7 evaluates the case study findings and the new framework in order to establish a basis for generalizations, broader conclusions, and contribution to theory and practice.

Finally, chapter 8 provides conclusions for strategic capability through BI applications and outlines potential contributions to theory and practice. Additionally, consideration is given to the limitations of this research thesis. Furthermore, a comprehensive model, a total model, will illustrate the link between the research questions and summarize the results.

## 2. Literature review

This chapter presents a critical examination of the existing literature regarding BI technologies and tools, and business strategy and associated capabilities that are relevant to the research aims and objectives. Seminal articles and publications relevant to the research topic will be discussed and assessed. A number of key terms and concepts are defined and the following topics and structure are reviewed:

- BI with its data storage system, the data warehouse, applications, big data management and management accounting as data provider,
- Business strategy and associated capabilities are considered as they relate to business processes and information technology.

This chapter covers two main topics – BI (Section 2.1), and strategy development process and strategic capability (Section 2.2). The BI topic in Section 2.1 includes the DWH as BI infrastructure, big data, and the classification of BI technologies and tools as they relate to strategic and operational business. This will be of significance in the design of a conceptual framework within which BI technologies and tools can be integrated.

Section 2.2 outlines the different phases of the strategy development process and the importance of strategic aspects of IT. To identify a possible strategic capability through BI applications, and their integration into a strategy development process, a definition of competitive advantage and strategic capability is given first in Section 2.2.6.

Section 2.3 provides a structured review, and summary of the pertinent literature using current journals in the field of study.

## 2.1 Business intelligence

Different definitions can be found for the term BI in literature. BI has become an important IT system that can help organizations to manage, develop, and to communicate intangible assets such as information and knowledge. Thus, it can be considered an essential for organizations operating in the current knowledge-based economy arena (Alnoukari, 2009).

In 1996, the Gartner Group asserted that: “data analysis, reporting, and query tools can help business users wade through a sea of data to synthesize valuable information from it – today these tools collectively fall into a category called business intelligence” (Anandarajan et al., 2004, p. 19). BI is an umbrella term that combines architectures, tools, data bases, applications, practices, and methodologies (Turban et al., 2007).

BI is discussed by Gansor, Totok and Stock (2010) as an analytical process that transfers internal and external data into appropriate knowledge to support decision-making. The term BI was used and defined as the collection, saving, analysis, and provision of data to support the decision-making processes of a company (Seufert & Oehler, 2009). In the broadest sense, BI is defined as a generic term that encompasses different system components. These components generate and prepare information from operating systems and provide analysis and presentation functions (Chamoni & Gluchowski, 2004). These particular components exclude the extracting, transforming and loading processes (ETL) from the operating systems into a company’s centralized data base (see DWH definitions and proceeds in Section 2.1.1).

Thus, data and information have to be provided within the organization from a certain organizational unit with appropriate technologies. For example, McCarthy (2014) proposed an “Analytics Center of Excellence” as an organizational unit that spans the enterprise. This center is a team of data scientists, business analysts and domain experts from various business functions – marketing, finance or management accounting – that are brought together to facilitate a crosspollination of experiences and ideas to find solutions to a variety of business goals

(McCarthy, 2014). Biere (2011) described a new era of enterprise BI for achieving global competitive advantage and capabilities and using BI technologies and their potential to transform into real business value (Biere, 2011). This is an important point which will be illustrated in an appropriate conceptual framework later. “The key to thriving in a competitive marketplace is staying ahead of the competition. Making sound business decisions based on accurate and current information takes more than intuition” (Anandarajan et al., 2004, p. 18 f.). Therefore, the dissemination and availability of data and analytic platforms within an organization are highly significant.

Chamoni & Gluchowski (2004) identified a collective concept for the characterization of systems that have the capability to support top management in its planning and controlling activities based on internal and external market information and ratios (Chamoni & Gluchowski, 2004). BI can be seen as a cohesive and comprehensive architecture for integrating data or keys for decision-making, learning and corporate solutions for users. BI refers to applications and technologies used to gather, capture, access, consolidate and analyze information to improve the decision-making of different stakeholder groups. These systems capture important metrics about business operations as well as providing a mechanism for data gathering. At the various levels these information items may include documents, reports, dashboards, search, data bases or user knowledge. These technologies can help to coordinate projects, and schedules, discuss and develop ideas, review documents, share information, keep in touch with others, utilize key performance indicators (KPI) to evaluate operational status, and to generate reporting information on-demand (Moss, 2007; Ranjan, 2008; Saha, 2007).

Thus, BI systems combine operational data with analytical tools to present and illuminate complex and competitive information to planners or management. A main goal of these systems is to improve the timeliness and quality of inputs that impact the decision process for strategic capabilities. Hočevár & Jaklič (2010) outline several arguments that demonstrate that the use of BI systems can bring multiple benefits, for instance, via faster and easier access to information, savings in IT, greater customer satisfaction, and can generate or improve the

competitiveness of enterprises. Miller et al. (2006) viewed BI as a competitive differentiator. The practical use should be analyzed (Miller et al., 2006).

Kemper et al. (2004) created a BI framework that provides a scope of action for corporate BI development. It is conceived of as layered architecture and composed of three levels: data, logic, and presentation as shown in Figure 2.1.

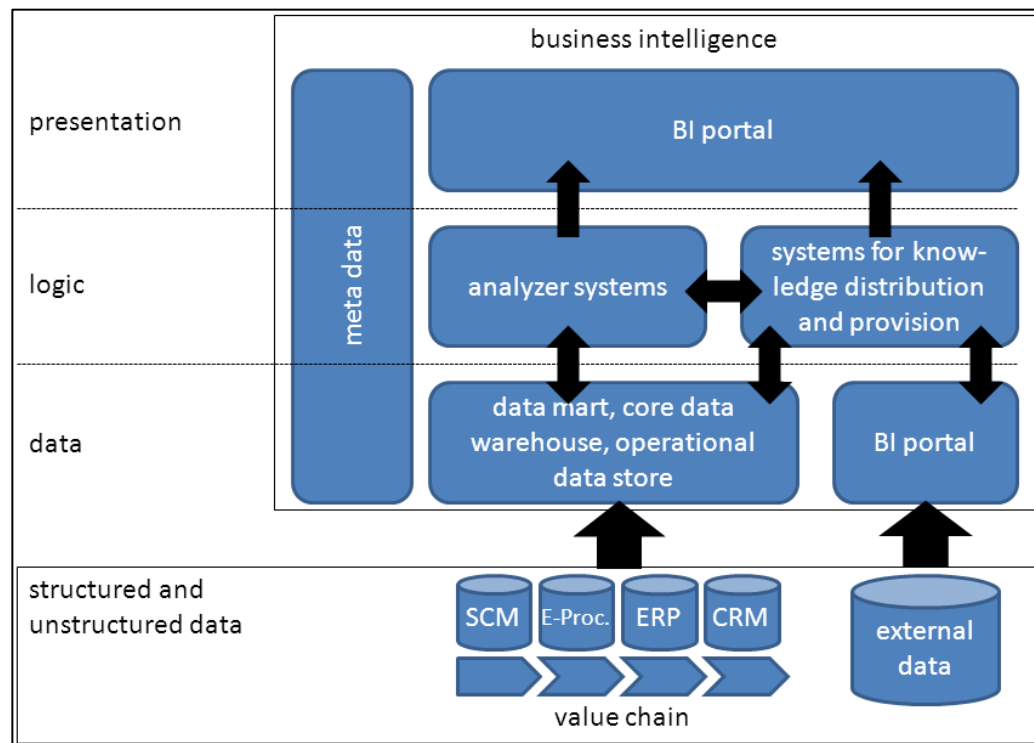


Figure 2.1: BI framework (Kemper et al., 2004)

As mentioned in the introduction, the DWH and its integrated data forms will be presented in Section 2.1.1 in detail. BI represents a way to rethink and reorient practices in the health insurance sector because of increasingly complex data emerging from operational systems such as SAP oscare. BI solutions support the optimization of methods and processes for systematic data analysis. Challenges and changes in the market can be managed and reacted to in a faster and more focused and efficient way, which will lead to strategic capabilities (McKinsey, 2010). In the healthcare industry in the United States, for instance, BI is also utilized in managing supply costs. This illustrates how of BI technologies and tools can be used for tracking purchasing costs more accurately and determining the root causes of cost increases (Bunata, 2013).

Measurements of qualitative values will become more significant to justify investments in information systems (Popovič, Turk & Jaklič, 2010). Biere (2011) stresses that it is critical for companies to transform BI potential into real business value. Biere (2011) emphasized the necessity for creating explicit BI strategies and infrastructures in order to maximize the value of information as well (Biere, 2011). Further consideration will be given to the objectives that the target audience finds as recommendable or optional. For business management, the business value of BI and its handling are important factors. However, for users and practitioners, the best practice solutions and opportunities are key points (Logica BI Framework, 2010).

Chamoni & Gluchowski (2004) suggested that it is significant for organizations to strive after mature BI systems in order to capture true benefits of BI investments. Health insurance companies face extensive challenges represented by ongoing and future revisions and potential legal reformation. Furthermore, complex optional tariffs, health programmes and contracts for customers result in a vast amount of data that has to be managed by the management accounting division for valid reporting. Therefore, it is vital for a health insurance company to have management tools that enable the company to adjust its strategy quickly and to communicate it in an appropriate way within the company (Morganski, 2001). BI can also be considered as a maturity model, with three related dimensions (technological, information quality, and business). With the use of a clustering or classification method, the relative strength of the three dimensions within the model at any one time can be identified. This provides pointers for further BI developments and better utilisation in commercial enterprises (Lukman et al., 2011).

Data volume continues to increase; however, top management and employees should be able to derive value from it (Burn & Loch, 2001). In addition to this conceptual work, two approaches to BI, the managerial and technological approach, will be considered in order to separate and illustrate different patterns as shown in Table 2.1. This supports the view that there are two related understandings of BI.

Table 2.1: Two approaches to BI

Managerial Approach	Technological Approach
Focus on the “process” of gathering data from internal and external sources and of analysing them in order to generate reliable information (Liataud, 2000; Schonberg et al., 2000; Kalakota and Robinson, 2001).	Focus on the “technological tools” that support the process (Kudyba and Hoptroff, 2001; Scoggins, 1999; Hackathorn, 1999; Dhar and Stein, 1996; Giovinazzo, 2002).

The managerial approach includes the processes of extraction, preparation, and allocation of relevant data material for different efficient reporting systems and the analysis of several data sources, which is a crucial task of employees responsible for dispositive data processing. BI can be viewed as the process of integrating internal and external data in order to generate information relevant to the decision-making process. The role of BI here is to create an informational environment and process in which operational data is gathered from transactional systems and external sources and can be analyzed to reveal the strategic business dimensions. A concept that emerges from this perspective is the intelligent company: one that uses BI to make faster and smarter decisions than its competitors (Liataud, 2000). Based on this concept, intelligence is defined by the ability to reduce a huge volume of data into knowledge through a process of filtering, analyzing and reporting information (Petrini & Pozzebon, 2003).

The technological approach defines BI as a set of tools that support the storage and analysis of data. The focus is not on the process itself, but in the technologies that allow the recording, recovering, intervention, and analysis of information. Classifications of BI technologies are presented in several works. Kudyba and Hoptroff (2001) interpreted BI as DWH, Scoggins (1999) illustrated data mining as a BI technique, and Giovinazzo (2002) depicted the integration of DWH and customer relationship management (CRM) applications.

The coherence of these two approaches consists of gaining, processing, and analyzing different forms and structures of data from internal or external sources. This thesis is supported by Becker’s (2010) assertion that medical and healthcare sectors must offer more applications and data other than simple documentation or

administrative functions as in the past. Therefore, IT and its relevant systems and products emerge as strategic success factors. Becker (2010) emphasized the necessity for IT managers to be members of business management in order to facilitate technical corporate communication. The conceptual design and procurement of new application systems are the main tasks of IT divisions. Furthermore, the technical support and administration of developed ratios through the management accounting division will be the BI and strategic mosaic for success (Becker, 2010). A first inventory of BI use will be presented in Figure 2.2 by Chamoni & Gluchowski (2004b) for different scopes of analysis and shows an overall result of BI degree of maturity. Further analyses and examinations in the context of the research questions and interviews will be conducted later in chapters 6 and 7.

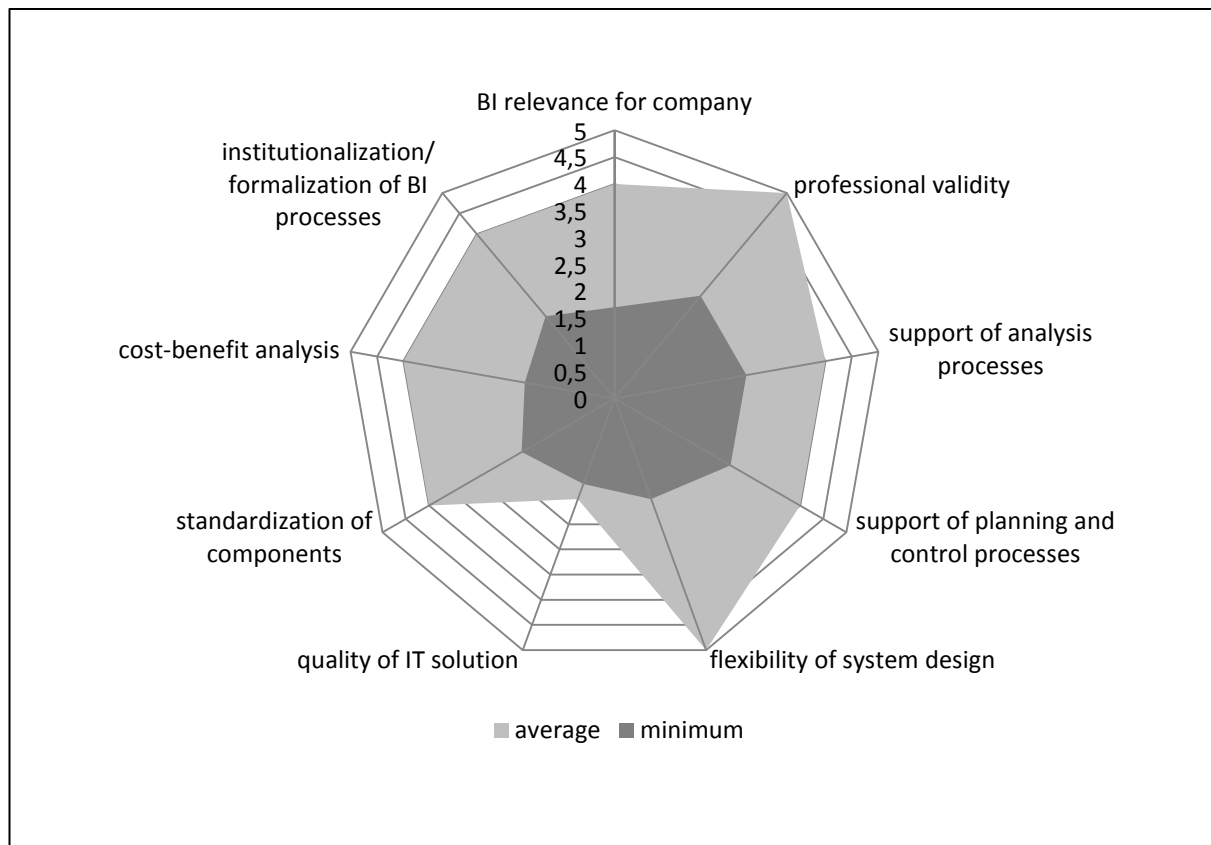


Figure 2.2: Result of BI degree of maturity (Chamoni & Gluchowski, 2004b)

Therefore, the BI concept is recognized by many experts as an approach to generate strategic capabilities (Umbach, 2006).



In summary, BI as cohesive whole architecture and management information system plays a crucial role in organizations by facilitating faster and easier access to information, particularly big data complexes, for an efficient decision-making process. Furthermore, benefits include increased customer satisfaction and improved competitiveness of organizations. One of the key purposes of BI is to improve support for business decisions and decision-makers. On the one hand, that means that investments in modern and efficient information technology should be made and, on the other hand, the information technology should help the company to achieve and generate strategic capabilities. BI benefits such as increasing revenue, improving customer satisfaction or increasing health care market share can be successfully linked to the long-term business strategy. The managerial and technological approach to BI showed that a company faces two challenges to implement and/ or improve BI applications. There are various definitions and meanings of BI that integrate manifold applications for different purposes meant to develop an information system. These concepts impact the integral components of BI, which will be classified using a conceptual framework as a starting point for the first research question. For instance, to provide relevant information, a DWH is the crucial requirement to extract, transform and load, and to harmonize data from various operational sources such as DMP, hospitals, or customer data. Thus, the DWH as centralized data base will be discussed in the next section.

### **2.1.1 BI infrastructure and data warehouse**

Dispositive data can be defined as data that support management in answering key strategic questions or that assists in guiding management to make relevant decisions. The storage of such data occurs in a DWH, a centralized data base. The idea is the storage of all strategic relevant information in a structured way. Therefore, the DWH system represents the infrastructure of a BI system because it provides important information for a company's management and the requirements for data recording (Chamoni & Gluchowski, 2006). Further, a regular data warehouse tool offers capabilities to secure the environment (Mantha, Manthey, Valeyko, and Yonce, 2014). The data with which BI tasks are performed

often comes from different sources – typically from multiple operational data bases across departments within the organization, as well as from external data vendors. Different sources contain data of varying quality, use inconsistent representations, codes and formats, which have to be reconciled. Thus the problems of integrating and standardizing data in preparation for BI tasks can be rather challenging. Efficient data loading is imperative for BI (Chaudhuri, Dayal, & Narasayya, 2011). Further, current cost accounting systems are sophisticated but decentralized across departments. Often, half of employees' time in analyzing a problem is taken up with just getting the relevant cost data together. With DWH this situation can be improved (Moore et al., 2012).

Simply put, operational systems provide a basis for data entry and the analytical DWH system allows for an organized and comprehensible output of huge amounts of data (Chamoni & Gluchowski, 2006). Gansor, Totok and Stock (2010) present the introduction of a DWH as the continuous development of the management supporting systems that is suitable for data management and integration. This DWH is a companywide system for data integration to control the company (Chamoni & Gluchowski, 2006). Therefore, a DWH is a “subject oriented, integrated, non-volatile, and time variant collection of data in support of management decisions” (Inmon, 1996, p. 31). Therefore, the most important task of a DWH is to structure and harmonize data from different operational systems. It is an integrated collection of data extracted from operational, historical, and external data bases; this data is then cleaned, transformed, and catalogued for retrieval and analysis (Simonovich, 2006) in order to provide BI for business decision-making.

Figure 2.3 puts the concepts of DWH and analytical processing into context. As the figure illustrates, a DWH stores data that has been extracted from various operational and external data bases of an organization and can include: AOKN's doctor data base, hospital or rehabilitation information, or external individual programmed data base for specific health care programs of an organization. It serves as a central source of the data that has been cleaned so they can be used by managers and other business professionals for analysis purposes.

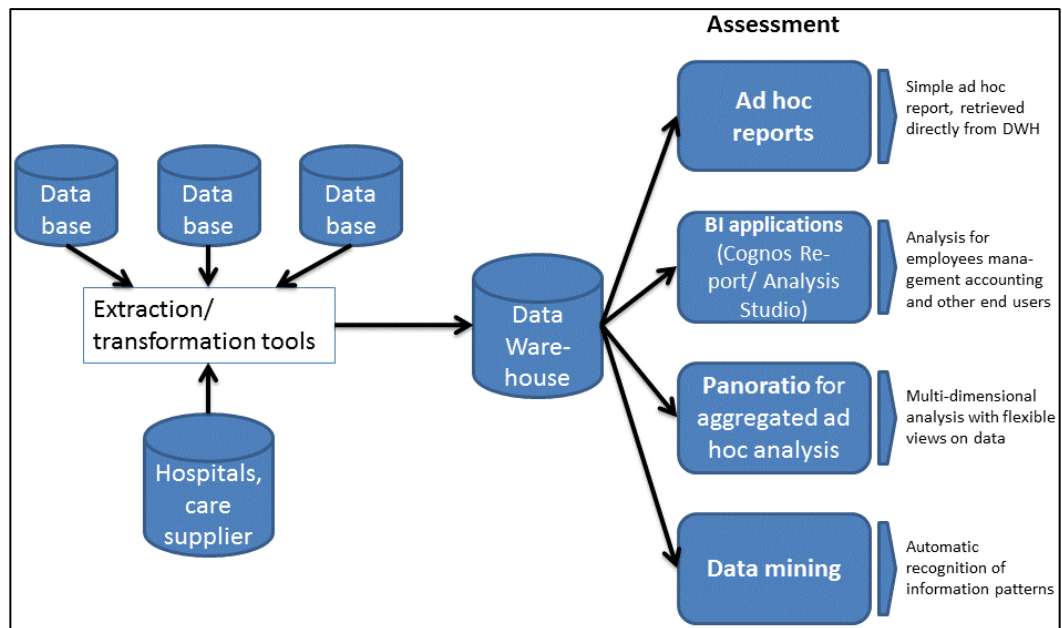


Figure 2.3: DWH structure (according to O'Brien, 2004)

As depicted in Figure 2.3, there are different ways for managing the contents of a DWH. Apart from ad-hoc access to a DWH, the use of analysis tools is popular. A multidimensional structure can be a data base model that uses multiple dimensions to represent data. Such a structure can be appropriate way for end users to develop individual analysis on a multidimensional model. These aggregated data structures can be seen as data cubes appropriate for BI end users. Online analytical processing draws on four commands to navigate through analysis:

- slice: extracting a view by omitting the data of irrelevant dimensions
- dice: turning the cube to change the two dimensions desired to be seen on screen. It is not possible to visualise three or more dimensions.
- drill down: looking into details, which corresponds to looking into a cube within a cube
- roll up: aggregating data

In contrast, a relational data base is a logical data structure in which all data elements within the data base are stored in the form of tables. Most commercial data bases today are relational structures or are based on these. In the relational model, all data elements within the data base are interpreted as a set of simple

tables. In information systems design and theory, as initiated at the enterprise level, the “Single Point of Truth” refers to the practice of structuring information models and associated schemata such that every data element is stored only once. That means that the element is positioned in no more than a single row of a single table. Organizations are looking for and need BI solutions that can deliver information based on a single view of the operational data, rather than multiple views and resultant inconsistent information (Logica BI Framework, 2010). The different navigation opportunities of different data models - aggregated cubes or relational in-depth data files - to drill down and up will be a crucial point for BI end users that have to be enhanced later.

On the other hand, data that resides outside of structured data bases or DWH is called unstructured data. This includes electronic documents, Powerpoint presentations, email, images, schedules or multimedia files. This data typically resides on individual computers or on file servers. In some cases, when the unstructured data is particularly important to the company and it needs to be searchable or requires further analysis, it might be organized into a structured data base and made available as part of a BI solution. There are a number of so-called content management systems that are designed to organize unstructured data in order to help control and manage content, versioning, and access rights (Brannon, 2010). However, these data structures can also be integrated into a DWH without implementing an additional content management system.

In summary, a DWH is a structured data base for collecting and revising relevant data from various sources. This instrument enables companies to further integrate data forms from more external sources to create benchmarks relative to competitors and/ or care providers. In this way, data structures can be harmonized for easier and better performance access and analysis of different constellations. It will also be necessary to implement standardized data dimensions and ratios and to document them appropriately for other users. With regard to target-oriented and data-oriented content, the DWH is determined through the core elements topic orientation, consolidation, constancy and time orientation (Gansor, Totok & Stock, 2010). The DWH is a basic requirement for a structured data generation from many operational sources with many different data structures and formats. In order

to avoid protracted data processing, the DWH functions as single point of truth and basic data orientation for BI end users. These infrastructural requirements constitute the BI framework for implementing further business and BI strategic objectives. Thus, a DWH is an important basis for the conceptual framework, which will be developed in Section 5.2.

Good architectures address the cost, benefits, and risks of every design decision. Good architectures draw upon existing skills and tools where they make sense and add new ones where needed (Lopez and D'Antoni, 2014). For most business users, the DWH's front room with its BI reports and analytic applications is the only visible layer of the DWH. It is possible to build BI applications without the benefit of a DWH, but this rarely happens. A well-built DWH adds value through the dimensional model and load processes, thus it makes no sense to replicate this effort to build a standalone BI application. Most successful BI applications are an integral part of the user-facing portion of the DWH (Kimball et al., 2010). These BI technologies and tools will be discussed in Section 2.1.3. Serving big data, with BI technologies and tools, and the data provision will also be an important topic that will be presented in the next Section.

### **2.1.2 Big data management and data provision**

A "call to action" has been made by articles regarding the need to respond to emerging market needs in BI including big data. Wixom et al. (2014) believe that information system leaders need to continuously refine BI curricula at universities to keep pace with the turbulent BI marketplace.

The promise of big data is both enticing and overwhelming for leaders in many different fields. For finance and information technology executives, who in recent years have achieved steady performance improvements in forecasting, business insight and predictive analytics, the challenge of harnessing big data's potential for revenue and profit enhancement is a significant challenge. Over the past ten years, business leaders have dealt with unprecedented change that has accelerated across the global economy, from entirely new business models to

growing shareholder activism, to powerful technology applications. In the current business environment, users have a wide range of tools at their disposal, and their experience drives the expectation that corporate workers, not only consumers, connect through intelligent Internet-based applications for communication, data, transactions and taking action. In the same way Internet search engines have proven they can find a good answer to sometimes cryptic queries – the data in systems hold the answers to questions yet unasked. The recent economic turmoil forced firms to recognize that, even in good economic conditions, growth does not preclude the need for tangible, accurate data and reliable, transparent analytic processes. The best place to start is not with the technologies of computing or analysis, but with the functional capabilities required to meet evolving business needs (Ohata & Kumar, 2012).

Big data is defined as large volumes of data from different data sources that can be identified and analyzed with the help of BI technologies and tools.

“Big data offers the opportunity to explore information that may not have been accessible or manageable before. This requires new thinking and innovation around capturing and working with large amounts of data. It also offers new opportunities to explore new areas that may not have been considered in the past. Working with business users to determine the high-value opportunities and how best they can be captured needs to be considered” (Boyer, Frank, Green, Harris & van de Vanter, 2012, p. 137).

Recently, the big data era has quietly descended on many communities, from governments and e-commerce to health organizations. With an overwhelming amount of web-based, mobile, and sensor-generated data arriving at a terabyte and even exabyte scale, new science, discovery, and insights can be obtained from the highly detailed, contextualized, and rich content of relevance to any business or organization (Chen, Chiang & Storey, 2012).

Much of the complexity of big data stems from the definition itself. Respondents in a study were asked to choose up to two descriptions about how their organizations view big data from the choices beneath in Figure 2.4. Choices have been

abbreviated, and selections have been normalized to equal 100 percent (total respondents were 1,144). Rather than any single characteristic clearly dominating among the choices, respondents were divided in their views on whether big data is best described by today's greater volume of data, the new types of data and analysis or the emerging requirements for more real-time information analysis (Schroeck et al., 2012; see Figure 2.4).

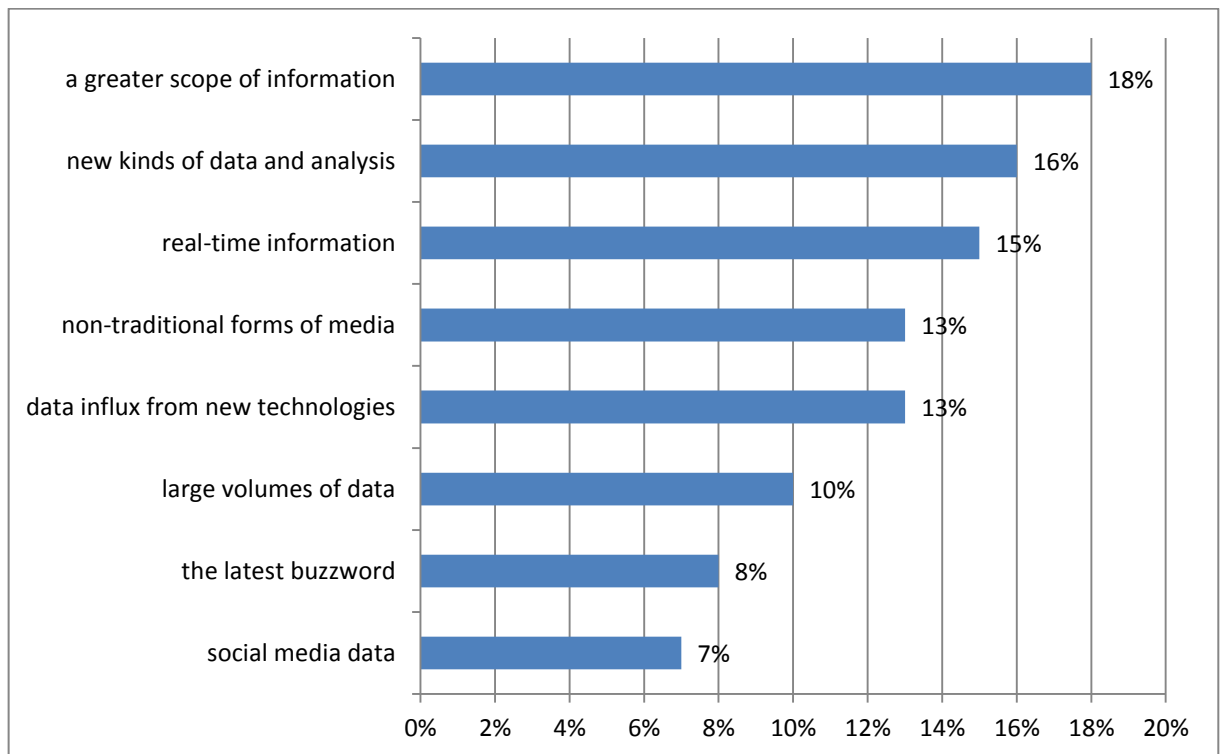


Figure 2.4: Defining big data (Schroeck et al., 2012, p. 3)

These results align with a useful way of characterizing three dimensions of big data commonly termed - “the three Vs” and representative of volume, variety, and velocity. And while they cover the key attributes of big data itself, organizations need to consider an important fourth dimension: veracity. Inclusion of veracity as the fourth big data attribute emphasizes the importance of addressing and managing the uncertainty inherent within some types of data (see Figure 2.5). The convergence of these four dimensions helps both to define and distinguish big data.

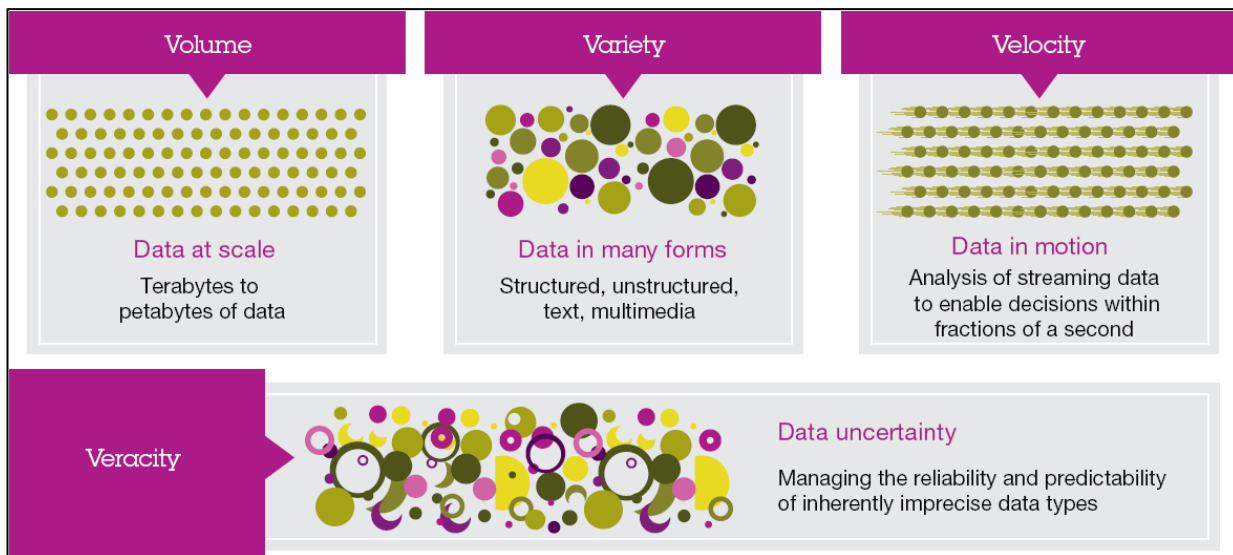


Figure 2.5: Big data in four dimensions (Schroeck et al., 2012, p. 4)

Similar to analytics, big data should generate findings and insights from data and therefore provide a framework for business advantages. Big data refers to a large variety of data sources and forms, such as messages, actualizations or pictures of social networks or benefits, measurements of sensors, GPS signals from mobile phones, and more. The vast quantity of information emanating from social media is as recent as the networks themselves; Facebook started in 2004 and Twitter in 2006. The same can be said for smartphones and other mobile phones that provide enormous data streams from people, activities and positions. These data are often unstructured, i.e. not structured or classified in a data base, and therefore are unmanageable. However, much “treasure data and information” are still waiting to get discovered (McAfee & Brynjolfsson, 2012). Cortez & Santos (2013) present a paper of Oliveira & Gama (2013) that introduces a new approach for analyzing dynamic temporal changes in social networks. In particular, three-order tensors are used to project the trajectories of social entities into a two-dimensional space, which helps in understanding latent properties of the dynamic social network. Although the approach was tested in friendship networks among university freshmen, there are also potential benefits in business applications, such as prediction or marketing.

A related area of interest for future BI investigation is the views and opinions posted by AOKN customers on AOKN’s Facebook page. Blogs provide



considerable potential for BI in collecting blog data, evaluating blog content, and analyzing the underlying social networks. Blogs are dynamic and are frequently updated. Contents and linkages can be added or removed any time. Bloggers have their own styles of linking to each other. These linkages, which represent the interactions between bloggers, are different from traditional hyperlinks between Web documents. Consequently, automated techniques are needed to collect and analyze the sheer volume of blog data in order to have a good understanding and make effective use of the underlying information and structure (Chau and Xu, 2012).

Thus, (big) data have to be transferred to the appropriate information receiver within the company. In an ideal world, the respective organizational embedding provides a center or department of “excellence” that is composed of business, information-technology, and analytics leaders. The center requires someone to work with business units to identify and articulate problems, as well as someone who can work with modelers to find the right approaches. Today, a few insurers have hired people with titles such as chief decision scientist and chief data officer to head new departments of digitally savvy experts. These roles will become more common, but finding individuals with the desired combination of technical skills and business-leadership experience will not be easy. By 2018, global demand for technical and managerial talent will exceed supply by 50 to 60 percent (Clarke & Libarikian, 2014).

To outline the data provision process at this point, the management accounting department can be seen as the centralized department for the BI system development and enhancement. It is also responsible for preparing big data and providing it to the appropriate recipient within the company. Management accounting is defined as a sub-system of management and leadership that coordinates enterprise planning, controlling, and information provision within an organization. Therefore, the coordination of the whole organization can support a specific goal. Management accounting supports the decision-making processes of top management and business management (Horváth, 1998). In addition to the development and publication of reports, the management process could be improved by adding the preparation and control of relevant information.

Advances in information provision have led organizations to attempt to develop IT strategies that are interrelated with their business strategies and together support corporate missions (Rogerson & Fidler, 1994). The delegation of overall goals and objectives to all levels of business management is ideally organized to achieve respective sub-goals. However, the resources necessary for this process are limited, employees for example. The subsidiary units must develop a plan that mandates how and when to achieve the goals. Goals are not automatically achieved when the required activities are completed. During the business processes, different influences or “disturbance variables” can emerge. Therefore, business management must be prepared to counteract those influences and take responsibility for decisions and activities in order to guarantee goal achievements (Stahl, 2009). This information process depends on an organizational implementation of a controlling circle. Figure 2.6 illustrates this process.

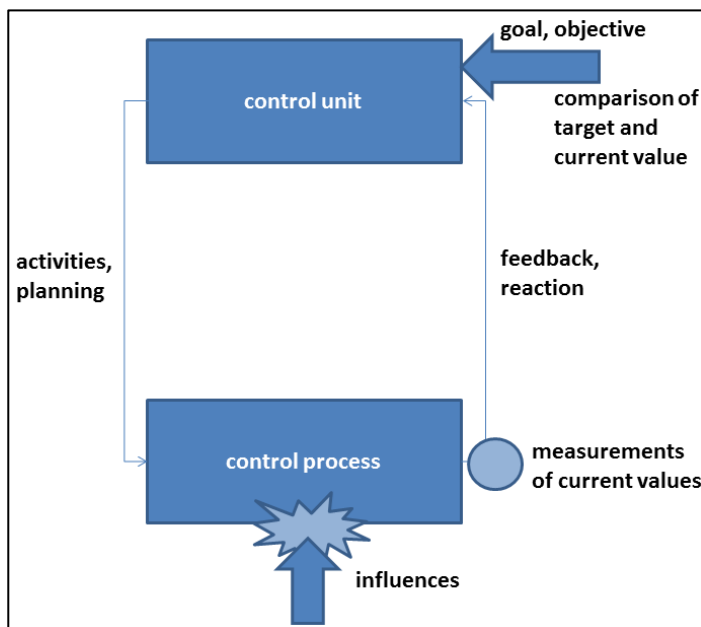


Figure 2.6: Structure and terms of a controlling circle (according to Stahl, 2009)

To fully comprehend a management accounting system, an in-depth understanding of the controlling circle and its information process is fundamental. Once a control unit receives an objective, this objective becomes relevant to the control process. The first step of the process is to develop activities designed to achieve the objective. Then a continuous examination and review of the degree of

achievement is conducted based on expected variation caused by different influences. This can be completed using the current value that will be sent as confirmation to the control unit. The control unit compares the target with the current value, determines the divergence and develops further correcting activities for objective achievement. Thus, management accounting is an implemented controlling circle (Stahl, 2009). The need and explicit role of management accounting, especially within AOKN, will be discussed and clarified on the basis of the conceptual framework.

### **2.1.3 Strategic BI technologies and tools**

BI applications are the delivery vehicles of BI - the reports and analyses that provide usable information to the business. BI applications include a broad spectrum of reports and analyses, ranging from simple fixed-format reports to sophisticated analytics with complex embedded algorithms and domain expertise. It is helpful to divide this spectrum based on the level of sophistication (Kimball et al., 2010). Therefore, BI technologies and tools can be classified into different analytic purposes and objectives.

BI technologies and tools have attracted significant interest from senior executives and consultants for their ability to exploit organizational data and provide operational and strategic benefits through improved management control systems. A large body of literature indicates that organizations have largely failed to use their BI investments effectively to exploit this wealth of data. As a result, BI has too often failed to support organizations' managerial decision-making at strategic levels and, thus, failed to enhance business value. However, BI assimilation plays a significant role in translating organizational resources into capabilities that enhance the business value of BI (Elbashir et al., 2013).

Organizations are constantly pressured to understand and react quickly to information or emerging trends. Information systems, business processes and a comprehensive data landscape can be important components here. As BI applications are installed in the company, capability hinges on improvements to

business processes. With capable and efficient BI solutions, all levels of an organization can receive or even produce the information necessary to determine how, when and where better and more timely decisions can be made (Popovič, Turk & Jaklič, 2010).

Today, BI technologies and tools play an important role in the creation of current information for operational and strategic business decision-making. Although business decisions are made at different organizational levels, in daily operations they are based upon an organization's policies and rules. BI, on the other hand, support specifically decision processes at the analytical level and has a high potential of differentiation from competitors and thus capability improvement with IT (Popovič, Turk and Jaklič, 2010).

The three general types of information systems that are developed and commonly used are financial, operational, and strategic systems. It is typical for well-directed operational systems to become the strategic systems. Until recently, the relationship between information system functions and corporate strategy was of little interest to the top management of organizations, which resulted in problems related to achieving strategies. Modern organizations are increasingly seen as knowledge-based enterprises in which proactive knowledge management is important for competitiveness (Holsapple et al., 2000).

Strategic BI technologies and tools could be characterized by their ability to significantly change the manner in which business is conducted by providing a firm with a strategic advantage (Turban et al., 2006). Strategic BI technologies are perceived as instruments that support or change the enterprise's strategy (Wiseman, 1985). Thus, the technologies represent a system that helps companies change their business strategy or structure. BI technologies are typically utilized to streamline and increase the reaction time to environmental changes and to assist the organization in achieving a capability. Key features of the strategic BI technologies are decision support systems, enterprise resource planning, data base systems, and real-time information systems (Hemmatfar, Salehi & Bayat, 2010). In the following sub-sections, the differentiation will be focused on strategy and operational BI technologies and tools.

#### **2.1.4 Planning tools**

Tools for enterprise planning can be classified as strategic BI tools. Eckerson (2005) understands BI as information system to provide data mining, planning, and modelling tools. BI includes a set of concepts, methods, and processes designed to improve business decisions, using information from multiple sources and applying past experience to develop an exact understanding of business dynamics (Maria, 2005). It integrates the analysis of data with decision-analysis tools to provide the right information to the right persons throughout the organization, with the purpose of improving strategic decisions.

The decision-making process level can therefore be seen at a strategic level. The respective implementation in organizations is defined as critical success factors that define the prerequisites to reach the goals. The strategy states how the goals should be reached. The strategic level of BI usage contains the business focus of developing long-term business goals. Primary users are executives or business analysts. The time frame is months to years and historical and projected data will be analyzed (Logica, 2010).

Several BI tools can be helpful for streamlining the corporate planning, budgeting, forecasting, reporting, and consolidation processes. Cognos TM1 can be considered as a planning tool as well as the SAP business planning and reporting tools and additional products.

#### **2.1.5 Predictive tools and analytics**

Predictive analytics will play an increasingly critical role in the business world by enabling management to forecast financial developments or consolidation activities (Siegel, 2010). The underlying assumption for implementing predictive analytics is that a company will gain a competitive advantage if it can anticipate the future better. If the company understands their customers better, it can anticipate their needs and increase its benefits. By analyzing the data, predictive

analytics can provide actionable knowledge in a timely manner. Maximizing the business value of predictive analytics requires using the predictive model's insights immediately at the point of contact with the external customer or internal decision maker; and then urging them to take action (Koch, 2015).

Additionally, these analytics are rapidly becoming an important strategic tool for companies in building their talent management pipeline. Leading companies are using predictive analytics to understand and forecast where talent will be plentiful and scarce, how talent will move between roles, and even who will leave and when (Harvard Business Review, Workforce Analytics of the Future: Using Predictive Analytics to Forecast Talent Needs, email, 22 October 2014)

Predictive analytics has become an increasingly significant core enterprise practice that is necessary to sustain capability and competitive advantage (Siegel, 2010). This technology enables an entirely new phase of enterprise evolution by applying organizational learning, which empowers the business to grow by deploying a unique form of data-driven risk management across multiple fronts (Siegel, 2010). The value proposition of predictive analytics is to improve decision-making and operations within a company using applied organizational learning. This learning process provides a unique capability and reveals competitor weaknesses. Survey results show that the primary reason that organizations adopt predictive analytics is to thrive in highly competitive environments (White, 2010). Predictive analytics delivers powerful, unique, qualitative differentiation by providing a company a proprietary source of BI that assists with competing for sales and retaining current customers. A predictive model is generated from routine data taps into experience that the company is privy to, since it is unique to the company's prospect list and to the product and marketing message to which their customers respond - both positively and negatively. Therefore, the model's intelligence and insights extend beyond common knowledge. It flags the most promising prospects and organizes them into a customized, and proprietary contact list. In contrast to broad trends that may be measured on a macro scale, a predictive model yields more refined buying patterns and trends in the form of customer characteristics. The model is trained to extract data that includes sales and/or the lack of sales to customers that have been identified as being aware of

the products and marketing of the company of origin and its competitors. Therefore, the process can effectively distinguish the customers who choose the company of origin and those who choose a competitor. In this way, the organization can identify weakness in their competitors, which is revealed by the behavior trends encoded in the data. The enterprise can then leverage this knowledge and act, upon these opportunities by implementing precisely targeted marketing and sales activities (Siegel, 2010).

However, past and present insight and trend information are insufficient to competition in business. Business organizations need to know more about the future, and in particular, about future trends, patterns, and customer behaviour in order to better understand the market. To meet this demand, many BI vendors have developed predictive analytics that forecast future trends in customer behaviour, buying patterns, and track who is entering and leaving the market and why (Zaman, 2007). Prospective customer needs and characteristics have to be identified in order to provide appropriate products and to control those products, which contributes to generating efficient business processes. This will be an important task for organizations in the future.

Predictive analytics are used to determine the probable future outcome of an event or the likelihood of the occurrence of a situation. It is the branch of data mining concerned with the prediction of future probabilities and trends. Predictive analytics can be used to automatically analyze large amounts of data with different variables. It includes clustering, decision trees, market basket analysis, regression modeling, neural nets, genetic algorithms, text mining, hypothesis testing, decision analytics, and others. The core element of predictive analytics is the predictor, a variable that can be measured for an individual or entity to predict future behavior. For instance, a credit card company could consider age, income, credit history, and other demographics as predictors to determine an applicant's risk factor when issuing a credit card. Multiple predictors are combined into a predictive model that are, subjected to analysis, and can then be used to forecast future probabilities with an acceptable level of reliability. In predictive modeling, data is collected, a statistical model is formulated, predictions are made, and the model is validated or revised as additional data become available. Predictive analytics combine

business knowledge and statistical analytical techniques to apply with business data to achieve insights. These insights help organizations understand how people behave as customers, buyers, sellers, or distributors. Multiple related predictive models can produce valuable insights that aid in making strategic company decisions, such as where to explore new markets, acquisitions, and retentions. In addition, those models can identify areas that need to be improved concerning security and fraud detection. Predictive analytics indicates what to do, how and when to do it, and explains what-if scenarios (Zaman, 2007).

An additional and significant component of a BI system is data mining. Each level of the organization utilizes different data mining processes to analyze data and report information that is most relevant to that specific level (Kumar et al., 2013). The future of data mining lies in predictive analytics. Data mining is the practice of automatically searching large stores of data for patterns, and is also known as knowledge-discovery in data bases. In order to accomplish this, data mining uses computational techniques from statistics and pattern recognition. In addition, data extraction is the process of pulling data from one data source and loading them into a targeted data base. For instance, it pulls data from source or legacy system and loads that data into a standard data base or DWH. A predictive analytical model is built using data mining tools and techniques. Data mining tools extract data by accessing massive data bases; the data is then processed using advanced algorithms to find hidden patterns and predictive information. Although a clear connection exists between statistics and data mining, the methodologies used in data mining have originated in several different fields. Data mining resides at the shared borders of several domains, including data base management, artificial intelligence, machine learning, pattern recognition, and data visualization. Common data mining techniques include artificial neural networks, decision trees, genetic algorithms, nearest neighbor method, and rule induction. Some vendors have been in the predictive analytical tools sector for decades, others have recently emerged. The following section briefly discusses the capabilities of key vendors in predictive analytics.

Statistical Analysis Systems (SAS) is one of the leaders in predictive analytics. Although SAS has only recently been involved with BI, the company began



creating tools for statistical analysis since the 1980's, which has helped it to move into data mining and creating predictive analytic tools. This application streamlines the entire data mining process from data access to model deployment by supporting all necessary tasks within a single, integrated solution. Delivered as a distributed client-server system, it is well suited for data mining in large organizations. SAS provides financial, forecasting, and statistical analysis tools that are critical for problem-solving and competitive competency. This application is geared towards power users and can be difficult to learn. SAS lags behind competitors like IBM Cognos or SAP Business Objects in terms of real-time analytics, and building dashboards. However, its niche product in data mining and predictive analytics has made it stand out of the crowd (Zaman, 2007).

Statistical Package for the Social Sciences (SPSS) is another leader in providing predictive analytics software and solutions. Today, SPSS is recognized more as a predictive analytics software developer than a statistical analysis software developer. SPSS has played a thought-leadership role in the emergence of predictive analytics, showcasing predictive analytics as an important and distinct segment within the broader business intelligence software sector. SPSS performs almost all general statistical analyses: regression, logistic regression, survival analysis, analysis of variance, factor analysis, and multivariate analysis. The company now has a full set of data mining and predictive analytical tools. SPSS is a leader in the area of graphics, but lacks in cutting edge statistical procedures, sound methods, and survey methods (Zaman, 2007).

The propensity score matching (PSM) tool is an internal AOK solution, developed by the AOK Systems to conduct a propensity score matching. This is a comparison group building to compare and evaluate different cost groups. "A-LOH-A" is a further internal AOK solution designed to identify and calculate likelihoods of hospitalization for patients, and is based on past diagnoses and ambulant or stationary benefits.

### 2.1.6 Explorative analytics

Explorative analytics makes the business more “intelligent”, flexible and variable to support a variety of strategic objectives, changes in business processes, reduction of costs, and even acquiring competitive intelligence (Hemmatfar, Salehi, & Bayat, 2010).

For efficient data usage, the use of new analytical and optimization methods is necessary to enable BI end users to understand data and work with them. These methods can be summarized as business analytics. It enables companies to answer questions like “what happens when ...?” and “what ... if?”. These methods can present great potential benefits for companies (Weber & Fohrholz, 2013). End users get an adequate analysis platform with relevant basis ratios and have the additional opportunity to perform analyses at a detailed level.

Analytics work requires business domain knowledge, the ability to work with data, and modeling skills. The importance of specific skills and the manner in which they are manifested depend not only on the nature of the user, but the analytics as well. It is useful to distinguish among business users, business analysts, and data scientists (Watson, 2012).

Explorative analytic applications are more complex than standard reports, which will be discussed as standard tools in Section 2.1.8. Analytic applications center on a specific business process and encapsulate domain expertise about how to analyze and interpret that process. They may include complex algorithms or data mining models. Some analytic applications give BI users the advanced capability to feed changes back into the transaction systems based on insights gained using the application. Common examples of analytic applications include budgeting and forecasting systems, promotion effectiveness, category management applications, fraud detection, and web path analysis (Kimball et al., 2010).

Cognos “Analysis Studio” can be used for ad-hoc or explorative analysis as an analytic-oriented BI understanding. It is an application for the individual analysis of aggregated data structures (cubes). Great amounts of data can be analyzed

through ranking, complex filters and individual subsets of data can be developed. Analysis Studio is used primarily by business analysts. In addition, Cognos “Workspace” is a web-based application that allows users to create interactive workspaces and illustrations from Cognos contents, such as standard reports or single pages, and external data sources data that provide detailed information for reliable decisions.

Further, dashboards and portlets can be developed as data cockpit and ad-hoc navigation tools for the company. Dashboards are a web page that collates information about the business, for instance developments and trends of customers, costs or the drill to the standard report file folders. In management information systems, a dashboard is a real-time user interface that shows a graphic presentation of the current status and historical trends of an organization’s key performance indicators to enable and drive strategic relevant decisions. The main challenge is to determine the appropriate BI tool to use to meet any specific reporting need or inquiries (Kelly, 2010). The dashboarding capabilities enable end users to use the needed information from their perspective in their desired format. Executives are able to get an at-a-glance view of how their organization is performing, then quickly drill down to an appropriate level of detail that helps them make fast and effective decisions. Business users are able to assemble information into a view that makes sense to them and have the flexibility to conduct deeper analyses to guide their decisions. Thus, the dashboard has emerged as a business framework to manage and share information in context. This framework gives companies a factual and timely window into performance and helps to identify anomalies that could become significant business issues (IBM, 2010b). In this way, every user can access the same data base with the same data status to focus on discussions with regard to content.

Panoratio is another explorative tool that transforms customer big data into capability. Thus, users can handle large volumes and varieties of data and reconcile all of them efficiently. Panoratio informs perspective and shows context about organizational interdependencies. Thus, it allows BI end users to handle large volumes and variety of structured data in order to perform on demand,

complex, in-memory analysis on multiple large data sets, so called “pdi” (Panoratio, 2014).

Explorative tools provide individual analytic options for end users apart from the standard print reporting. In the future, these tools will become a significant part of employees’ day-to-day business practice in an increasing number of organizations.

### **2.1.7 Operational BI technologies and tools**

The term “operational BI” does not clearly distinguish between the realm of BI and that of operational systems. Several examples given by vendors speak to insufficient operational support, rather than need for new BI applications. If a mature IT landscape is already in place, as in the manufacturing industry, then the need for better operational decision support must be substantiated (Kemper, Baars & Lasi, 2013).

Operational tools improve the way that internal business processes are executed so that an organization performs the same activities better than its competitors (Porter, 1996). Such improvements increase employee and customer satisfaction, quality, productivity, and decrease time to market. Improved decision-making and management activities also contribute to improved efficiency. As previously mentioned, strategic BI tools can also be used in operational business processes. Operational tools can also be integrated into the strategy development process.

### **2.1.8 Standard tools**

Standard tools are used for a valid performance management and allow organizations to track, understand, and manage vital business information. End users should be able to perform a number of analyses or just be able to analyze standardized reports to get a global understanding of the managerial context. BI standard tools are assuming an increasingly strategic role as more organizations look for ways to tap into the valuable data stored in their operational systems

(Elliott, 2004). Standard reports usually have a fixed format, are parameter driven, and in their simplest form, are pre-run. These reports provide a core set of information about what is going on in a particular business area. Examples from different industries include year-to-date sales versus forecast by sales representatives, monthly churn rate by service plan, and direct mail response rates by promotion and by product (Kimball et al., 2010).

BI standard tools can be used to support the operational business when an organization develops a standardized reporting or management information system. The operational level of BI usage includes the business focus of managing and monitoring daily business operations. The primary users are front-line employees and operational managers. Real-time, low-latency, and historical data are analyzed (Logica, 2010).

For standardized reports, Cognos “Report Studio” functions as tool for developing reports in a fixed format for top management and different business divisions. It is used to create and manage more advanced reports that are frequently standardized, executed periodically, and then distributed to people in various departments of an organization. Reports can engage dashboards with charts, maps, and other graphical elements with full drill-through capabilities. End users can execute reports with different functions if they are developed. For instance, a user can execute a report in an aggregate level and then drill down to further individual data files for more information.

Microsoft technologies and tools are classic applications designed to quickly develop report views. Today, those technologies continue to represent a viable option for reporting because the majority of employees appreciate the flexibility of the platform. Furthermore, Microsoft also offers a variety of self-service BI products. The Microsoft server covers the full range of reporting ranging from highly interactive and explorative self-service reporting for end users to powerful operational report authoring and rendering environments for IT professionals and developers. Microsoft also provides additional deployment agility by extending reporting to a cloud solution (Microsoft, 2014).

Furthermore, the 2013 BI Survey shows that IBM Cognos products are quite different technologically and the user base is also different. This disparity may change as integration becomes more widespread. In the 2013 survey, 96 participants were users of IBM Cognos BI. Figure 2.7 shows the user and use case demographics with the IBM BI product usage (BARC, 2014).

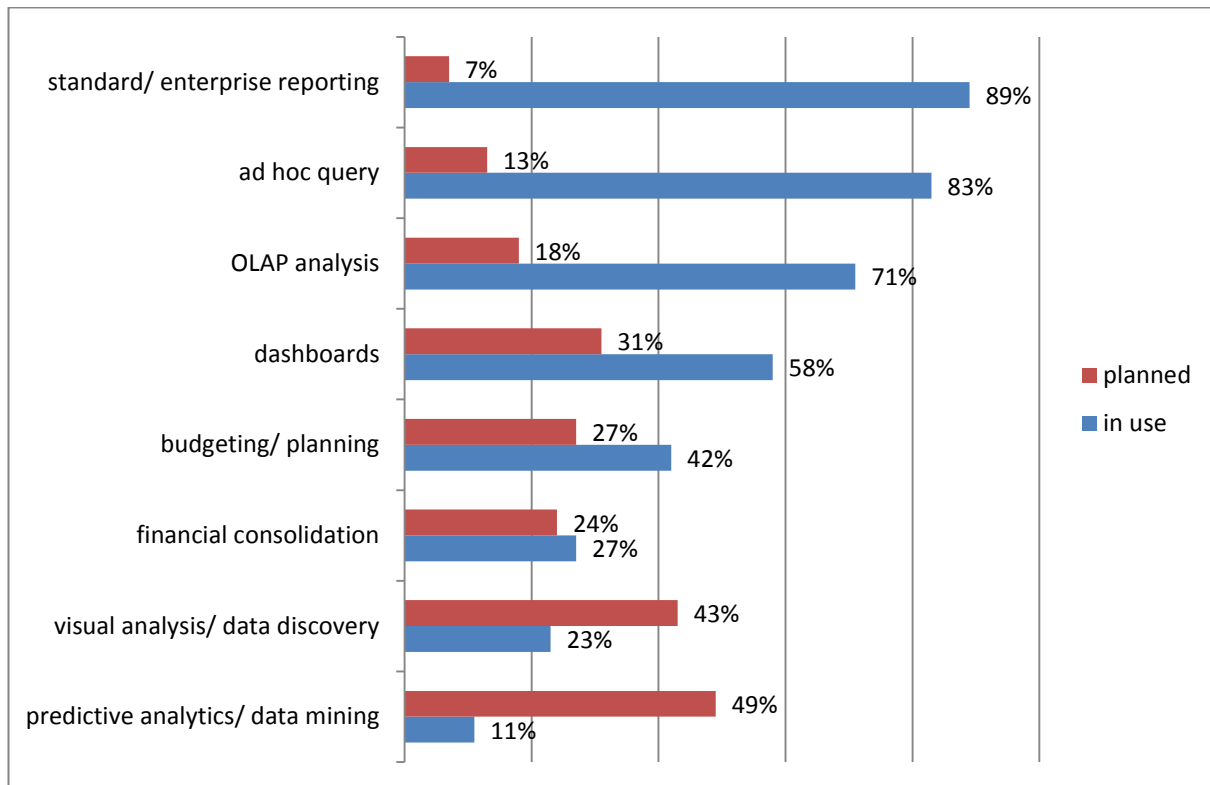


Figure 2.7: User and use case demographics - IBM BI product usage

Bolte (2008) stated that listing all available controlling or reporting tools would be an impossible task. The management accounting department uses instruments and tools to get specific solutions. A list of instruments can never be complete because the instruments that are used are situation or constellation specific and come from different disciplines (Bolte, 2008). A continuous examination should be conducted of the BI market and customer and corporate needs. Section 2.2 provides an in-depth examination of the terms strategy and strategic capability and a critical assessment of those terms as relevant to the topic of this thesis. That discussion will provide an understanding of the benefits of BI that include information provision, assistance with decision-making, and strategic capabilities.

## 2.2 Strategy development process and strategic capability

This chapter clarifies the terms strategy, strategic aspects of IT, and strategic capability. It is reasonable to discuss the strategy development process as discovered in the literature review to present the role that BI tools can play in this process.

Strategy theory is concerned with the explanations of firm's performance in a competitive environment (Porter, 1991). Strategy or strategic thinking, as used in today's business world, had its beginning in the United States during World War II when resources were scarce in a wartime economy. During that period, the military introduced quantitative analysis and formal strategic planning. The success of that approach encouraged the use of formal strategic thinking to guide management decisions. Drucker (1974, in Simonovich, 2008) argued that "management is not just passive, adaptive behaviour; it means taking action to make the desired results come to pass" (p. 37). This argument became the basic logic for business strategy. By consciously using formal planning, a company could exert some positive control over market forces (Simonovich, 2008).

A strategy is the pattern or plan that integrates an organization's major goals, policies and action sequences into a cohesive whole. A well-formulated strategy helps to assemble and allocate an organization's resources into a unique and viable posture based upon its relative internal competencies and shortcomings, anticipated changes in the environment, and potential moves made by competitors (Quinn, 1980).

Strategy formulation requires two distinct parts of examination: an external analysis aimed at performing an environmental scan (Cristensen and Smith, 1951), and an internal analysis assessing a firm's competency for competing (Smith, 1951). External and internal analyses continue to represent the major components of contemporary strategy development. This can be summarized as: strengths, weaknesses, opportunities and threats – SWOT – as presented in Figure 2.8.

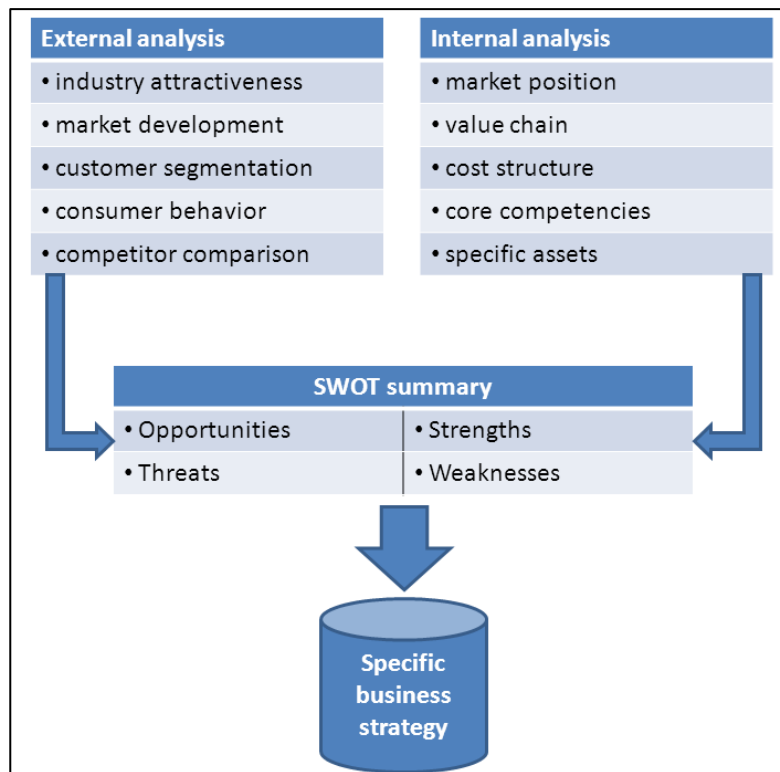


Figure 2.8: General approach to strategy formulation (according to Andrews, 1987)

The major building blocks of the external analysis are industry appeal and the analysis of customers and competitors:

- Industry attractiveness: as shown in many studies, industries differ greatly in their profitability (McGahan, 1992). In his work, Porter found forces, which can be analyzed in turn to determine an industry's attractiveness: the bargaining power of suppliers and customers, the threat from substitutes, competitive rivalry, and barriers to entry (Porter, 1980). For the past two decades, Porter's work has dominated the field of competitive strategy. Generally recognized as father of the field of modern strategy Porter ranks consistently as the world's most influential thinker on management and competitiveness.
- Analysis of customers and competitors: Ohmae (1980) summarized the important categories of analysis as: customers, competitors, and corporation. The examination of customers and competitors is almost identical to that of the tools used in the area of marketing (e.g.



segmentation, consumer behaviour etc.). Lastly, the company is part of the internal analysis.

The internal analysis focuses on the value of internal activities and business processes. Once a strategic analysis is performed, the overall current state of the firm and its competitive context can be summarized by matching the external threats and opportunities with the internal strengths and weaknesses in order to derive options for strategic direction and actions. The content of the resultant recommendations is specific to a company for the particular situation considered. Some frameworks exist to shape decisions such as growth options (Ansoff, 1965) and the BCG matrix for investment strategies in a multi-business context (Stalk & Hout, 1990). According to the concept of generic strategies, there are at least two contrasting recommendations for achieving competitive advantage and capability. Cost advantage is defined as the approach of offering a product similar to that of a competitor at a lower price. The differentiation advantage can be defined as the method of offering a unique product at a premium price point (Hall, 1980). Furthermore, studies of market leaders during the 1990s have revealed three strategies or value disciplines (Treacy and Wiersema, 1995) as depicted in Figure 2.10. Tradeoffs are essential to strategy and represent a firm's choices of those actions that are acceptable and those that are unacceptable for achieving success. From a market perspective, a company must focus on choosing its customers and disregard those customers that exist outside of that parameter. Once strategic choices are made, all relevant aspects of business design and activities should be adjusted fit within the strategy (Porter, 1996). Whether it is based on Porter or Treacy and Wiersema, a generic strategy reflects a conscious and long-term choice of how to compete in a given environment. It is not possible to be or to offer everything to everybody.

The definition of the term 'strategy', and its support of BI applications, play a crucial role in this thesis. Strategy is the creation of a unique and valuable position that involves a variety of activities (Porter, 1996). However, choosing and implementing a strategy can create difficulties. The risks to strategy are typically perceived as coming from external forces because of changes in technology or the behaviour of competitors. Although external changes can be the problem,

frequently the greater threat to strategy comes from within an organization. A sound strategy can be undermined by a misguided view of competition, by organizational failures, and particularly by the desire to grow (Porter, 1996). Typically, when a company fails to execute its strategy, a manager's first thought is to restructure. But research shows that the fundamentals of effective execution are based on the appropriate delegation of decision-making and ensuring that information is streamed to the appropriate channels. When companies successfully implement those facets, then the correct structure and models often become obvious (Neilson, Martin, & Powers, 2008).

The use of data analytics is growing in the healthcare field and in related finance operations. The using BI for competitive advantage is strategic for the execution of business strategy (Giniat, 2011). The strategic integration and use of BI systems can play a crucial role within companies. BI systems use analytics and performance management concepts to leverage enterprise system data bases. Elbashir et al. (2011) indicate that organizational absorptive capacity (i.e., the ability to gather, absorb, and strategically leverage new external information) is critical to establishing appropriate technology infrastructure and to assimilating BI systems for organizational benefit. Further, findings show that while top management plays a significant role in effective deployment of BI systems, their impact is indirect and a function of operational managers' absorptive capacity. In particular, this indirect effect suggests that leveraging BI systems is driven from the bottom up as opposed to the top down. This differentiates BI from other isolated strategic innovations that have traditionally been viewed as top management driven (Elbashir et al., 2011).

In order to assess whether BI technologies and tools can be used effectively and integrated into the strategy development process as addressed by the second research question, the theory of the process needs to be discussed in the following. Generally, four steps and methods can be defined to generate a strategy development process as shown in Figure 2.9 (Fueglistaller, Frey, Halter & Hartl, 2005).

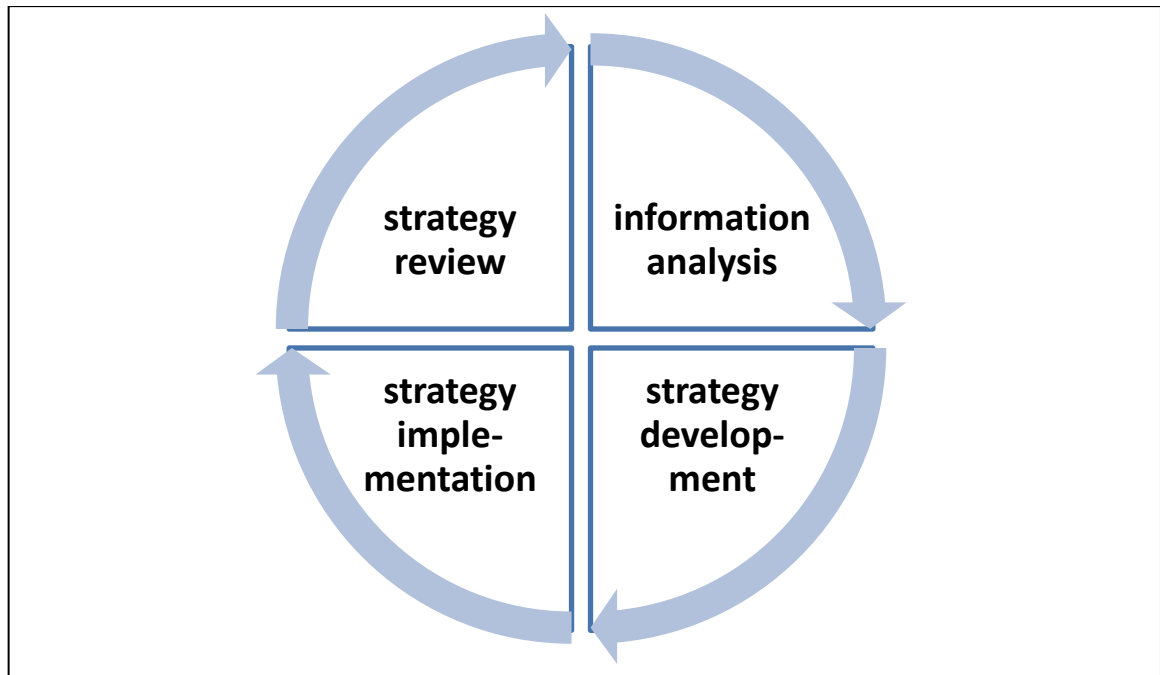


Figure 2.9: Strategy development process (in four steps)

These points can be seen as recommendations because of practical successes (Fueglistaller, Frey, Halter & Hartl, 2005). Thus, Fueglistaller, Frey, Halter, and Hartl (2005) provided the fundamentals of establishing the strategy development process.

### 2.2.1 Information analysis

The information analysis focuses on identifying relevant data to advance the strategy development process. This specific data analysis can be conducted with a variety of instruments. It is necessary that the different information be defined and exchanged together. The aggregation, condensation, presentation, and visualization of the results create a common understanding and the fundamentals for strategic orientation (Fueglistaller, Frey, Halter, & Hartl, 2005) and for strategic formulation (Andrews, 1987).

It is important to show the links between the certain strengths and weaknesses with the analyzed and developed opportunities and threats within the SWOT analysis. Using this option of visualization, strategic orientation can be developed analytically.

### **2.2.2 Strategy development**

Based on the information analysis, the actual strategy development focuses on the organization's structure of the mandated strategy. This defined strategy represents the corporate target system for the next decade of an organization. The matrix can be the guideline for desirable and undesirable markets, benefits, or corporate activity fields. Creativity is necessary to combine existing strengths to generate unique and exceptional positions for strategy development (Fueglistaller, Frey, Halter, & Hartl, 2005) and strategy formulation (Andrews, 1987).

The aim of the strategy development is to define the future direction of the company in generally or in specific fields. Employing a concise strategy as a guiding principle can be helpful (Fueglistaller, Frey, Halter, & Hartl, 2005). BI tools do not measure all factors easily. However, the second research question will examine the effective use and integration of BI technologies and tools into the strategy development process.

### **2.2.3 Strategy implementation**

The strategy should be implemented effectively and within a reasonable time frame. Therefore, all relevant activities and functions in the company should be focused consequently on the defined strategic excellence positions. Project teams may be implemented to answer questions relevant to the development or adjustment of budgets, revision of current incentive system, enhancement of the information system, or introduction of management information system. The information and communication toward employees play a crucial role in this strategy implementation phase (Fueglistaller, Frey, Halter, & Hartl, 2005).

#### **2.2.4 Strategy review**

Implementation can be controlled with the periodical strategy review. Thus, abnormalities can be identified early in the process. Furthermore, conditions should be checked frequently to determine whether changes have occurred that necessitate altering the original strategy. Therefore, the procedure, involved employees, and objectives require systematic examination.

The main and most important intentions of strategy are using formal planning. Thus, a company could exert positive control over market forces. Generally, strategy can be described as being positioned on a high level. However, it will be necessary to identify the strategy development process and the implemented business strategy to see if further strategies can be realized – even through BI applications deployment and support. As Chaffee (1985) asserted, strategy concerns both organization and environment. It will be significant to see if a company can do its “homework” and profit by the environment and external basic conditions. The strategic aspects of IT will be discussed in the upcoming section as relevant to BI issues.

#### **2.2.5 Strategic aspects of IT**

Strategic aspects of IT will also be presented because BI applications should generate strategic capability for an organization. As mentioned in Section 2.1, IT and BI in strategic management can be defined as information systems to support or change an enterprise's strategy. Thus, it is a system to manage information and assist in strategic decision-making (Turban et al., 2006). Today, IT permeates virtually every aspect of modern business to the extent that its proper use can impact corporate success or failure. Managers in every area, from marketing or finance, from management accounting to human resources, need to understand the implications of IT (Simonovich, 2008). The effective use of IT represents not only one of the biggest challenges facing contemporary organizations today; it also represents one of the greatest opportunities. Business management and employees should better understand how to frame IT systems as part of a firm's search for gaining and sustaining strategic capability.

The information systems of an organization consist of the information technology infrastructure, data, application systems, and the personnel who employ IT to deliver information and communications services in an organization. However, the term information systems also refers to the management of the organizational function in charge of planning, designing, developing, implementing, operating the systems, and providing services (Chen et al., 2010). Thus, the concept of an information system combines both the technical components and human activities within the organization; it also describes the process of managing the life cycle of organizational information system practices (Avgerou & McGrath, 2007). Over the past two decades, information systems have continued to grow in importance. An article in the Wall Street Journal (Worthen, 2007) indicated that 87 percent of business leaders believe that an information system is critical to their strategic success.

IT has also been applied in successful strategy frameworks. Studies aimed at explaining the strategic pattern of market leaders have revealed three generic strategies or value disciplines: operational excellence, customer intimacy, and product leadership (Treacy & Wiersema, 1995).

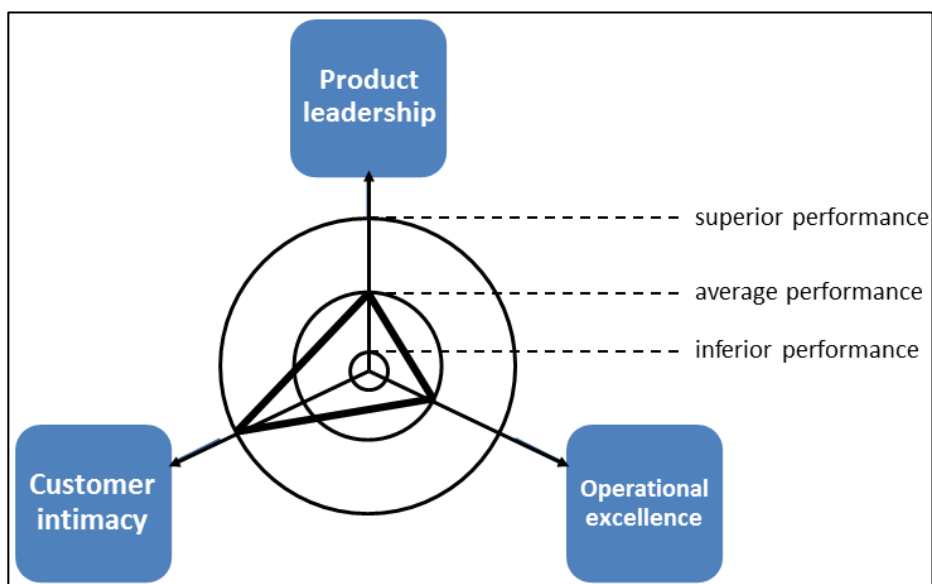


Figure 2.10: Value discipline framework (according to Treacy and Wiersema, 1995)

Operational excellence means the provision of consistent quality at the best price using a standardized business system that minimizes cost and increases the ease for a customer to acquire the product. Customer intimacy strategies put the emphasis on the careful tailoring and adaptation of products and services to meet increasingly precise requirements. There is a strong orientation to addressing the distinct needs of individual customers in order to nurture long-term relationships. Product leadership is attained by continuous, fast-paced innovation that yields a steady flow of cutting-edge products that consistently advance the state of the art of technology or enhance a customer's use or applications (Treacy & Wiersema, 1995).

In the coming years, strategic plans need to be well defined and understood. If no plans exist or are ready for update, a strategy development process including environmental scans and internal scrutiny, should be executed (Hax & Majluf, 1996). The SWOT analysis forms the basis for concrete strategic options. An additional strategic aspect of IT is information, which should be viewed as a production factor that should be in place prior to employing additional production factors. In addition, information is seen as basis of all meaningful economic decisions and activities (Umbach, 2006). The increasing importance of information is unquestionable.

Because a single piece information or ratio can only reflect one specific issue, additional ratios or an entire structured information system is necessary to achieve the objectives of companies in today's market and business structures. Therefore, an information system should include a purposeful structure of information, data, and ratios that are linked together. The most important characteristic is the goal orientation. Table 2.2 illustrates an evaluation scheme provides information about the benefits and capabilities an information system (Meffert, Burmann, & Kirchgeorg, 2008).

Table 2.2: Quality criteria for an information system

a useful information system is...:	
adequate for problem solutions	<ul style="list-style-type: none"> <li>- ratios and information are in timed and factual context with the objective</li> <li>- adequate degree of information (aggregation standard, actuality, periodization)</li> <li>- germane information and data quality (valid, reliable)</li> <li>- protection of manipulation and suboptimal information level</li> </ul>
consistent	<ul style="list-style-type: none"> <li>- cause and effect context</li> <li>- unambiguous</li> <li>- balanced</li> <li>- operationalized</li> </ul>
flexible	<ul style="list-style-type: none"> <li>- opportunities to delete or add ratios and data dimensions</li> <li>- integration of external data</li> <li>- modular structure and implementation</li> </ul>
user- and organization-adequate	<ul style="list-style-type: none"> <li>- compatible with organizational culture</li> <li>- perceived utility</li> <li>- intimacy through standardization</li> <li>- integration into relevant business control processes</li> <li>- consolidated, transparent</li> </ul>
efficient/ profitable	<ul style="list-style-type: none"> <li>- efforts of data collection and processing?</li> <li>- degree of automation</li> </ul>

*Adapted from Meffert, Burmann and Kirchgeorg (2008)*

Strategic questions and challenges require a higher aggregation level than operational questions (Bauer, Stokburger, & Hammerschmidt, 2006). Therefore, an ideal information system includes key ratios composed of relevant indicators for strategic decisions. At the same time, this key ratio can be broken down for management accounting activities at an operational level in companies. The DuPont system with its ratio and driver tree logic can be used as a relevant example of this concept (Meffert, Burmann, & Kirchgeorg, 2008).

Strategic information systems are important to support or change an enterprise's strategy. Strategic management is the technique that an organization can use to plan the strategy of its future operations. Thus, a strategic information system is a system to manage information and assist in strategic decision-making. The term strategic points to the long-term nature of this mapping exercise and to the great



advantage that the exercise is expected to give an organization (Turban et al., 2006). The concept of information and its impact are highly significant in today's global marketplace. Information allows for integration and enables organizations to contend in the new arenas of competition because strategic information systems support and shape competitive strategies. IT can be used to support a variety of strategic objectives, including the creation of innovative applications, changes in business processes, links with business partners, reduction of costs, acquiring competitive intelligence and others (Hemmatfar, Salehi, & Bayat, 2010).

The customer perspective must be considered as well. This is necessary to underpin the significance of information to “customize” them and to develop individual corporate customer models. Balboni and Cook (2011) stated that an organizational model was evolving as customer-centric in the sense that it seeks and uses customer input to inform and optimize activities along the value chain. Organizations need to forge connections with customers at every stage and become better at “listening” to broader online conversations. That process requires analytics to make sense of it all. Thus, organizations should consider critical areas of opportunity that include laying an information management foundation for understanding customers as individuals and not markets, and applying analytics predictively to anticipate new needs (Balboni, & Cook, 2011).

### **2.2.6 Strategic capability and competitive advantage**

A more complete definition of strategy is based on competitive advantage or strategic capability. Competitive advantage is the object of most corporate strategy: “Competitive advantage grows out of value a firm is able to create for its buyers that exceeds the firm's cost of creating it. Value is what buyers are willing to pay, and superior value stems from offering lower prices than competitors for equivalent benefits or providing unique benefits that more than offset a higher price” (Porter, 1985, p. 3). Further, strategic positions should have a horizon of a decade or more, not of a single planning cycle. Continuity fosters improvements in individual activities and the fit across activities, allowing an organization to build unique capabilities and skills tailored to its strategy (Porter, 1996).

Strategic capability refers to a business' ability to successfully employ competitive strategies that allow it to survive and increase its value over time. While strategic capability takes into account the strategies a business uses, it focuses on the organization's assets, resources and market position, projecting how well it will be able to employ strategies in the future. There is no single method or universal metric for measuring or noting strategic capability (Hartman, 2015).

A business' strategic capability is a major component in remaining financially viable and growing, despite the presence of competitors in a free market. Many groups of interested parties attempt to measure and track strategic capability. They include investors, who want to put their money into businesses with reasonable chances of future success and growth. Employees also care about strategic capability since it identifies businesses that are stable and unlikely to go under, or those that need to cut costs through layoffs. Business leaders track strategic capability, not only for their own companies but also for competitors to better understand the markets in which they operate. Finally, financial analysts and government regulatory agencies have interests in strategic capability, since it plays a role in how they value and monitor businesses (Hartman, 2015). It is important to position the company so that its capabilities provide the best defense against competitive forces, influencing the balance of forces through strategic moves, and anticipating shifts in the factors underlying the competitive forces (Porter, 1979).

However, international managers may not be aware of the need for strategic capability, because the strategic capability paradigm for international business has not been sufficiently conceptualized and explored. Every business in order to survive and thrive in a competitive business environment needs to possess a certain level of strategic capability. The type of strategic capability that the company needs at a specific time is determined by the legitimizing forces and the threats and opportunities in the future business environment (Ansoff, 1965). Although there is a general consensus in strategic management theory that the international business environment, strategy, and strategic capability are all crucial elements in the strategic management of firms, there is no consensus on the

sequencing of strategy and strategic capability on one side and the place of the international business environment in relation to the other two. Moreover the elements of strategic capability are poorly understood (Johannesson, 2010). It is thus appropriate to analyze strategic capability and competitive advantage to understand the relevance of using BI technologies and tools.

Jenster and Søylen (2013) presented a model for including competitive intelligence in the study of the correlation between strategy types and successful performance. Competitive intelligence is the practice of defining, gathering, analyzing and distributing relevant information to the organization's decision makers. As such, it is a vital part of strategic planning. Specific strategies can produce competitive intelligence which leads to successful performance. The chosen strategy again defines the company's competitive intelligence activities, explicitly or implicitly. The result of these activities will determine the success of the company, or its performance (Jenster and Søylen, 2013).

Every company can gain success by using BI. Thus, it becomes apparent that BI applications can provide significant potential to overtake competitors (Biere, 2011). There is a high probability that BI applied with goals and purpose can make a huge difference. By incorporating external data into BI applications and the DWH, organizations are able to ascertain market reactions to competitors with sales campaigns and benefits. Competitors' key moves and pricing actions can be identified by using web "crawling" technology. In past decades, companies had to acquire competitor information from printed sources. Today, much of this information is available online and is up-to-date. This experience led to a broader view of the applicability of BI in their organizations. With the emergence of service-oriented architectures and cloud computing, it will become easier to strap on and extend a BI solution. The definition of BI should incorporate these innovative applications. The BI stand-alone or insular approach or solution has immediate value. In the majority of enterprises, the success of using multiple tools can be observed (Biere, 2011). While no defined scope of various BI deployment models exists, the selection should be appropriate to an organization's size, objective, philosophy, branch, and customer character. "Competitive Intelligence or Business Intelligence can be defined as both a process and a product" (Vedder & Vanecek,

1999, p. 109). Thus, competitive intelligence is a systematically, ethics-based approach designed to generate and analyze information about competitors and market trends to achieve business objectives (Kemper et al., 2004).

Typically two reasons arise that lead to implementing a reliable information system or a structured BI solution to transform information into a strategic competitive and capability resource. First, the information provision requirements of decision maker might have become increasingly important. The second motive can emerge due to an unmanageable IT structure and data structures that are integrated into manifold data platforms. BI is viewed as a suitable instrument for solving those issues. Saving time is another crucial factor that can be used by data compositions from several sources and data structures. The increase of the value of information increase can also be determined through flexibility of analysis, real-time data, comparability, and standardized reports. Additionally, those factors speak to increased transparency and improved data quality (Umbach, 2006).

Bachmann & Kemper (2009) defined the success factors of BI as: employee's with in-depth data knowledge, the definition and communication of an organization's corporate culture and philosophy, organization, budget processes, master data management, homogeneous IT and BI landscape and architecture, stable interfaces to BI end users, data quality, and comprehensive data provision. Each of these facets contributes to the success of an organization (Bachmann & Kemper, 2009) and can be part of a BI conceptual framework.

In order to achieve strategic capability, organizations must add real value and excellence to information products and knowledge base. The quality of the data can be seen a single element that can add real value to any organization's information products and knowledge base, while enhancing any system implementation and optimization (Bachmann & Kemper, 2009).

The current system of fragmented care does not create the value people in healthcare organizations expect. Healthcare leaders who want to enhance value for customers need to build organizational capabilities in BI that integrate clinical and financial data, improve safety and reduce variation and risk. They need to

improve contract management capabilities that create, manage, and mitigate actuarial risk of the provider networks of care. Managing cost is an important component of the value equation, and technology, and BI in particular, is a key enabler for organizations to develop systems and information that reduce cost. In addition to fostering technology improvements, healthcare finance leaders must help their organizations rethink the approaches used to organize and report accounting/ financial data to decision makers, especially clinical decision makers. Given the current environment, driving value for customers is a key success strategy for all healthcare providers. It is critical that finance leaders improve how they are developing and reporting key accounting and financial information through their BI systems (Clarke, 2012).

The literature stresses the importance of BI for a successful overall information systems deployment in a competitive marketplace (Biere, 2011; Anandarajan et al., 2004, p. 18; Chameni & Gluchowski, 2004). The literature review revealed different classifications of BI tools (Kimball et al, 2004; Lehmann, 2012), architecture, and the resultant opportunities for improving corporate competitiveness. Those opportunities include gaining relevant external and internal information, and generating fruitful outcomes through the access and knowledge about modern controlling BI tools. The above mentioned components represent the primary analysis components that could generate a BI competitive advantage and capability model to develop strategic capabilities. Figure 2.11 illustrates this model as based on the work of Gonzales (2011).

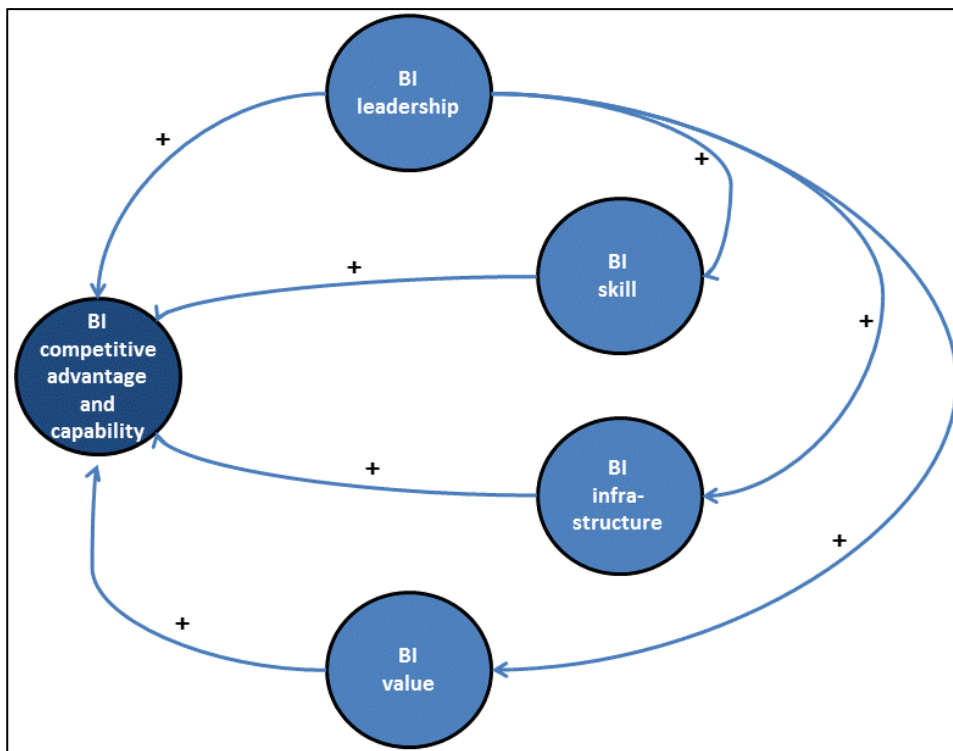


Figure 2.11: BI competitive advantage and capability model (according to Gonzales, 2011)

Gonzales (2011) demonstrated a certain connection and positive influence between the respective circles. The model introduces four key factors of BI maturity. As it maps, strong BI leadership will have a positive impact on a company's BI competitive advantage, capability or maturity level. The same relationship is true for BI skill, infrastructure and value. In addition to these direct relationships, the model also defines a second level of influence: BI leadership has a positive influence on the three other factors. Thus, if the leadership of a BI program is strong, it is likely that the skill of the BI team and user communities will be high, the infrastructure used to support the BI program will be robust and the organization will consider the program to be of high value and maintain a significant investment in a company's BI initiative. Conversely, if the leadership is inconsistent or weak, the organization can expect the other factors to be negatively affected (Gonzales, 2011). Each of the four factors is briefly described below to show the influences and fundamentals of competitiveness.

Effective BI leadership is critical to sound business strategy and competitive advantage, but it may take several years to cultivate and nurture within an

organization. Measuring leadership is based on at least three subordinate variables: sponsorship, organization and planning (Gonzales, 2011).

Skill level can impact competitive advantage as well. Seasoned BI practitioners support the notion that well-trained teams and user communities are essential to implement successful, leading BI technology and applications. As with effective leadership, a highly skilled resource pool is not developed quickly. However; once that is accomplished, it is difficult for competitors to duplicate. The measure of BI skill should include at least the variables of user competencies and training (Gonzales, 2011).

To reduce the complexity of the BI competitive advantage and capability model, infrastructure is measured in terms of technical and functional factors for BI. From a technical perspective, hardware and software are important components. Functional components include elements such as development standards, metadata, data quality, and other relevant areas. For supporters, advanced hardware and software are differentiators that, when implemented correctly, are difficult for competitors to emulate. Detractors, suggest that most hardware and software solutions are widely available, which minimizes differentiation. Due to emerging technologies such as cloud computing and infrastructure-as-a-service, the argument based solely on hardware and software may be moot (Gonzales, 2011).

The financial commitment organizations are willing to dedicate to BI initiatives is considered influential in the evolution and success of BI for an organization. The variables risk and contribution of BI to monetizing information for customers or suppliers contribute to the measurement of value, for instance (Gonzales, 2011).

Therefore, information processing has gradually become the basis for achieving strategic capabilities. The organization must have the right information at the right time and available to the right people (Guarda et al., 2013). The complexity of today's business environment requires companies to be agile and proactive in relation to the decision-making processes (Bocij, Greasley, & Hickie, 2009), it is necessary to understand the information to manage future events. This factor

leads many organizations to adopt and BI systems in their business processes (Marjanovic, 2007). BI tools have a number of advantages for businesses (Lönqvist & Pirttimäki, 2006):

- The reduction of the dispersion of information;
- Greater scope for interaction between users;
- Ease of access to information;
- Useful in the process of decision-making.

With BI, organizations can integrate powerful tools, analysis, standardized reporting, monitoring system with various metrics, data integration, and additional features within a service-oriented architecture (Eckerson, 2010; Ranjan, 2008). This is essential for good business management to guide managers in strategic direction for quality information, with the establishment of standards and procedures to ensure compliance with the objectives.

### **2.3 Summary Analysis of Literature sources**

The concepts and issues derived from the literature review contribute to the development of a provisional conceptual framework for this research, which is discussed in chapter 3. A structured review of the pertinent literature using current journals in the field is presented here. The key authors used in the review and their respective areas or expertise (relevant to this research) are depicted in Table 2.3. A summary of some of the key points and issues is included here.





First, different definitions concerning the term BI were given throughout the works of Alnoukari (2009), Miller et al. (2006), Anandarajan et al. (2004), Turban et al. (2007), Chamoni & Gluchowski (2004) or Lukman et al. (2011). All these definitions identify the main objective of BI as supporting a company in decision-making and information transparency, which is recognized in Section 2.1.

A significant number of publications concern the supporting infrastructure, for instance a DWH, of a BI system. The works of Chamoni & Gluchowski (2004), Kemper et al. (2004), Kimball et al. (2010), or O'Brien (2004) stress the importance of infrastructure as a component of BI. New massive parallel data architectures and analytic tools go beyond the traditional parallel DWH (Chaudhuri, Dayal, & Narasayya, 2011). Operational systems provide a basis for data entry and the analytical DWH system allows for an organized and comprehensible output of huge amounts of data. Good architectures address the cost, benefits, and risks of every design decision. Good architectures draw upon existing skills and tools where they make sense and add new ones where needed (Lopez and D'Antoni, 2014). A well-built DWH adds value through the dimensional model and load processes; thus it makes no sense to replicate this effort to build a standalone BI application. Most successful BI applications are an integral part of the user-facing portion of the DWH (Kimball et al., 2010).

Chen, Chiang & Storey (2012) assessed the big data theme, which has become increasingly important in many organizations, from governments and e-commerce to health organizations. New science, discovery, and insights are being pursued and obtained by many organizations using BI tools and technologies to find and analyze big data.

The literature review presented a spectrum of BI reports and analyses – such as explorative or predictive analytics – (Kimball et al., 2010; Lehmann, 2012; Koch, 2015). Kemper et al. (2004) created a BI framework that provides a framework for action for corporate BI development. It is conceived of as a layered architecture and is composed of three levels: data, logic, and presentation as shown in Figure 2.1. Lehmann (2012) assessed the business value of the spectrum of BI

technologies. This value can be classified especially to reporting in the enhanced conceptual framework. Koch (2015) stressed that an investment in capturing and mining unstructured data is becoming more important, especially as it relates to social media. By analyzing tweets on Twitter or posts on Facebook, emerging trends can be identified quickly and acted upon in order to gain a competitive advantage. Combining structured data with unstructured data will create powerful predictive analytics models. Related to this, Oliveira & Gama (2013) introduce a new approach for analyzing dynamic temporal changes in social networks.

Four phases of the strategy development process were discussed and analyzed by Fueglistaller et al. (2005). To consider strategic aspects of IT, the information systems of an organization consist of the information technology infrastructure, data, application systems, and the personnel who employ IT to deliver information and communications services in an organization (Chen et al., 2010). The use of BI for competitive advantage is strategic for the execution of business strategy (Giniat, 2011). The strategic integration and use of BI systems can play a crucial role within companies. Elbashir et al. (2011) indicated that organizational absorptive capacity (i.e., the ability to gather, absorb, and strategically leverage new external information) is critical to establishing appropriate technology infrastructure and to assimilating BI systems for organizational benefit. Elbashir et al. (2013) also stated that BI has too often failed to support organizations' managerial decision-making at strategic levels and, thus, failed to enhance business value. However, BI assimilation plays a significant role in translating organizational resources into capabilities that enhance the business value of BI.

Jenster and Søylen (2013) presented a model for understanding how competitive intelligence relates of the correlation between strategy types and successful performance. Competitive intelligence is the practice of defining, gathering, analyzing and distributing relevant information to the organization's decision makers. As such it is a vital part of strategic planning. Biere (2011) discussed a new era of enterprise BI for achieving global competitive advantage and new capabilities, in which BI technologies can deliver real business value (Biere, 2011). Managing cost is an important component of the value equation, and technology is

a key enabler for organizations to develop systems and information that reduce cost (Clarke, 2012).

Gonzales (2011) develops a model that represents success factors for BI maturity, competitive advantage and related capabilities. These factors are discussed in Section 2.2.6 and will be appropriate to enhance the initial conceptual framework in Figure 5.16. According to Gonzales (2011), this BI competitive advantage and capability model focuses on four key factors of BI maturity: leadership, skill, infrastructure, and value. It is thus appropriate to analyze strategic capability and competitive advantage to understand the relevance of using BI technologies and tools. One interesting area for future analysis is insurants' opinions as posted in their blogs on the Facebook page (Chau and Xu, 2012).

The development of a provisional conceptual framework in chapter 3 will draw upon the literature of Guarda et al. (2013) and Kemper et al. (2004) to develop a classification for later analysis of findings. Guarda et al. (2013) develop a framework that exemplified and clarified the applicability of BI as a driving force for organizations, bridging the gap between theoretical knowledge and the practical use of a tool for decision support. Additional BI framework models exist, such as the one presented by Kemper et al. (2004). Further, Yeoh & Koronios (2010) develop a conceptual framework which outlines how a set of critical factors contributes to the success of a BI system implementation. The three dimensions technology, process, and organization are considered in this model. These concepts are built upon in the proposed framework, which will be structured in four phases: planning, technology, intelligence, and dissemination.

### 3. Development of provisional conceptual framework

This chapter presents a provisional conceptual framework based on the literature review and preliminary investigation of BI deployment in AOKN. This framework was initially designed to gain insight and ideas that would address the first research question and was then adapted in its structure to answer the third research question as well.

Yeoh & Koronios (2010) developed a conceptual framework which outlines how a set of critical factors contributes to the success of a BI system implementation. Three dimensions can be considered: technology, process, and organization. According to Ariyachandra & Watson (2006), the implementation success criteria of this research take into account two key dimensions: process performance (i.e. how well the process of a BI system implementation went), and infrastructure performance (i.e. the quality of the system and the standard of output). The infrastructure performance has parallels with the three major information system success variables described by Delone & McLean (2003), namely system quality, information quality, and system use, whereas process performance can be assessed in terms of time-schedule and budgetary considerations (Ariyachandra & Watson, 2006). Specifically, system quality is concerned with the performance characteristics of the information processing system itself, in which the system should be flexible, scalable and able to integrate data. Information quality refers to accuracy, completeness, timeliness, relevance, consistency, and usefulness of information generated by the system (Ariyachandra & Watson, 2006; Delone & McLean, 2003).

The general BI situation in AOKN will be discussed prior to addressing the design of a provisional conceptual framework at this point. AOKN has implemented one cohesive DWH. As illustrated in chapter 1, the BI infrastructure and applications that have been implemented are autarkical - self-sustaining - in the management accounting department. The implementation process in 2011 focused on two main objectives:

- IT support for analytics and operational management accounting with the help of an automatic and customer-focused data base that enabled queries through professional employees and supports of innovative processes
- Management accounting and management processes which included the implementation of a flexible BI system with controlling functions and low ad hoc efforts.

Basically, the objectives of infrastructure and analysis platforms could be achieved. However, data driven decisions do not play a main role in daily business. Strategic information perspectives can be an important consulting “institution“ or navigator for the current business situation and future-oriented way of the company. Thus, it will be crucial to implement a clear BI target picture and strategy picture that is known throughout all business levels in AOKN itself.

A provisional conceptual framework can be an efficient device when used to validate the requirements of a project by exposing faults or discrepancies. In case of BI, the framework allows an evaluation of the capabilities of this technology through data access and analysis that can assist in decision-making processes within organizations (Williams & Williams, 2010). Guarda et al. (2013) developed a framework that exemplified and clarified the applicability of BI as a driving force for organizations, bridging the gap between theoretical knowledge and the practical use of a tool for decision support. The exploration of the historical data of customers with BI technologies and tools will facilitate decision-making and planning strategies. This can be done through the use of techniques of extraction, processing and visualization of data, exploitation mechanisms of large volumes of data, and enhancing the analysis of unknown patterns, which constitutes an important advantage in understanding the business processes (Nicolaou, 2003; Castellanos et al., 2004). According to Guarda et al. (2013), the proposed framework is structured in four phases: planning, technology, intelligence, and dissemination.

The first phase is planning. In this stage, it is necessary to define what data is needed to form the basis of BI. In the next phase, the technology is integrated into the BI system’s software, which includes data mining, data analysis, scorecards,

and dashboards. Intelligence is the third phase, and represents one of the most important aspects of a BI project. At this stage, a determination must be made regarding what data should be evaluated and how it should be assessed. Thus, companies have to define the critical success factors of the business, and are determined for each of these metrics appropriate for measuring what is running and creating the appropriate alerts. These metrics will support the architecture of the BI solution. The last phase, dissemination, should be the simplest process, unless the previous phases have not been successfully performed. At this stage it is essential that users of the system are capable of interpreting the obtained results (Guarda et al., 2013).

### **3.1 Data bases, internal and external data**

The achievement of the objectives described above requires an implementation of a corporate consistent data model and basis integrating a modular application layer in order to provide a BI target picture in AOKN. Figure 3.1 depicts the architecture of this data basis as DWH. As already discussed in the literature review, the DWH is an information storage facility with the capabilities to support reporting and traditional BI platforms and is intended to be a broader analytics infrastructure that supports operational analytics, performance management, and other new applications and uses, such as operational BI and operational technologies (Gartner, 2011).

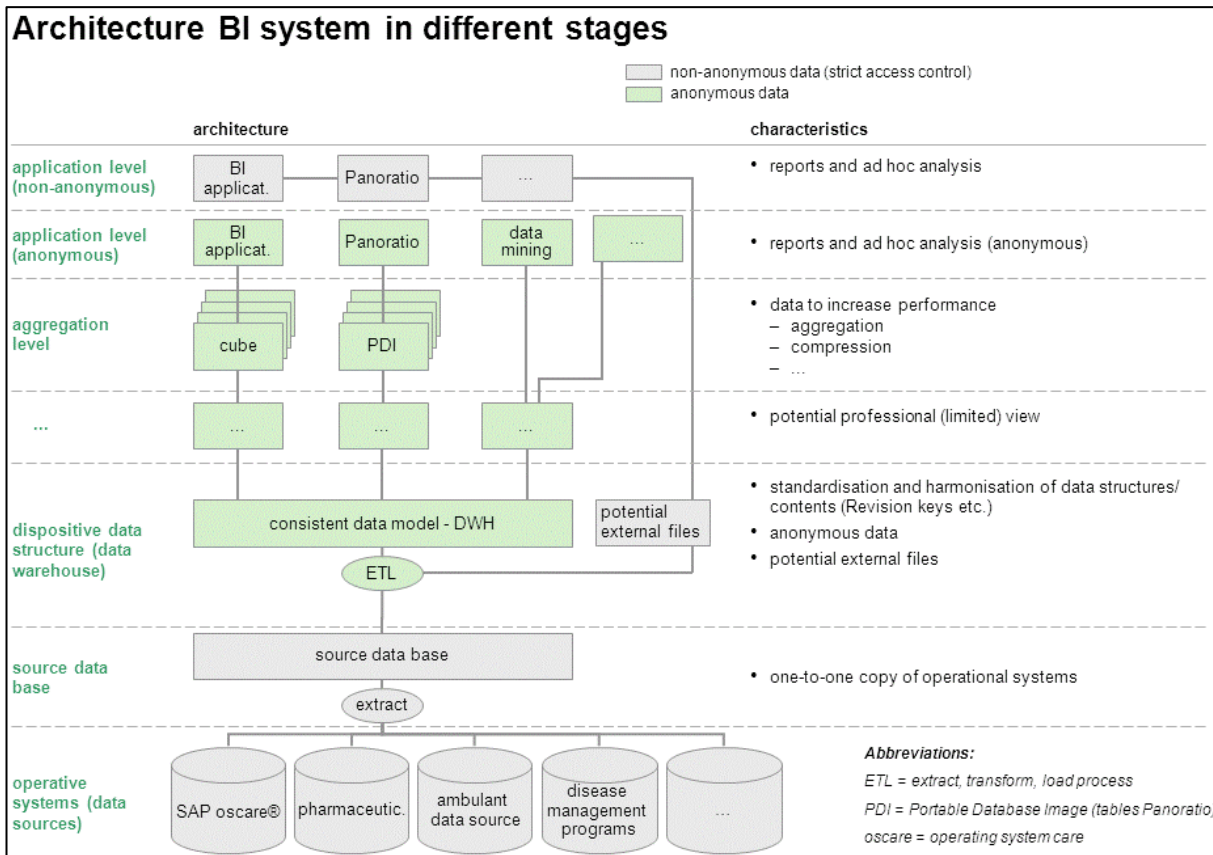


Figure 3.1: BI architecture and data bases within AOKN (AOK Niedersachsen, 2013)

At this point, it is unnecessary to expand on the technological aspects of the BI system. However, the architecture dictates that data from different operational systems will be prepared in several stages; the first is to copy the data one-to-one in the source stage. Afterward, the different data formats will be anonymized. Therefore, at the application level, BI end users have the opportunity to access the prepared data via BI tools Cognos, Panoratio, or other potential BI applications.

### 3.2 Planning, technology and intelligence

The role of the management accounting department in AOKN is crucial due to the functions performed. Those include data pre-processing, planning, and providing data and information to all relevant business divisions in the company, which is accomplished with the help of the BI mainstream tool Cognos. Management accounting delivers the data requirements that support an efficient decision-making process within the company. In this way, management accounting can be linked primarily with the provision of data in AOKN. The management accounting



conceptual design and its role can be illustrated with the help of the information value chain as presented in Figure 3.2.

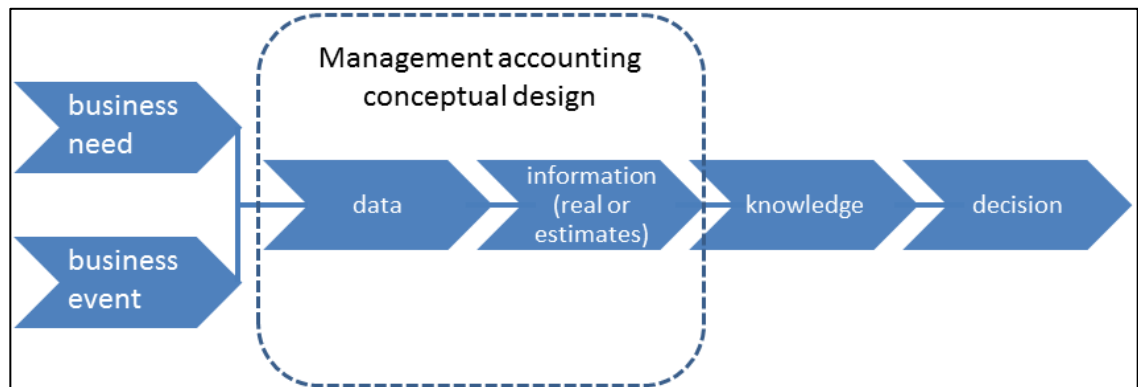


Figure 3.2: Information value chain (IMA, 2008)

The traditional role of management accountants as information providers is often described and interpreted as positioned at the lower end of the value chain. The role of a management accountant should be expanded to participation in all levels of the value chain. Additionally, management accountants should be included in key strategic decisions as members of management decision-making teams (interviews management accounting employees). The role for management accountants has therefore shifted in two respects with regard to the information value chain: first, management accountants provide the conceptual framework for converting data into information; second, they fulfill the roles of enabler and strategic business partner along the entire information value chain (IMA, 2008).

The main tasks of management accounting in AOKN are summarized and presented in Figure 3.3. Those tasks are planning, countersteering, and controlling of the business objectives (interview management accounting director health care; AOK Niedersachsen, 2013d).

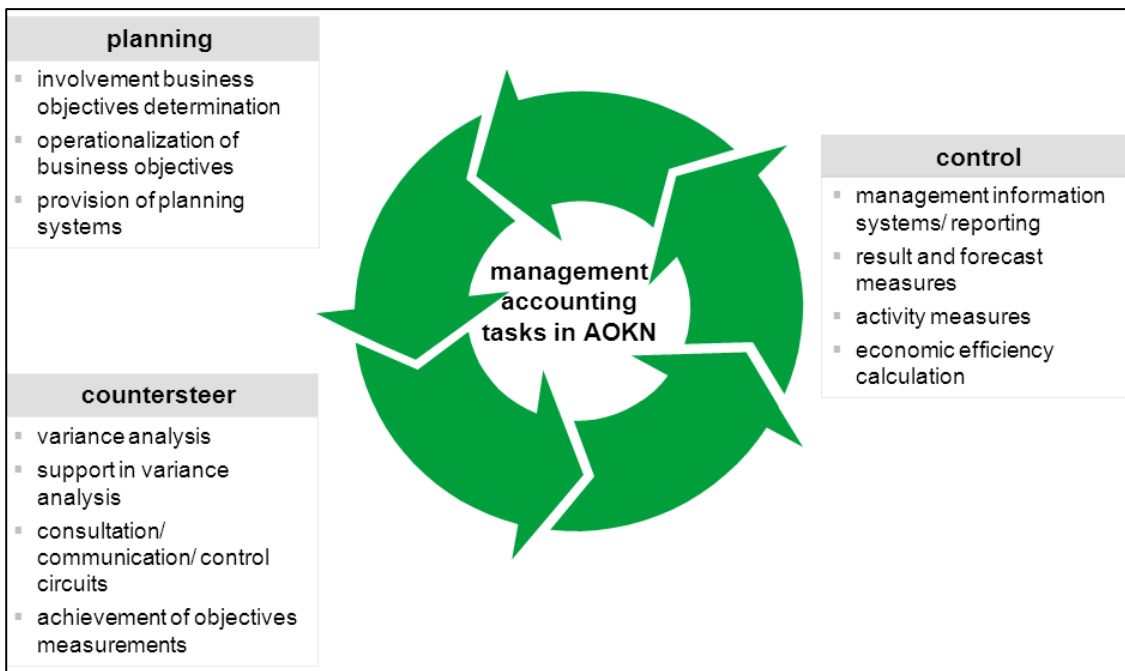


Figure 3.3: Management accounting tasks in AOKN (AOK Niedersachsen, 2013d)

Management accounting provides an integrated managerial and economic analysis of the company and gives due consideration to environments in which the company operates. Furthermore, the management accounting concept pursues different tasks and roles (AOK Niedersachsen, 2009):

- Transparency of results, processes and strategies to increase economic efficiency,
- Integrated coordination of sub-goals and -plans and cross-functional organization of modern reporting,
- Moderation and presentation of management accounting process in order to support decision-maker of goal-oriented activities. Provision of required data and information, and
- Activities of managerial consultants for decision-maker and of navigators for goal achievements.

The management accounting concept focuses on different perspectives in order to develop transparency in structures, business processes, and questions relevant to different professional divisions. Standardized management accounting is necessary to ensure that all projects can be controlled. In the absence of this

practice, transparency and controllability cannot be developed and ensured, which hinders the ability to answer key business questions about a project. The four following perspectives clarify specific topics included within the field of management accounting field: activities, quality, cost-efficiency, and customer satisfaction. For each of the perspectives, numerous key business questions will be defined and the resultant ratios will be identified, in order to design and implement a management accounting approach (AOK Niedersachsen, 2012b) as shown in Table 3.1.

Table 3.1: Key business questions and ratios for four perspectives

Perspective	Key business questions	Management accounting approach/ ratios
<b>I Activities</b>	<ul style="list-style-type: none"> <li>▪ Is the field alive with customers or business clients?</li> <li>▪ Are the right customers in a respective program (effectivity)?</li> <li>▪ Is acquisition and registration process successful (efficiency)?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Number of customers/ participants</li> <li>▪ Number of business clients/ care provider</li> <li>▪ Differentiation target numbers and current values</li> <li>▪ Illustration of acquisition processes</li> <li>▪ Benchmark results (health insurance sector/ AOK system)</li> </ul>
<b>II Quality</b>	<ul style="list-style-type: none"> <li>▪ Which medical care effects can be generated?</li> <li>▪ Which key indicators can be developed and measured to increase medical care provision?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hospital ratios</li> <li>▪ Mortality ratios</li> <li>▪ Development of Co-morbidity rates</li> <li>▪ Field individual ratios</li> </ul>
<b>III Cost-efficiency</b>	<ul style="list-style-type: none"> <li>▪ Is the program sustainable economic?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Development of individual economical models</li> <li>▪ Focus on internal information provision</li> <li>▪ Consideration of direct program costs</li> </ul>
<b>IV Customer satisfaction</b>	<ul style="list-style-type: none"> <li>▪ Are the customers satisfied with the program/ health insurance?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Exit and cancellation rates</li> <li>▪ Optional: satisfaction ratios based on customer interviews/ questionnaires (consideration of control sample)</li> </ul>

Source: AOK Niedersachsen (2012b)

Employing these perspectives should ensure frequent measurements and activity measures as well as economical results in order to promptly prevent failures, if required (AOK Niedersachsen, 2012b). There are many ways and forms of reporting in AOKN's daily business. Therefore, the information path is also different.

The standardized report is created with specific and uniform perspectives and is delivered in a fixed format; it is typically manifested as print media for business management. The effort of developing reports is manageable and takes approximately 30 to 60 minutes weekly. Reports only have to be created once AOKN's current data actualization is established to deliver the reports automatically to the information receiver (interview management accounting employee). Currently, the quality of reports is assessed as good. However, potential is recognized for improvements in visualized and graphic presentations to improve the ability "read and understand" the reports' objectives. Standardized reports can also be an entrance to data and relevant ratios. During or after business meetings, process chains and details should be discussed continuously to enhance current analyses and decision qualities (interview performance analyst). However, in some activity fields, standard reports only target relevant objectives marginally because relevant and concrete questions can only be answered a specific volume of data. Time can be lost when an employee is consumed with filling out reports, but lacks the correct data definitions or appropriate data bases in order to verify results. In that circumstance, the material needs of the business division have to be recognized by management accounting (interview physical therapy director). For healthcare projects, using a standardized report is not possible because each case is unique. Individual reporting is necessary and encompasses approximately eighty contacts that must be addressed (interview health care management director). Here, flexible analysis options must be used and will be described in the following sections.

Analysis templates such as dashboards or files in Analysis Studio, allow BI end users to conduct a navigation analysis and to explore data correlations. Explorative analytics should be a suitable, fitting data modulation for decision-making processes and the achievement of objectives (interview management accounting employee). BI users get an adequate analysis platform with relevant basis ratios and also have the opportunity to perform analyses at a detailed level with individual data. Explorative analytic applications are more complex than standard reports. Analytic applications center on a specific business process and encapsulate domain expertise that illustrates how to analyze and interpret that specific process. Panoratio and Cognos Analysis Studio are the most frequently

used BI applications in this situation (interview management accounting employee).

Furthermore, self-service should also be implemented to enable users to create their own reports and relevant ratios for their specific business area. Mobile reporting can be a future-oriented module available on tablets for top management and also for travelling business managers that need to access real-time ratios (interview BI consultant).

The management accounting employees are also still available to conduct an individual analysis or report for the respective professional business divisions. Prior to the conclusion of a contract, preliminary in-depth data analyses are necessary and are performed by management accounting employees (interview agent to CEO). BI end users should have a formal contact person within management accounting, which should be established during the process. Individual opportunities of ad hoc analysis on aggregate data model should be enhanced if standardized reports do not provide sufficient information to the users (interview BI consultant).

The information conversation can also be made on different business meetings and on the bilateral way. "Front" training for new users of BI; that means training in front of employees, is typically not helpful. However, on the job training can motivate users to formulate questions and can lower resistance to BI (interview management accounting employee). BI video podcasts with instructions and hints for individual analyses can also be a way to reach the BI end users (interview performance analyst). However, from interviews with several employees in the health system, it became apparent that the health system regards its efforts to refine data analysis ties as key to the future. The next step is to move from collection to analysis and action, which will require investment of additional resources in both information systems and staff. Many organizations in the health system see BI as key to improving value. BI can help to transform care delivery to models that are more patient-centered, cost-effective, and coordinated (Moore et al., 2012).

### 3.3 Dissemination

For an organization to gain maximum benefits from an information system, individual users in the organization must use it effectively and extensively – and they must receive the relevant information in an efficient way. To do so, users often have to overcome many problems associated with their system use in order to integrate the information system into their work routines. Much remains to be learned about the types of problems that users encounter in using a new system. Deng & Chi (2012) seek to develop a comprehensive and dynamic view of system use problems in organizations. Their study contributes to advancing the theoretical understanding of postadoptive BI system use by focusing on its problematic aspects.

The individuals that receive the reports and analysis platforms in AOKN are members of top management, “regional” business management, employees, and different professional panels. Not all business levels have the same information needs. Some divisions only need an elementary overview of the most relevant ratios and developments, and others need in-depth and enhanced analyses to lend transparency to internal processes. Therefore, the communication and consulting to BI end users should be employed continuously to improve user confidence in the BI system. This is also part of the business strategy to enhance financial stability and market share (AOK Niedersachsen, 2012a). The dissemination of reports will be conducted via email, uploading in Cognos BI portal or self-service of individual analysis platforms. Figure 3.4 illustrates a provisional conceptual framework for BI implementation based on an existing framework model and the literature review. All light blue boxes and elements in this figure came from literature review – the Guarda et al. (2013) framework – and the dark blue boxes in the middle of the figure base on the preliminary research on BI technologies and tools in AOKN.

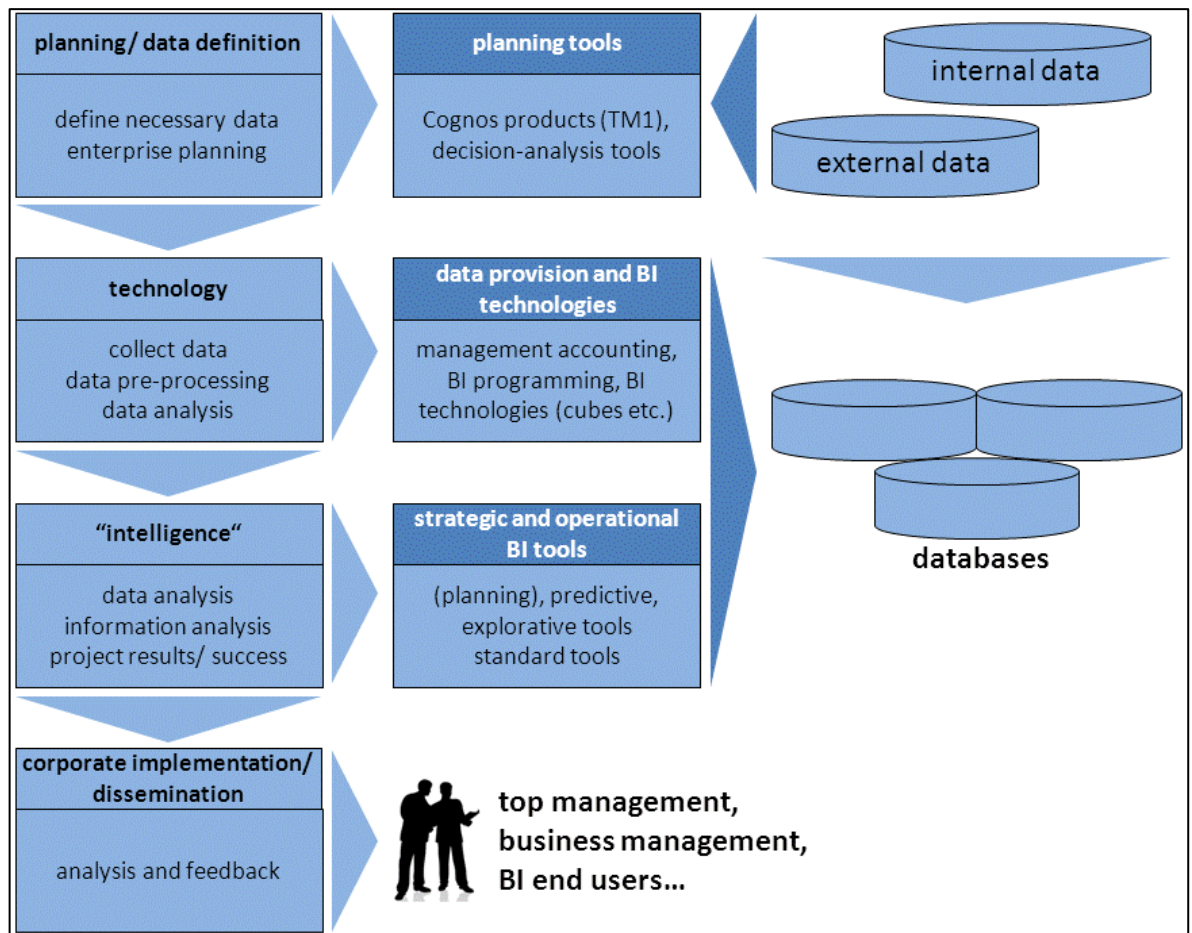


Figure 3.4: Provisional conceptual framework (according to Guarda et al., 2013, and literature review)

This provisional framework for BI implementation (Guarda et al., 2013) and literature review can be seen as an initial assessment that will be enhanced later in chapters 5 and 6. It shows on the left the light blue coloured classification and structure according to Guarda et al. (2013); dark blue coloured elements from the literature review are added and include: planning tools, data provision and BI technologies, or strategic and operational BI tools. The framework is necessary to lay a foundation for further developments and enhancements in the following chapters. Thus, this framework becomes crucial for the classification of BI technologies and tools within an appropriate conceptual framework. As discussed in the literature review, additional BI framework models exist such as the one presented by Kemper et al. (2004). Due to the increased volume of data in today's organizations, BI has become essential for companies of all sizes in increasing the competence of decision-making. Companies that replace obsolete tools with state-of-the-art BI applications could realize strategic success factors that would enable

their capacity to face the changing markets and technologies. The choice of a suitable BI system should be strategic and should make the most of advances in technology (Guarda et al., 2013). Figure 3.4 represents the relevant concepts that have been reviewed and synthesized to create the design for the provisional BI framework. The next chapter examines the role of research methodology in this thesis. It reviews different approaches and techniques by which valuable knowledge can be generated.



## 4. Research methodology and design

### 4.1 Introduction

This research uses the case study method with AOKN, a company operating in the German healthcare industry, as a case study setting. It will be part of the research design to use the research questions to generate sets of sub-questions for the one-to-one interviews with AOKN employees who are involved in BI processes or use BI tools. As previously discussed, the literature review has a strong foundation in the related literature and was used to identify a research gap and to design research questions that address the gap (Creswell, 2009).

This chapter commences with the description of epistemology and methodology in Sections 4.2 and 4.3. The development of the case study design and data collection with a focus on interview groups for the one-to-one interviews is discussed in Sections 4.4 and 4.5. The purpose of chapter 4 is to depict and state the methodology used to conduct the research in order to answer the research questions. The methodology will further support the development of the provisional conceptual framework as created in chapter 3. According to Crotty (1998), two important questions have to be answered when developing research proposals and methodologies:

- What methodology and methods will be employed in the research?
- How could this specific choice and utilization of methodology and methods be justified?

With particular regard to management research, the daily activities of people can be observed. Individuals work in organizations and try to make sense of their own experiences (Easterby-Smith, Thorpe, & Jackson, 2008). Crotty's (1998) second question refers to the individual research questions that the doctoral thesis is seeking to answer. The appropriate choice and especially the use of methodology and methods refer to assumptions about reality that have to be integrated into this work. Taking these assumptions into account, the researcher has to question his

theoretical point of view (Crotty, 1998) and his content analysis through a combination of induction and deduction (Saunders et al., 2009). The theoretical position, also called research philosophy (Saunders et al., 2007) or research paradigm (Guba & Lincoln, 1994), refers to a set of philosophical assumptions with regard to epistemology and typically includes specific methodological strategies (Maxwell, 2005).

Epistemology is the study of knowledge and is concerned with questions about the conditions or sources of knowledge (Steup, 2011). Table 4.1 shows each of the philosophical assumptions. It details how they might be used and written into qualitative research and even linked to different interpretive frameworks that operate at a more specific level in the process of research (Creswell, 2007).

*Table 4.1: Philosophical assumptions with implications for practice*

<i>assumption</i>	<i>questions</i>	<i>characteristics</i>	<i>implications for practice (examples)</i>
<b>epistemological</b>	What counts as knowledge? How are knowledge claims justified? What is the relationship between the researcher and that being researched?	Subjective evidence from participants; researcher attempts to lessen distance between himself or herself and that being researched	Researcher relies on quotes as evidence from the participant; collaborates, spends time in field with participants and becomes an “insider”
<b>methodological</b>	What is the process of research? What is the language of research?	Researcher uses inductive logic, studies the topic within its context and uses an emerging design	Researcher works with particulars (details) before generalizations, describes in detail the context of the study and continually revises questions from experiences in the field

*Source: according to Creswell (2007)*

The following sections lay out the relevant research design specifications, which include the philosophical research position, research methodology and case study research method used to address the research questions and objectives.

## 4.2 Research strategy

A research strategy or research philosophy can be defined as a “basic set of beliefs that guide action” (Guba, 1990, p. 17). It refers to a specific plan or action designed to achieve a particular understanding (Flick, 2009) and is aligned with the described purpose. The choice of the research approach will be guided by the philosophical position (Saunders, Lewis & Thornhill, 2009). When a researcher takes a clear philosophical position, a positive impact is made on the quality of research and the practical aspects of choosing appropriate methodologies (Easterby-Smith, Thorpe & Jackson, 2008).

In the literature, positivism and interpretivism are viewed as the two main research paradigms (Easterby-Smith, Thorpe & Lowe, 1991; Roberts, Wallace & O’Farell, 2009). The differences between the two paradigms are depicted in Table 4.2.

Table 4.2: Essential research paradigms

	positivist paradigm	interpretivist paradigm
<b>basic beliefs</b>	<ul style="list-style-type: none"> <li>• The world is external and objective</li> <li>• Observer is independent</li> <li>• Science is value-free</li> </ul>	<ul style="list-style-type: none"> <li>• The world is socially constructed and subjective</li> <li>• <b>Observer is part of what is observed</b></li> <li>• <b>Science is driven by human interests</b></li> </ul>
<b>researcher should...</b>	<ul style="list-style-type: none"> <li>• focus on facts</li> <li>• look for causality and fundamental laws</li> <li>• reduce phenomenon to simplest elements</li> <li>• formulate hypotheses and then test them</li> </ul>	<ul style="list-style-type: none"> <li>• <b>focus on meanings</b></li> <li>• <b>try to understand what is happening</b></li> <li>• look at the totality of each situation</li> <li>• <b>develop ideas through induction from data</b></li> </ul>
<b>preferred methods include</b>	<ul style="list-style-type: none"> <li>• Operationalizing concepts so that they can be measured</li> <li>• Taking large samples</li> </ul>	<ul style="list-style-type: none"> <li>• Using multiple methods to establish different views of phenomena</li> <li>• <b>Small samples investigated in depth or over time</b></li> </ul>

Source: according to Easterby-Smith, Thorpe and Lowe (1991)

In the right column, the most important points for an interpretivist paradigm to the researcher are shown in bold type. These points will be relevant for this case study and will be discussed later in detail. Researchers bring beliefs and philosophical assumptions to their work. Beliefs and attitudes can be instilled in researchers

during their education in a variety of ways: by reading journal articles and books, by listening to advice from advisors, by engaging with scholarly communities, and by attending business conferences or meetings (Creswell, 2007).

Qualitative researchers have underscored the importance of not only understanding the beliefs and theories that inform research but also actively writing about them in reports and studies (Creswell, 2007). Based on Table 4.2, positivistic research applies the research tradition of the natural sciences to social science research (Saunders et al., 2003). Positivists believe that a real world exists and that this reality is stable and can be observed, and respectively described from an objective viewpoint (Levin, 1988). Vreede (1995) mentioned that by developing a case study the researcher functions as an observer shaped by exploratory or descriptive characteristics and he or she may be a positivist or interpretivist (Vreede, 1995). Positivism offers the assurance of unambiguous and accurate knowledge of the world. Positivist positions are not arrived at through reasoning. Rather, reality is a “given” and existent. The basis of positive science is direct experience, not speculation. Therefore, positivist science proceeds by a study of the “given” (Crotty, 1998).

In this thesis, the researcher will do an interpretive research in order to focus on meanings and to understand what is happening in the company. The researcher will derive meanings and theories from the one-to-one interviews. However, in subsequent discussions that centre on the measurement of strategic capabilities, it will be necessary to focus on facts and numbers that are generated from the interviews. In this tradition, research results are typically obtained through formulation and testing of hypotheses. In each layer of Figure 4.1, the researcher highlighted his choice for research positions in black bold type.

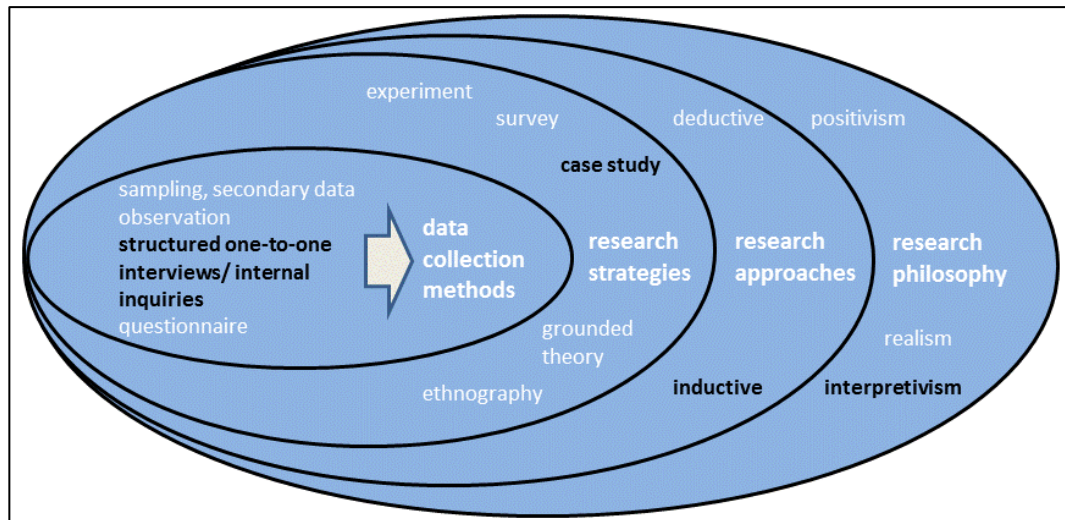


Figure 4.1: Research onion with black highlighted choices (according to Saunders et al., 2003)

Interpretive research allows the establishment of “more complex and interrelated” relationships and is “preferable where subjective assessment is required” (Roberts et al., 2009). An interpretive research philosophy is also a suitable choice when quantitative measures seem inappropriate. Interpretive research also seems “more realistic” than positivism to choose an ethical value perspective. Whereas positivism adheres to the idea of value-free science, the interpretivist attitude acknowledges that human “interests drive science”. This statement underlines the practical relevance of interpretive research and its contribution to professional practice through this research (Dent, 2002).

Research patterns can be discussed in terms of quantity, terminology, and interpretation (Easterby-Smith et al., 2008). Therefore, a researcher faces a multitude of choices when he or she searches for a suitable paradigm (Creswell, 2009). When little is known about a particular phenomenon (Gray, 2009), an exploratory study can lead to valuable insights on topics related to that phenomenon (Saunders et al., 2007). Exploratory research often relies on secondary research methods such as reviewing existing literature and is typically combined with qualitative methods.

Constructivism (or interpretivism) represents an appropriate philosophical position for the researcher because an exploratory study leads to valuable insights. This position further focuses on the way people share experiences and attitudes.

Constructivists accept and assume that the researcher interacts with the research issue and that findings are influenced and “literally created” within the process of investigation (Guba & Lincoln, 1994, p. 111). A further position is manifested in the constructivists’ “own personal, cultural and historical experiences” (Creswell, 2009, p. 9) that support constructivists in refining their research findings, interpretations, and evaluations.

Therefore, the thesis will be written and interpreted from a social constructivist’s view, which is also often described as interpretive research (Denzin & Lincoln, 2011; Mertens, 2010). The research relies on the participant’s views and evaluations of the situation, and their experiences (Creswell, 2009). The researcher is also aware of the fact, that his background and experience in management accounting can influence the interpretation, but can also give further evaluations and proposals to achieve the research objectives. Therefore, the research cannot have the aim and requirement to be totally objective (Easterby-Smith et al., 2008; Creswell, 2009). Creswell (2007) and Crotty (1998) stated several indicators of social constructionism. These indicators or characteristics shall be outlined here since they may have impacts on the researcher’s design and potential data interpretations and evaluations:

- Meanings are interpreted by human beings; thus, open-ended or less structured questions are preferred so that participants can share their views.
- Individuals seek an understanding of the world in which they live and work. They develop subjective meanings of their experiences. These meanings are directed toward certain objectives or issues.
- Researchers prefer to gather information and data personally. Researchers’ interpretations are shaped by their own experiences and professional background.
- The goal of research is to rely as much as possible on the participants’ views and statements of the respective situation.

- The more open-ended the questioning, the better, as the researcher listens carefully to what people say or do in their life setting. Constructivist researchers often address the “processes” of interaction among individuals.
- Meaning is generated by the interpretation by individuals. This favours an inductive approach, where the meaning is generated by the collected data of the study.

As a social constructivist, the researcher intends to gather information primarily through personal interaction such as one-to-one interviews. The involved participants or employees have different experiences and professional backgrounds that determine their meaning and the view of the particular situation.

In order to position and prepare the appropriate questions, an important part of the research strategy is to use the overall research questions to generate sets of sub-questions for the interviews. Thus, it would be logical to show how the questions in the interviews are linked to answering the research questions. Furthermore, it will be valuable to map the interview questions as key words to the research questions. This will be illustrated by a high level process map as depicted in Figure 4.2.

The figure illustrates a first structure and process of the overall research questions (RQ1 etc.) and their requested and expected outcome as key words. The expected outcome is based on the researcher’s experiences in the management accounting department and daily BI processes. These key words represent a basis for developing the respective interview questions to gain valuable responses. The interviews in AOKN were conducted in German.

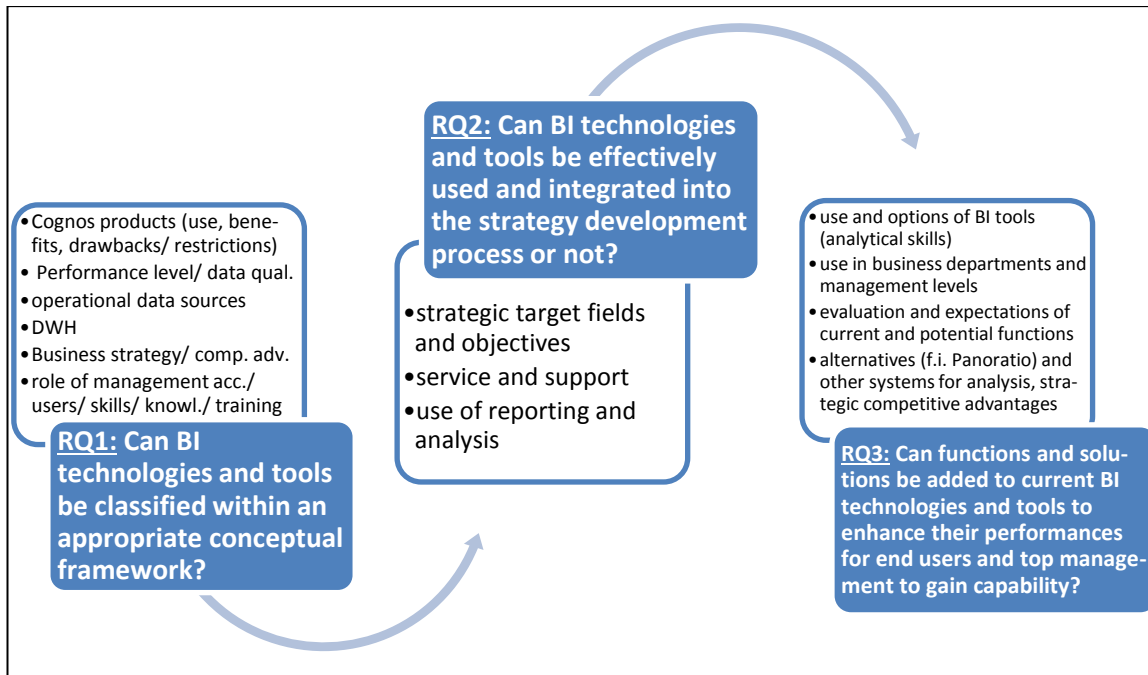


Figure 4.2: High level process map for research question outcome

This process map was chosen because there is a dynamic development and connection between the three research questions. There is a link between each research question that will be outlined more deeply in the analysis and conclusion chapters. Furthermore, a research workflow will be charted to provide a complete account of the process. The potential outcomes and answers from the participants are shown in the white boxes in Figure 4.2. These outcomes do not represent the entire spectrum of possible answers, rather they are represent key ideas and terms. Some of the interview questions have been designed to answer the other two research questions could be asked twice in two different forms, which will underpin this workflow process.

### 4.3 Research methodology

The methodology can be conceptualized as the process or design that provides the foundation for choosing and employing particular methods, which is then linked to the desired outcomes. Thus, this is the research design that shapes the researcher's choice and use of methods. It is not only a description of the



methodology, but also an account of the rationale for the choice of methods and the particular forms in which the methods are employed (Crotty, 1998).

In order to develop the research methodology, the research approach has to be defined. A research approach can be either deductive or inductive. The approach determines the relationship between theory and research. In deductive research, the theory and its derived hypotheses come first, and the research and findings follow (Bryman & Bell, 2011). Strategies of inquiry describe types of qualitative, quantitative, and mixed methods research, depicted as research methodologies (Mertens, 2010). Interviews are techniques that are associated primarily with qualitative methods (Easterby-Smith et al., 2004). The use of qualitative approaches has steadily increased in the past. Furthermore, qualitative research favours an inductive approach. An inductive approach is characterized by searching for emerging patterns only after data collection and analysis, with the aim to construct generalizations, relationships, and theories. This approach relies on pre-existing theories or ideas when approaching a problem (Gray, 2009). Thus, theory will be the outcome of the research (Punch, 2005; Bryman & Bell, 2011).

To answer the research questions, an inductive approach is appropriate because the findings of this research will set the basis for generating new ideas and structures. Although the literature review provided theory and relevant concepts from the literature review, that does not represent a contradiction to the inductive approach. As Gray (2009) stated, pre-existing theories or ideas are beneficial when approaching a problem. Saunders et al. (2009) argued that using combination of the deductive and inductive approaches is possible and can be particularly valuable for generating a guide for future research. Thus, the theory as presented in the literature will be considered as a guide for creating new concepts.

The inductive approach has been chosen for conducting a case study (Yin, 2009) in order to understand it in depth and to generate ideas and meanings from the data. For this purpose, the inductive approach is the most appropriate one (Saunders et al., 2009). Furthermore, this approach suits the researcher's philosophical position as social constructivist. The researcher wants to understand a situation in depth; therefore, the collected data, the meaning, and interpretations

that are derived will be of a qualitative nature. Thus, the inductive approach is the preferred one for being a social constructivist (Creswell, 2009).

Research methodology is divided into three categories: qualitative, quantitative, and mixed method (Tashakkori & Teddlie, 2010). Qualitative and quantitative methods are not mutually exclusive. Studies tend to be defined as either more qualitative or more quantitative (Creswell, 2009). Qualitative methodology collects data that can be expressed mainly in words and uses open-ended questions, whereby the quantitative methodology rather collects data that can be expressed in numbers and use closed-ended questions (Easterby-Smith et al., 2008).

This study is a qualitative one. It was chosen because the researcher wants to explore and understand the individual meanings of the participants as shaped through their experiences and respective business views (Creswell, 2009). Therefore, data will be collected from one-to-one interviews with open-ended questions, in order to give the participants the chance to express their meaning and share their opinions and experiences. The collected data will be of a qualitative nature as produced by the participants.

Interpretations will be derived inductively from the collected data. According to Yin (2009) a qualitative approach is the preferred method when how-questions are asked of participants. The qualitative approach fits well with a social constructivist position (Creswell, 2009).

For the research method, a case study approach will be applied. Eisenhardt (1989, p. 534) defined a case study as follows: "A case study is a research strategy that focuses on understanding the dynamics present within single settings." According to Eisenhardt and Graebner (2007) the case study is a widely used research method within business research. The case study focuses on a single case or a single organization (Easterby-Smith et al., 2008). Bryman and Bell (2011) argued that the case study is particularly appropriate for qualitative methods, because qualitative methods help to examine a case in detail and in a very intensive manner. The case study method is a method that is preferred to answer why and how questions, but can also show which questions can be answered (Saunders et

al., 2009; Yin, 2009). Saunders et al. (2009) argued that for this reason case studies are mostly used in explanatory and exploratory research. In a qualitative approach, the case study typically follows an inductive approach concerning the relationship between theory and research (Bryman & Bell, 2011).

Each method has advantages and disadvantages, depending upon three conditions: the type of research question, the control an investigator has over actual behavioural events, and the focus on contemporary phenomena as opposed to historical phenomena. In general, case studies are the preferred method to use when “how” and “why” questions are asked; the investigator has little control over events and the focus is on a contemporary phenomenon within a real-life context. Nevertheless, some overlapping contents of different methods can be recognized (Yin, 2009). Case studies are designed to illuminate a process, and why and how it is implemented (Schramm, 1971). Therefore, the need to conduct a case study arises from the desire to understand a complex social phenomenon (Verschuren, 2003). According to Yin (2009) case studies are highly appropriate for conducting research on managerial processes. The primary purpose for undertaking a case study is to explore the unique nature of a single case (Simons, 2009).

The strength of a case study is that it allows the researcher to deal with a large variety of evidence such as interviews that would not be available in a conventional historical study (Yin, 2009). Based on the concepts presented above, the case study method is appropriate for the researcher because involved employees of the events can be interviewed and observed to generate valuable data and information for this case.

A common concern about case studies is that they provide little basis for scientific generalization because it is difficult to generalize from a single case (Kennedy, 1976). Thus, the researcher’s goal in this context will be to expand and generalize theories, to create an analytic generalization, and not to enumerate frequencies or to a statistical generalization. Lipset, Trow and Coleman (1956, pp. 419-420) described the goal as doing “generalizing” and not a “particularizing” analysis. This reservation deserves serious consideration because the researcher is trying to

develop generalizations from his research work in order to design a synthesized framework that will provide value to the healthcare industry and AOKN. While it can be difficult to draw generalizations from a single case study, however the potential of case studies can be defended (Verschuren, 2003).

In general, case studies are most often defined by the types of topics to which they apply. The essence of a case study is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result (Schramm, 1971). The case study strategy begins with “a logic of design...a strategy to be preferred when circumstances and research problems are appropriate rather than an ideological commitment to be followed whatever the circumstances” (Platt, 1992, p. 46).

Because phenomenon and context are not always distinguishable in real-life situations, other technical characteristics, including data collection and data analysis strategies, have to be recognized as a second technical definition of case studies (Yin, 2009). The case study inquiry:

- Copes with the technically distinctive situation in which there will be many more variables of interest than data points and as one result
- Relies on multiple sources of evidence, with data needing to converge in a triangulating fashion and as another result
- Benefits from the prior development of theoretical propositions to guide data collection and analysis.

The explanations above show how case study research covers the logic of design, data collection techniques, and certain approaches to data analysis. In this context, case studies are not limited to being only a data collection tactic or simply a design feature (Stoecker, 1991).

This Section introduced the importance of the case study as an appropriate research method for the researcher. The case study design in Section 4.4 will support the researcher’s decision as well. The case study approach is a way of investigating an empirical topic by following a set of specific procedures to gain

valuable information and ideas. It is also a basic goal and recognition of the researcher to consider alternative research methods in given environment of social science research (Yin, 2009).

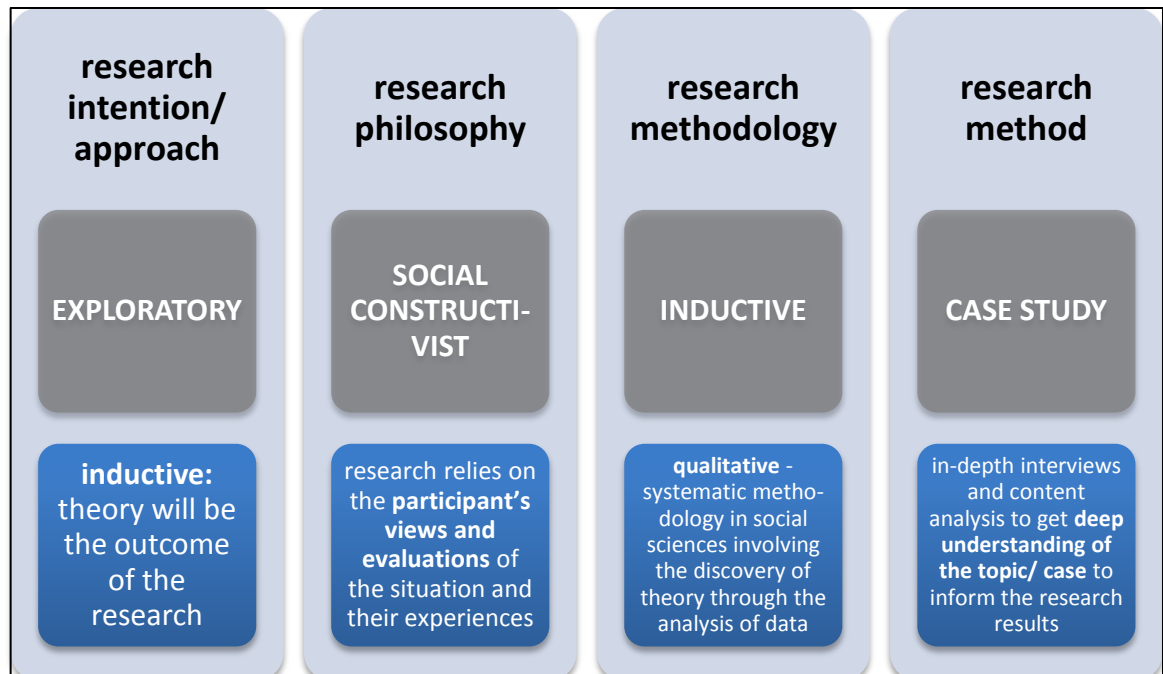


Figure 4.3: The chosen research methodology and design – matching case study to methodology choices

In summary, the researcher uses an exploratory and inductive methodology to generate answers to the research questions. He uses in-depth interviews and content analysis to inform the research results.

Thus, a case study research, using only one single organization, best fits the researcher's philosophical position and the purpose of this study. Figure 4.3 illustrates and summarizes the chosen methodology. A case study is a good vehicle for an exploratory, inductive, and qualitative approach. It allows the researcher to study one case in depth and to use qualitative methods, which enables the researcher to answer the research questions and the sub-questions adequately. A single case method was chosen because it is closely related to a social constructivist position (Easterby-Smith et al., 2008). There are two other reasons why a single case has been selected and why this approach is seen as appropriate for achieving the research purpose:

- The researcher wants to study one particular case in depth and describe and develop strategic capability for a German health insurance company through the deployment of appropriate BI applications based on the specific situation of that one company, AOKN as case study setting.
- AOKN can be an example to explore strategic capabilities along the business strategic target fields. Because BI applications are used primarily to control the company's developments in multiple segments and are used in the management accounting department, it is a highly sensitive topic. Multiple cases would not provide deeper insights by exploring several health insurance companies. Thus, a single case method provides the optimal instrument and opportunity to conduct an in-depth case study research.

A single case enables the researcher to collect data about AOKN in great detail as shown in the interview output (see Appendix). The collected data relates to the nature and "extent of any improvements within the organization" and extent of developing ideas for answering the research questions. Thus, through the ideas and meanings produced from the interviews, the case study will be multifaceted. The following characteristics of AOKN, the situation and market-orientation are also reasons to conduct a single case.

#### **4.4 Case study design**

The researcher will use the case study as a qualitative research method to answer the research questions and gain a deep understanding of the research topic. To deepen the selected case study design at this point, the heart of the case study protocol of Yin (2009) is to create a set of substantive questions that reflect the researcher's actual line of inquiry. It is a requirement for the preparation to collect case study evidence: a general orientation of questions is needed to get the necessary information. The protocol contains procedures and general rules to be followed. The contents of a protocol for conducting case studies include an

introduction to the case study, hypotheses and propositions, data collection procedures, an outline of a case study report, the practice of case study questions, and a final evaluation (Yin, 2009).

Once the case study has been identified as the appropriate research method, it is necessary to design the case study (Yin, 2009). The research design will guide the researcher through the process of collecting, analyzing, and interpreting the data for the study (Frankfort-Nachmias & Nachmias, 2007). It is important to define the case or the unit of analysis in order to determine what data are relevant, how the data are collected, and finally how these data are analyzed and interpreted (Yin, 2009).

The selection of cases and their focus are important aspects of building theory from case studies (Eisenhardt, 1989). Cases can be based on a person, a classroom, an institution, a programme, a policy, or a system. The literature indicates that a determination should be made of whether to expand the research to include processes, policies, or events (Simons, 2009). Stake (1995) viewed the case as an integrated system focusing on specifics rather than generalities: “The case is a specific, a complex, functioning thing” (p. 2).

The research design is the logic that links the collected data and conclusions to the initial questions of study. Every empirical study has a research design, which can be either implicit or explicit. Articulating “theory” about what is being studied and what is to be learned helps to operationalize case study designs and make them more explicit (Yin, 2009).

The first step of the study design is structuring the case before any data is collected (Yin, 2009). This includes deciding whether the case study will be a single or a multiple one and the determination of the unit of analysis. The choice should best enable the researcher to explore the research problem. However, formulating a problem is not the only way to decide what the case is. Leaving aside the issue of where the case is a given, it may be that the researcher will choose a case in which he has a specific interest. In that circumstance, a problem

is not stated. Often, a problem is not stated, but intent is to understand what is happening in the case (Simons, 2009).

For case studies, five components of a design are significant (Yin, 2009):

1. A study's questions,
2. Its potential propositions,
3. Its unit(s) of analysis,
4. The logic linking the data to the propositions and
5. Criteria for interpreting the findings.

The study questions are the research questions that define the object of study and are appropriate to the level of the proposed degree.

For the second component of a single case, each proposition directs attention to something that should be examined within the scope of study. If the researcher wants to answer the research question of how BI tools can be used most effectively and integrated into the strategy development process, then the researcher might have different assumptions or information about strategic fields and BI tools. Thus, the researcher begins with a rationale and direction, even if the researcher's initial assumptions are later proved wrong (Wilford, 1992).

The third component, the unit of analysis, is related to the fundamental problem of defining what the "case" is and has engaged many investigators at the outset of case studies (Ragin & Becker, 1992). The unit of analysis in this study will be a particular company and the potential generation of strategic capabilities. As mentioned above, AOKN provides a suitable platform because of its use of different BI applications for exploring and generating ideas and meanings for the strategic management and development process. The company is perceived to be a good choice for generating valuable research results; therefore, the choice of this particular company is justified.

The fourth and fifth components impact the data analysis steps in case study research. The actual analyses require the researcher to combine or calculate the



case study data as a direct reflection of the initial propositions of the study. Thus, the design should indicate to the researcher what is to be done after the data have been collected, as specified by the logic linking the data to the propositions and the criteria for interpreting the findings (Yin, 2009).

As derived from the overall research questions, the following sub-questions will be asked in structured one-to-one interviews. Tables 4.3 to 4.5 illustrate the one-to-one conversation guide of the three research questions structured as a case study design. The expected outcome and even the operationalization of the structured review of the current literature (see Table 2.3) guide the research questions. The sub-questions and research questions should be answered with the help of descriptions, explanations, and ideas given by the participants. The investigator should build the respective theory from the responses related to developing strategic capabilities and benefits for AOKN. This interview guide will be the primary source of case study information and the data collection. The interviews will be guided conversations rather than structured queries as shown by the interviews with the agent to CEO or the director of physical department. Although the researcher will be pursuing a consistent line of inquiry, his actual stream of “semi-structured” questions in the interview is likely to be fluid rather than rigid (Rubin & Rubin, 1995).

Table 4.3: One-to-one conversation guide of first research question

<b>First research question, interview questions and definitions</b>
<p>Explanations and background information towards research thesis, topic, contents and objectives. Definition and analysis of exploratory research case study and this interview method for collecting relevant data. Gathering an extensive understanding with regards to BI applications, Cognos products, data knowledge and sources, strategy and objectives of the AOKN and the BI reports/ analysis and their contribution to any competitive advantages. After each question the researcher made sure if the participant has understood the question.</p>
<p><b>First research question:</b>  <b>Can BI technologies and tools be classified within an appropriate conceptual framework?</b></p> <ol style="list-style-type: none"> <li>1. What do you associate with BI and its purposes? Can you define an “intelligent business”?</li> <li>2. What BI tools do you use?</li> <li>3. What are they used for (and thus, what is your role/ task/ job)?</li> <li>4. What are the benefits and advantages for you/ for AOKN?</li> <li>5. What are the drawbacks/ restrictions?</li> <li>6. What do you think of the user interface?</li> <li>7. What is the performance level for your reporting like?</li> <li>8. What data can you access with the BI tools?</li> <li>9. Where is the data stored and is there an “easy” way to access data sources?</li> <li>10. Do you generate reports or data analysis yourself?</li> <li>11. What skills are needed to use BI technologies and tools?</li> <li>12. What knowledge of the data is needed? Are you able to make sense of all this quantitative information?</li> <li>13. What training or briefing have you had and is it adequate for your purposes?</li> <li>14. What do you think of the current quality of reports in AOKN?</li> <li>15. Are these used for strategy development or operational KPI reporting?</li> <li>16. What do you think of the role, role perception (and support) of management accounting?</li> <li>17. Do they (reports, analysis, KPI) clearly provide any competitive advantage, do you think?</li> </ol> <p><i>Likewise an estimation on a scale 1 to 10 (10: very high / 1: very low).</i></p> <ol style="list-style-type: none"> <li>18. <i>Miscellaneous remarks and/ or ideas relating to these research questions?</i></li> </ol>

Table 4.4: One-to-one conversation guide of second research question

<b>Second research question, interview questions and definitions</b>
<p>Explanations and background information towards research thesis, topic, contents and objectives. Definition and analysis of exploratory research case study and this interview method for collecting relevant data. Gathering an extensive understanding with regards to BI applications, Cognos products, data knowledge and sources, strategy and objectives of the AOKN and the BI reports/ analysis and their contribution to any competitive advantages. After each question the researcher made sure if the participant has understood the question.</p>
<p><b>Second research question:</b>  <b>Can BI technologies and tools be effectively used and integrated into the strategy development process or not?</b></p>
<p>19. How do you define strategy and the development process yourself? Is there a strictly defined and implemented strategy development process in AOKN?</p> <p>20. Does it make sense to define a strategy process in future or to adjust the current “strategic components” in AOKN?</p> <p>21. What are AOKN’s business strategy (strategic target fields) its objectives, and how can business strategy be enhanced?</p> <p>22. What is the difference between operational vs. strategic reporting in AOKN’s world?</p> <p>23. Can current BI reports, analysis, dashboards etc. be useful to strengthen the business strategy and/ or its development process?</p> <p>24. Which forms of reports (functions, contents, structures, performances etc.) should be developed to generate a clear contribution to business strategy?</p> <p>25. What service and support is required to use reports in this process?</p> <p>26. <i>Miscellaneous remarks and ideas relating to these research questions – please answer the research question!</i></p>

Table 4.5: One-to-one conversation guide of third research question

<b>Third research question, interview questions and definitions</b>
Explanations and background information towards research thesis, topic, contents and objectives. Definition and analysis of exploratory research case study and this interview method for collecting relevant data. Gathering an extensive understanding with regards to BI applications, Cognos products, data knowledge and sources, strategy and objectives of the AOKN and the BI reports/ analysis and their contribution to any competitive advantages. After each question the researcher made sure if the participant has understood the question.
<p><b>Third research question:</b>  <b>Can functions and solutions be added to current BI technologies and tools to enhance their performance for end users and top management to gain capability?</b></p> <p>27. What do you know about competitive advantage and capability (in general)?</p> <p>28. What do you think about the competitive situation of AOKN in certain strategic fields?</p> <p>29. What requirements do BI reports have to have to generate competitive advantage and capability (data sources, big data structures, aggregate data structures, special functions etc.)?</p> <p>30. The focus is on end users ("don't lose them!"). What about strengthening multidimensional analysis options? Are these aggregated data structures a good basis for decision-making and therefore strategy development through top management?</p> <p>31. Can knowledge building of analytical skills to understand and use analytics ("keeping up with the quants") be a fundamental solution?</p> <p>32. How can deployment in business departments and certain management levels be increased and sensitized to force "win-win-situations"?</p> <p>33. What are the expectations (and evaluations) of current and potential functions? Do we have to change perspectives with the aim to offer additional benefits and to find out what customers really want?</p> <p>34. Can an organization "relaunch" be useful to abolish rules or certain authorities?</p> <p>35. Which analysis alternatives (f.i. Panoratio, SPSS Modeler/ Statistics) can be enhanced to handle unstructured data?</p> <p>36. What do think about data scientists? Is it necessary to develop data algorithms?</p> <p>37. <i>Miscellaneous remarks and/ or ideas relating to these research questions?</i></p>
<p><b>Summary and remarks</b></p> <p>Summarizing the key facts and statements at the end of each research question. The investigator and the participant should summarize and discuss distinctive features or difficulties in understanding if applicable. The participant should give recommendations, evaluations and remarks concerning interview structure, content, output, sources, literature and further potential adequate contact persons as participants, if necessary. The summary should be made by both sides in order to avoid misunderstandings and inadequate deductions.</p>

These questions were asked in German because AOKN is a German health insurance company. Further, it is easier for the participants to express and formulate their responses, evaluations, ideas and to gain an in-depth understanding of the topic and objectives. Furthermore, the interviews were structured so that the same questions will be asked of all participants according to the (German) interview guide. The raw interview material in German will be presented in the appendix. The following sections specify the target audience, which is the group of interview participants that serve as respondents in the data collection process. Furthermore, an insight into interview samples will be given.

## 4.5 Data collection

Case study evidence comes from different sources. Using these sources requires different data collection procedures. Each source is associated with an array of data or evidence. Simons (2009) stated that the most commonly used method for case studies is the interview process, which will be discussed in depth. Compared with other methods, interviews enable the researcher to discover the main issues in the case more quickly and in greater depth, to probe motivations, attitudes, perspectives, to ask follow-up questions, and to facilitate individuals to tell their stories, and to describe their views or needs (Simons, 2009).

The interview form is one of the most important sources of case study information (Yin, 2009). However, interviews guide conversations rather than structured queries, so that the researcher's current stream of questions in a case study interview is more likely to be fluid rather than rigid (Rubin & Rubin, 1995). Throughout the interview process, the researcher has two tasks (Yin, 2009):

- To follow his own line of inquiry, as reflected by his case study planning or documentation and,
- To ask his questions in an unbiased manner that serves the needs of his line of inquiry. For instance, the researcher wants to know (in the line of inquiry) "why" a particular process occurred as it did.

Case study interviews require the researcher to operate on two levels at the same time: satisfying the needs of his line of inquiry (level 2 questions) while simultaneously asking "friendly" and "nonthreatening" questions in his open-ended interviews (level 1 questions) to maintain the conversation "flow" (Yin, 2009).

One type of case study interview is the in-depth interview. One can ask key respondents about the facts of a matter as well as their opinions about events. In some situations, the researcher may even ask the interviewee to propose her or his own insights into certain topics and may use such proposals as the basis for further inquiry. The "interview" may take place over an extended period of time, not

just a single setting. The interviewee can also suggest other “topic-involved” persons for the researcher to interview, as well as other sources of evidence (Yin, 2009)

A second type of case study interview is a focused interview (Merton, Fiske, & Kendall, 1990), in which a person is interviewed for a short period of time, an hour for instance. In such cases, the interviews may still remain open-ended and assume a conversational manner, but the researcher is more likely to follow a specific set of questions that were derived from the case study planning. Furthermore, the researcher has to appear “neutral” without any prejudices or previous knowledge of relevant issues to get the “right” answers. Probing for information is necessary. One way is to test the sequence of events if to deliberately check with persons known to hold different perspectives. If one of the interviewees fails to comment, even though the others tend to corroborate one another’s versions of what took place, the good case study investigator will note this in the case study documentation. It is important to record when respondents decline to comment as based on the best practices of journalism (Yin, 2009).

A third type of interview entails more structured questions, and is similar to a formal survey. Such a survey produces quantitative data as part of the case study evidence. This situation would be relevant, if the researcher were to conduct a case study of an urban design project and surveyed a group of designers about the project (Crewe, 2001), or if he or she did a case study of an organization that included a survey of workers and managers. This type of survey would follow both the sampling procedures and the instruments that are used in regular surveys, and it would be analyzed in a similar manner. The difference would be the survey’s role in relation to other sources of evidence (Yin, 2009).

Well-informed interviewees can provide important insights into events and they can also provide details about events, which helps the researcher to identify other relevant sources of evidence. A common question about doing interviews is whether to record them. Using recording devices is a matter of personal preference. However, audiotapes provide a more accurate rendition of an interview than other methods (Yin, 2009). For this thesis, the researcher will use

this method during the interview process. The researcher will use the in-depth interview type as data collection method because of the following reasons:

- The selection of the appropriate interview group of BI involved and experienced employees in AOKN provides an optimal basis to develop ideas and different views of the research topic
- The level 1 questions can be posed in a simple way because the researcher has a professional management accounting background with Cognos BI experiences and can ask appropriate questions and follow his initial inquiry
- Well-informed interviewees can provide important insights and perspectives. For instance, a regional quality manager responsible for cost-efficiency of sickness benefits can give advice and proposals for relevant ratios that can be developed in a Cognos BI reporting.
- The interviewees recommend other relevant corporate sources such corporate intranet, professional meetings, internal presentations, or other BI end users
- Individuals employed in management accounting and business management are suitable as interviewees based on their direct connections to the CEO and management board, which means that the interviews will be influenced by all relevant strategic and decision-making levels
- To explore the interviewees' perspective on the topic (Patton, 1980, p. 196, cited by Simons, 2009), which means discovering what interviewees think about BI strengths, weaknesses, experiences, or future potentials. That will allow the interview to address multiple issues.
- To develop an active engagement and learning for researcher and participants in order to identify and analyze issues (Simons, 2009) and strategies together
- To enhance and maintain flexibility within the interview process so that a different perspective can be considered, such as those from employees, regional directors, or top management
- To create "potentials for uncovering and representing unobserved feeling and events that cannot be observed" (Simons, 2009, p. 43). Interviewees should feel a relationship of trust with the interviewer and be assured that

comments or statements, internal documents, or information from meetings will be handled with confidentiality. However, the interviewees should be informed that the gathered information will be used in the research.

Because of these reasons, the interview form is appropriate for this research to get meaningful results. For a detailed description and definition of certain BI applications and their opportunities to generate manifold business advantages, quantitative data collection methods such as questionnaires are unsuitable because they focus on getting limited information from a large group (Robson, 2002). BI end users represent only a part of the AOKN workforce. However, they can make important decisions about BI use for the company and/or provide relevant information to business management. The researcher intends to gather in-depth information from a small number of participants in AOKN in order to answer the research questions. The interview group will be introduced in the next Section.

#### **4.5.1 Interview groups and profiles**

The researcher decided to avoid a process mapping approach in favour of a more informal process involving those employees who are engaged in BI business or strategy development processes. This can be viewed as a subjective choice based on the professional experience of the researcher. However, these employees all have a certain responsibility and depend on BI applications. Therefore, this Section specifies the target audience that will serve as participants in the data collection process via one-to-one interviews. It is important to describe the professional backgrounds of the interviewees and to understand their contribution and expectations of information systems and BI practice. The job descriptions are made analogue the current AOKN job characteristics in 2013.

Concerning the selection of the AOKN employees as interviewees, nine employee types are of primary interest with regard to answering the research questions. Those employees were selected by the researcher; they act as BI end users or have access to certain BI solutions such as reports or analysis platforms.



### **1. Authorized agent to CEO and manager of corporate development division**

The authorized agent to CEO is the business manager of corporate development division, which includes the management accounting department. This individual brings to distinct advantages to the interview process. He has direct contact with the CEO and can give recommendations and information about relevant developments from management accounting and other departments. Thus, through this interview he can actively create ideas and meanings and these statements will come directly from AOKN's top management. Those statements can be evaluated as prioritized recommendations and potential requirements for the corporate strategic process. Therefore, this person is appropriate for such an interview.

### **2. Marketing director**

The marketing director from the AOKN region "Mittelweser" near the city of Bremen is responsible for the regional acquisition marketing of private and business clients. The objectives of this position are characterized by goal-oriented planning and the control of distribution and marketing, which is intended to achieve the acquisition and cancellation objectives. The mentoring of the current client base is also an operational objective. The professional tasks of the marketing director are the implementation and development of marketing strategies, the planning, control and supervision of marketing activities, the selection of target customer groups for certain activities, and the analysis and evaluation of marketing results.

### **3. BI consultant (from novem business applications GmbH)**

The BI consultant from novem is the team leader of the BI developer for the entire management accounting division. The BI developers are responsible for data processing in the DWH. This means that they extract, prepare, and provide defined data structures and contents from relevant tables for reporting and analyzing activities that will be developed by management accounting. After consulting management accounting employees, the

developers create professional requirements and implement these requirements as a data processing concept. In short, the BI consultant is the leader of the BI developers as Cognos software engineers of the management accounting employees for certain fields.

#### **4. Management accounting employee**

This employee follows strategic and operational alignments. The strategic alignment includes the support of the strategic corporate planning and the self-dependent implementation of strategic plans in the operational target and planning process. Here specific analyses and reports for top management and goal-oriented executive managers and other organizational units will be required. The operational direction speaks to the development and maintenance of the reporting system and valid reporting ratios and forecasts. This information system with its ratios will be enhanced and evaluated by the management accounting employee who will make recommendations for management for enhancing the operational processes.

#### **5. Director of the management accounting department**

The director of the management accounting department is responsible for the implementation and development of a controlling/ management accounting system for improved control of the business management divisions market, ambulant and stationary in the context of the strategic target system to guarantee a long-term corporate survival. This target system must be improved with due consideration of an efficient receipts and expenditures optimization and innovative healthcare management approaches. The director coordinates the consolidation program of the company, and supports and advises the CEO in matters of company control, target systematics, and consolidation. The director also creates specific analyses for the CEO. He further supports the business manager and regional directors in terms of division control of the certain target and activity fields.

## **6. Performance analyst**

The performance analyst works directly for the marketing business manager and prepares data, analyses, and evaluations for him. This analyst has access to the majority of reports and analyses from the management accounting division and can also create his own reports. He also supports the business manager market strategy in terms of the control of the business divisions by preparing and moderating target achievement conversations, action plans, developing measures for counteractions, and monitors of results. He also makes specific analyses and preparations that have not been executed by the management accounting department. He lends additional support to internal projects and manages those. Therefore, this employee has strategic and operational tasks.

## **7. Director of management accounting for health care**

The director of management accounting healthcare is responsible for the field of healthcare management, which includes: the activity fields hospital management, DMP, outpatient care, dental prosthesis, pharmaceuticals, and healthcare management for integrated health care. He develops and enhances standardized perspectives for corporate reporting and analysis activities. In 2011, he coordinated the BI implementation project for several fields. Thus, the director is an ideal subject for the topic and can provide valuable recommendations and viewpoints.

## **8. Director of the health care management department**

The director is responsible for the enhancement of the AOKN sustainability of healthcare management implementation. Healthcare management targets specific healthcare forms that address cost effectiveness. He conducts and instructs the observation of the market and the competition observation in order to identify specific healthcare needs.

## **9. Director of physical therapy department**

The director of physical therapy department is responsible for the cost-efficient approval and accounting of different types of physical therapy such as massages or speech therapies.

In reviewing the nine interview groups and twelve participants from those groups, the overall homogeneity diverges from only providing or analyzing data or information through BI applications. The activities and potential understanding of their analysis profession can be seen as higher for management accounting employees and regional professional quality manager more than other groups. Table 4.6 shows the use, objectives, and typical activities associated with BI, and is a subjective evaluation and observation of the researcher.

Table 4.6: Current use, objectives and activities for different interview groups

interview groups:	BI gateway (using BI components, f.i. dashboards)	installation and further development DWH and data bases	report creating (Cognos Report Studio)	ad-hoc analysis (Cognos Analysis Studio, Panoratio)
top management (authorized agent to CEO)	✓✓	×	×	×
business management (directors of departments management accounting, health care management and physical therapy)	✓	×	×	×/✓
management accounting employees	✓	×/✓	✓✓	✓
regional business division (marketing director)	✓	×	×	✓✓
BI developer team leader (BI consultant)	✓	✓✓	×/✓	✓
business division (director of management accounting health care)	✓	✓	×/✓	✓
performance analyst	✓✓	×	×	✓

- ✓ = regularly use
- ✓✓ = intensive regularly use
- × = no need or access
- ×/✓ = both regularly use and no need

The green check marks and red crosses represent the current activities or demands and requirements for BI and can be seen as significant for the interview and for the entire company as well. This inventory must be critically evaluated by questioning the participants about current functions and opportunities to optimize the BI applications and to generate values from big data. Therefore, the potential responses from the participants must be examined against the background of their current position and degree of BI use.

The BI user group and their requirements for technical and professional knowledge can be presented on the basis of the following matrix in Figure 4.4. Objectives of the BI user group are the dissemination and advancement of BI development know-how in AOKN. Additional objectives are the creation of a particular network and the development of best-practice solutions.

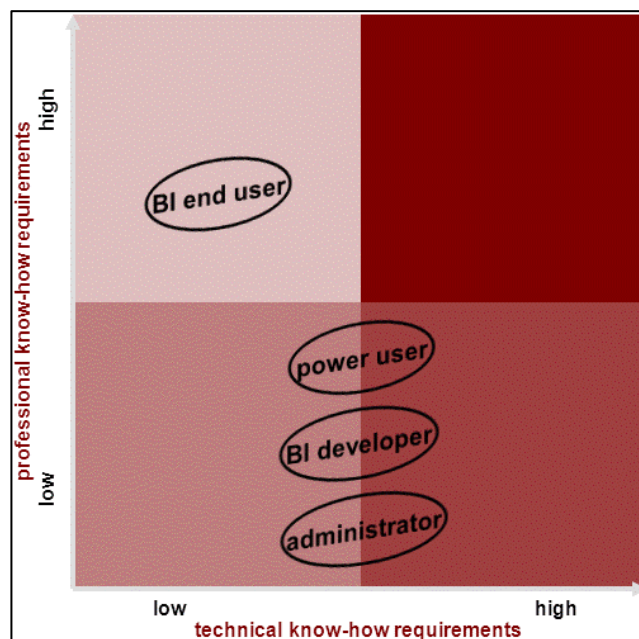
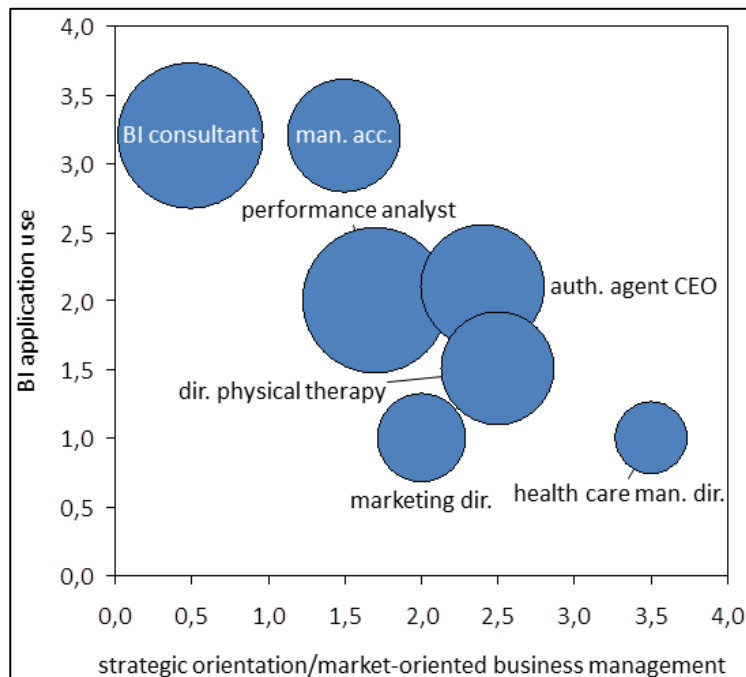


Figure 4.4: BI user group and requirements (according to AOK Systems GmbH, 2013)

Thus, the interview participants have different professional backgrounds and also different responsibilities. For example, the authorized agent to CEO is required to have a higher degree of strategic thinking as opposed to employees in management accounting or employees of result control who are more involved in BI application use. This is, according to the job description, with the strategic

orientations at five percent. Therefore, the level of detail for relevant terms is different as Figure 4.5 illustrates.



The abbreviations in this chart can be defined as follows:  
 man. acc. – management accounting employee  
 auth. agent to CEO – authorized agent to CEO  
 dir. physical therapy – director physical therapy  
 marketing dir. – marketing director  
 health care man. dir. – health care management director

Figure 4.5: BI and strategic orientation/ market-oriented business management – level of detail from interview responses

The two dimensions were defined to discover the appropriate characteristics for the research issues and to answer the research questions in an optimal way. The vertical scale stresses the degree of participant involvement in BI applications or processes. The horizontal scale defines the strategic orientation or market-oriented business management engagement according to the participant job characteristics. The size of the circles characterizes the extent of job potential and focus. For instance, the job focus of the BI consultant is vast as shown by the assessment of BI applications (3,2) and strategic orientation (0,5). Therefore, this portfolio matrix with both dimensions and its particular degree offers a picture of whether the participant is suitable subject with regard to relevant information for a BI conceptual framework.

It can be assumed that all participants have a certain relationship and engagement in either strategically oriented and market-oriented business management, uses and understands BI applications with all their components (products, analyses opportunities, support to end users etc.).

#### **4.5.2 Interview samples and coding**

The empirical data collection was performed through in-depth interviews. These interviews with twelve employees in all from the respective interview groups were conducted from July to August 2013, and in November 2013, in AOKN Hanover. The target employees were presented in Section 4.5.1.

The interview situation can be described as follows. Typically, the interview began with a few moments of light discussion of the current situation, why doing a DBA research, and in most cases, the participants and researcher were known to each other. The participant was then asked if they were comfortable in proceeding with the interview. No participants expressed the desire to excuse themselves from the interview. The digital voice recorder of the researcher's mobile phone was then placed on the table, and the participant was asked if he/she had any concerns with the interview being recorded. Some participants did understand the interview being recorded in order to accurately document the proceedings. However, other participants wished not to record their interviews. All of the participants expressed the opinion that they were comfortable with the interview topic and the research questions that were designed to identify valuable drivers. Therefore, no changes were made to the interview guide. Prior to and throughout the interview, the comfort of the interviewee was monitored, and efforts were made to ensure that rapport and trust was established and maintained between interviewer and interviewee (Charmaz, 2003; de Vaus, 2002; Ryen, 2003). The German interview guide, which provided raw interview material will be presented in the Appendix.

Concerning the sample size, two to ten participants or research subjects was sufficient to reach data saturation and Creswell (1998), pp. 65 and 113, cited by Groenewald, 2004) recommended "long interviews with up to 10 people" for a

phenomenological study. The example of Creswell selected ten managers of a certain enterprise. Quantitative research is often associated with large sample sizes and is not intended to provide in-depth results. In contrast, qualitative research provides the opportunity to gain deep insight into a topic. The objective of this thesis is to accrue a sample that will permit an in-depth understanding of the topic (Lapum, 2009). Indeed the sample size of twelve AOKN employees was ideal and a number of insights were generated from the interviews. That result supports the purpose of data analysis in emerging research domains that are characterized by qualitative data collection (Edmondson & McManus, 2005).

Generally, the interviews will be audio-recorded, if the participant agrees, and point form notes will be taken during the interviews in order to guide further probing and form preliminary field notes. The analysis should value the messiness, depth and texture of life's experiences (Etherington, 2004). Therefore, this analysis tries to capture the various components of participant's stories and represents the story the way it was told reflecting all of its complexities.

The respective audio files will be transcribed by the researcher after each interview as soon as possible. Transcription means that oral data, for instance audio mp3, will be rendered into a written representation (Sandelowski, 1994). The transcript will not be verbatim because there is an interpretive character to transcription associated with linguistic nuances. Therefore, speed, tone, silences, and pauses will be noted, for instance as "pause" in the transcript. After transcription, the transcript will be verified with the audio records by reading the transcript while listening to the audio record.

A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative or essence-capturing attribute for a portion of language-based or visual data. The data can consist of interview transcripts, field notes, or journals (Saldana, 2008). The process of coding involves aggregating or focusing the text or visual data into several categories of information, seeking evidence for the code from different data bases being used in a study, and then assigning a label to the code (Creswell, 2007). Therefore, the researcher seeks to create main categories as codes and the respective answers and statements of the



participants will be assigned to these main categories (Saldana, 2008). The Appendix Figure 6 illustrates the intended mind mapping structure and coding scheme. Because it is much detailed, an extract will be given.

The interviews as primary data source are a highly efficient way to gather rich, empirical data, especially when the phenomenon of interest occurs infrequently. Data presentation is very important and case data cannot be easily or tightly summarized because much of it consists of rich qualitative detail. Finally, the researcher should provide a visual theory summary such as “boxes and arrows” diagram or summary table (Eisenhardt & Graebner, 2007).

The data interpretation and different ways to illustrate them appropriately to the audience will be presented here. Providing extensive tables or clearly represented figures and diagrams can be an essential summarized visual theory for the reader in this research process (Eisenhardt & Graebner, 2007).

It is possible that the interview environment might create influenced responses. Each interview was conducted in a formal environment at a venue of the participant’s choice, at either the interviewee’s workplace or a chosen meeting room. This allowed a level of familiarity and comfort to the proceedings (Sarantakos, 1998).

Before the main interviews took place, the researcher conducted a test run with a management accounting employee to validate the clarity and information value of each interview question. This pilot interview was conducted on 16 July 2013 and can be seen as a starting point for case study research. The aim of the pilot interview was to prepare for the main interviews and to enhance the interview technique. Although the data collection from this interview will not be used as case study findings, the responses, experiences, and reactions will be depicted in this chapter. In this case, no tables are created but findings are presented in the form of a high level process map generated from the interview contents (Figure 4.6).

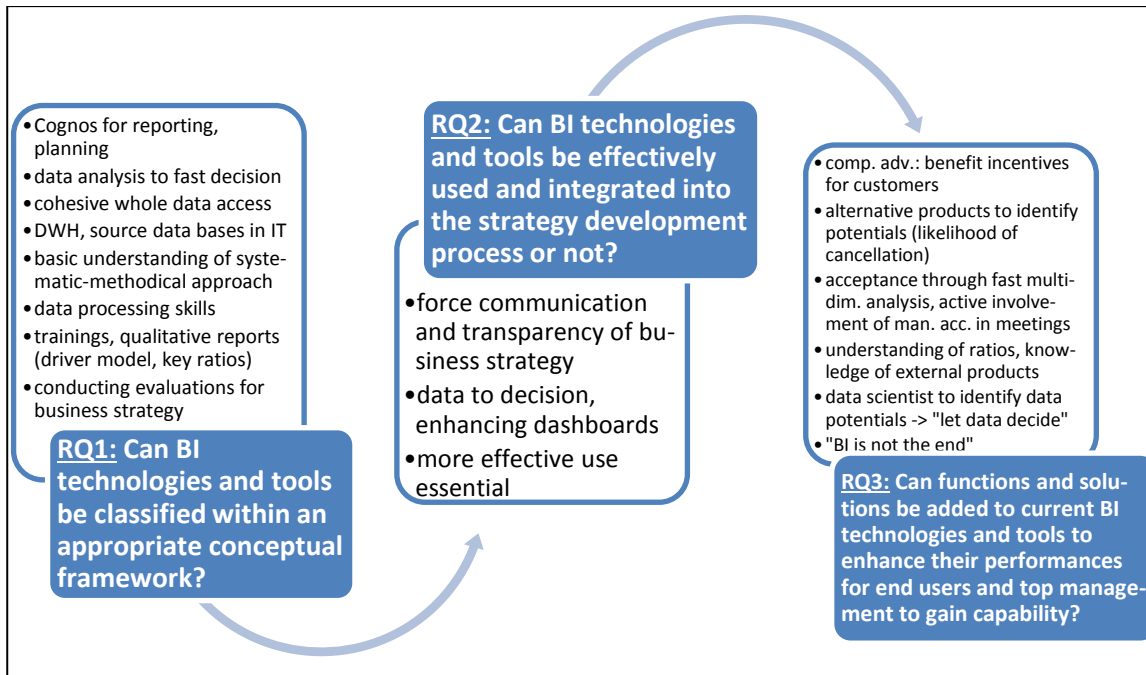


Figure 4.6: High level process map generated from the pilot interview contents

In the following, the statements of the pilot interview will be summarized to show an overview of the potential responses. During the RQ1 block, the participant focused on Cognos products as mainstream report tools. In the management accounting department there is access to data structures in the DWH and to further data sources from operational systems. For employees who are involved in analysis processes, it is important to get a basic understanding of systematic-methodical approaches in order to manage data amounts. The reports are currently on an appropriate level concerning transparency, effort, and meaning. However, they have to be enhanced continuously to serve concrete business needs (pilot interview).

During the sub-questions for the second block (RQ2) the participant mentioned that the communication and transparency of business strategy should be encouraged within AOKN. That improvement would lend clarity to how BI technologies and tools could be effectively integrated in the strategy development process. "Data to decision" is a relevant topic that implicates the enhancing process of dashboards for business management. Structured data presentations should be used to make decisions. The more effective use of BI tools is essential to harmonize data contents and structures (pilot interview).

The last question block clarifies the terms competitive advantage and capability, which means providing additional benefits to customers. Alternative products should be considered, and potentials should be identified, such as the likelihood of cancellation. The acceptance for BI technologies has to be strengthened through the active involvement of management accounting employees in professional meetings in order to raise the corporate understanding of relevant ratios. The job of data scientists could be discussed as well. In the future, these employees should be able to coax data treasures and to identify relevant data correlations with the help of algorithms (pilot interview).

In conclusion, this chapter addresses the hard-to-measure nature of the domains connected in this thesis, such as strategy or capability, through BI applications, which makes qualitative research an appropriate choice. In-depth expert interviews are given preference over other qualitative approaches such as ethnography or collaborative research. To ensure a sufficient similarity among solicited respondents, the interview groups are further focused. The interview groups are interviewed to explore the transfer of BI deployment to business strategy and potential advantages. This will guarantee a high degree of BI professionalism, flexibility, and development capabilities, which will provide high quality statements and recommendations to the researcher. Furthermore, he further can use his experience as employee in the management accounting department to develop valuable meanings or theoretical solutions. Figure 4.7 summarizes the research process and design and includes the contents and objectives of the research questions, research objectives, and the case study method with the interview groups and in-depth interviews for the data collection process.

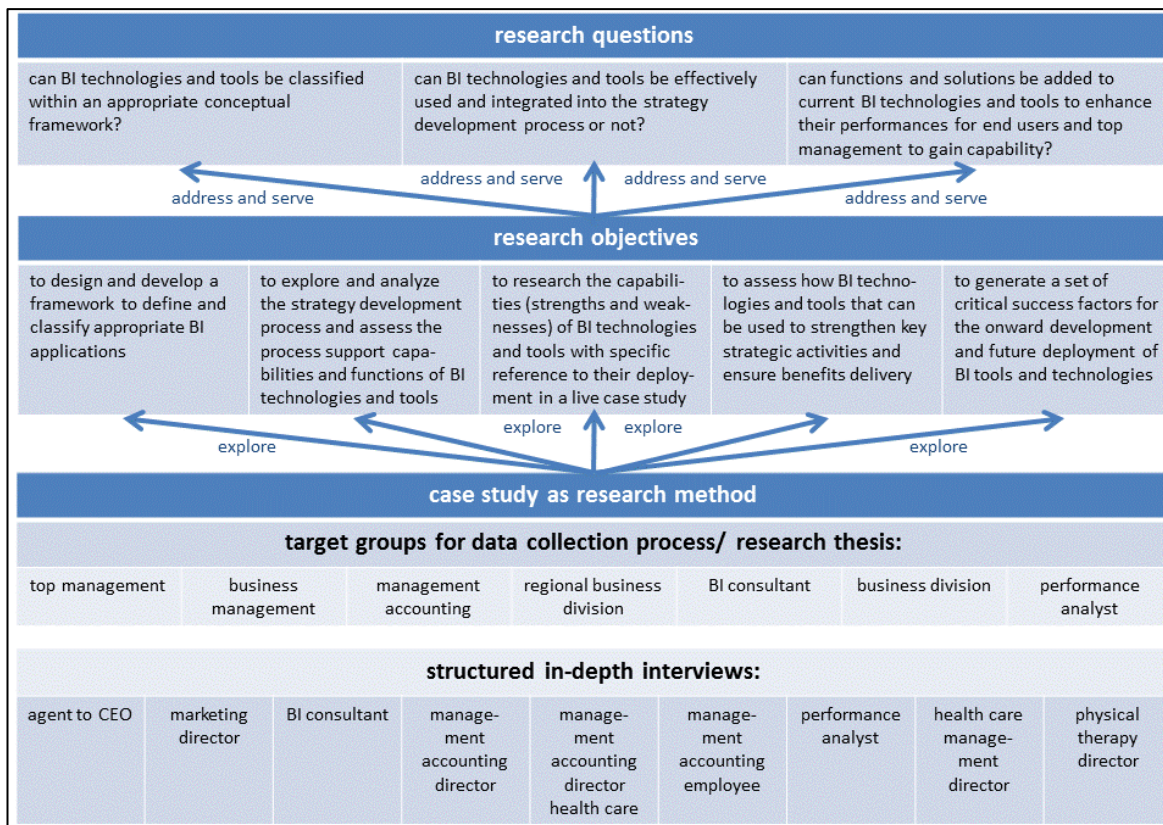


Figure 4.7: Summary of research process and design

The case study findings in chapter 5 will examine potential BI applications that could be used to generate strategic capabilities for AOKN. Research will also focus on how BI applications can be implemented as information and control instruments in the strategy development process. The chapter gives an account of the findings and analysis of the proposed research design and method. This will be the basis for building a theory from the case, which will be analyzed further in chapters 6 and 7.

## 4.6 Ethical considerations

This research thesis has been developed with assistance from the researcher's organization (AOKN). The researcher was given executive approval to undertake this research and has been working for the management accounting department for a period of six years. This enabled the researcher to build up a network of BI involved colleagues, which proved essential to conducting qualitative research.

The interviews and collaborations were based on trust, honesty, and mutual respect.

The main ethical considerations in this research are as follows: as stated in “Appendix 1 Research Ethics - The Principal Issues of Research Ethics: A Handbook of Principles and Procedures,” free informed consent will be guaranteed to AOKN and the participants involved in the research. The researcher will explain to the participants involved in the research the aims and nature of the study, its duration, and how the results will be disseminated. Consent will be indicated by signature for both AOKN and participants. As stated further in Appendix 6 of the *Handbook*, the data obtained will be stored with all precautions and released without any identifying information. The researcher will make the participants’ names anonymous in his study and use only their respective business titles. In particular, the anonymity of all interviewed individuals is respected and their responses treated in a confidential manner.

Flick (2009) holds that all aspects of the research process have ethical implications. Ethical theory is linked to four issues: non-maleficence, beneficence, self-determination, and justice. Yin (2009) suggested that a researcher conducting a case study has an obligation to follow ethical practices that include working with special care and sensitivity, gaining informed consent of participants, and as protecting the privacy and confidentiality of those who participate.

All conducted interviews were performed on the basis of a mutual agreement and trust because the researcher has many internal contacts and relationships and selected well-known colleagues. Therefore, data collection is accomplished on the basis of mutually agreed upon and informed consent. In addition, sensitivity was shown regarding demanding work schedules and the working conditions of respondents. Certain issues that arise in “ethics in qualitative field research” (Babbie, 2004, p. 306), do not apply to this thesis. Those issues include: paying people for their opinion, taking sides, or not responding to severe needs. The author of this thesis furthermore commits to excluding any organizations or individuals from the study who conduct business with the author.

## 5. Case study findings

This chapter presents the findings and material of the case study, based on twelve interviews with AOKN staff, selected as representatives of a group of about six hundred BI users company-wide. AOKN will be analyzed as a single case study on the basis of the interview findings. This chapter addresses the three research questions on the basis of the findings from the interviews. The deployment of different BI technologies and tools in AOKN will be clarified in order to classify them within an appropriate conceptual framework, to identify options within the strategy development process, and to evaluate additional functions or solutions to improve capabilities.

### 5.1 Introduction

This chapter is comprised of three sections with several sub-sections dealing explicitly with the findings of each research question. These findings refer explicitly to the AOKN organization and business. The case study findings provide the basis for potential generalizations and broader conclusions that are presented in chapters 6 and 7. Based on the discussed methodologies in chapter 4, some general quantitative analyses will be presented including frequencies and weights of given responses in the interviews. This represents the first step in providing an initial overview of the given responses, which will assist in structuring and assessing the different research questions and their sub-questions. The main description and presentation of the findings and each research question follows afterward.

The evidence from the one-to-one interviews will be a key element of this findings chapter. Appendix Table 7 presents the significant amount of data collected in the interviews. In presenting the interview data, the first two phases of the approach of Miles and Huberman (1994, pp. 10-11) have been adopted:

- **Relevant data summary and distinct responses:** responses to interview questions were summarized and then provided in Appendix Table 7.
- **Data display:** first, the responses to each interview question were organized and compressed into a table that summarized the findings for each research objective and interview question. In this way, many statements and attitudes toward current BI applications can be recognized. Then, the potential drivers of success will be structured by different category will be assigned further classifications such as “internal”, “external analysis”, or “strategy”, and “competitive advantage and capability” (see the pyramid in Figure 5.1).

With the help of a “quantitative” introduction of the interview results and the findings, each of the three research questions will be answered. The three research questions will be repeated at this point:

- Can BI technologies and tools be classified within an appropriate conceptual framework?
- Can BI technologies and tools be effectively used and integrated into the strategy development process or not?
- Can functions and solutions be added to current BI technologies and tools to enhance their performance for end users and top management to gain strategic capability?

In this introduction, the results of the interviews will be summarized to obtain a primary quantitative overview. The main opinions and statements will be listed and classified into different themes (analysis and evaluation). Subsequently the answers of the research questions and its sub-questions will be documented as a relevant data summary. To structure these data and information, all responses from the participants will be listed as a summarized reference in the Appendix Table 7.

Figure 5.1 illustrates a classification of internal and external analysis as well as evaluations for strategy, competitive advantage and capability, and BI applications

that integrate the relevant research thesis topics. The responses from the interviews to each question can occur several times. For instance, the responses to the first interview question are helpful and significant both for an internal analysis and for a recommendation of BI applications. This helped to create a structure for mapping the answers as illustrated in Figure 5.1.

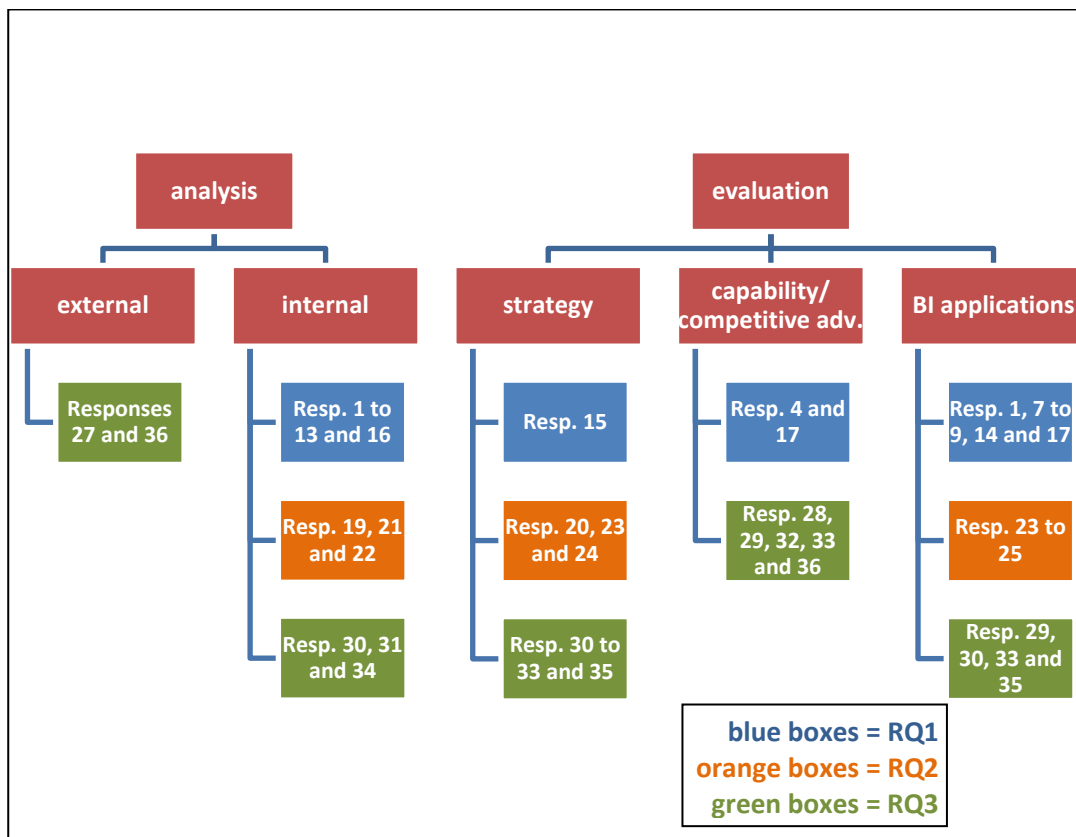


Figure 5.1: Pyramid for interview responses structure and interpretation

The objective of this pyramid is to provide an initial overview of the classification of the interview questions into selected business topics such as internal and external analysis. Thus, interview questions target specific business topics. The different coloured boxes with numbers represent the numbered interview questions. The questions target different business topics that are presented in the red boxes (analysis or evaluation). Thus, the contents and objectives from the interview questions 1 to 13, for instance, can be classified as internal analysis. Questions 27 and 36 can be classified as external analysis. All boxes were shown in blue, orange or green in order to correlate the classifications to the three research questions. In this way, the objectives and targets of the interview and different



research questions will be transparent in order to make a first classification of relevant terms such as analysis, evaluation, etc.). The different coloured boxes show the matching and allocation to the different terms. The most responses can be matched to the internal analysis. Obviously, the first research question with its focus on BI classification within a conceptual framework can be primarily allocated to an internal analysis and the evaluation of BI applications. The responses can be the requirement to design and develop a framework to define and classify appropriate BI applications.

The orange boxes illustrate the allocation to the second research question of whether BI technologies can be effectively used and integrated into the strategy development process. Therefore, the twenty-third question can be allocated to the strategy and BI application terms at the same, which illustrates the interview workflow.

The green boxes relate to the third research question concerning the potential addition of functions and solutions to current BI technologies, and focus on the evaluation themes of strategy, capabilities, and competitive advantages for AOKN.

Another way to interpret the outcomes of the interviews is to count and assess the most frequent responses of each research question based on participant evaluation. In this way, the qualitative interview outcome could be structured to become more transparent. The frequency of the responses is presented for each research question in the figures 5.2 to 5.4 and provides an overview of the number of responses. The following charts represent a first step in analyzing the findings in a quantitative way by examining statements that were made most frequently to specific research questions, and are represented in percentages. This output underlines the variety of the opinions and responses and can be seen as introduction for the findings at this point. However, these statement classifications and findings must be separated and viewed on different levels of analysis.

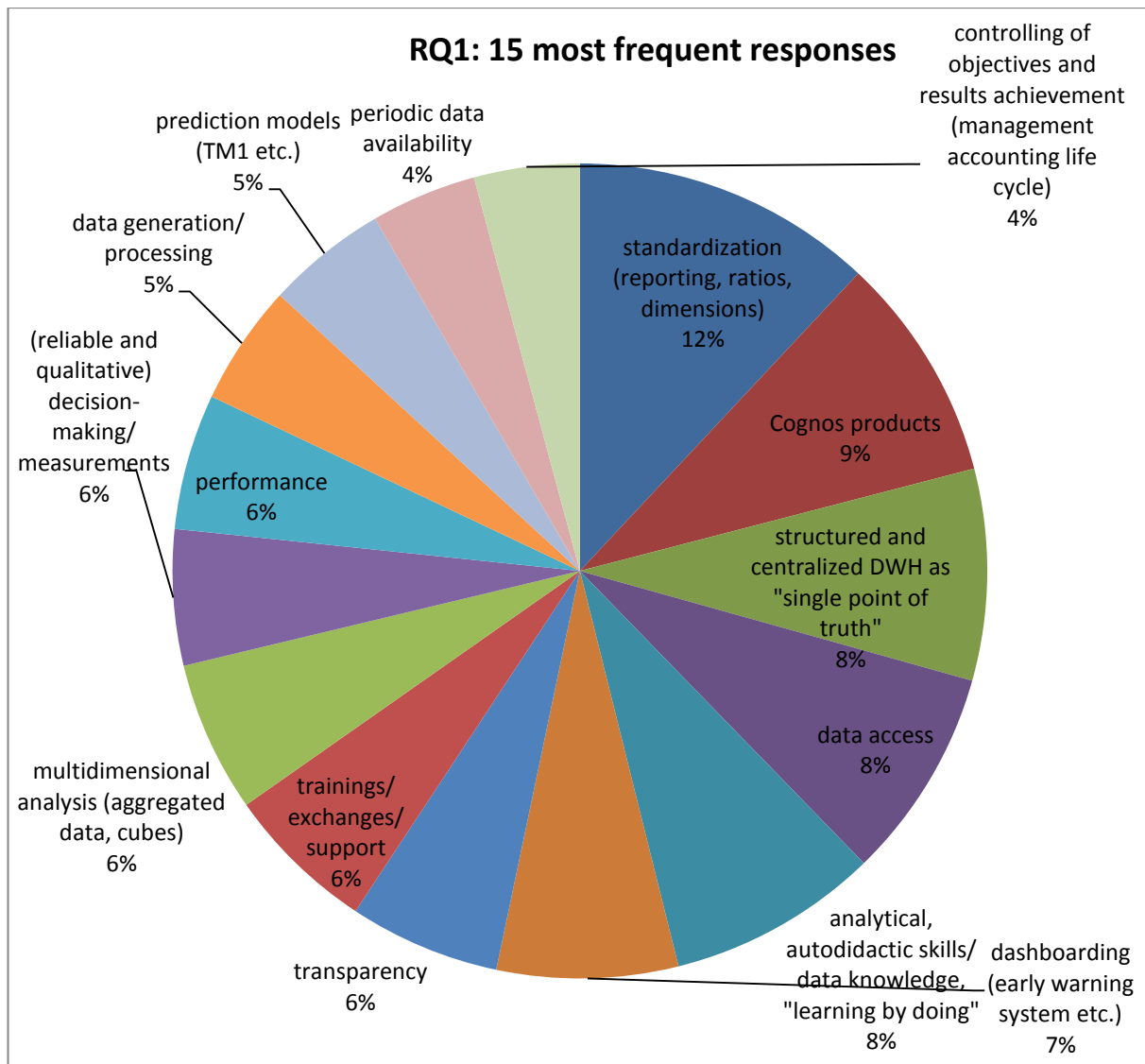


Figure 5.2: Interviewee comments relating to BI tools and technologies classification (first RQ)

From the fifteen most frequent responses of the first research question, the standardization for reporting, ratios, and dimensions is mentioned the most at twelve percent. This is followed by Cognos products for creating reports with nine percent, and the structured DWH with eight percent. The descending order is presented in clockwise rotation. Generally, it can be said that no noticeable points or explanations exist and that the response frequencies are of equal distribution in the circle. On the basis of the facts and responses the variety increases so that the distributions can be read as more equal. Because of this situation, the fifteen most frequent responses have been selected.

In Figure 5.3 there is a similar situation, but the two most common responses concern business strategy and strategic target fields (twenty-one percent), and transparency with regard to contents or business processes (fourteen percent). The remaining responses show a wide gap from the first two with a range of two to eight percent.

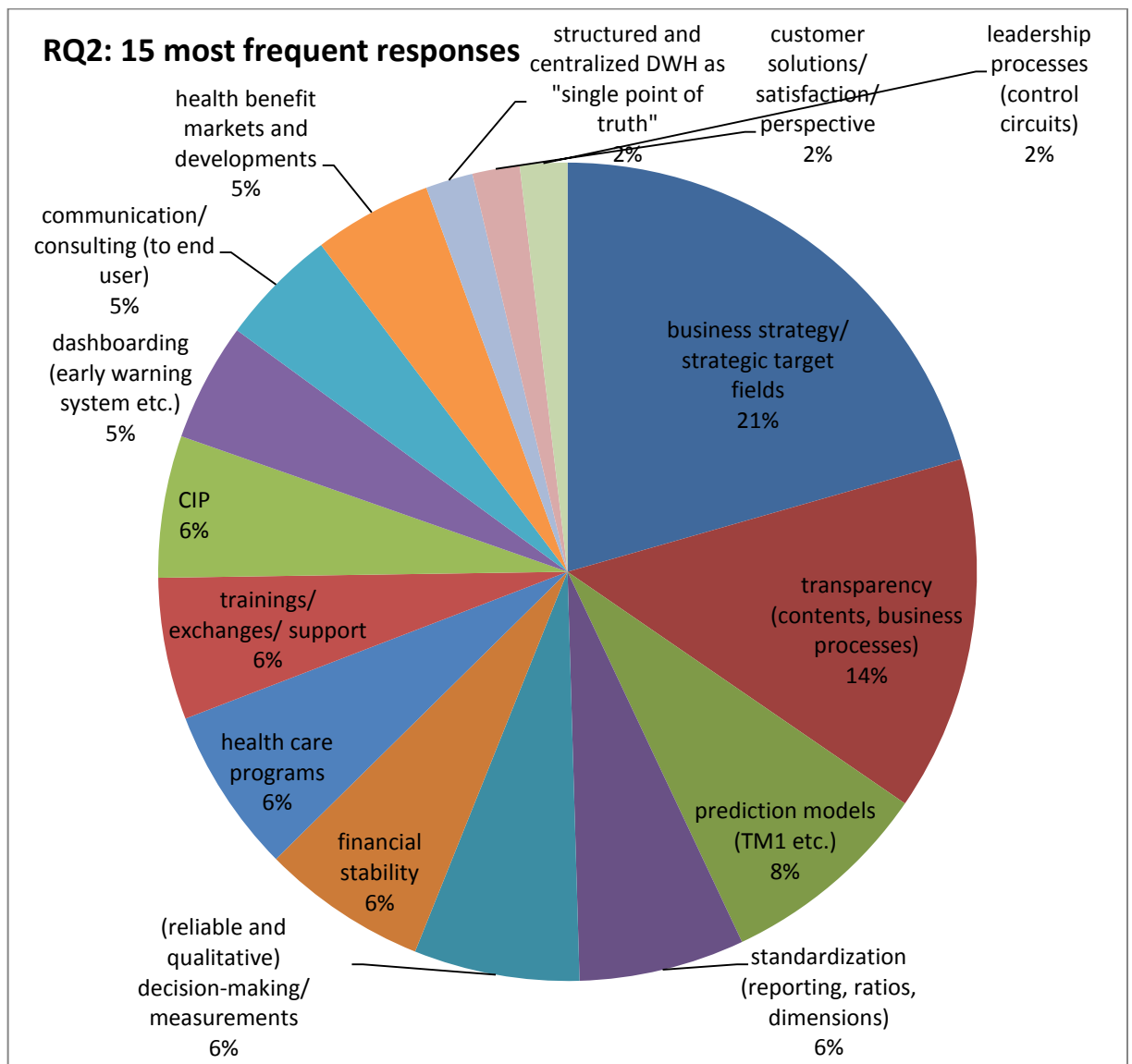


Figure 5.3: Interviewee comments relating to BI tools and technologies integration into strategy development process (second RQ)

On the other hand, the structure and distribution of the most common responses of the third research questions can be compared to the response frequencies of the first research question. Thus, in Figure 5.4 a range can be noticed from four up to eleven percent (transparency).

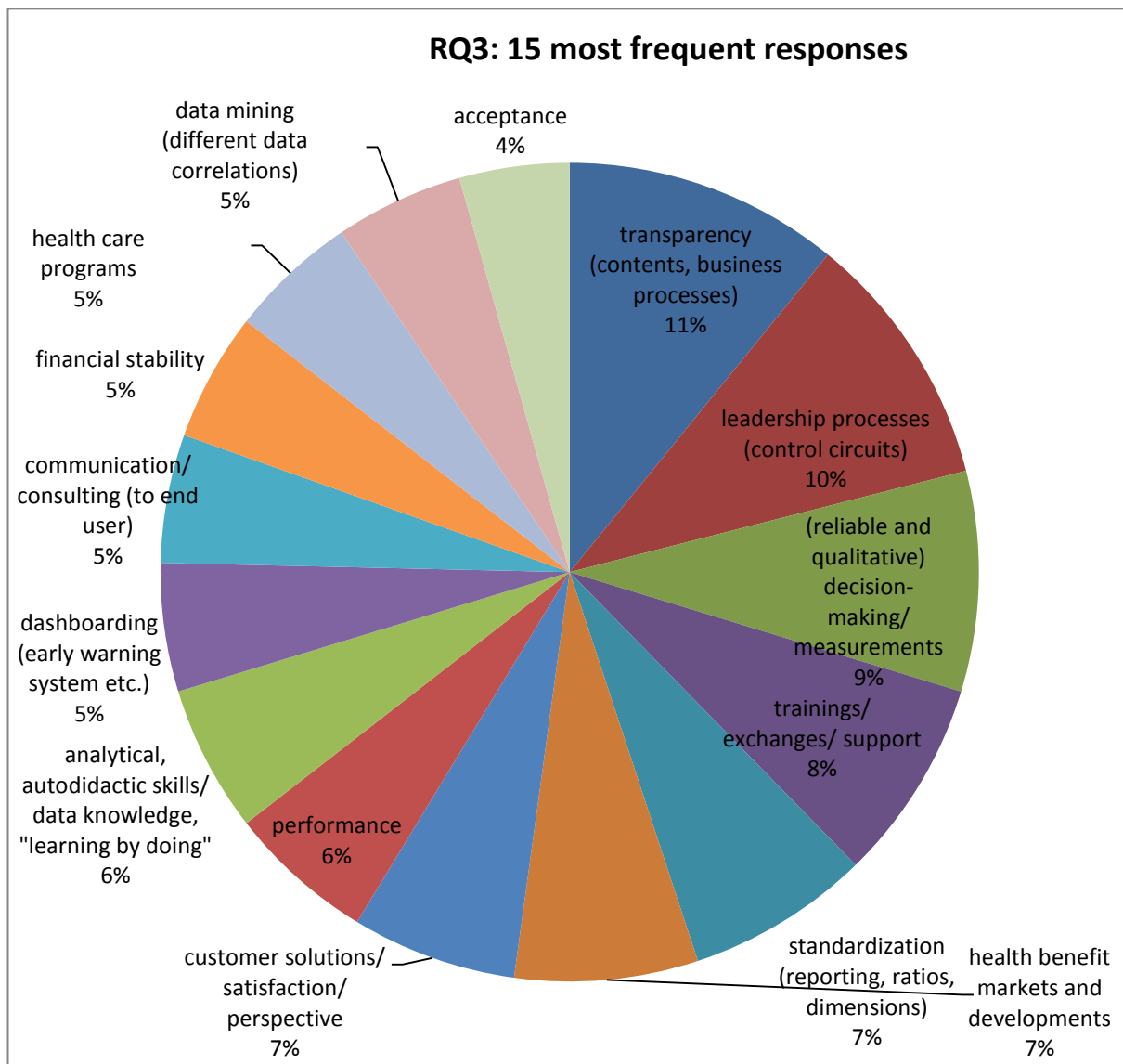


Figure 5.4: Interviewee comments relating to BI solutions and functions to gain strategic capability (third RQ)

To answer the third research question, the focus will be on the discussion of additional functions and solutions to current BI technologies and tools. Likewise, the answers of the other two questions will be given on the basis of the next sections and the evaluations in chapter 7. The pie charts above and the matrixes that will follow present the quantitative orientation and assessment of the interview participants that serves as first overview and impression.

In a second step, the responses are weighted by an evaluation inquiry of the interview participants and additional selected employees in order to emphasize the

relevance of the responses in connection with their frequency. The most common responses have been evaluated by the participants with regard to their relevance to the whole company on a scale from one to five. The results are shown in figure 5.5, which underscores the descending BI relevance in anti-clockwise rotation. The more frequently that the boxes are positioned closer to the outer edge of the chart, the more points were given to their weighted relevance.

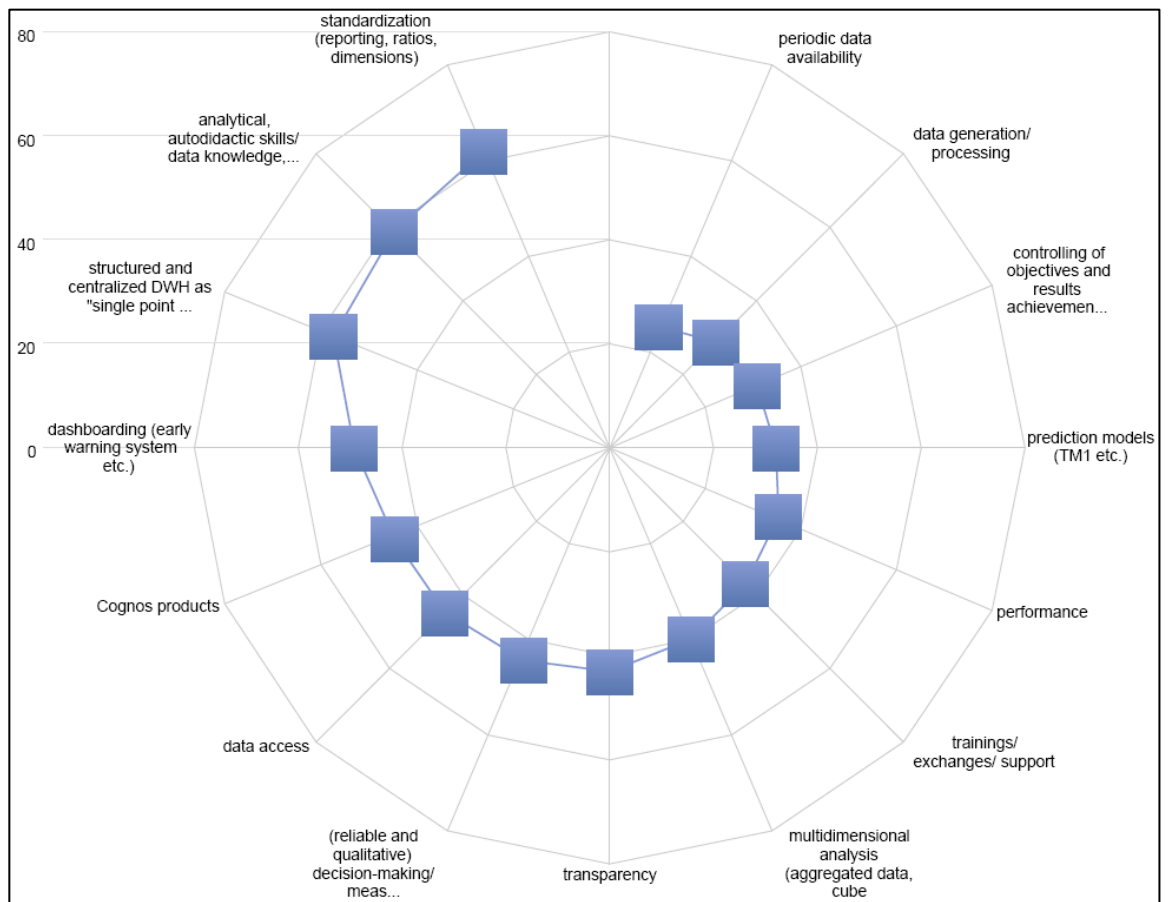


Figure 5.5: Interviewee comments and weighting relating to BI tools and technologies classification (first RQ)

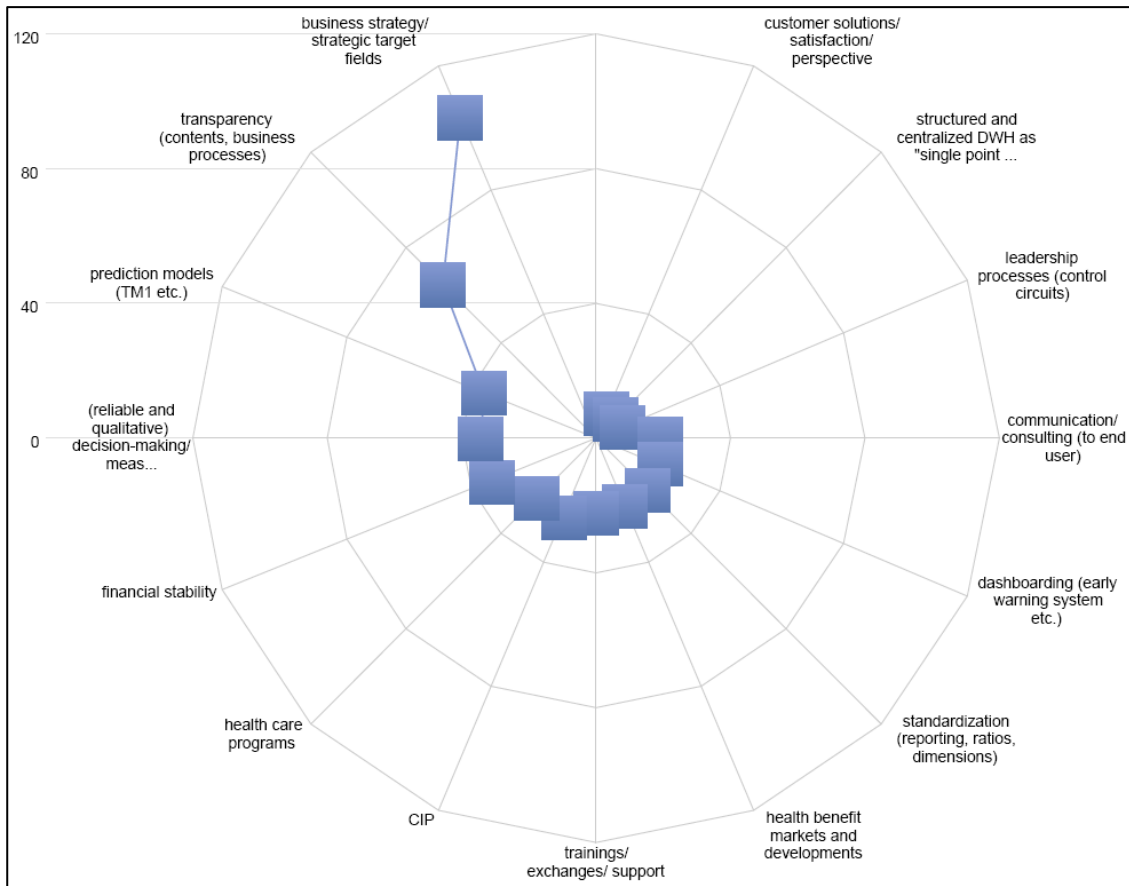


Figure 5.6: Interviewee comments and weighting relating to BI tools and technologies integration with the strategy development process (second RQ)

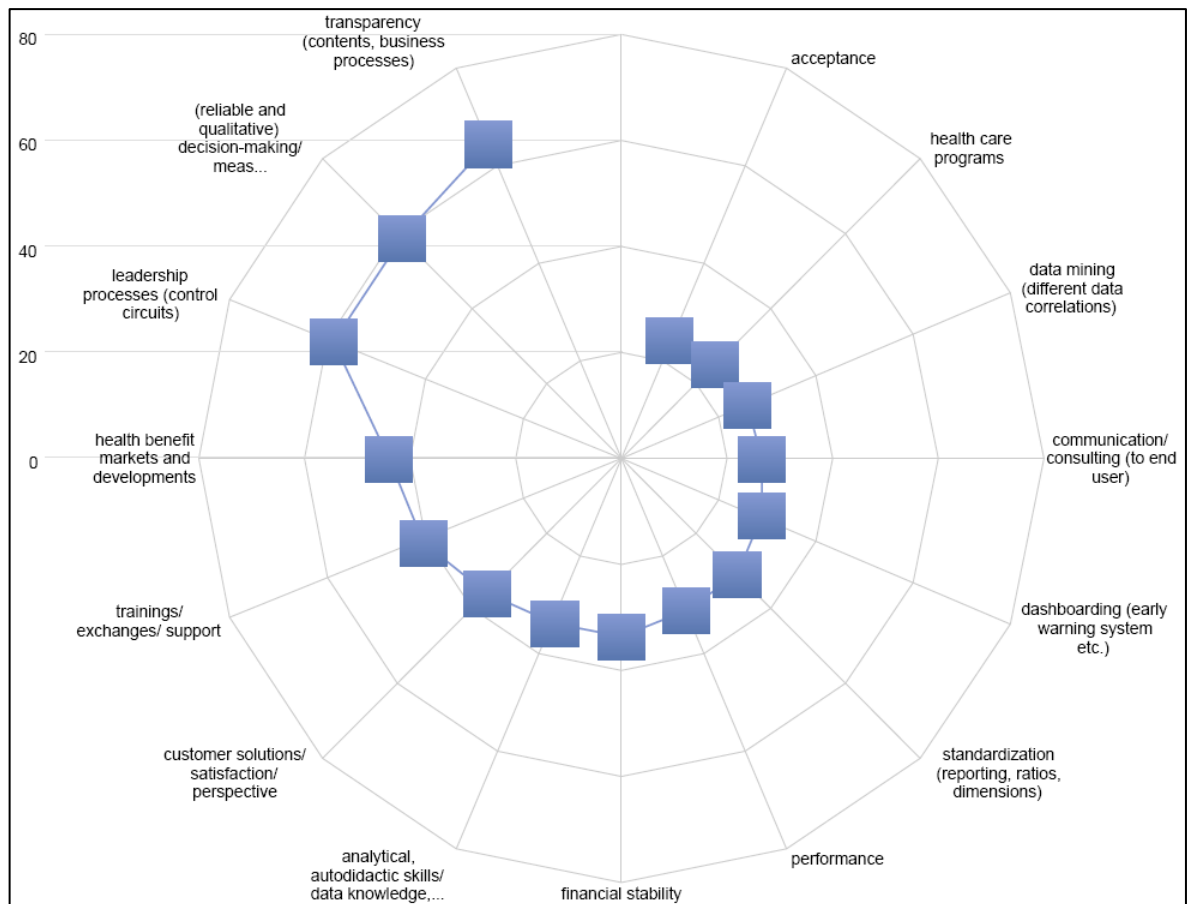


Figure 5.7: Interviewee comments and weighting relating to BI solutions and functions to gain strategic capability (third RQ)

Because of the weight of the different responses, which is the product of response frequency and weight factor on a scale of 1=irrelevant to 5=very relevant. A different picture emerges as compared to the frequency distribution in the figures 5.2 to 5.4. Therefore, the response for “standardization” (reports, ratios or dimensions) is the most relevant BI issue for the whole company because the weight factor is defined by the relevance for AOKN. For instance, during the interview for the first research question, the most frequent response was “standardization” with 20 and includes reporting, ratios, and dimensions. In the internal inquiry for corporate relevance, the average value for this response was 3.1. Therefore, the product of 20 and 3.1 is 62, which can be read from the radar scale on the left hand (Figure 5.7). The data collection and calculations of weight and relevance can be seen in the Appendix in Tables 2 to 4.

The third step is shaped by the generation of summarized responses and their relevance to the company. For this purpose all values of the twenty-three most frequent responses for all research questions, based on the evaluation of the relevance on a scale from 1 to 5, are added up to a total value of the certain statements. Thus, an index will be generated that shows the overall existing focus and significant issues in the business departments (see Figure 5.8).

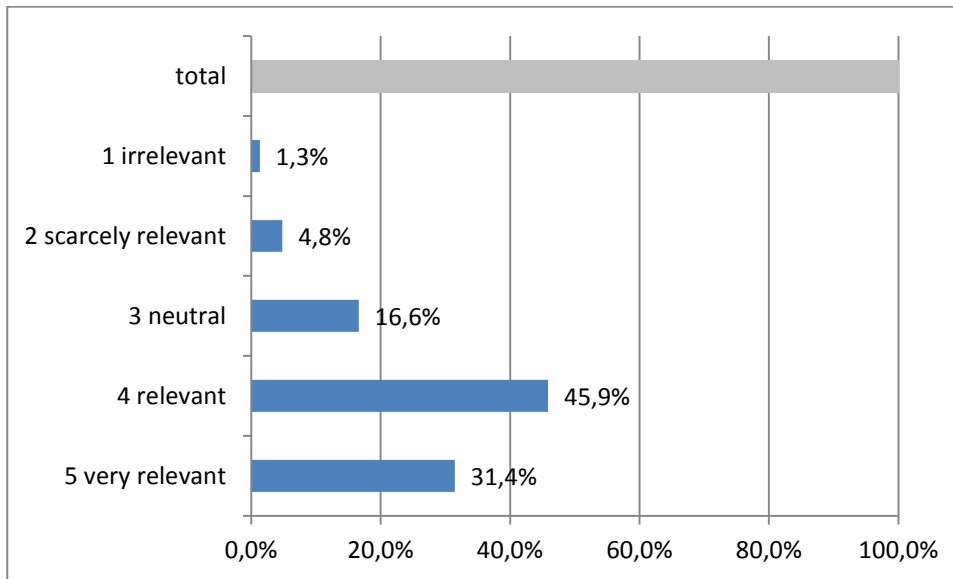


Figure 5.8: Total responses and relevance focus on AOKN (in percentage) (according to Heinemann, 1998)

With 45.9 percent, the most frequent responses are valued with “4 relevant”. These responses account for 105 responses of the total number of 229 responses. The average of all responses was 4.01 on the scale.

In a last step for this quantitative data presentation and interpretation, Figure 5.9 shows the five most frequent responses as a diagram created from the research questions as indicators for relevant BI terms and given as percentage of all given responses. Here the values are separated and calculated to specific response themes. Values are summarized of statements on which the radar charts in Figures 5.5 to 5.7 are based as key indicators of the response themes. The results and percentages are visualized in Figure 5.9.



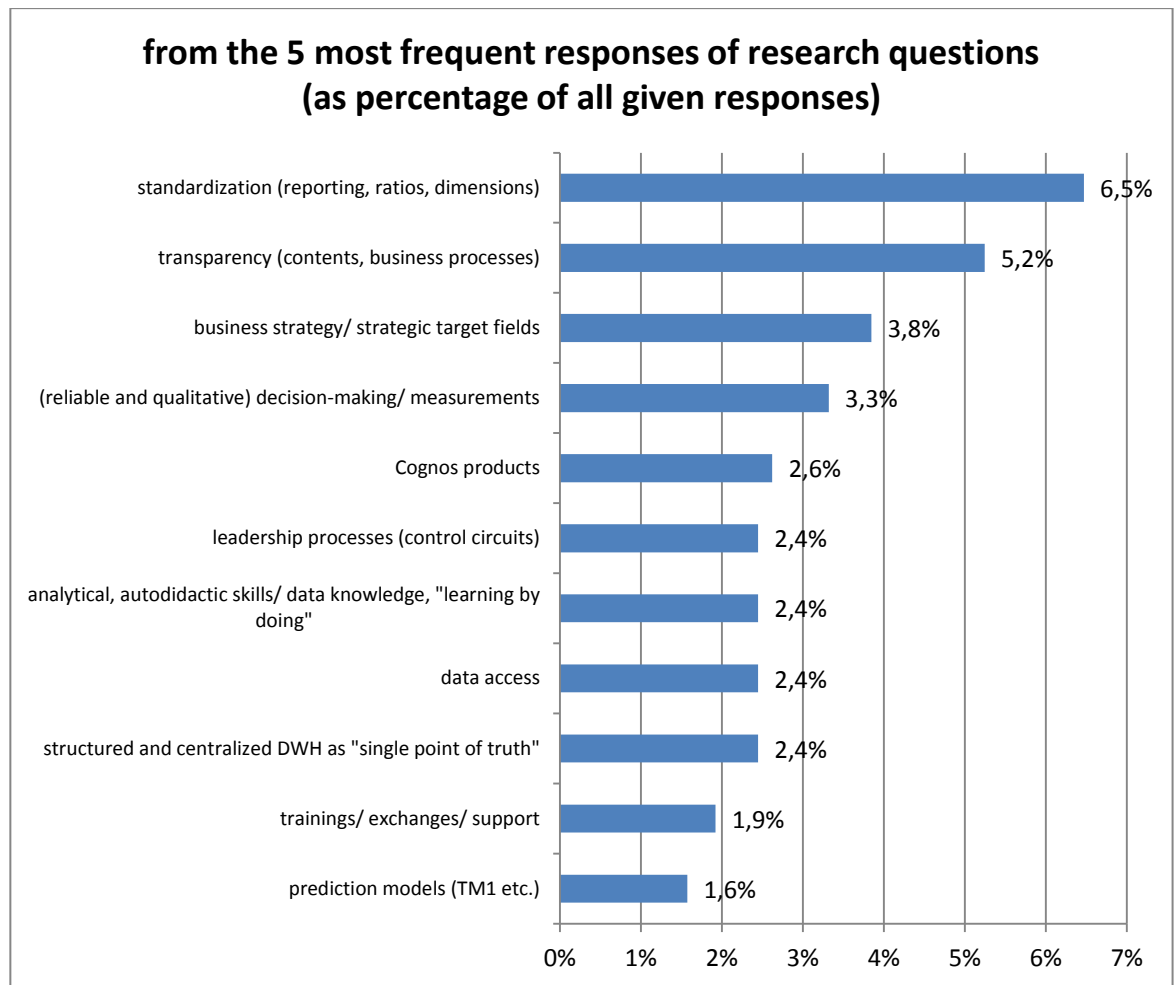


Figure 5.9: Diagram of most frequent responses (as indicators for relevant BI terms) (according to Heinemann, 1998)

As percentage of all given responses during the interviews the standardization (6.5 percent indicates 37 responses), transparency (5.2 percent indicates 30 responses) and business strategy (3.8 percent indicates 22 responses) are mostly mentioned. This also reflects the illustrated statements in figures 5.5 to 5.7. Therefore, Cognos products would be assessed as “not relevant” with a response percentage of 2.6. However, when viewed in relation to all responses those products can be relevant to satisfy the need for “standardization“, which leads the responses with 6.5 percent. These responses above represent the five most frequently given by the respondents with regard to the answers given to each research question.

The case study findings with its proposed graphical presentations of interview responses and relevance represent the quantitative component of the evaluation

of participants involved in BI processes. However, the qualitative case study will be the main focus in this thesis and will be discussed in the next three sections.

## 5.2 Findings for first research question

In this Section the findings for the first research question will be presented.

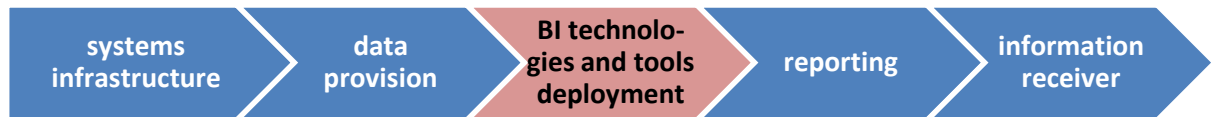
- Can BI technologies and tools be classified within an appropriate conceptual framework?

To design and develop an appropriate conceptual framework for AOKN's purpose and organization, it is important to discuss the different interview statements in an organizational context. Furthermore, BI will be integrated in this context. This will be necessary to highlight the classification of BI technologies and tools within the framework. Chapter 3 presented a provisional conceptual framework based on the existing literature and the preliminary investigation of BI deployment in AOKN.

The following conceptual classification of BI technologies and tools was derived from the case study findings and interview statements. This classification will serve as the foundation for the development and adaptation of the provisional conceptual framework from chapter 3. This development will focus on the research questions and AOKN's BI situation. Five segments are of primary importance for a classification to use in designing a first process structure. The content and objectives of each segment in AOKN will be presented in this Section to provide an in-depth understanding for a specific segment's position in the conceptual framework.

The conceptual framework intends to provide a framework for the classification and integration of BI technologies and tools. Certain elements have been taken from the literature and can be seen in the provisional conceptual framework and include data bases or dissemination. However, the respective contents and attributes for the infrastructure or reporting and the resultant classifications were

based on the interviews with AOKN employees that addressed designing an appropriate conceptual framework for this company.



The purpose of this framework is to identify the flow of activities involved in BI technologies and tools deployment. Thus, this framework can be divided into five phases consist of infrastructure, data provision, BI technologies and tools deployment, reporting and information receiver. The descriptions of the framework follow in the next sub-sections. At the end of the sub-sections of the findings in this chapter, the “voices” of the participants from the responses to the interviews as key quotes are now be introduced and summarized. The difference between top level and lower level employees throughout this analysis is clarified and visualized in Figure 5.19.

### 5.2.1 Establishment of an appropriate infrastructure

To develop qualitative reports and analyses with the help of BI tools, a consistent data base has to be implemented. A consistent BI infrastructure as the first segment in this process plays a crucial role as single point of truth in AOKN. From the interviewees’ perspective, a great need is seen to structure and harmonize different data sources and contents (interviews management accounting director health care and BI consultant). This infrastructure should be filled with data from internal operational systems and external scientific data bases, such as official health statistics of memberships or financial data (KV45, KJ1, balances, results) for healthcare industry benchmarking. These data will be prepared in DWH in aggregated forms for multidimensional cube access as well as relational forms to provide an in-depth view and to present detailed information. In the DWH of the operational system oscare, which is called SAP business warehouse, data in aggregated forms are also available and they must be completely integrated in the DWH (interview BI consultant). These tables in the business warehouse contain precalculated and final financial data for many benefit segments that are significant for the financial accounting in AOKN.

The harmonization of data from different data sources is a current advantage to use in developing reports and analyses. In the past, this technology was accomplished with great effort by management accounting employees. Furthermore, BI end users can now access centralized and common master data and dimensions (interview management accounting director health care). Ratios can be used that are commonly defined so that reports in organizations can be compared with each other (interview management accounting employee). With the help of the DWH, management accounting has the opportunity to gain full access to prepared and structured data. Furthermore, short distances in the Hanover building within the management accounting division enable employees and BI developers to look directly into the operational tables if enhancements or adjustments of information attributes are necessary (interview management accounting employee). Nevertheless, a continuous review of the current data bases and structures is necessary because even operational systems can be enhanced. Thus, the data generation and preparation for the DWH must be continuous. “Further, data such as SAP BW official statistics should be integrated in the DWH as well” (interview BI consultant). Also more external data should be considered such as questionnaire data from people registered in healthcare programs in order to measure quality and to gauge the wellbeing of those individuals.

The DWH integrates different data sources that are primarily operational SAP source tables, but could include flat files and manual inputs. If new acquisitions have to be integrated into the operational system, then the DWH has to be adjusted as well. In this way, the BI system can be valuable with its structured and centralized DWH that has been extensively redesigned since 2010. A consequent anonymization of personal data and the design of standardized data dimensions guarantee multiplied data access from different data sources and an efficient analysis of corporate data that can answer inquiries from top management in a comprehensible and reliable manner. Thus, a structured data process and analysis is the fundamental requirement for a successful BI implementation. Because the focus was on the continuous integration of further external data in the DWH (interview BI consultant), Figure 5.10 can be added with specific data bases

(SAP, external data and flat files, statistics) as shown with the three boxes on the left of the illustration. This will be the rule for all following Figures in this chapter and the following chapters: light blue colours stand for information from the literature and dark blue coloured boxes or symbols indicate new content or findings from the interviews. This will help the reader to see new and existing contents immediately.

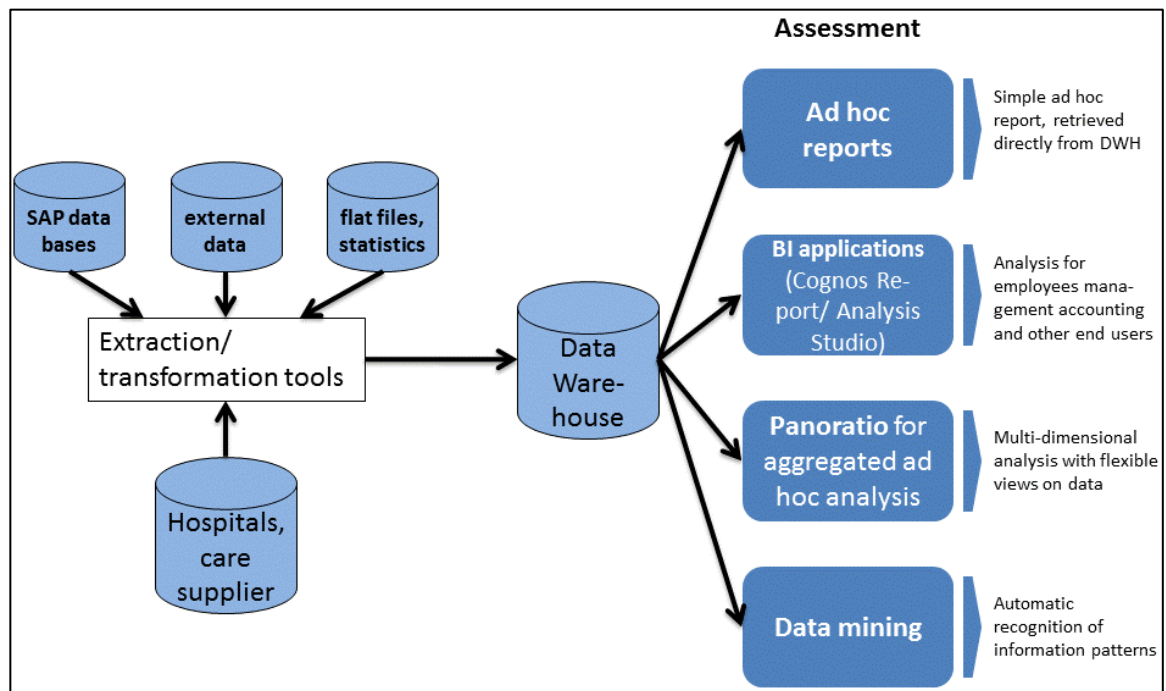


Figure 5.10: Amended DWH in literature review (according to O'Brien, 2004; interviews)

The interview output from the management accounting director and employees focused on potential technical opportunities and the business requirements that would necessitate BI market developments. The standardization of reports, ratios and dimensions, and the centralized structure of the DWH played a crucial role. Efficient customer solutions are necessary, which means that respective BI solutions must be shaped concerning data generation, processing and quality (interviews management accounting director and employees). Through DWH conventions, the data anonymization can be guaranteed, which is necessary due to security concerns.

The BI consultant from the consultancy “novem business applications GmbH” mentioned that a single point of truth in AOKN with the help of an integrative DWH

is the basis for a reliable decision-making and measurement process. Additionally, a consistent data status for all activity should be discussed. Therefore, parallel report systems, which were developed in the past through regional management accounting employees, can be avoided. The system performance for report and data availability plays an important role as well (interview BI consultant).

Financial information is a key element that has yet to be integrated in DWH. Financial accounts such as the trial balance or balance of accounts are currently available via monthly filter (interview management accounting employee). This DWH integration is necessary to spend technical efforts for the management accounting employees.

Therefore, it can be summarized that a DWH is a relevant data infrastructure even from the point of view of senior management and BI end users as well (see Figure 5.19). “One centralized and harmonized data base for a single point of truth within the company” (interview management accounting employee, July 30, 2013), “standardization and one-time effort for a periodic data actualization” (interview BI consultant, July 30, 2013) with a “same data basis so that meetings and control circuits discuss the same results” (interview performance analyst, July 31, 2013). Top management agrees: “through structured data in a DWH it is possible to see further influences and developments from many data sources for a required analysis, for instance main or relevant auxiliary diagnosis” (interview agent to CEO, July 24, 2013).

### **5.2.2 Provision of data**

The provision of data for AOKN management and BI end users can be classified within a technological and organizational context. This classification is based on the provision of different technologies through AOKN’s management accounting department. Management accounting provides data and access to BI tools for BI end users. BI end users receive print reports from management accounting employee, and they can also access analysis platforms to develop individual reports. Aggregated data cubes and “pdi” sets are the technologies for explorative

and aggregated analytics. For standardized monitoring and reporting, relational data packages for in-depth customer information are used at AOKN. TM1 will be used as planning technology and the pilot predictive analysis form is based on data marts prepared for a specific healthcare field (interviews).

BI end users can now access much more information and data than they were able to prior to the BI implementation 2010 (interview management accounting employees). Thus, information could be used to validate decisions more qualitatively than in past decades. Less effort is needed to develop reports because of a weekly or monthly automatic data actualization or ETL processes. To generate new ideas and synergy effects through analyses, end users can create concepts for individual analyses based on reports and analysis provided by management accounting (interviews management accounting employees and performance analyst).

Thus, management accounting in AOKN can be defined as a business division that supports management and business management with regard to relevant data provision and transparency. The objectives and tasks of management accounting are presented in Figure 3.3. The provisions of data and analysis tools should be linked to the business needs and inquiries (interview management accounting director). There are different management accounting employees who are responsible for certain professional business fields and divisions including doctors, daily sickness benefits, or pharmaceuticals. The employees provide the relevant needed information via reports, analyses, and other data preparations. This data provision is performed with the assistance of the Cognos portal “Cognos Connection,” where BI end users can log in and access their relevant reports. The users can directly conduct the fixed standard report or an analysis template with further options to make in-depth analyses via drag and drop. Management accounting employees have two contact persons for technical analysis questions and support. Those individuals function as BI power users in the management accounting division (see Figure 4.4). In the BI team, BI developers generate and enhance the current technical ETL processes to develop and update the data packages for the management accounting employees (interview management accounting director health care). Thus, BI developers are the technical contact

persons for management accounting employees for developments or enhancements of data packages to provide data-driven decision foundations for management and professional business divisions.

That means that for these three employee characteristics, certain skills and know how are required. The skills must be improved with it training and briefings on daily business (interview management accounting director health care). These are analytical and technical skills, used to conduct different analyses such as cascade models or region profiles; logical thinking, as represented by a systematic-methodical process; as well the ability to learn independently, to manage complex software solutions and to understand data contents and structures. Furthermore, abilities are necessary to make relevant decisions and to understand information from data files. This could be accomplished by in-house training for different BI products, by attending external conventions for an exchange of BI knowledge, or by arranging for presentations of innovative BI technologies and tools. This knowledge should be transferred into AOKN on the job trainings for BI end users in the business management. This could assist employees to gain an in-depth understanding of BI processes and calculated ratios or data dimensions (interviews management accounting employee director health care, management accounting employees and performance analyst). On the other hand professional input for BI users will be required to make adequate selections and exclusions in analyses to gain further insights and to know which data from which data package have to be explicitly used to answer relevant questions. Thus, it is important to know who is the right contact person in the management accounting as well as in the professional business division.

It is a “rare close collaboration and management accounting employees are noticed as report generator and data delivery men” (interview management accounting employee, August 12, 2013). However, management accounting division has “good professional competencies and fast access in case of short-term questions. But if adjustments in reports or data are necessary, often the required personnel resources are missing in the management accounting division” (interview physical therapy director, November 22, 2013). “The collaboration is good. For the standardized reporting there must be a more efficient ratio finding



process, for instance a common access on Panoratio data bases which can be relieved for management accounting division” (interview health care management director, November 25, 2013).

### 5.2.3 BI technologies and tools

During the interviews, many BI technologies and tools were mentioned that are used in AOKN. The main BI technologies that are used in AOKN are:

- Data cubes and pdi sets for aggregated data structures and explorative analytics,
- Relational data structures and packages to gain an in-depth view of individual data files (customers or cases) and to develop standardized reports,
- TM1 as BI enterprise planning technology,
- Data marts for data mining or predictive analytics. Data marts are the access layers of the DWH environment that are used to deliver data to BI users. The data mart is a subset of the DWH that is usually oriented to a specific business line, team, or project

(interviews management accounting director health care, employees, BI consultant).

To serve these BI technologies, several well-known BI mainstream tools are used in AOKN:

- Cognos Analysis Studio, dashboards/ portlets, Panoratio and Microsoft Powerpoint to serve and present aggregated data, and to conduct explorative analytics,
- Cognos Report Studio, Cognos Workspace Advanced, Microsoft Excel to develop standardized reports, and to analyze relational data structures,
- TM1 as enterprise planning tool,
- IBM SPSS as data mining tool to analyze specific data abnormalities, and to make predictions

(interviews management accounting director health care, employees, BI consultant).

Thus, the different interview statements towards analytic purposes of BI technologies and tools can be classified and summarized as presented in Table 5.1. The table presents the BI technologies and tools with their analytic purposes in AOKN.

*Table 5.1: BI technologies and tools with analytic purposes in AOKN*

<b>analytic purposes:</b>	<b>BI technologies</b>	<b>BI tools</b>
<b>explorative analytics</b>	data cubes, pdi sets	Cognos Analysis Studio, dashboards/ portlets, Panoratio, Microsoft Powerpoint
<b>standard reporting/ relational analytics</b>	relational data packages	Cognos Report Studio, Cognos Workspace Advanced, Microsoft Excel
<b>planning</b>	TM1	TM1
<b>predictive analytics</b>	data marts	IBM SPSS

The provisional conceptual framework (see Figure 3.4) showed an initial classification of BI technologies and tools and their analytic purposes. In addition, literature review presented a spectrum of reports and analyses – such as explorative or predictive analytics – (Kimball et al., 2010; Lehmann, 2012). The interview findings reinforced these different BI analytics purposes, that should be used and “communicated” to BI end users within AOKN (interview management accounting director for health care).

This structure and classification is important because in AOKN there are many different business cases and questions that have to be answered, using relevant data in many different ways. In meetings for health care management, different costs or cohorts from medical groups have to be answered in an exploratory way to see trends and amounts (interview health care management director). Standard monitoring is not so important here, but rather exception reporting that identifies

and details weaknesses within business processes (interview management accounting director for health care).

The concept of planning is central to overall company forecasting in one information system - Cognos TM1. It is also necessary to implement a planning and prioritization process for different projects such as consultation campaigns for doctors with different topics (interview management accounting director for health care). This is important for prioritization within AOKN and for inspections within the company.

Predictive analytics is another form of BI analysis with the purpose of developing predictive or forecast data models for different campaigns. For example, to avoid cancellations of members or reduce costs of daily sickness benefits, it is important to implement an appropriate early warning system, which is also part of the BI analytic purposes classification in Table 5.1. Thus, predictive analytics are more future-oriented forms of analytics to predict and generate different possibilities or budget options. For example, as regards the cancellation by disease threatened customers, a fifteen percent possibility of disease generates a fifty percent likelihood of cancellation (interview health care management director).

This structure will play a crucial role in designing a conceptual framework for the first research question. The different BI technologies and tools have different purposes and analytical opportunities for each BI end user. Therefore, the framework will have several stages and specifications as illustrated in Figure 5.16.

Microsoft standard tools are also used to analyze or prepare data from AOKN's operational systems (interview management accounting director). However, the tools are used mainly for presentation purposes. Therefore, they are also presented in Table 5.1.

However, the BI market should be observed continuously to check for additional BI applications like SAP products (BO), Microsoft BI, QlikView from open sources for small businesses, Oracle, and other data base driven BI products (interviews BI consultant and management accounting director health care).

Cognos as the mainstream BI tool of AOKN provides a unified workspace for BI and analytics that the entire organization can use to answer key business questions and outperform the competition. With Cognos BI, users can:

- view, and personalize information,
- explore types of information from various angles to assess the current business situation (date or business case dimensions),
- analyze facts and anticipate tactical and strategic implications by simply shifting from viewing to more advanced or predictive analyses,
- communicate and coordinate tasks to engage the right people at the right time,
- access information and take action anywhere, by taking advantage of mobile devices and real-time analytics and,
- integrate and link analytics in everyday work to business workflow and processes

(IBM, 2010; interview management accounting director).

Therefore, BI Cognos products deliver analytics that all BI end users can use to answer key business questions. Users can also develop individual analyses for specific cases. In order to enhance these analytics, management accounting employees have to support BI end users in such questions (interview performance analyst). In order to answer various questions and to get different forms of results, efficient and manageable BI solutions have to be enhanced. Information from different operational systems should be integrated into one system for analysis purposes and to answer business questions (interview management accounting director health care). During the interviews, Cognos technologies were mentioned most frequently. However, further products will be presented in the upcoming sub-sections as well.

Several interviewees stated that a strategic classification of BI technologies could be made on the basis of planning predictive and explorative BI technologies.

Standard BI technologies can be classified within AOKN's operational business because they rather focus on short-term results (interviews).

#### **5.2.4 Planning technologies**

Cognos TM1 is used for planning and forecasts for all activity fields in AOKN. The whole planning circle and each of its phases can be served with this software. With TM1, cube based planning systems can be developed and enhanced, which were first used at the beginning of 2014 (interview BI consultant).

#### **5.2.5 Predictive technologies**

Building a robust predictive model with respective technologies has many layers: identifying and clarifying the business problem and source of value, creatively incorporating the business insights of everyone with an informed opinion about the problem and the potential outcome, or reducing the complexity of the solution path to gain "future-oriented" data (interview BI consultant; Clarke & Libarikian, 2014).

Predictive analysis options will be checked in ongoing pilot projects such as identifying cases of fraud in the pharmaceutical department. Data mining components are also used in this pilot project in AOKN. With the SPSS modeler, anomalies should be identified to gain knowledge about "particular cases" with the help of specific parameters and differences from standard values (interview BI consultant).

These predictive analyses are more future-oriented and are designed to predict and generate different potentials or budget options, such as cancellation or disease prone customers. This can be expressed by the following: "15 percent of a certain potential manifests a 50 percent likelihood of cancellation." In this way, specific campaigns for different customer segments can be implemented to reduce the cancellation rate. This predictive analysis approach has only recently been implemented in the management accounting division, but steps have been made with the data mining project and the use of SPSS modeler as BI tool in the

pharmaceutical fields. The results and experiences from this project have to be critically evaluated concerning the required effort and the degree of benefit for this field and for the entire company. Such statistical techniques, for instance predictive analysis forms, create new opportunities to make thorough future-oriented decisions. However, exchanges with AOK Baden-Württemberg in 2013 showed that certain basic conditions such as know how or SPSS as appropriate BI applications have to be implemented for this purpose (interview management accounting director health care).

Therefore, predictive analysis forms should be enhanced, which also means strengthening the necessary skills for joining several data sources. These skills are helpful to verify doctor contracts, or to identify cases of fraud. Further, AOKN employees have to be sensitized for new BI statistical tools. The data mining process can be seen as potential driver for analyzing certain data patterns and contexts for future activities and developments. Further AOK tools for predictive analytics will be developed and should be observed by the responsible AOKN departments (interview management accounting director health care). A further step will be prescriptive analytics as final frontier of analytic capabilities. Prescriptive analytics attempts to influence or recommend an action to be taken within a given time constraint in order to realize a desired outcome. Prescriptive analytics incorporates unstructured data with the tools utilized in previous analysis to enable business analysts to identify the actions needed to drive predicted outcomes and to gain insight into the potential impact of each alternative action (Hamilton & Koch, 2015). However, prescriptive analytics can be a future oriented topic for AOKN.

### **5.2.6 Explorative technologies**

The primary explorative tool can be presented as portlet, the corporate dashboard, or a cockpit. Every level of business management has the opportunity to navigate from corporate ratios and trends to individual regional developments. Figure 5.11 shows a dashboard solution of market and customer views.

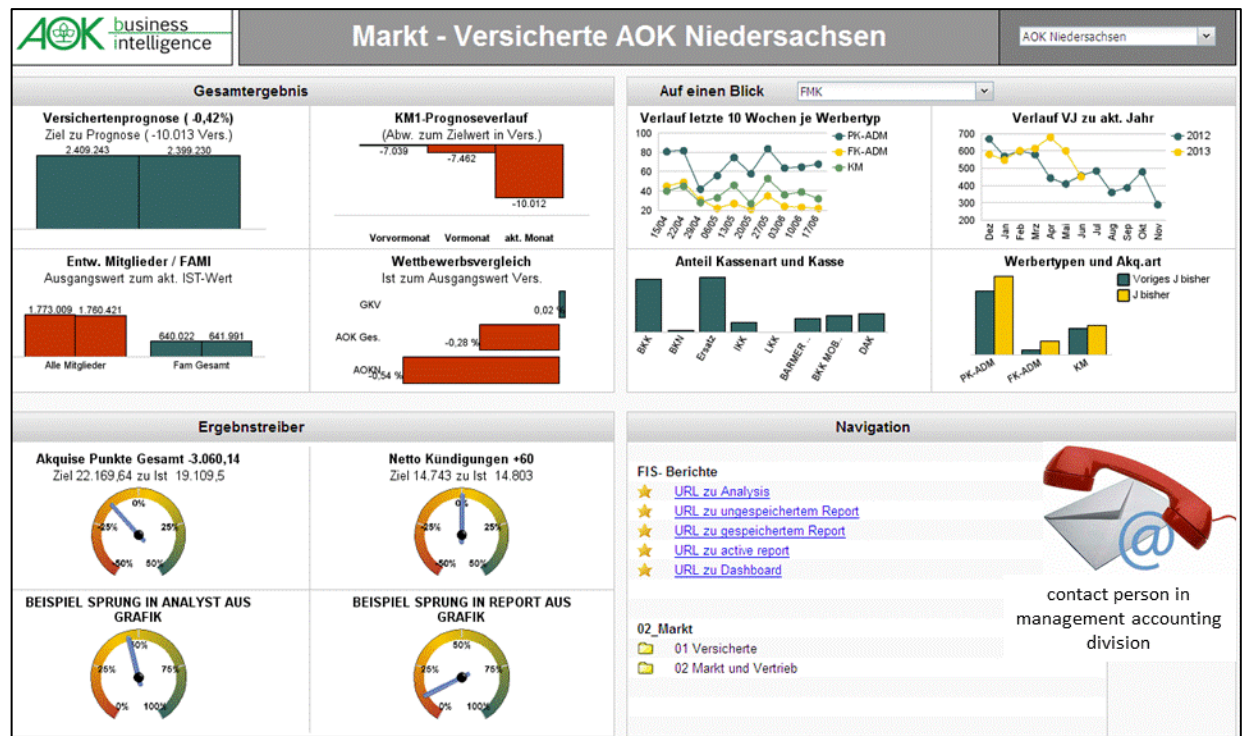


Figure 5.11: Dashboard solution (own dashboard execution, 2013)

Dashboards are helpful to get a graphic display with relevant corporate trends in a comprehensive overview. With dashboard solutions, all data, functions, developments, trends, and navigation opportunities can be integrated into one cockpit. This dashboard version in Figure 5.11 integrates the market division with the ratios and trends of customer predictions and developments. Even the acquisition and cancellation ratios are illustrated as business driver. In the navigation box at the bottom right, the contact person in the management accounting division for this field “market” can be added. In an ideal situation, top management can receive transparent information, a panorama view in an integrated reporting system, and consolidated processes at any time. Thus, the internal service, distribution and market or medical data from hospital or doctors should be summarized and integrated (interviews management accounting employees). To achieve the most benefits for the BI end users, the dashboards have to be critically and carefully evaluated. In order to interpret the dashboard outputs, it is important to understand the selection of ratios and their explicit definitions.

As already discussed, Cognos “Analysis Studio” targets the segments of ad hoc and explorative analytics. End users can complete complex queries with a few mouse clicks, even without having the knowledge of specific data base commands. Analysis Studio is the component of Cognos that analysts can use for multidimensional analysis and the exploration of large data sources. An interactive drag-and-drop environment is typical for this application for exploring and analyzing data. This tool helps employees to focus on items that are important for business, to understand trends and anomalies, to assess performance by focusing on the best or worst results. This tool also allows for data comparisons such as, as details versus summaries or actual results versus budgeted results. Figure 5.12 illustrates an exploration of quickly selected AOKN acquisition ratios from 2011 to 2014. This can be further illustrated by a bar diagram with a few mouse clicks. In addition to viewing details, users can select these ratios per year or age of the customers.

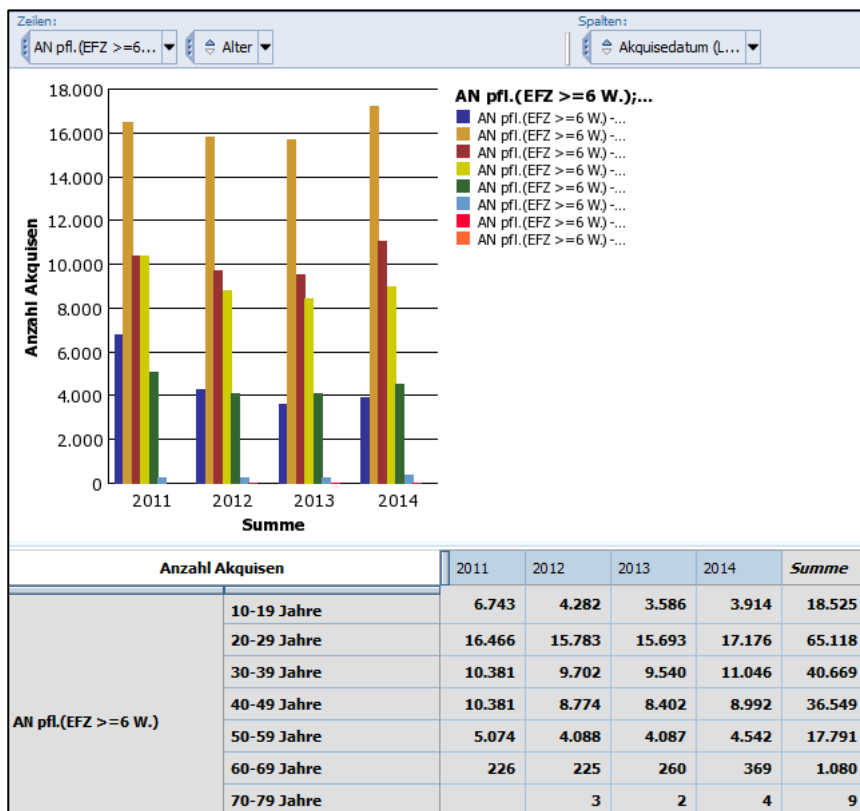


Figure 5.12: Selected acquisition ratios 2011 to 2014 with Analysis Studio

Another explorative tool is Cognos “Workspace Advanced,” which introduces an integrative area of operations and reporting. This integrative workspace provides a



faster overview and information. It allows basic developers, predominantly AOKN's management accounting employees, to create reports and analyze different data sources in one interface. The product is designed to allow querying and analyses from a single interface, and it interacts with other Cognos products (Adkison, 2013). It could be an advantage in AOKN meetings as it displays a structured overview and trends and can be switched to show further analysis forms and visualizations that make decision processes more transparent. Until now, this procedure could only be conducted with Panoratio with its different analysis monitors.. Further characteristics of Workspace Advanced are self-service dashboarding, the interaction of dashboards and analysis, ad hoc querying, reporting and analysis in one workspace, and the integration of Report Studio for standardized reports. Information and data can be processed and presented in the workspace from several external data sources (IBM, 2013; interviews). Figure 5.13 depicts a Cognos Workspace Advanced demo from AOKN market analysis.

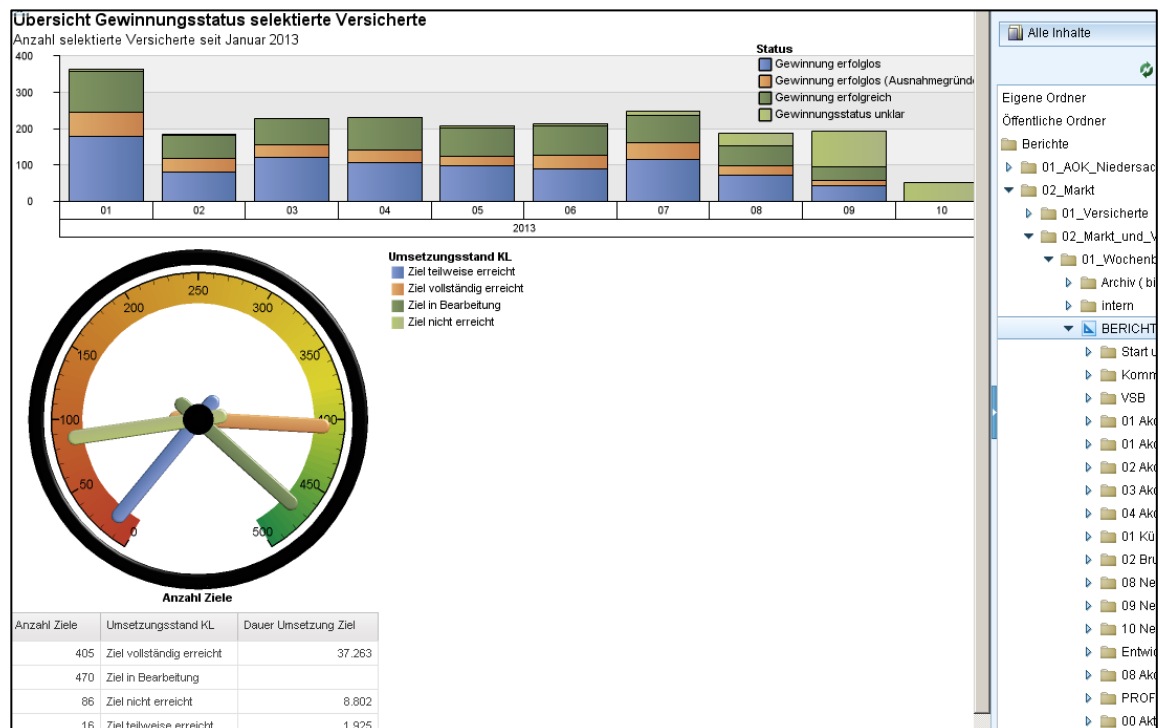


Figure 5.13: Cognos Workspace Advanced market demo

Panoratio can be used for as a fast multisectoral analysis option to obtain an initial overview and to gain insights of a specific business case. Only a few management accounting employees can use Panoratio's potential to simulate business cases

and scenarios. Nevertheless, a training guide should be developed from management accounting (interview management accounting employee). Five years ago, 2008, many questions could not be answered, particularly in health care management. However, in 2014, Panoratio provided the biggest data model nationwide to AOKN. Based on its performance and data integrity, Panoratio is seen as competitive factor in the company, in particular for healthcare analytics (interview management accounting director health care).

Therefore, these explorative tools provide platforms for roughly and fast ad-hoc analysis opportunities, even for cross-sectoral purposes. This can be done with the help of multidimensional cubes and aggregated data structures. BI can be seen as business analytics in this context (interview BI consultant), which enables almost every BI end user to play with data and to develop individual scenarios and data portfolios.

### **5.2.7 Standard technologies**

For the operational business, Cognos Report Studio and standard Microsoft tools provide opportunities to develop a standard reporting with relevant ratios. The reports are mostly in a fixed format, and can be conducted in various forms, such as HTML or Excel, with actualized weekly data. BI tools and reports are available for the business operations and management that will be conducted mainly in the AOKN regions in Lower-Saxony. In the short term, the business will be presented and analyzed. The operational business should be made transparent; contacts and different rates of a customer campaign of benefits or consultation should be accessible. Professional business divisions should be involved to enhance quality management (interview BI consultant).

Operational BI tools should be available for professional business divisions and business management in order to implement quality management for their business processes and control activities through defined ratios in reports or dashboards to countersteer and to achieve their objectives. Further advantages for operational business can be illustrated in terms of performance to develop reports

and analyses as well as the quality standards to shift business meetings, discussions and the leadership dialogue in a qualitative instead of quantitative level (interview management accounting director).

Within AOKN, Cognos “Report Studio” focuses on the development of standardized reports. It is a web-based tool that professional report authors, such as employees in management accounting division, use to build multiple-query reports on multiple data bases. Employees can create reports with information required by AOKN’s top management or business management, such as invoices, statements, weekly acquisitions, and inventory reports. However, the information and views created in this process show historical data and cannot generate forecasts or predictive analysis structures (interview agent to CEO). Therefore, Report Studio is a tool for creating and managing standardized reports in order to make the current corporate situation transparent. Receivers of reports are employees from different business divisions within AOKN. Different requirements such as report contents, objectives, and forms must be defined and communicated from the professional division to the report developer because that individual has the designated responsibility in this field and should control it with relevant ratios (interview management accounting employee).

Through standard BI tools, the operational KPI reporting and standard information of each activity field will be generated almost every week. The definition of KPI and relevant ratios for the standardized reporting has to be defined by management accounting employees together with the respective professional business divisions. In this area, AOKN could be improved because business divisions frequently do not understand the ratios and objectives of certain report pages (interview management accounting employee).

### **5.2.8 Strategic reporting**

An internal role and security concept explicitly defines which BI end user and which professional business division can view specific reports and folders within the Cognos portal structure. It is further defined which employees can develop

reports individually. The AOKN reporting can be classified within planning, strategic, and operational reporting forms (interviews management accounting employees). The enterprise planning component can be conducted with TM1 for developing budgets as can planning for the entire organization.

Strategic-oriented divisions are mainly located in head office in Hanover and include: market-strategy, management accounting, risk management, and the healthcare management division. Currently, employees from the local regions in Lower-Saxony receive marginal information from reports, but they receive increasing amounts of information from the head office in order to make their own regional strategic decisions (interview marketing director). During the interview process, a separation of operational and strategic reporting could not be defined exactly because daily business requires multiple tasks from management accounting, which makes it difficult to make a differentiation (interviews management accounting employees). Generally, management accounting employees are responsible for certain activity fields in a strategic or operational way. Operational can be defined as: just pushing the button to update a report for professional business divisions (interviews management accounting employees). However, all BI end users are able to answer relevant business questions themselves. These questions can address the likelihood of cancellation, the potential for members to require hospitalization, and developing individual campaigns. This tool can also be used as early-warning system. Thus, every BI end user will be involved in strategic decisions driven by data analyses.

The continuous enhancement in the management accounting should be also based on the knowledge of explorative cross-sectoral analytics; currently only a few employees can manage this process. These employees primarily serve the activity field of healthcare management and generate data and information from different data packages for ongoing healthcare projects. In the future, it will be necessary that a management accounting employee working for hospitals or doctors, must generate information from other data packages to enrich and enhance his own activity field (interview management accounting employee). Thus, health care management and the necessary data analyses in its strategic orientation can be a good example for strategic reporting approaches.

### 5.2.9 Operational reporting

Operational reporting is short-term-oriented and is highly detailed, while strategic reporting is oriented for the long-term and is designed to produce predictions or trends in all relevant activity fields (interview management accounting employee). Clearly structured reports with relevant ratios and high-performance dashboards are needed. However, those instruments must be kept simple and should be easily managed by users. Additionally, they need to avoid abstract definitions of ratios. The standard reporting and monitoring serve as information channels for management and professional business divisions to view past activity on a short-term basis as founded on previously defined relevant ratios and trend views. Because AOKN did not acquire BI until 2010, fixed print reporting is still in use for management to get a fast overview of business events. The future design should enable BI users to generate data and develop reports individually to get preferred analyses for their area of responsibility and to navigate through AOKN data cockpits and dashboards (interview management accounting health care).

The reports have to be developed transparently and to “sell and communicate” to end users and they should increase data affinity with the help of technical and consulting support (interviews management accounting employees and director health care). Figure 5.14 illustrates the BI support and communication within AOKN.

In the following, the voices from the interview participants will be presented concerning the before mentioned BI technologies and tools and the different analytic purposes such as explorative or standard reporting. The agent to CEO stated that the explorative analyses provide “advantages to answer the third and fourth upcoming question in a meeting or business control circuit with the help of navigation dashboards or even ad hoc analysis apart from standardized reports. The focus on data will be given” (interview agent to CEO, July 24, 2013). “Dashboards are the main management accounting tool for result and trend overviews and navigation opportunities. But CIP has to be considered. Vision of dashboarding: the information system of daily working and activities and decision basis in business meetings/ professional control circuits. They solve problems of

previous data files of standardized reports with non-relevant information” (interview agent to CEO, July 24, 2013).

The physical therapy director stressed the “opportunities to connect developments from previous years with own experiences to make informed and strategic-oriented decisions. The systematic structure of comparable data is essential for a long-term retrospective view, particularly for the development of authoritative forecasts” (interview physical therapy director, November 22, 2013).

However, the health care management director mentioned that “not every form of data and information are available and current routine data in the DWH are only partly informative. Mmany questions could not be answered ad-hoc and efforts are high for implementing a standardized reporting” (interview health care management director, November 25, 2013).

“Results will be presented and updated every week which saves time. BI tools make controlling of employees and the whole company easier than before with Microsoft Office tools. Trends and developments will be illustrated and visual and strategic basis for decisions will be generated” (interview regional marketing director, July 26, 2013).

“Cognos for standardized and Panoratio for explorative reporting, for instance, and support for business divisions concerning operational control (customer campaigns etc.)” (interview management accounting employee, July 30, 2013).

#### **5.2.10 Information receiver**

The reports, analysis platforms, and other prepared information have to be transferred to BI end users. The provisional conceptual framework depicted this transfer as dissemination (see Figure 3.4). Based on the interviews and on personal management accounting experiences, planning applications are used by BI end users and the third level of seniority – GBL. The strategic reporting will be conducted by BI end users who should employ predictive analytics. In the future

explorative analytics should be the focus of top management, and the first, second, and third levels of the organizations hierarchy, that is CEO, GF, RD, UBL, and GBL, as well as BI end users. The operational business will emanate from the second and third level of seniority, as well as BI end users (see Figure 7.2).

To guarantee an efficient and successful use of the corporate BI technologies and tools, training and support are necessary for BI involved employees to assist those individuals to analyze data. The initial point is the management accounting that is responsible for data provision and storage. Management accounting should also be responsible for the introduction of further BI products and for the observation of BI market trends (interview management accounting director health care).

Integrating BI technologies appropriately can be a fundamental step in developing an intelligent business. The definition and approach could be as follows:

- Providing opportunities to find good customer solutions in due consideration of efficiency
- No limitation of customer needs, running customer requests
- Well-informed customers about AOKN's supply and products or
- Health will be seen as production and cures as a process where BI must give "data-driven" answers

(interviews agent to CEO and health care management director).

"End user should be able to answer hypothesis driven questions but analyses end not in themselves" (interview management accounting director for health care, August 05, 2013).

### **5.2.11 Strategic and operational business**

This Section presents the strategic orientation and the operational business of AOKN and establishes the potential strategic and operational embedding of BI technologies and tools. It will also present the current BI use in the context of the strategic target fields. This will be enriched with internal AOKN material and

interview statements. The four main strategic target fields of AOKN are illustrated in Figure 5.14.

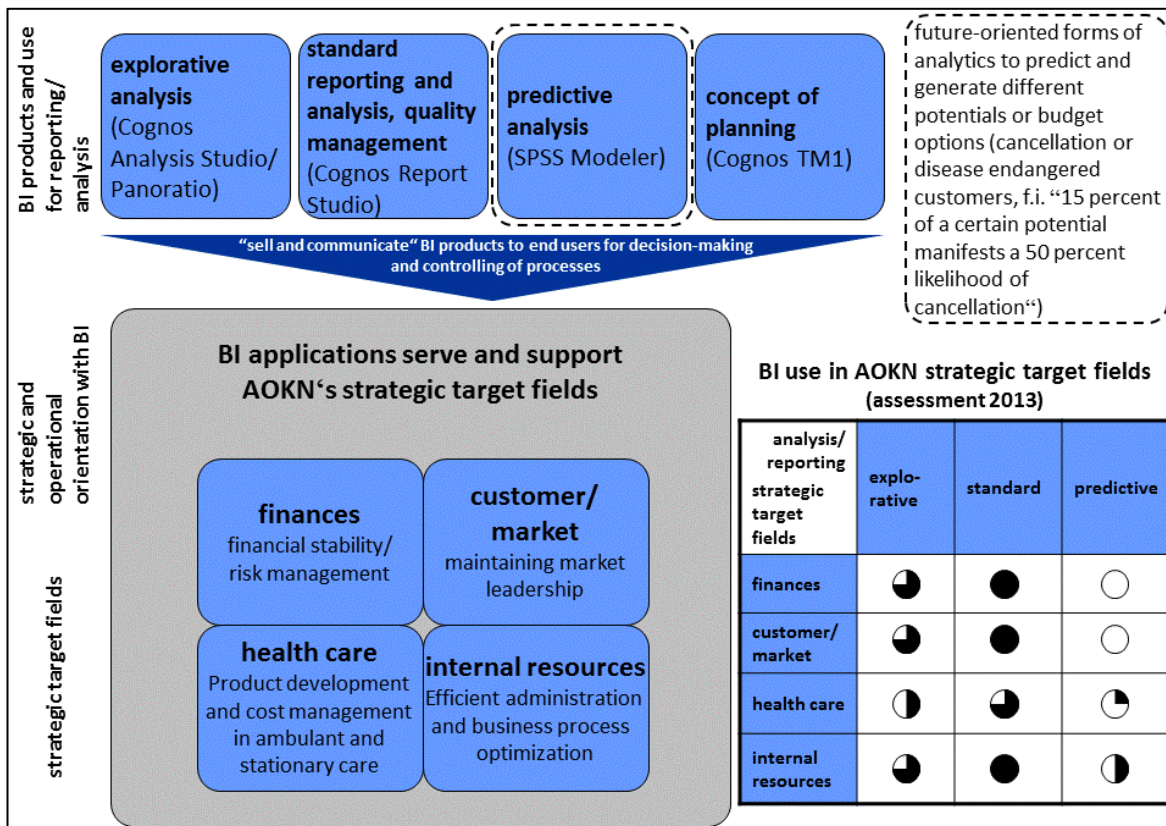


Figure 5.14: Strategic map of AOKN's Balanced Scorecard and Cognos products (according to AOK Niedersachsen, 2012a; interviews)

The four strategic target fields in the four light blue boxes in the middle represent the whole strategic orientation and business strategy of AOKN that are famous and confirmed in the interviews. The current strategy matrix on the basis of the enforced customer orientation from 2014 has only changed marginally. Without the enhancement of the initial strategic target fields, the corporate performance will be endangered. The target fields will be realigned to balance customer orientation and financial stability (see Figure 5.15). However, this structure will not be further used in this thesis. The matrix that will be used is based on AOKN prior to November 2013, which was the date of the last conducted one-to-one interview).



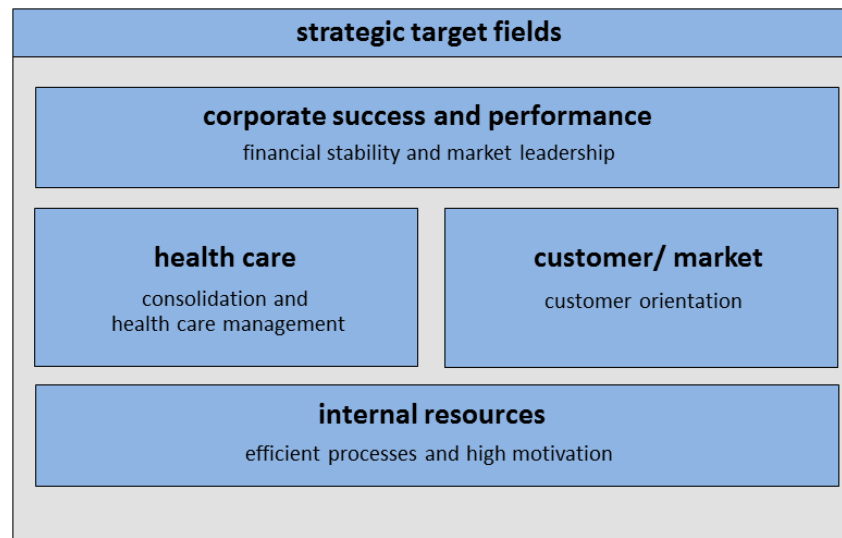


Figure 5.15: Strategic target fields 2014 (AOK Niedersachsen, 2013e)

Thus, Figure 5.14 shows the different analytic forms, such as explorative, predictive, and standard, that support the strategy development process to achieve the four strategic targets. The explicit integration of BI technologies and tools in the strategy development process with its different phases, which leads to the achievement of the strategic target fields, will be described in the findings for the second research question in Section 5.3. The respective analysis in Section 6.2 will then be conducted with the help of the example of healthcare management. AOKN has no explicit strategy development process implemented for all fields; (interviews agent to CEO and marketing director) therefore, the healthcare management example will be suitable because of the variety of health care projects that provide different data sources, such as doctors, pharmaceuticals, or hospitals.

Thus, the strategic target fields and their strategy development processes in AOKN define the analytical orientation that BI applications serve. The strategic target fields represent the contents and strategic factors of AOKN's business strategy. The strategic matrix in Figure 5.14 illustrates how to achieve AOKN's strategic objectives. All business division strategies follow the overall business strategy and harmonize with it (interview agent to CEO). The certain target fields, their contents and objectives will not be described in detail in this thesis

The three blue boxes above the strategic fields show the different BI products and their respective usage and purpose for reporting and analyzing. This underlines the support relevance of BI technologies and tools for all four strategic target fields. Different innovations and enhancements of current measurement or indicator systems are the basis for a modern and competitive management accounting. The objective of a BI application is to provide management with information targeted toward corporate aims (interview management accounting director health care). As a result, reporting and analysis systems will be expected to fit the users' cognitive abilities. In contrast to operational systems, BI supports dispositive and analytical activities. With regard to content, BI can be seen as logical complement to operational information systems.

Concerning the strategic target fields of finance and internal resources, a further conversation with an employee in the department for organization and personnel controlling, revealed a need for activities. The status and the main topics that organization and personnel controlling is responsible for are overhead cost management, administration costs, and human resources. Those responsibilities are illustrated on the basis of "Harvey ball system" in Figure 5.14. The following values of the current status of each field are documented like this:

- finances / explorative = 90%
- finances / standard = 100%
- finances / predictive = 5%
- internal resources / explorative = 80%
- internal resources / standard = 100%
- internal resources / predictive = 40%

The "Harvey balls" are illustrated in a more generous way to get a first overview. The need for action definitely exists in predictive methods and opportunities. The department should be positioned in this activity field to develop medium-term scenarios with multiple influencing factors. There are some theoretical approaches such as personnel prediction models, but a respective BI implementation and data processing will require great effort. On the other hand, the department has nearly

completely integrated standardized and explorative analysis models into BI architecture. They work on different data aggregation levels to develop dashboard visualizations. This was performed with less effort and the demand for data collection and report generating took approximately three hours weekly. This situation will be used for optimization and interpretation of reports and analysis (Employee of organization and personnel controlling, Personal communication, 05 August 2013).

A further internal assessment of the current BI use and development stage was made concerning the fields customer/ market and healthcare. In the customer/ market field, the BI use with standard reporting is on a high level and explorative analysis forms have been used on a “three-fourths ball level.” A level below can be seen the explorative (50 percent) and standard reporting (75 percent) in the healthcare field. The predictive sector could be encouraged for both fields.

During the interview with the physical therapy director, it became clear that the corporate orientation toward the strategic target fields is essential to find the appropriate balance. However, “where the AOKN stands exactly” is missing. It is difficult to find the “right” balance and keep it alive. Therefore, a transparent overall view of the whole situation is lacking. It would make sense to invest in know-how and staff to develop strategies and assessments. Then, a customer value evaluation should be implemented to see if millions of euros should be spent on specific programs or products and how the benefits can be measured in the context of cancellation rates or customer satisfaction. What does it mean to be in a competitive situation and to have a particular advantage? Thus, the certain equivalent value is still missing for a cohesive whole evaluation and measurement (interview physical therapy director).

“A pure strategy development process had not been implemented within AOKN, but the four strategic target fields represent the internal strategic business” (interview agent to CEO). External conditions should also be considered, such as the healthcare industry and even the legal framework. “Strategy is defined as ‘first follower’ due to financial situation of AOKN. Customer satisfaction and certain

health products (f.i. program for depressive patients – this is a strategy driven health care model) have to be improved” (interview agent to CEO, July 24, 2013).

However, there should be “a strategic development process, but I am not involved” (interview management accounting employee, August 12, 2013).

Relevant data and information for a competitive analysis should be collected (interviews management accounting director health care and physical therapy director), evaluated, passed on, and used within an appropriate information system. Concerning AOKN’s competitive situation, the focus on the internal resources and business process optimization – the implementation of BI applications and DWH – was a strategic decision meant to improve its position as a competitor in the health insurance industry (interview management accounting director health care). To summarize the statements for an efficient conceptual classification of BI technologies and tools in this Section, the following illustration represents the findings of the conducted interviews. These statements also reflect the section structure of this chapter to provide a comprehensive overview.

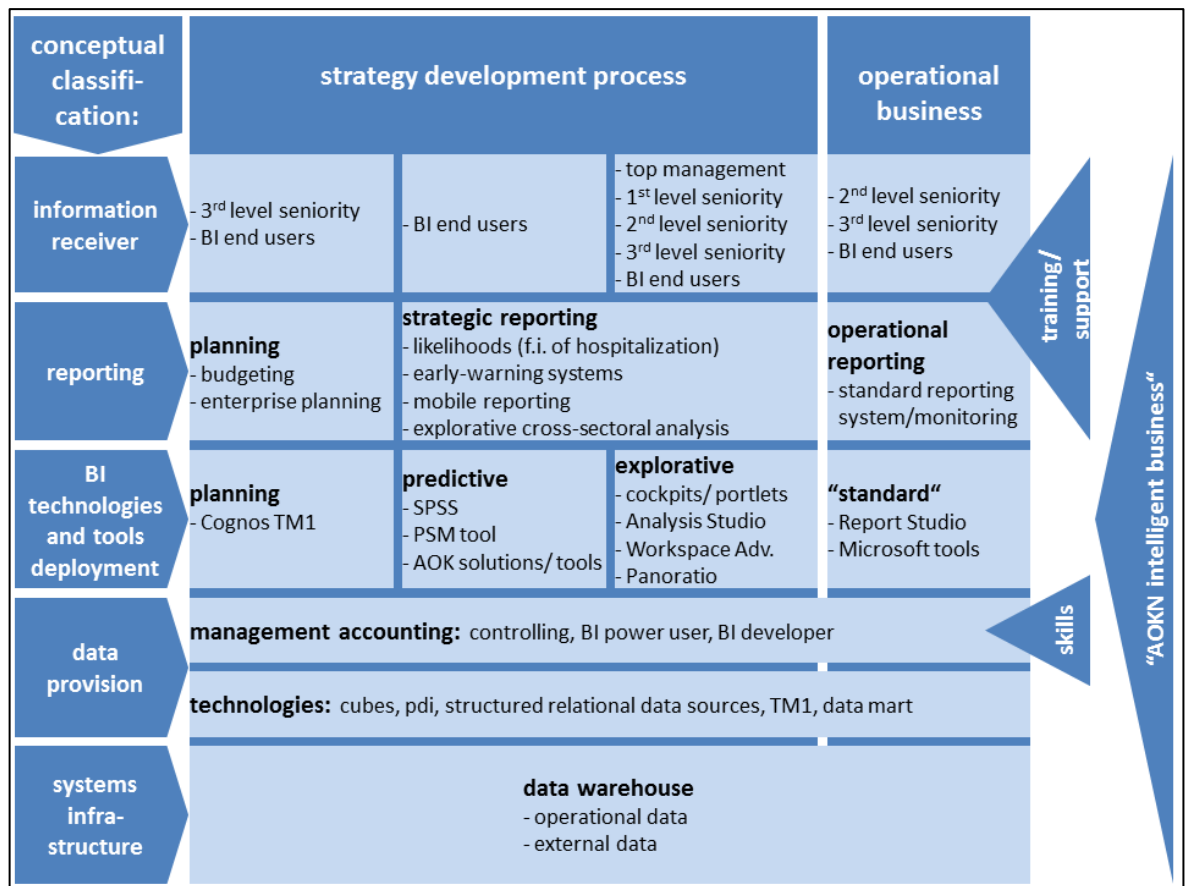


Figure 5.16: Finding matrix for RQ1 – conceptual framework

This illustration stresses the complexity and the diversification of a BI framework for AOKN. On the left side, the dark blue boxes show the main categories as conceptual classifications of BI technologies and tools. These categories can be found in the structure section of this chapter. Thus, it is a designed conceptual framework within which BI technologies and tools are integrated. The light blue boxes represent the contents and characteristics of the classification. These characteristics are further embedded in strategy development process and operational business at the top of this figure.

For AOKN, the explicit embedding of BI technologies and tools can be considered on the basis of BI planning, predictive, explorative and standard technologies as they are mentioned in the interviews. This construct should be recognized and assessed as a holistic BI structure with BI technologies and tools integration. Again this integration is an important element of the whole framework - a necessary element to technological pick up the provision of data and to exploit

data in different ways (explorative, predictive) to the next level within the framework. On the next level of reporting in the matrix, the classification of strategic and operational reporting will be clear. BI predictive and explorative technologies are presented as pre-level, for instance, because the blue box of the strategic reporting is comprehensively illustrated above both of these technologies in the matrix.

In comparison with the existing models in literature (Guarda et al., 2013; Gonzales, 2011; Kemper et al., 2004), the BI framework structure in AOKN can be considered as more complex and detailed. The case study and interviews presented in-depth views and opinions from different perspectives of how the BI users are involved in the whole BI process. They also revealed the reports and analysis platforms that users can access and how BI can be used to answer relevant business questions. Thus, the provisional conceptual framework as based on the current literature was adapted and enhanced to fit the more complex BI demands and structures of AOKN, and is shown in Figure 5.16. For instance, the planning stage of the provisional conceptual framework includes internal and external data, which was designed for the BI infrastructure in the final conceptual framework. It was further important to integrate every BI end user and his or her role as data provisioner or just information receiver in the conceptual framework to consider the whole BI process within AOKN. The transparency of the AOKN BI structure should be underlined in this way to design the strategic and operational process. The overall construct represents the AOKN intelligent business that only considers data analysis, information analysis, or project results in the provisional conceptual framework. Intelligent business should include the whole BI construct with its different stages and classifications. BI or intelligent business should be based on the implementation of a structured and consistent DWH (interview management accounting director health care), to find and develop appropriate customer solutions (interview agent to CEO), to identify and analyze relevant ratios (interview marketing director), to organize information, management performance and support of decision-making processes (interview BI consultant), to implement different management accounting instruments (interview physical therapy director), or to join different data sources for an overall corporate view (interview health care management director). These understandings and

definitions should be integrated into an appropriate conceptual framework with adequate classification and staging.

The conceptual framework can not only be used to help classifying BI technologies and tools, it can also be used to identify links and work flows in their integration and deployment within AOKN.

### **5.3 Findings for second research question**

In this Section the findings for the second research question will be presented:

- Can BI technologies and tools be effectively used and integrated into the strategy development process or not?

The main characteristics of strategic BI tools and how they can be success factors for AOKN in the strategy development process will be discussed. The certain phases in the strategy development process and their approaches were defined and presented in the literature review (see Section 2.2). These phases can be classified into information analysis/ strategy definition, strategy/ concept development, strategy implementation/ business, and strategy review.

The four phases will guide the strategy development process to the objective and “end-product” which are the four AOKN strategic target fields (interviews). The fields integrate finance, customer/market, healthcare, and internal resources, which could be served and supported with BI technologies and tools. However, the interviews showed that a strictly defined strategy development process is not implemented in AOKN or not famous to the participant in detail. It was also mentioned that there is no defined or common strategy process for the four strategic target fields (interviews). For the integration of BI technologies and tools, the discussed literature review in chapter 2 can be used as a foundation. In this chapter, in-depth assessments of BI technologies and tools for each phase of the strategy development process will be made and then analyzed in chapter 6 using an example of a specific strategic target field.

### 5.3.1 Information analysis (phase 1)

For the first phase of information analysis, comprehensive internal and external analyses of relevant information are required to define an appropriate business strategy. These analyses can be conducted on different analysis bases, such as explorative or predictive, and depends on the certain information need, detail, and availability. On this basis, a SWOT summary (see Section 2.2) will be the objective of appropriate BI technologies and tools to analyze health industry markets, customers, or competitors.

In his interview, the health care management director focused on analysis options for a first insight of the healthcare market. In the second step, ad-hoc questions should be answered that address a specific healthcare topic. Panoratio, in particular, can be helpful to define a strategy for identifying the cost-driving disease patterns and for focusing on the “right” fields. A scenario comparison of different groups enables the evaluation of relevant attributes of customers in benefit fields to analyze differences of certain potentials, for instance, in health care projects. Therefore, Panoratio can be effectively used and integrated within this first strategy development phase (interview health care management director).

SPSS serves as predictive analysis tool for calculations of likelihoods and identifies relevant potentials in that can be directly addressed. Examples of situations that would benefit from this platform are customer cancellations and hospitalization rates. Predictive data could be helpful to find and verify the appropriate strategy for relevant customers and to optimize AOKN's business portfolio. The methodical and theoretical knowledge of handling data and potential identification is at the beginning stage and needs to be developed further in the management accounting department (interview management accounting director health care). Both of these data bases should be enhanced to an analytical basis for this information phase. SPSS and Panoratio can be first selected examples to support the strategy development process at this point. Certainly, relevant ratios or trends can be developed in dashboards to identify certain needs, so that even this instrument has to be enhanced (interview performance analyst). Other BI tools can also be considered for these purposes.



### **5.3.2 Strategy/ concept development (phase 2)**

The search for new activity fields and strategic orientations will be advised in the second phase of the strategy development process. The definition of project objectives, cohorts or interventions of current processes should be made at this point. This can be done with the help of an explorative information search, prediction models, or scenario generators. Panoratio can be used to develop scenarios as well. In this phase the concept development will be the focus, and it is desirable to elaborate on several concepts that are supported by data analyses (interview health care management director). That means that certain strategy alternatives have to be elaborated in order to present them to management for decision-making. Nevertheless, the transparency and communication of strategy development and objectives have to be increased which generally should be made from the top down from the CEO to business management, and then to the professional business divisions (interview management accounting employee). Therefore, by interpreting the different interview statements, Panoratio, SPSS or a scenario generator will be proposed as integrative BI tools for this phase.

### **5.3.3 Strategy implementation and operational business (phase 3)**

The third phase focuses on implementing and developing the data-driven supported strategy and the exhaustive analysis of the objectives. Here, standardized monitoring has to be implemented to show relevant ratios and to develop transparency of the organization for strategic staff (interview management accounting director health care). The reporting and monitoring that supports the business strategy has to be completed with all of the relevant and required ratios in order to minimize uncertainties of strategy implementation and evaluation (interview agent to CEO). The comprehensive picture includes individual in-depth analyses and the ability to view single data files of the specific program in order to optimize business processes. This can be done with the availability of relevant single data files for a case management project or the enhancement of a certain budget or incentives through AOKN management. Provided reports and analyses can also illustrate a necessary adjustment of the information system or integrated

ratios that can be considerable through strategy implementation or the operational business. For standardized monitoring, Cognos Report Studio can be helpful in providing access to all data packages – market and customers, hospital, doctors, pharmaceuticals or several statistic ratios – and to prepare them appropriately (interview management accounting director health care). For further analyses, including countersteers and abnormalities, explorative tools such as dashboards or Cognos Analysis Studio are germane.

#### **5.3.4 Strategy review (phase 4)**

The strategy review phase has not been developed at AOKN. The four strategic target fields are considered as sufficient (interview physical therapy director). There are many projects in the company that are driven by politics or social law. Generally, this makes a critical review difficult and inaccurate in a theoretical environment (interviews). A classic controlling life cycle with its objectives, planning, and countersteers has been implemented, but is controlling focused and lacks the critical assessment of strategy objectives with the responsible professional business division. Thus, an integration of strategy divisions and management accounting has to be impelled to make a data based strategy review (interview management accounting director). A periodical review could be implemented as an early warning system with different countersteer analyses and measurements. Relevant ratios should present the current status transparently and should define the efforts that are necessary to achieve the strategic objectives or milestones (interview performance analyst). A holistic evaluation of a healthcare project, for instance, measures the defined economic objectives and the strategy approach. Statistic evaluation software solutions such as the AOK internal product PSM tool or Panoratio with its integrated statistic package can be meaningful BI tools in this process (interview health care management director). In this way, experiences and results of the evaluation and strategy review can be reflected to the responsible strategy division, for instance, health care management.

“In the context of product development, f.i. health programs, the four strategic target fields will be considered as bottom-up strategy” (interview agent to CEO, July 24, 2013).

A “BI strategy makes sense” (interview BI consultant, July 30, 2013). “BI has to be seen as internal resource to fulfill certain tasks such as BI has the same function like a pencil or telephone” (interview management accounting employee, July 30, 2013). The BI system can be a “good method to gain an overview of all relevant fields” (interview management accounting director for health care, August 05, 2013) of AOKN’s strategy.

“In 2010, top management recognized the strengths of a BI system that are helpful to control the company’s internal processes more effectively. For a further development of the BSC to an integrative planning or predictive model, the corporate development division has to prove the respective requirements for the BI landscape then” (interview management accounting director for health care, August 05, 2013).

The data driven strategy development process should be implemented as “Problem - (driver) analysis - options for action - decision - planning implementation - implementation - controlling/ countersteer ... and back again” (interview physical therapy director, November 22, 2013).

In concluding these findings for the second research question, Figure 5.17 illustrates the above-mentioned phases and approaches. The middle circle presents the four phases of the strategy development process. It bases on the theory mentioned in chapter 2. These phases lead to a strategic “end-product” of AOKN, namely the strategic target fields. Each phase is extended by approaches, contents, and objectives of the certain phase. The focus is on the both blue boxes called “active tools” near the frame that present the adequate use and integration of BI technologies and tools. As already mentioned, these tools are recommended and can be adjusted and enhanced for additional business situations. According to requirements, a certain BI tool, such as Cognos Report Studio, can be used during the phases if it is sufficient for the certain data selection and generation of the

process. The development of a prediction model can also be an example to use mainly SPSS or Report Studio equally and can play a crucial role in the strategy development process.

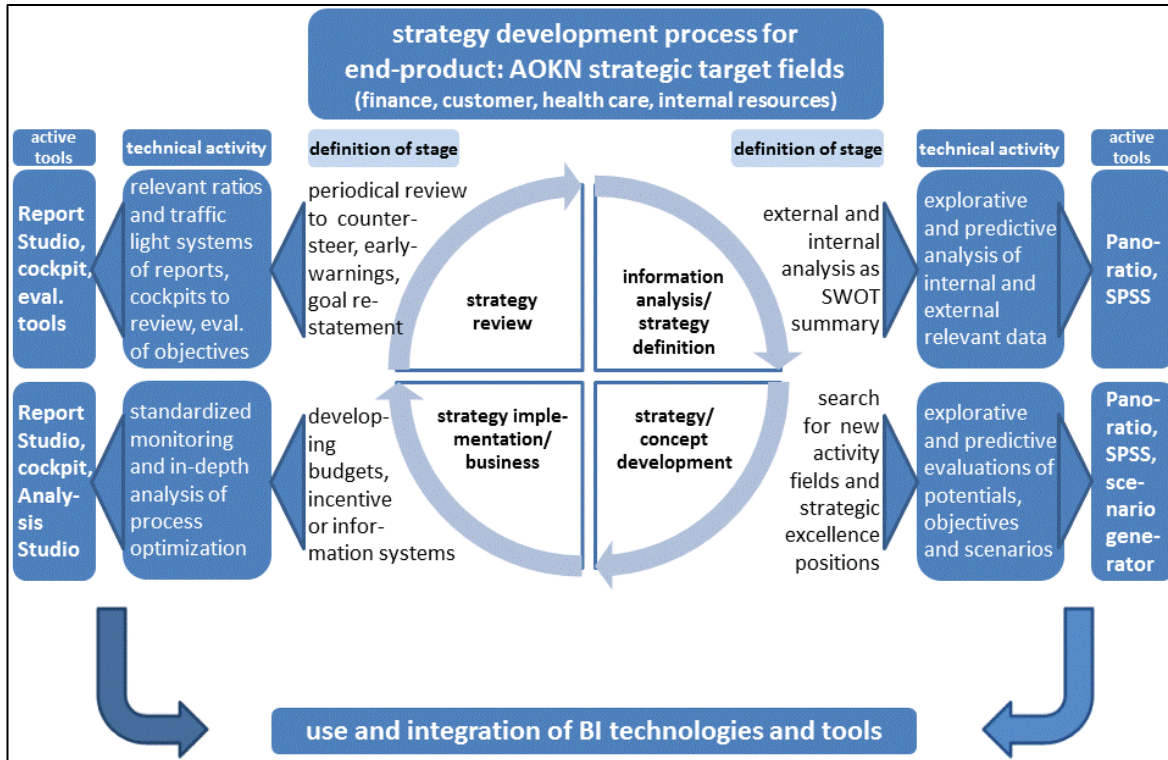


Figure 5.17: Findings for RQ2 as strategy development process

Therefore, Figure 5.17 can be considered as a global strategy development process and position for the findings of the second research question. On the basis of the health care management process, this position and strategy development process will be further analyzed in chapter 6. An explicit use and integration of BI technologies and tools in the health care management process will also be illustrated.

#### 5.4 Findings for third research question

In this Section the findings for the third research question will be presented:

- Can functions and solutions be added to current BI technologies and tools to enhance their performances for end users and top management to gain capability?

Many statements were mentioned in the interviews that included factors or ways to gain a capability. The following classification as process structure can be derived and developed from the interview findings to recognize the different roles and tasks of BI end users. This classification is the cornerstone for capabilities. At the end of this Section, the classification and whole structure will be considered together to uncover and visualize potential capabilities (see Figure 5.18).



#### 5.4.1 Technology

BI technologies should be efficient, user-friendly, and custom-fit to the market and business division needs (interviews). Planning applications (TM1) and aggregated data structures for performance analyses (Panoratio data base, data marts) play a crucial role in certain business segments. For further in-depth data analyses, relational data technologies have to be available primarily for management accounting employees and certain BI end users (interview management accounting director health care). In this way, requirements can be developed for efficient administration and management of internal resources. The analysis of relational data is also important to optimize business processes because customer information and characteristics can be examined.

“All data, functions and opportunities have to be integrated into one cockpit (“dashboard”) with all relevant screens, ratios and trends of AOKN. A cockpit like on a plane where the left wing cannot be disregarded. Internal service, distribution and market have to be overviewed and integrated. A potential weakness has to be compensated by strengths; respectively the weaknesses have to be improved” (interview management accounting employee, August 08, 2013).

“Big data has to be managed individually through Panoratio pdi or a specific data modulation as data mart, f.i. historical time slices, but it is a CIP” (interview management accounting employee, July 30, 2013).

“No self-satisfaction because it is a fast moving business; critical assessments of market developments. Which benefit can be seen by developing predictive analysis forms? Enhancing BI constantly, such as TM1 for planning applications” (interview management accounting director for health care, August 05, 2013).

It will be necessary to have a “deepened data understanding for relational reporting (which has increased); an incorrect join of different data sources would be fatal” (interview management accounting employee, August 12, 2013).

#### **5.4.2 Software**

The introduced technologies in Section 5.4.1 have to be used with a performance and user-friendly BI software solution. Currently, the Cognos software provides fast and efficient functioning with planning, standard and explorative tools, and mobile cockpits and dashboards (interview management accounting director health care). Data mining is a further segment of this technology classification, which can be served with SPSS and a potential social media analytical platform. The social media is a current focus field used to analyze social behavior, characteristics, and the needs and attitudes of customers. This should be conducted in with due consideration of privacy protection (interview agent to CEO). Panoratio with its manifold pdi and data sets is an instrument that provides fast multisectoral data. Other software solutions in the AOK system have to be observed and continuously proved if a potential integration can be realized (interview management accounting director health care). This can be an AOK software solution, SAP solution, or an Office solution used to implement and grown project management objectives (interview management accounting employee).

“BI applications have to handle big and manifold data structures (size and performance) with a simple handling” (interview health care management director, November 25, 2013). “Quantitative information can be handled with Cognos Report Studio” (interview management accounting employee, August 12, 2013).

“Data mining as potential process” (interview BI consultant, July 30, 2013); an analysis and information process chain is worthwhile (f.i. data mining)” (interview management accounting director, July 31, 2013). It is a question to “building up methodical knowledge. Data mining project in pharmaceutical field, what options do we have here?” (interview management accounting director for health care, August 05, 2013).

“Panoratio is helpful for defining a strategy to identify the cost-driving disease patterns and to focus on the right fields. Panoratio is helpful for the strategy process” (interview health care management director, November 25, 2013). “Panoratio for first analysis of needs to develop an idea or certain project and to prioritize topics. The controlling of health care contracts, the implementation of a reporting during a period and a comprehensive evaluation of contracts is essential to see what is going on in certain business fields” (interview agent to CEO, July 24, 2013).

“On the basis of subprime information we cannot generate premium decisions. Activity fields are made transparent and we can ask: what are we doing on which fields? Many questions could not be answered five years ago but now AOKN has got the nationwide biggest data model, particularly for Panoratio. It is now a clear competitive advantage” (interview management accounting director for health care, August 05, 2013). Thus, “BI becomes business analytics” (interview BI consultant, July 30, 2013).

“IBM Cognos, SAP BO, Microsoft BI products, QlikView® from open source for small and medium-sized enterprises, and Oracle products are data base driven” that can be used in AOKN as BI applications (interview BI consultant, July 30, 2013).

### 5.4.3 Ways of access

The best analysts, and often the best assets, in most organizations are those users who want to manage data and want to understand why the business is performing the way that it is. There are many ways to access reports or analysis templates. The delivery can be active transmission through management accounting support. Standard reporting, for instance a management report, is delivered via email in pdf format through management accounting employees (interviews management accounting director health care and BI consultant). However, standard reporting can differ in the handling and provision. The management of AOKN was introduced to self-provision from the Cognos portal where reports are delivered as a fixed pdf. The Cognos Event Studio can be used to schedule a report to conduct after the weekly data actualization automatically (interview management accounting employee). The self-provision will be a crucial factor in the BI process for AOKN in the coming decades (interview management director health care).

The self-service and the provision for pick up should be enhanced in the future without neglecting management accounting support. The capabilities of BI end users should be expanded. Those users should be encouraged to pick up reports themselves and to develop analyses independently (interview management accounting director). Cognos Connection is the current portal with a separate folder structure that includes reports and analysis templates for all business divisions and developed activity fields in the DWH. BI end users can create folders or bookmarks in their favorite segments. The independent learning acquirement of functions, solutions and hints for report developing can also be achieved via video podcasts and report instruction. Podcasts and mobile reporting provide information on an individual basis (interview performance analyst). Information can be transferred fast and directly to BI users, which allows them to make operational decisions without contacting the management accounting department. At the same time, analytical knowledge will be fostered by involving BI users in the BI data and information provision process. Afterward, data-driven decisions can be better understood and reconstructed if professional business divisions and users were



part of the information process rather than using the fixed defined ratios from management accounting.

To gain capability and competitive advantage, a “fast and rapid access on relevant data for valid decision-making” (interview BI consultant, July 30, 2013) will be necessary for top management and BI end users.

“Active reports for mobile reporting will be checked currently” (interview BI consultant, July 30, 2013).

“For the standardized reporting there must be a more efficient ratio finding process, for instance a common access on Panoratio data bases which can be relieved for management accounting division” (interview health care management director, November 25, 2013).

#### **5.4.4 Report characteristics**

To develop a standard reporting procedure, transparency of data, ratios and business processes should be structured visually (interviews management accounting director health care and performance analyst). Certain functions should be integrated in the reporting activities and analyses as well. An interactive visualization should be presented as a graphic overview of the analysis (interviews health care management director and performance analyst). Even statistical functions should be managed to conduct evaluations and statistics for a health economics evaluation of health care projects, for instance. Finally, reports should provide flexibility so that BI users and management can access multiple views, trends, or data (interview management accounting employee). The secure handling of big data files must be guaranteed to avoid losing relevant results from these politically and strategically relevant fields. The objectives of reports are: early warnings, controlling, and activity measurements (interview agent to CEO and management accounting director healthcare).

Therefore, AOKN is moving toward making its business processes more transparent by defining explicit ratios together with business divisions and specialists to identify relevant business needs or to react on business events (interview management accounting employee). This will be done with the help of BI applications and the defined ratios will be prepared in the ETL processes for the DWH integration. Thus, every involved employee can reproduce the contents and meanings afterwards. Customer satisfaction has to be addressed in this context. A leading ratio for all processes has to be developed or proved to enhance and control respective rate trends. In this context, decision-making should be supported through BI deployment. However, BI is not generally a substitute for managerial decisions. Data driven answers can be a solid basis to make those decisions (interviews agent to CEO and management accounting employee).

“Reporting for supporting of trends or even refusals and information of products and markets should be implemented. Where are bad customer values and many refusals etc. to make the negative benefit sale and internal processes transparent. Registrations and reference values have to be confronted” (interview physical therapy director, November 22, 2013).

Report characteristics play a crucial role to gain capability and to “be flexible for a multifaceted use, standardization and automation” (interview management accounting employee, July 30, 2013). It is also important “to have the ability to handle big data and just to answer relevant corporate questions” (interview management accounting employee, August 12, 2013).

#### **5.4.5 Addressing BI end users/customers**

Communication of BI developments plays a crucial role and has to be strengthened in the coming years. This is necessary because the communication, understanding, and marketing of BI are currently seen as heterogenous in AOKN (interviews). The addressing of BI end users and BI customers within the company has to be more custom-fit on the basis of the corporate needs (interview management accounting director). The communication can be supported by first-

level support, qualification of BI end users, communication and even cultural aspects such as corporate mission and vision. Several aspects are given below that are important in this communication segment for BI customers as support functions.

The BI power users can also play an important role in the communication process. These advanced-analytics experts also need to be “architects” and “general contractors” who can quickly assess what resources are available in the management accounting department to train other BI users (interview management accounting director health care).

All of the mentioned classification and requirements in this chapter should lead to capabilities on each level including: technology, software, ways of access, report characteristics, and addressing BI end users. The conducted interviews underlined a differentiated picture of capabilities through BI applications. The most important factor to stress for these advantages is the performance of the whole BI system to handle amounts of data. BI technologies and tools must completely fulfil the corporate analytic needs and must be integrated into the information infrastructure. This construct should minimize uncertainties by generating data from a complete system in order to make reliable decisions (interview agent to CEO). To gain complete corporate transparency of all business processes or of the financial situation, it is necessary to use BI tools fast and efficiently. The reporting and monitoring have to be flexible, performant, and of high quality to consider customer needs, contract negotiations or health products for customer retention. Management accounting has to “sell” BI opportunities of transparent analyses with a continuous information dialogue with AOKN’s top management. In this way, data understanding, confidence, and know how will increase the quality of professional analytical employees or data scientists (interviews).

Finally, these requirements, ways and ideas for capabilities led to the illustration in Figure 5.18 and are shown in the boxes “capability” on the right side as new content. In the middle of the graphic, the boxes present the described requirements of BI technologies and tools for classification and capabilities. The classifications on the left reflect the structure of this findings chapter as well.

CLASSIFICATION:	structured requirements needed to improve BI technologies and tools to gain capability				capability
addressing BI end users/ customers	<b>first-level-support</b> - for technical, analytical, cognitive abilities	<b>qualification</b> - training/ briefing (on the job) - data scientists	<b>communication</b> - "sell" benefits of BI tools for understanding, confidence, acceptance	<b>corporate mission/ vision</b> - leadership processes - "live" demos	information dialogue, support, transparency of BI strengths
report characteristics	<b>standardized</b> - structured persp. - transparency of data, ratios, business processes etc.	<b>functions/ features</b> - interactive visualization - statistical features - multiple views, trends, scenarios, data correlations, big data management		<b>objectives</b> - early-warning - controlling - activities/measurements	flexibility, performance, quality, transparency of customer (needs), contracts, products
ways of access	<b>active transmission</b> - management accounting support - email (individual) - "burst" (target groups spreading) - event studio (alert)		<b>self service/ provision for pick-up</b> - portal (cockpit, job and events, report repository, own folders, time schedules) - book mark, archival storage - mobile reporting/ video podcasts		get information to minimize uncertainty of decision-making, build up (data) knowledge
software	<b>Cognos</b> - planning - standard tools - explorative tools - portlets/ mobile	<b>data mining</b> - SPSS - social media data analytic platform	<b>Panoratio</b> - pdi sets	<b>others</b> - AOK software - SAP BO - Microsoft Office	fast and efficient use of technologies for whole corporate transparency (processes etc.)
technology	<b>TM1</b> - planning applications	<b>data mart</b> - aggregated data analytics for relevant segments	<b>pdi</b> - customer-focused views for cross-sectoral analytics	<b>structured relational data</b> - in-depth analytics	strengthening internal resources, early data integrity/ completeness

Figure 5.18: Classified findings for RQ3

The one-to-one interviews showed that reports or simply generated information do not immediately provide "pure" capabilities. Developed reports and analyses are necessary and basic requirements for a corporation that relies on quantitative ratio-oriented information. Furthermore, it is important to understand where data come from and when they are updated and available for users. Employees cannot generate "premium decisions" based on "subprime information." (interview management accounting director health care). As of 2008, many questions could not be answered regarding several activity fields, and for the cross-sectoral field healthcare management in particular. Actually, AOKN has the biggest data model nationwide, for instance the data base for explorative analytics in Panoratio. The foundation for the distinctive data platform, storage (DWH), and the current situation was developed in the BI project of 2010 and 2011. Those instruments can now be evaluated as having created a clear capability for AOKN (interview management accounting director health care). This can be realized insofar that

more transparency of healthcare benefit markets provides in-depth information about care supplier or contractual partner activities and their behaviors and objectives. This is accomplished by collecting, structuring, and analyzing more data about the environment and understanding and predicting market developments (interview management accounting employee and BI consultant).

Thus, Figure 5.18 summarizes the classification, solutions, and functions needed to gain a capability in a structured model. The direct impacts of capabilities on each solution and function of BI technologies and tools are emphasized in this model. Furthermore, examples of AOKN practical projects and proceedings that generate capabilities will be presented. In this way, a contribution will be made to the company in the form of a practical approach.

The communication process within AOKN is essential. “Reporting will be basically seen as BI tool collection, management accounting is part of management and leadership which also include communication, discussion or consulting. In order to serve the whole management accounting life cycle activities can be created through control circuits or business meetings” (interview management accounting employee, August 08, 2013).

“Advantages and opportunities should be better communicated to business divisions but in some divisions the demands are not increasing” (interview management accounting director for health care, August 05, 2013).

“Business strategy has to be transparently and comprehensibly communicated to employees which creates corporate identification” (interview regional marketing director, July 26, 2013).

There should be a “well-implemented network with business divisions. It is necessary to understand which relevant questions and challenges exist in the business divisions. Consequent communication and transfer of BI products to business divisions is also important” (interview management accounting director for health care, August 05, 2013).

Voices illustrating the difference between top level and lower level employees are presented throughout these findings. At his point, the findings of the interviews and even key BI issues relevant for AOKN from the assessment of the participants are summarized. They are discussed from three different business levels, and the difference between top level and lower level employees is analyzed. An internal inquiry showed that relevant BI issues for AOKN can be interpreted and evaluated differently from different senior levels. Figure 5.19 shows the rating of each relevant BI issue for AOKN found in the internal inquiry of BI end users and the two business management levels – business management and senior management. On a scale from 1 to 5, 1 is “irrelevant” and 5 is “very relevant” as regards BI issue for AOKN.

Members of senior management are the management accounting director, health care management director or physical department director. The authorized agent of the CEO can also be considered to this group. The business management is a level lower than senior management, for instance the management accounting director for health care or regional marketing director. BI end users represent management accounting employees or performance analysts for business management.

The largest deviation averages between senior management (red line) and BI end users (green line) are 0.7 and 0.9 average points. This concerns the following issues

- Analytical skills and data knowledge
- Management of objectives
- Early warning system
- Data access
- Performance of BI system
- Standardization (ratios etc.) and
- Transparency (of business processes)

These deviations and further differences in Figure 5.19 play a crucial role in analyzing and interpreting the different results matrices presented in this chapter. The detailed data of this internal inquiry can be found in Appendix Table 10.

Analytical skills and data knowledge, management of objectives, and transparency of business processes are assessed as a higher relevance for AOKN by senior management than by BI end users. This shows that a certain transparency and accuracy in analytics are very important for the AOKN’s performance. This is of relevance in answering the third research question concerning additional functions and solutions to current BI technologies and tools.

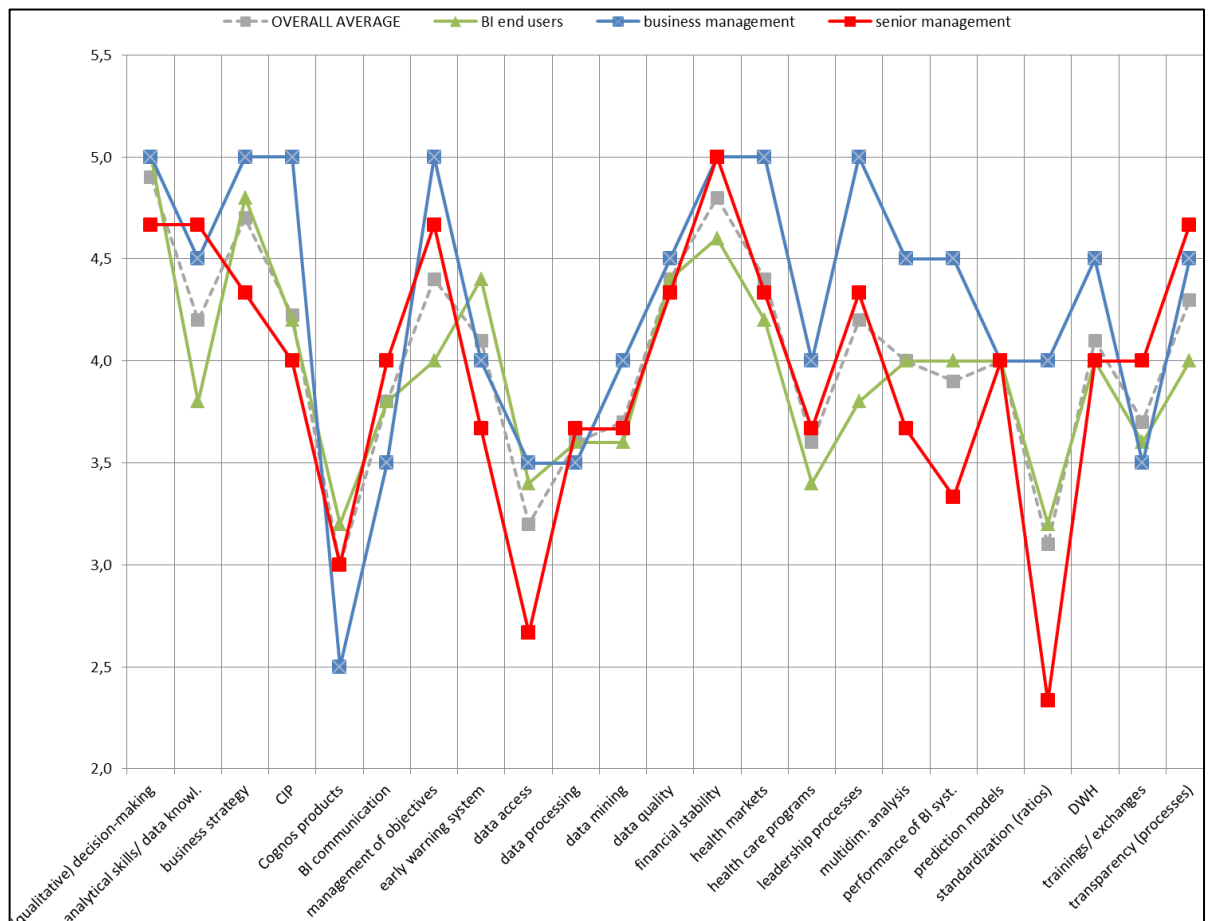


Figure 5.19: Deviation average top and lower level in AOKN from inquiry

## 6. Proposition, design and development of the new framework

In this chapter, the case study findings from chapter 5 will be evaluated further and developed to create a new framework. This structure sets the basis for analyses, evaluations, broader conclusions and potential generalizations in chapter 7.

The case study is used to answer the research questions, and developing new thinking that emerges from studying a single case in depth. The research objectives that are defined in Section 1.3 are addressed by analyzing and evaluating the research questions. Chapter 8 then summarizes how the research objectives have been met in this thesis in Figure 8.5.

### 6.1 Classification of BI technologies and tools within the conceptual framework

The findings presented a classification of BI technologies and tools, that was designed within an appropriate conceptual framework (see Figure 5.16). This framework was designed on the basis of the interview statements from the heterogenous participants. It clarifies the different needs, understandings, and motivations of each involved business department on all management levels. It also clarifies and stresses BI within a complex framework with different links and not as a single product for reporting or analysis purposes. The classification of BI technologies and tools can be classified within this whole construct of the conceptual framework. Despite the complexity of the conceptual framework, it is important to underline the illustrated classification on the left side that contributes to AOKN's practice. In this way, certain elements can be assessed by top management to determine whether they are significant for strategic or operational development. Even the explicit embedding of an element, such as a light blue box in the middle of the framework, can be used for AOKN's benefit because of its context, links, and dependency.

As already presented in the literature review in chapter 2, BI architecture integrates data for decision-making, learning, and corporate solutions (Ranjan,



2008; Saha, 2007). BI is not a single solution for an information system or a report, but rather a complex architecture that affects many business levels and employees who are involved in the BI process. Thus, the matrix provides the BI requirements and classification for AOKN as an “intelligent business“ in a holistic way. The framework will “ensure that the variety of elements that can derail an initiative or improve success are considered” (Boyer et al., 2010, p. 5). BI excellence can also be achieved when organizations have in place the strategy, people, process, and technology approaches that result in business impact, value, and effectiveness. Value and business impact are best achieved when the use of BI, performance management, and analytics spans departments and silos to provide an enterprise view of information and a collaborative team approach to achieving goals. This requires a defined approach that takes into account the technology, tools, and strategy amongst other factors. Therefore, the multiple elements within a conceptual framework should be considered to achieve BI success (Boyer et al., 2010, p. 5). Thus, this chapter uses some of the above-mentioned definitions to facilitate an enhancement and analysis of the conceptual framework. The respective literature presents different BI frameworks and models, which include certain elements of data bases, data analysis, reporting, and dissemination of relevant information within the organization (see chapters 2 and 3).

Gonzales (2011) provided a model that represents success factors for BI maturity, competitive advantages and capabilities. These factors are discussed in Section 2.2.6 and will be appropriate to enhance the initial conceptual framework. According to Gonzales (2011), this BI competitive advantage and capability model focuses on four key factors of BI maturity: leadership, skill, infrastructure, and value. The model suggests that a positive relationship exists between each of the four factors and the level of competitiveness that the BI project provides. This research focuses its attention on the four key factors of BI competitiveness and their interrelationships. Gonzales (2011) presented additional key findings in his research. These findings provide promising guidance and focus areas for executives to follow to better target their investments in BI and DWH projects. Consistent leadership has an unequivocal influence on the competitiveness of the BI project and impacts the other factors: infrastructure, skill, and value (Gonzales,

2011). For a potential enhancement of the conceptual framework in Figure 5.16, these four success factors of Gonzales (2011) will be added and integrated. Figure 6.1 presents this enhancement. The factors of Gonzales (2011) were chosen to clearly present and integrate the BI infrastructure, skill, value and leadership in the initial conceptual framework. Thus, the framework can be enhanced and developed to a “higher, more qualitative” level on the basis of the four factors.

conceptual classification:	strategy development process			operational business	factors of BI competitive advantage/capability model
information receiver	- 3 <sup>rd</sup> level seniority - BI end users	- BI end users	- top management - 1 <sup>st</sup> level seniority - 2 <sup>nd</sup> level seniority - 3 <sup>rd</sup> level seniority - BI end users	- 2 <sup>nd</sup> level seniority - 3 <sup>rd</sup> level seniority - BI end users	LEADERSHIP
reporting	<b>planning</b> - budgeting - enterprise planning	<b>strategic reporting</b> - likelihoods (f.i. of hospitalization) - early-warning systems - mobile reporting - explorative cross-sectoral analysis		<b>operational reporting</b> - standard reporting system/monitoring	+
BI technologies and tools deployment	<b>planning</b> - Cognos TM1	<b>predictive</b> - SPSS - PSM tool - AOK solutions/tools	<b>explorative</b> - cockpits/ portlets - Analysis Studio - Workspace Adv. - Panoratio	<b>“standard”</b> - Report Studio - Microsoft tools	+
data provision	<b>management accounting:</b> controlling, BI power user, BI developer				SKILL
	<b>technologies:</b> cubes, pdi, structured relational data sources, TM1, data mart				+
systems infrastructure	<b>data warehouse</b> - operational data - external data				INFRA-STRUCTURE

Figure 6.1: Enhanced “conceptual framework” for RQ1 by capability model

The four factors of the BI competitive advantage and capability model of Gonzales (2011) are classified and integrated on the right side of the matrix, each with the certain classification on the left side, so that skill is classified to provision of data, primarily for management accounting. However, skill is also classified to BI technologies and tools deployment. Value is classified to reporting as well as BI technologies and tools. The factor “value” can be focused on these two classifications. The matrix presents a holistic integration of the four factors. The benefits of the factors are illustrated by further classifications as the matrix reflects.

In this way, this additional classification of the four success factors can be designed for the initial classification of the conceptual framework. This framework should also be regarded as analytical tool with several variations and contexts. It is used to make conceptual distinctions and to develop ideas. Thus, the classification of BI technologies and tools will be discussed within this conceptual framework. However, the framework will be also seen in the whole context the effects and benefits that can be generated through the BI tools integration will be identified. Therefore, the matrix can be assessed as a mixed model integrating both case study findings and evidence from the literature (Gonzales, 2011).

## **6.2 Effective use and integration of BI technologies and tools into strategy development process**

The pure strategy development process, as it is presented in Figure 2.9, has not been implemented in AOKN (interviews agent to CEO; management accounting employees). The four strategic target fields can be seen together as a focused benchmark. However, the strategies of a company develop and improve according to its environment and the tenets of social law situation in order to strengthen the company's long-term success. An organization must deliver greater value to customers or create comparable value at a lower cost, or do both. When that is implemented, greater profitability results. The ability of a company to deliver higher value enables that company to charge higher average unit prices and greater efficiency results in lower average unit costs (Porter, 1996). Therefore, the strategic target fields can be the strategic bases used to observe markets and competitors. They further enable AOKN's business management to continuously adjust their strategy to the environment (interviews).

The strategy development process can be defined and summarized in several steps in order to develop a strategy in an iterative systematic process (see Figure 2.9). Therefore, the four strategic target fields present the strategic "end-product" in AOKN that must be achieved through this multiphase process. The strategy will be expressed in high-level conceptual terms and priorities. For effective implementation, the process should be translated into more detailed policies that

can be understood at the functional level of the organization, which will be demonstrated and depicted on the basis of healthcare management in Figure 6.2.

The healthcare management process can be a representative field and process to discuss the effective integration of BI technologies and tools in the strategy development process. This process shows the implementation of a healthcare program. This process was a central theme of the interview with the healthcare management director. The healthcare process will be supported on the basis of product teams as a project structure that develops and enhances the current healthcare project. The professional business divisions are ambulant, stationary, prevention, care, doctor, market management, and management accounting. The following health care projects are the current focus of the product teams: case management for high-costs, depression, schizophrenia, or cardiac disease. The requirements and standards of healthcare projects focus on generation of cost or quality advantages and the targeted enhancement of health care structures in Lower-Saxony. The basic conditions that are required in order to implement healthcare structures or models of specialized departments, hospitals, or cross-sectoral regional budgets in Lower-Saxony can be found in the Code of Social Law, Thus, AOKN has to act within this political and legal framework.

Thus, reports with traffic light systems of warnings and escalation mechanisms can provide evidence of whether a certain healthcare project is successful or not. These mechanisms can be used as foundations to make decisions to review or adjust the initial strategy. Therefore, the evaluation matrix in Figure 6.2 illustrates the first three phases of the strategy development process using the example of AOKN health care management.

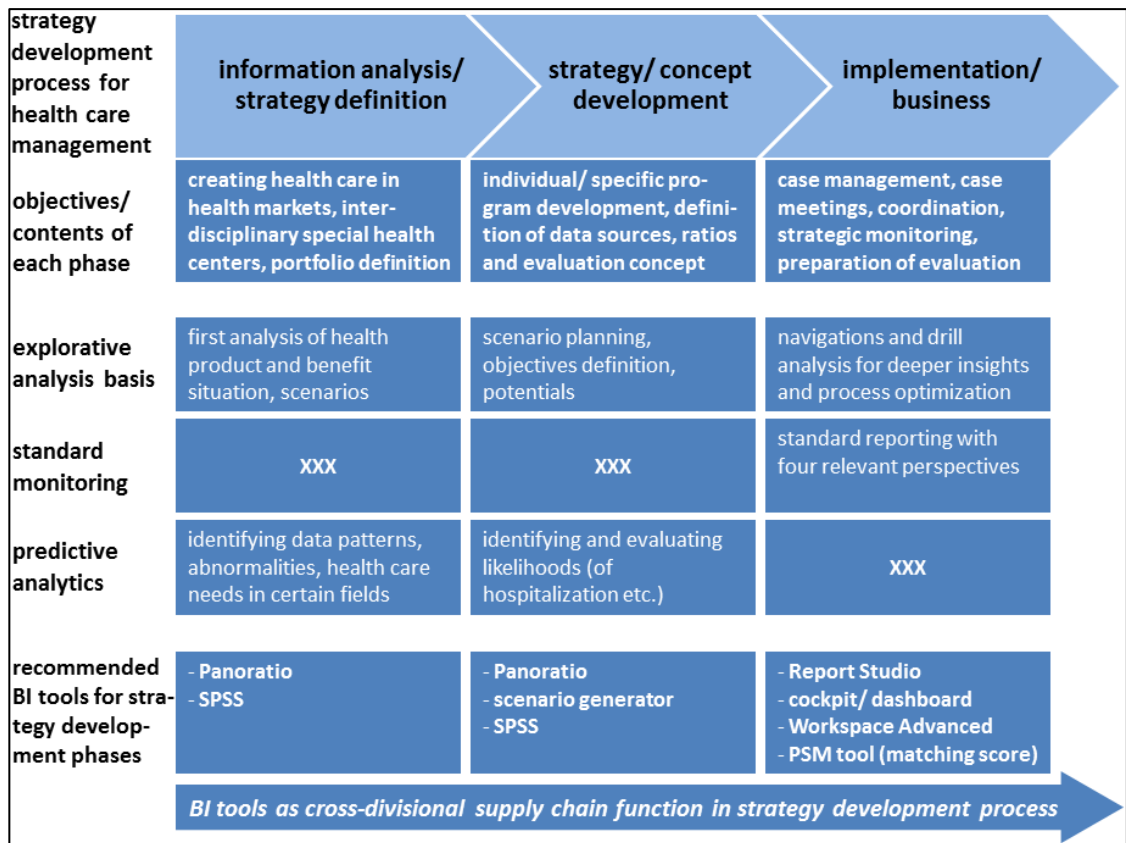


Figure 6.2: recommended BI tool integration in strategy development process for health care

Management accounting has a cross-divisional supply chain function in the strategy development process. This business division will be seen here as provider of information and BI technologies and tools as shown by the arrow at the bottom of the illustration. Thus, management accounting and BI technologies and tools are indirectly involved in the strategy development process. The “XXX” boxes show that on those levels a certain BI analytic form is not appropriate. Thus, certain analytic forms (the three box rows in the middle of the graphic – “explorative analysis basis, standard monitoring, and predictive analytics) are not recommended in phases of this healthcare example. Standard monitoring with fixed defined ratios will be useless for the strategy definition unless specific ideas can be found in current reports for a strategy formulation. For that phase standard monitoring should not be developed. At this point of the strategy development process, ideas and innovations can emerge from this phase by “playing” with data or scenarios from BI in an explorative way and/or regarding different customer cohorts. Thus, BI technologies and tools will be effectively integrated and used at the same time.

### 6.3 Addition of functions and solutions to current BI technologies and tools

Designing and developing a BI solution requires a good understanding of the BI conceptual framework as illustrated in chapter 5. It also requires advanced skills and capabilities in software engineering. Logica (2010) introduced a BI engineering framework that supports BI practitioners in their daily operating environment. The BI engineering framework is the working environment for the BI practitioner. It offers a structured set of activities and deliverable templates that enable efficient, manageable, and reproducible BI development. The BI framework describes the main processes that need to be understood by all involved parties in a BI initiative. The BI engineering framework defines in detail the activities, deliverables, interdependencies, and resources that support the BI practitioner. The framework integrates engineering discipline perspectives such as data, function, network, timing, people and motivation (Logica, 2010). These components are starting points that can be further integrated and analyzed in this Section.

The capability that is illustrated in Figure 5.18 on the right hand in dark blue colour will be evaluated further and linked directly to the classification that will be shown at the end of this Section (see Figure 6.7). The light blue boxes of the matrix represent the requirements and characteristics of BI technologies and tools that are intended to achieve a capability for AOKN. The objective is to generate a set of critical success factors for the future development and deployment of BI applications along with impacts for practical use.

To first highlight the success factors and capabilities that emerged from the interviews, competitive advantages and capabilities were only mentioned on a general aggregated level. AOKN possesses a large share of the market in Lower-Saxony and has a continuous regional presence. Financial stability is also a crucial factor to guarantee the balance for enhancing the four strategic target fields. The image and brand of AOKN as “Gesundheitskasse” should be have

sustainable political influence on care providers and should identify and contact relevant patients (interviews).

The requirements and characteristics of BI applications should be examined in order to gain transparency and understanding. That process should reveal the extent of information needed to make a sound decision. The answer of this third research question should be more complex, so that a classification matrix will be chosen that includes manifold levels that promote the gain of potential capabilities. Thus, different options should be examined that will enable BI applications to achieve this objective. This will be structured in this Section and then evaluated further in Section 7.3.

The requirements and characteristics of BI technologies and tools will be illustrated in order to establish the answer to the third research question on a more general cross-divisional level and to provide an overview of potential capabilities. This illustration is based on further internal inquiries with the interview participants and is intended to present capabilities from their point of view. The best technical BI applications are useless if management accounting, BI power user or IT employees are not motivated to provide appropriate BI customer solutions. Motivation must be increased to promote positive selling. End users should be guided and convinced of the advantages of BI applications and their functions, features, and flexibility. With the help of Analysis Studio, for instance, an examination of certain target discrepancies can be made based on the navigation of the dashboard and driver tree logic. With only a few filters or creative and imaginative analytics, hospitals, doctors, or other contractual partners can be identified and new measurements initiated (interview management accounting director health care). This approach has to be made together with management accounting and professional business divisions.

It is assumed that the users of the of research results documented in this thesis will be AOKN's top management, management accounting, and further BI end users in the head office or users across the organization in Lower-Saxony. With the help of Figure 6.3, a matrix with the current stage of development of BI applications illustrates contributions to AOKN's professional practice. For instance,

top management sees the capabilities and benefits from overall navigation options of dashboards and the different aggregated data levels that enable the CEO to see different result perspectives and to go deeper if desired. These navigation steps can be created in one information system.

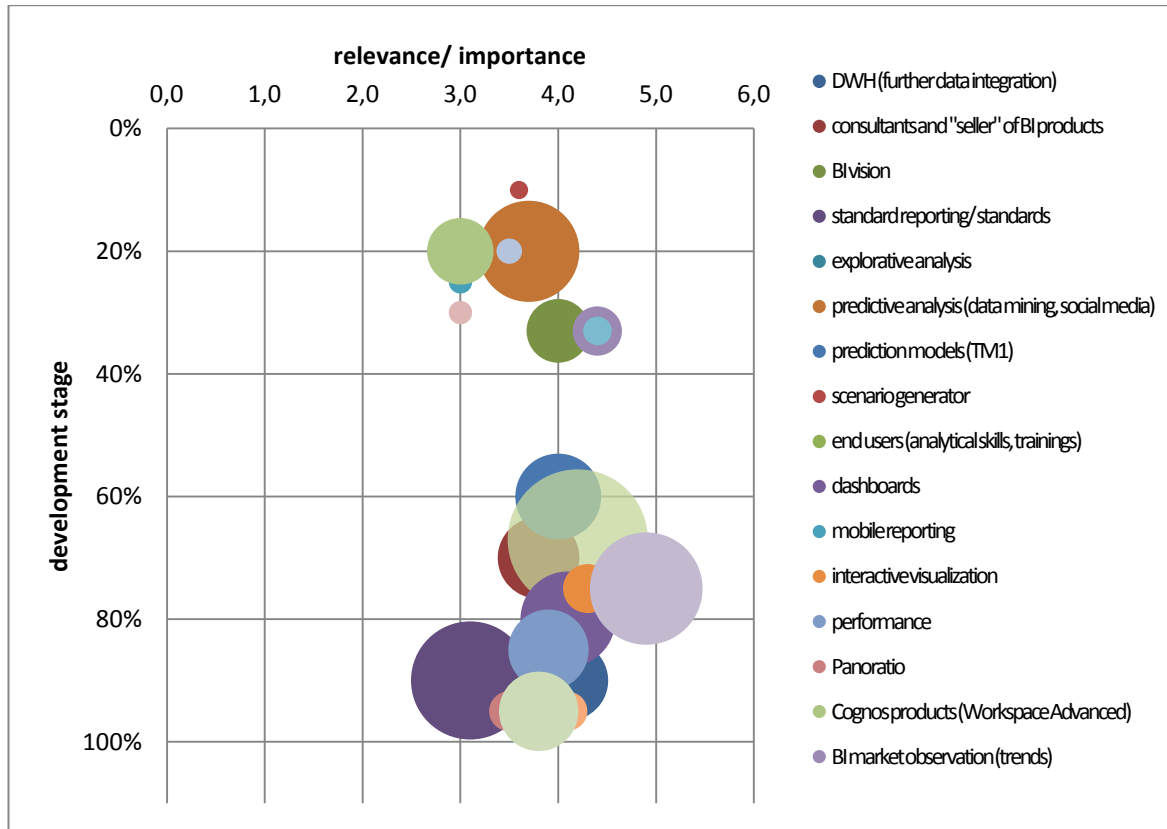


Figure 6.3: Matrix of development stage vs. relevance and capabilities for AOKN

On the left, the matrix depicts the current development stage as a percentage value. This development stage should represent the current status of the implementation of the respective BI issue, described on the right in the figure. This percentage of the implementation status in AOKN is an internal assessment of the interview participants and the researcher with his management accounting background. The top axis illustrates the relevance/ importance for AOKN on a scale from 1 (irrelevant) to 5 (very relevant). This, also, is an internal evaluation of this scale by the interviewees. The bubble size represents the relevance/ importance of the issue, and the number of interviews that have mentioned the respective BI issue.



This illustration shows that a low development stage implicates a need for development and investment. This is based on a combination of internal information or relevance and external information and impacts, which include the current development stage, its potential, capabilities and benefits as represented the size of the bubble. It can be difficult to calculate the sum of capabilities and benefits generated from BI applications. Therefore, the researcher operates with conducted interviews, frequencies of responses, and the internal relevance assessment of the listed BI topics as a triangulation method to increase empirical quality (Umbach, 2006). Thus, bubble size correlates with relevance/ importance. The matrix helps to orient and decide which BI application fields or topics the company should consider as investment potential (Simonovich, 2008). At first glance, the bubbles position themselves to two blocks at the top with a low current development stage and at the bottom starting with an almost 60 percent current development stage. The area at the top right represents an investment activity field. The bubbles should first show the distributions of the bubbles (in the "Word" version it can be seen the appropriate allocation via "mouse tool tip"). Figure 6.6 also focuses on this area where the relevance over 3.5 and the development potential over 50 percent have been selected. Figure 6.4 first points out the applications as individual BI classifications. Figure 6.5 then illustrates analytics as a further classification.

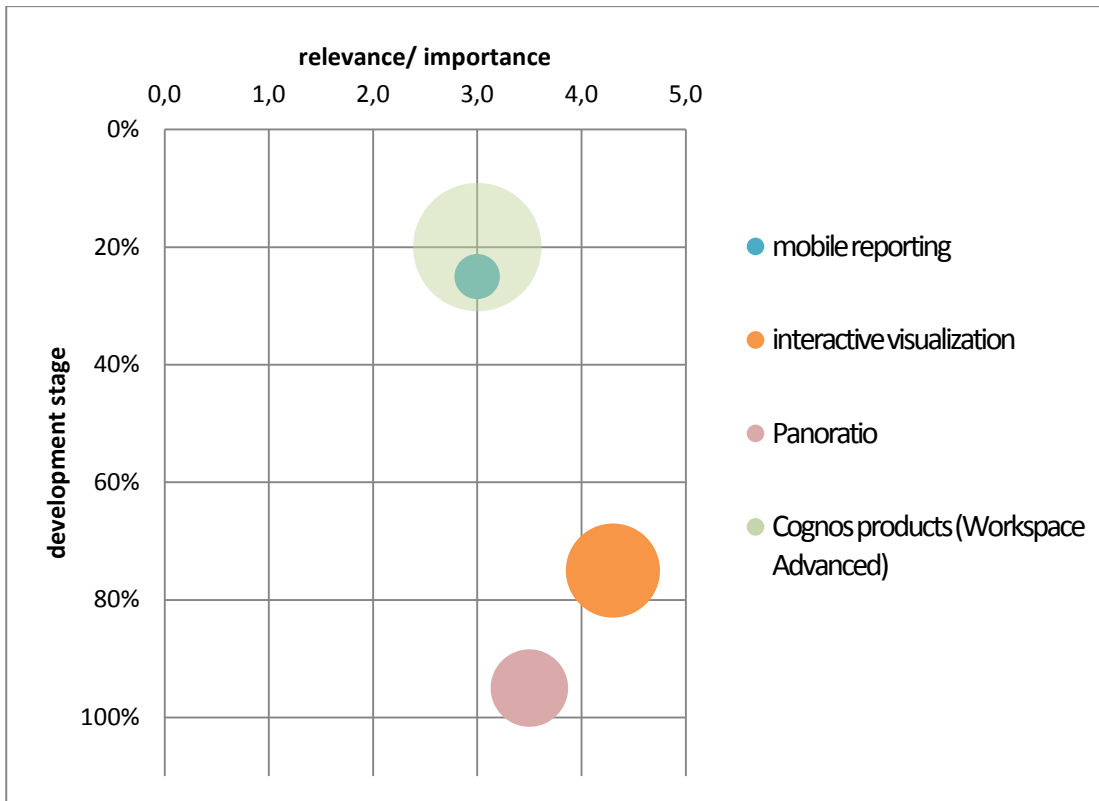


Figure 6.4: Matrix of development stage vs. relevance and capabilities for AOKN with applications classification

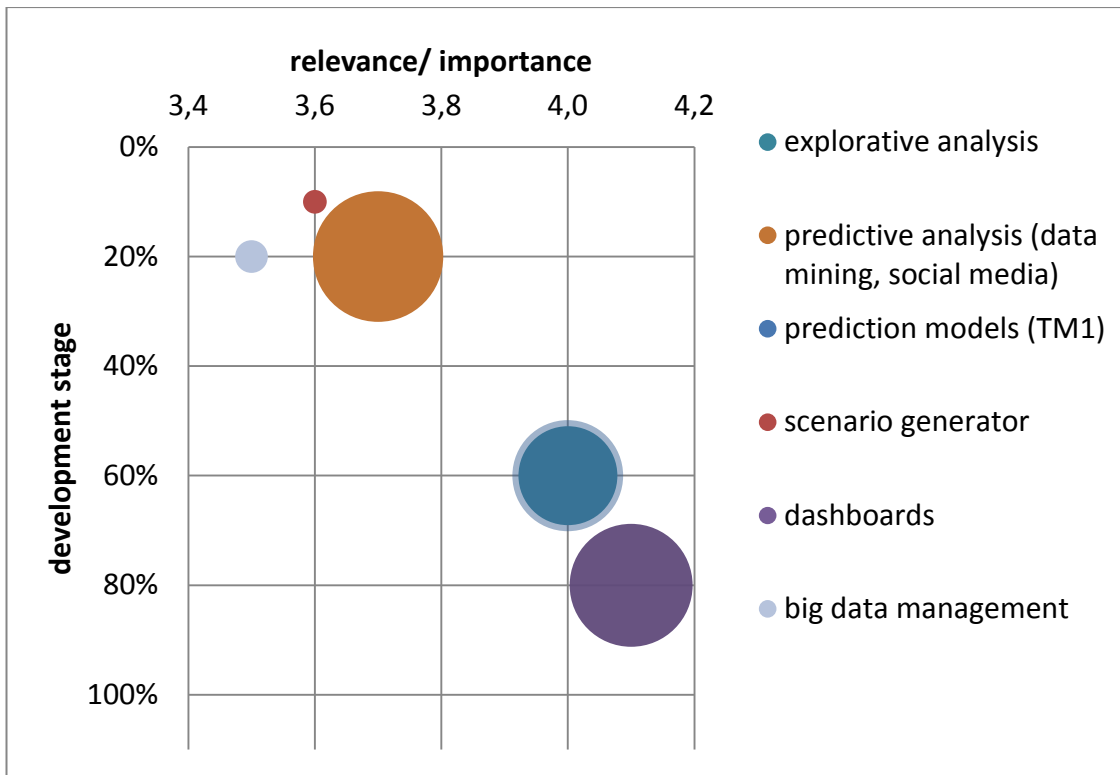


Figure 6.5: Matrix of development stage vs. relevance and capabilities for AOKN with analytics classification

As mentioned, Figure 6.6 now presents the focus area where the relevance over 3.5 and the development potential over 50 percent have been selected. For AOKN, this can represent activity fields that show a reasonable need to invest. However, the bubble sizes should be considered as a way to assess the individual benefits and relevance for the company.

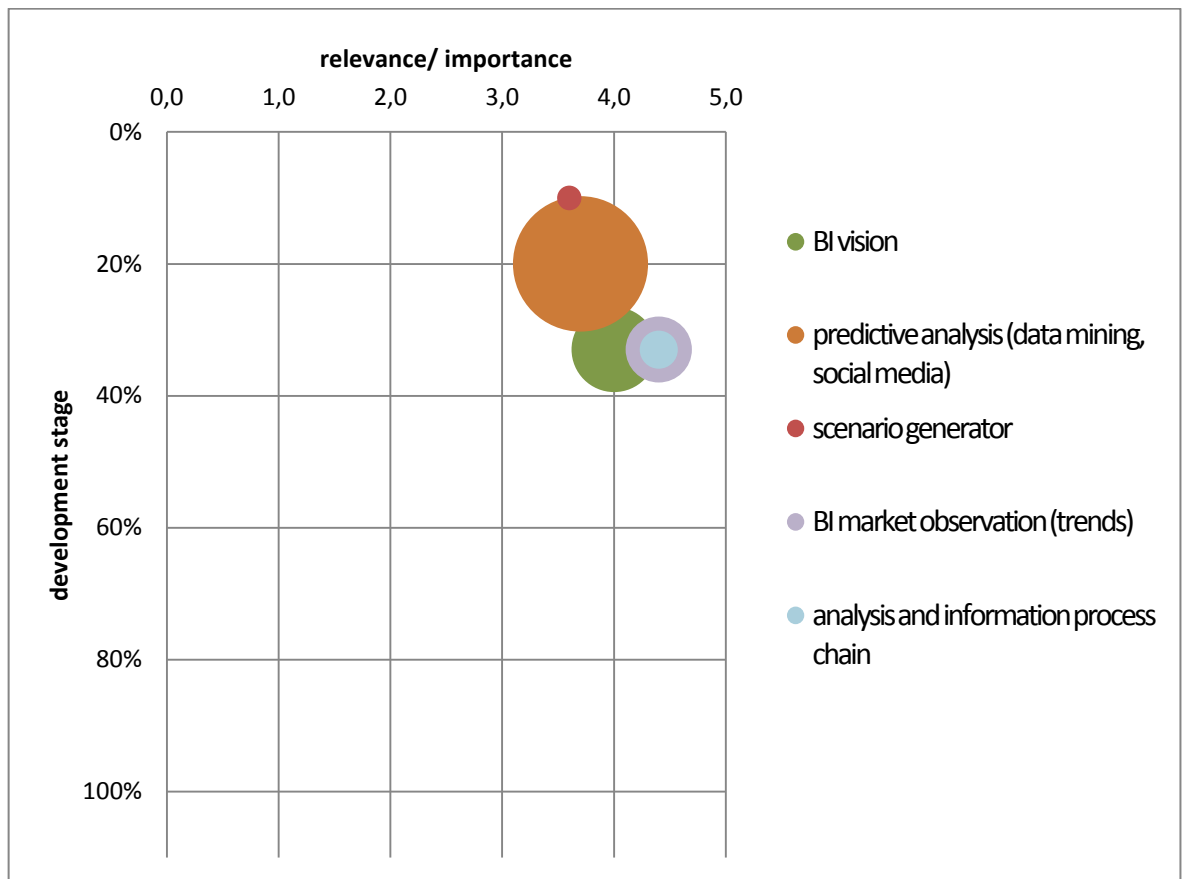


Figure 6.6: Matrix of development stage below 50 percent vs. relevance over 3.5 for AOKN (potential investment fields)

Thus, the BI classifications “strategy”, “analytics” and “business process” include the above five illustrated areas. To effectively communicate BI objectives, contents and opportunities to end users and employees a BI vision must be defined. This can contribute to understanding and acceptance within the company. Predictive analytics with data mining or social media examinations is the biggest bubble. The functions of the scenario generator are still unknown, but it is currently integrated in a financial predictive solution in AOKN. BI markets should be observed and continuously evaluated with POT perspectives to determine what is necessary for

the company. Analysis and information process chains are only partly implemented in the BI system for some activity fields and should be implemented in other fields. This is helpful to create transparency of defined business processes and to get relevant influencing parameters for financial and quantitative results in AOKN.

Reports, big data management, or a single technology are not sufficient and appropriate to enhance the performance of BI technologies and tools in order to gain a capability. This concept is similar to the first research question and its conceptual framework with the integrated BI technologies and tools within a complex matrix. Functions and solutions can be added to current BI tools and technologies to fill their potential with life that generates a capability for AOKN on their classification level in the matrix.

“As more business users begin to use BI tools, visually appealing graphics and exploration tools become a necessity. Innovative thinking about how best to offer visual appeal and the toolsets that can provide the flexibility required for visualization without too much confusion or clutter needs to be factored into an analytics program” (Boyer et al., 2012, p. 137). The interactive visualization includes animated visualizations to improve the usability of Cognos active reports and allows end users to notice data trends faster. This can be seen as paradigm change designed to provide additional benefits to customers and user. Because of increasing challenges of visualization and display formats, which are unique and difficult to manage, new solutions have to be developed. Therefore, a greater variety of visualizations has to be made available and must be flexible for the user and their specific needs. Thus, visualization is important and should be used to “read and understand” the current situation of AOKN by end users.

An IBM disclosure management can also be added to the visualization solutions for BI end users. Management accounting is required to connect the reports with additional information such as commentaries or texts that can be solved with the disclosure management. This tool simplifies the processes of formatting reports with textual, numerical, or graphical elements. An example is the management report that can be enriched with different commentaries for each activity field.

Important points are the full integration into the current BI architecture and the opportunity of shared working without losing control of the technical and complex development processes (interview BI consultant).

Furthermore, mobile reporting and active reports have been examined but require additional testing.

“Business users want analytics on the go. Tablet devices and smart phones are much more sophisticated today and offer information anytime, anywhere. How can analytics be offered in the most compelling ways to use on mobile devices? Interaction with information can also be different on mobile devices with limited size and touchscreen flexibility, so innovative thinking and development will be required to deliver analytics in the way that is most useful to these devices” (Boyer et al., 2012, p. 137).

With the Cognos version, mobile reports can be executed 2 to 6 times faster than in previous Cognos versions (IBM, 2013). For the iPad, a line of tablet computers designed and marketed by Apple Inc. that can shoot video, take photos, and even run mobile reports, only minor hardware requirements are needed for active report compression and memory optimization. AOKN is in the pilot stage with mobile reporting and has developed iPad reporting solutions in the form of dashboards for the CEO. He can rapidly request extensive analysis and use them immediately. He also can change analysis views and details or report pages by swiping on the iPad. Thus, improvements can be noticed in report execution, faster report development, faster execution of time schedules, and optimal hardware use (IBM, 2013). With a specific development of apps for mobile equipment like phones or tablets, the command of AOKN's distribution or market controlling could be strengthened. Those apps could help outside staff to enter doctor information from doctor consultants and that information can be transferred directly to the oscare system for the purpose of further analysis. This is a mobile documentation and reporting. Sensors that identify finger marks should be programmed to assist in delivering information to the appropriate AOKN department. Further solutions and opportunities can be developed as well (interview BI consultant and management accounting director).

Data quality and security have become more important in organizations. Methodologies to monitor and improve data quality are well-defined and available for end users. Data quality should be an integral part of the information management strategy in an organization. That factor is not only critical for a successful implementation of DWH, data migration, or BI technologies and tools, but can ultimately improve the profitability of an organization (Logica, 2010). The level of data quality influences the capability of an organization to be profitable. It also impacts the success of retaining customers, attracting new customers, or managing customer value more effectively. There are additional examples of risk prevention: preventing the loss of profitable customers, understanding the real value of your corporate assets, and ensuring the accurate reporting of figures to regulators. Good data quality supports the following aspects (Logica, 2010):

- Existence: based on the business process information needs one have to make sure that the required data elements exist within the organization.
- Validity: when starting a data quality assessment usually an inventory is made of definitions of available data elements; like a dictionary or collection of data models.
- Consistency: in a BI solution data from multiple sources is brought together. This enables consistency checks on data that is stored in multiple source systems.
- Timeliness: often business processes do not only require valid and consistent data but are also time-critical. If call center agents talk to customers, a current and actual customer view is needed in an instant.
- Accuracy: data might be within the definitions given in the data dictionary or collection of data models.

However, generating extensive analyses with the help of “qualified data” does not immediately result in a gain of capabilities. Basically, it is important to have BI functions and solutions that can present reliable data and information. However, it always depends on the operational system oscare, its performance, and the rigor of documentation standards for the employees. Until this process is implemented

and running, the best BI system cannot support decision-making processes. The information, its transparency, and reliability relate to many communication and transformation processes: AOKN should provide better products, benefits, and service than its competitors because customers today are well-informed about a company's offers because of the widespread information of different media channels. Therefore, the relevant data have to be more reliable and need to be delivered earlier to AOKN. A continuous exchange with customers who provide data contributes to a higher data quality and a mutual understanding for basic developers, management, end users, and even customers (interviews agent to CEO and management accounting employees). AOKN should not focus only on BI applications. AOKN should also focus on its business, data management, and core competencies. BI applications could be used as solutions to generate transparency and to serve AOKN's competencies (interview management accounting director).

The choice of a suitable BI system with its BI technologies and tools is strategic, and allows AOKN and other health insurance companies to take advantage of advances in technology. The designed matrix in Figure 6.6 illustrates an important classification of how current functions are useful and which solutions have been observed on the BI market by AOKN and mentioned during the interviews as relevant to capability sustainably. In summary, these main points can be mentioned for adding functions and solutions to current BI technologies and tools to gain capabilities. Figure 6.7 summarized the classifications, solutions, and functions to gain capabilities in a structured model. The direct impacts of capabilities on each solution and function of BI technologies and tools are emphasized in this model. Further, dark blue boxes upper right gives examples of practical AOKN projects and proceedings that generate capabilities. These examples will be evaluated in chapter 7.

classification	requirements needed to improve BI technologies and tools	capability	current practical AOKN examples/ projects
addressing BI end users/ customers	first-level-support	BI support for technical, analytical, cognitive abilities	BI power users in management acc. departm. for technical/ analytic knowledge transfer
	qualification	training/ briefing (on the job), "data scientists"	certain management accounting employees are involved in operational business processes
	communication	information dialogue, transparency of BI strengths/ opportunities	regular business meetings with active management accounting involvement
	corporate mission/ vision	leadership culture, creativity in analysis questions and approaches	"Jour Fixe corporate management", current sub project "leadership and capabilities"
report characteristics	standardized	structured fixed reports, perspectives, transparency, ratios, business processes, competition	less efforts for data actualizations than in previous decades with Microsoft Office products
	functions/ features	presentation and visualization, multiple views and trends	dashboards, mobile portlets, Cognos Workspace Advanced
	objectives	activities, measurements, (big) data management	performance server appliance "Netezza" to manage large data volumes (joins for cross-sectorals)
ways of access	active transmission	improving decision making processes	minimizing uncertainties via management accounting support
	self service portal/ provision for pick-up	individual data procurement and analyses	early data availability in (regional) business departments
software	Cognos	mainstream BI tool/ package with different functions and analyses purposes	using different Cognos products to gain the most benefit of their interactions (online updates etc.)
	data mining	statistic and predictive analyses for likelihoods, social data analyses	prediction models for daily sickness benefit and cancellations -> target-focused case control for employees to consult customers
	Panoratio	increasing performance and customer-focused views for cross-sectoral analytics	fast "live" analysis in health care project teams in early strategy development phases
	other software solutions	AOK software, SAP, Microsoft for flexibility, variety options	propensity score matching tools etc. for health intervention groups / TM1 Excel for mainstream use
technology	TM1	flexible and modular visualized planning with interfaces to reports and analyses	distribution planning during fiscal year with options for individual purposes and authorities
	data mart	in-depth insights, understanding and results of specific segments	cross-sectoral ratios and information for doctor reporting
	pdi (Panoratio database)	aggregated databases for fast cross-sectoral analyses	extensive pdi data model for Panoratio (some data are still missing in the model)
	structured relational data	early data integrity/ completeness in DWH	complete data packages for analysis enrichments (health care management situation)

Figure 6.7: Summarized functions and solutions to gain capability



## **7. Analysis and evaluation**

### **7.1 First research question: classification of BI technologies and tools within the conceptual framework**

The following sub-sections analyze and evaluate the framework developed from the first research question.

#### **7.1.1 Infrastructure**

The foundation of the initial conceptual framework and the enhanced matrix in Figure 6.1 is the infrastructure. The DWH as data infrastructure provides advantages of subject orientation, integration, or time-varying of data forms. The objective of this infrastructure must be to implement and enhance a consistent company-wide data base. This data base must be filled with previous data documentation in operational systems created by responsible employees. Out of this documentation, an efficient data extract and provision with backed up analyses and reports could be generated. As already presented in Figure 5.10, the construction and development of the DWH with its different ETL stages fits both the BI conceptual framework and the IT framework with its information processing department. The intersection of BI components and IT is illustrated in Figure 1.11.

#### **7.1.2 Skills**

To manage and handle data and information, companies have to develop the skills of their strategic staff. Therefore, skills will be primarily linked to the provision of data in the conceptual framework, particularly for the management accounting department. However, skills can also be necessary to develop reports but management accounting provides data basis and provision. The management accounting employees they should be supported with more BI core competencies and networking abilities in order to play a competitive role within the company. The

framework also stresses this thesis. It is important to understand the different data models with their complex calculations to define business cases: Are analyses developed with cases or customers and how are ratios in reports defined? The exchange among these questions should be made continuously between management accounting, result controlling, and other BI end users. The end users should not be “lost” in complex business processes and analytics. The first and foremost issue end users have to grapple with is being able to articulate their requirements and associated business value to complete the IT mission when crafting an enterprise BI framework. It is necessary for end users to spend quality time with a BI power user or IT employees in order to understand data structures that they provide and how to access it. Management accounting employees and additional further contact persons should provide first level support to the BI end users in AOKN. As mentioned above, the management accounting division is the initial point when analytical skills are developed and then transferred to the organization and the different divisions. This knowledge transfer will remain an important communication strategy for the next several decades to support and motivate end users for BI products.

Thus, the different employee types in the management accounting play a crucial role in skill development. One can distinguish among management accounting employees, BI power users, and BI developers in AOKN (see Figure 4.4). BI power users occupy key positions in management accounting and are currently filled by two employees with technological and analytical skill sets. They cannot be compared with data scientists directly, but they have the ability to handle data related to performing analytics – they are analytic experts. Certainly, more statistical knowledge could be fostered than currently occurs through autodidactic practices and by examining the literature. Statistical knowledge can be helpful in evaluating the results of different healthcare projects, for example, the comparison of two target cohorts. Investments should be made in external professional expertise in order to enhance analytical skills.

Therefore, the current data situation and its complexity have to be considered continuously by the management accounting employees and BI developers. This is particularly important for end users where a potential mismatch can

occur between daily business and data complexity. As already mentioned earlier in this Section, several consultancies suggested that the need to derive detailed data insights via BI solutions will be driven and executed by end users, not IT professionals (Peterson, 2009). This aspect emphasizes increased and continuous activities designed to inform and train end users. Then, the understanding, confidence and acceptance of purposes and objectives of BI solutions can be increased in AOKN. This is also a question of corporate philosophy and its culture (interview agent to CEO). Everyone needs analytical skills because the business world is inundated with data. Organizations have to be able to make sense of all this information. They need to be conversant with analytical terminology and methods and be able to work with quantitative information. Furthermore, they must develop relevant analytical skills to summarize data, find the meaning in it, extract its value in order to improve understanding of data analytics and enhance thinking and decision-making. Specific skills need to be acquired, including: how to formulate a hypothesis, how to gather and analyze relevant data, how to interpret and communicate analytical results, and/or how to develop the habits of quantitative thinking. Based on that assertion, the question arises of whether management accounting employees know the explored data contents and correlations, and if these employees can better assess data to prevent poor management decisions (Leitl, 2011; interviews management accounting employees; management accounting director for health care).

### **7.1.3 Value**

Gonzales (2011) asserted that BI value is proven a key measure of competitiveness and is significant in establishing and documenting standards, including processes and technologies. Financial aspects as discussed by Gonzales (2011) will not play a significant role in this thesis. Thus, the reporting level of planning, strategic, and operational characteristics can be used as a basis to generate values. The pure investments and financial benefits are not important to discuss in this thesis, but the classification of value to reporting can be made. The access of certain data bases will be significant to ensure the transfer to information receiver. Thus, the business value has to be explained. The

complexity and business value of BI technologies can be visualized with the help of Figure 7.1.

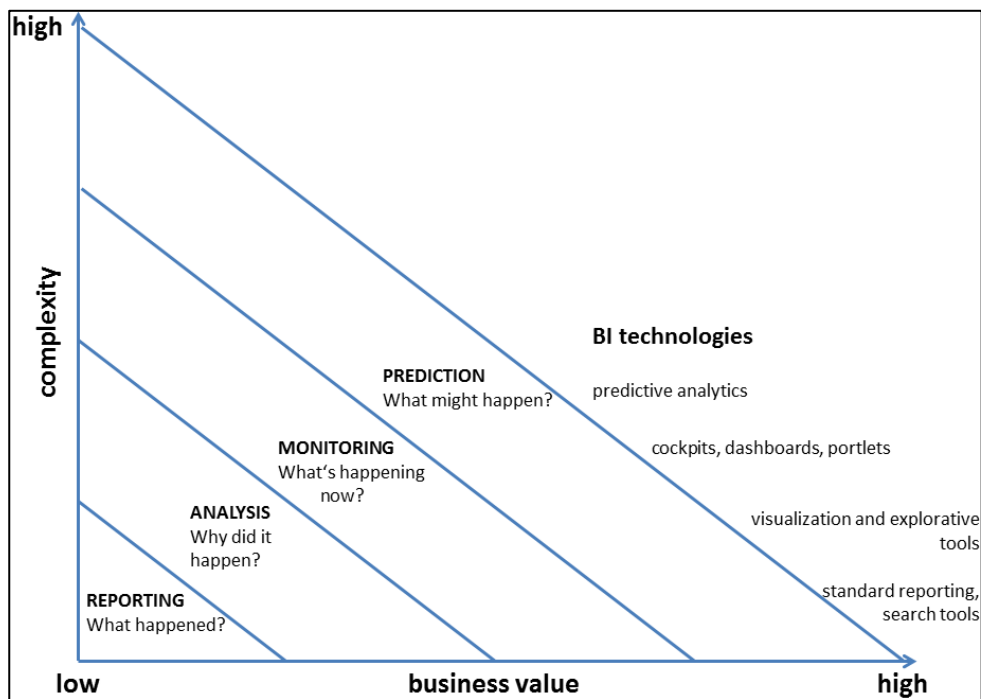


Figure 7.1: Spectrum of BI technologies (Lehmann, 2012)

In this graphic, the business value can be recognized through the spectrum of BI technologies. As already discussed, this value can be classified especially to reporting in the enhanced conceptual framework. However, BI technologies and tools establish a sound basis for the level below. For instance, predictive analysis models can generate decision-relevant knowledge from corporate data with the help of a “SPSS Modeler.” The results can be checked seamlessly using “SPSS Statistics”. With these SPSS solutions, companies get insights into hidden data patterns and correlations. Examples could be: identifying fraud, benefit abuses, multiple customer identities, crime rate prevention, cancellation prevention, a current AOKN project 2014 for customer orientation, optimizing customer retention campaigns and customer acquisition activities.

An AOK inhouse predictive technology has been developed by AOK Systems. The objectives of this PSM tool are to compare selected benefit expenses of contract participants to a certain comparison group from standard medical care. Further analyses are possible on the basis of statistical ratios to determine the likelihood of

inscription for specific healthcare programs or to make a cost comparison for these customers. Statistical knowledge will be necessary to interpret these statistical ratios (see Section 7.1.2)

The spectrum of BI technologies (Lehmann, 2012) can be applied to the AOKN situation, which can also be recognized with the help of the conceptual framework. Thus, the literature can establish the current situation of analytics in AOKN as shown by the literature review in chapter 2.

The business value should be therefore defined and generated through BI technologies and tools, and reporting as well. This requires that business processes be made transparent and visualized. However, processes and an appropriate infrastructure will be developed to generate a certain business value first through BI.

#### **7.1.4 Leadership**

Leadership is a long-term investment that takes time to integrate into an organization (Gonzales, 2011). Long-term investments can be examined through the current AOKN situation. The awareness and knowledge of BI have been developed and implemented in daily business from the top management of AOKN to a single BI end user (interview management accounting director). Analytical skills have to be developed, and leadership has to support these skills. Thus, productivity and creativity should be driven by innovative and individual BI analysis platforms.

In the future, the development and cultivation of BI will depend on who receives and analyzes the reports and the level of creativity and understanding that are given to the applications. Business managers must “sell” the powerful analysis instruments and analysis creativity, which will require a transformation in the thought process of leadership (interview agent to CEO). However, they have to accept BI technologies and tools from data providers first, which primarily impacts management accounting. They do not only have to distribute selected reports to

their employees, but must also guide and compel them to make individual analyses that are profitable for the business division and the whole company.

To accomplish this level of transparency, management accounting provides respective information standards for all levels of management. These are dashboards, standard reports, and specific analyzing instruments and tools. Using the example of the cost field daily sickness benefit, these levels and their provided report tools are shown in Figure 7.2.

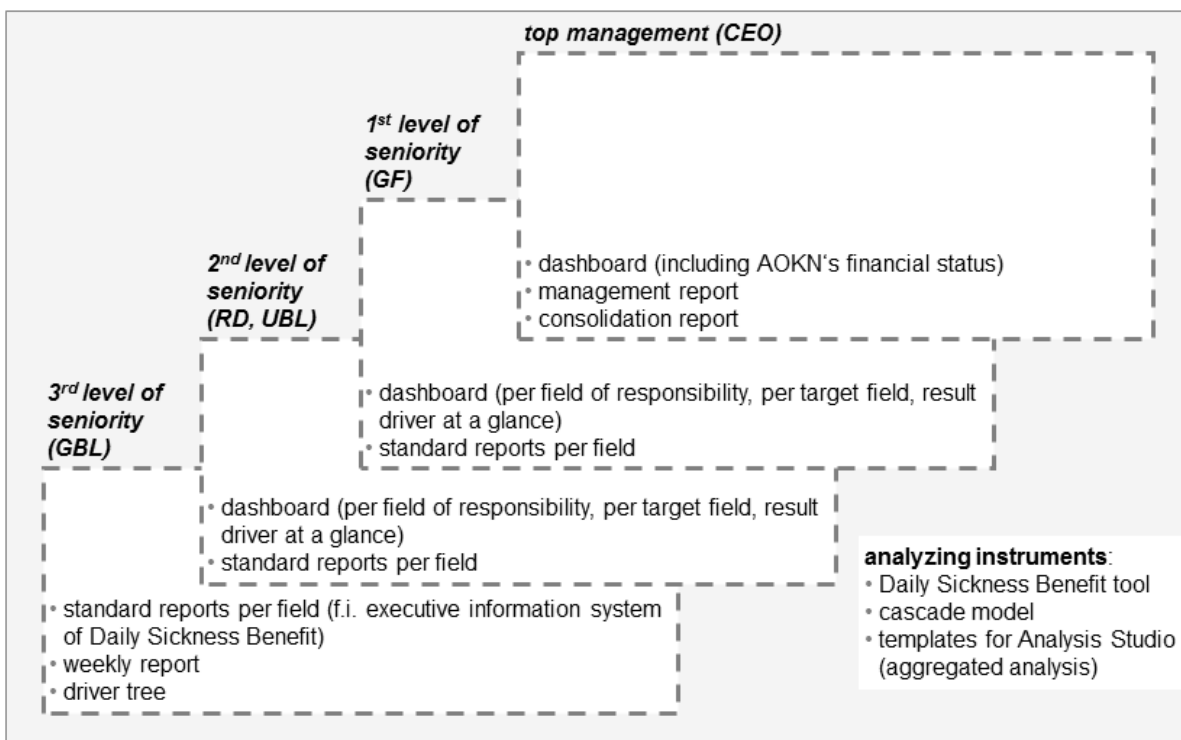


Figure 7.2: BI applications for levels of seniority (using the example of daily sickness benefit)

This example of daily sickness benefit shows where preferences and information needs can be found for each level of organization seniority. This picture shows a first assessment of BI usage, but should not be regarded as general procedure in AOKN. Each activity field can differentiate between their usage of BI tools, which depends on the current availability of reports and analyses as well as their business needs. Thus, this picture should be enhanced according to the current observation of BI markets and innovations. However, it will be important to use BI products in the future that can deliver structured relevant information to business management and can keep AOKN manageable by measuring business objectives.

Therefore, it can be recognized on the basis of the conceptual framework that “BI is not a single product, application, program, user, area, or system rather an architecture of integrated systems that provide users with easy access to and storage of information for decision-making and learning” (Woodside, 2011, p. 557). Thus, it is relevant to develop a framework that exemplifies and clarifies the applicability of BI as a driving force for organizations, bridging the gap between theoretical knowledge and practical use of a tool for decision support (Guarda et al., 2013). Because there are many dependencies and links within the BI system and structure, the adapted conceptual framework in Figure 6.1 was chosen as a visualization with a clear classification and potential for enhancements, for instance, with the help of additional BI models (Gonzales, 2011). Certainly, other framework models in literature can also be recognized and are discussed in the literature review. Thus, the conceptual framework can be enhanced with a competitive BI model for generalization. The structure and contents reflect many approaches in AOKN as well. However, there are some elements and success factors that are fundamental requirements for capability generation. The classification of BI technologies and tools and the interaction of all involved elements – even the factors of Gonzales (2011) – are crucial factors in this conceptual framework.

## **7.2 Second research question: effective use and integration of BI technologies and tools into strategy development process**

The following sub-sections analyze the framework from the second research question (see Figure 6.2).

### **7.2.1 Information analysis (phase 1)**

With the help of BI applications, preliminary data analysis or pre-calculations are fundamental requirements needed to implement, realize, or follow certain projects,

activities, and business strategies. A generally high administrative effort is being made to develop analyses singularly. Nevertheless, this effort has to be made to generate the necessary transparency in the respective activity field. That means that the professional business division is responsible for formulating clear strategic objectives and defining relevant ratios in order to achieve these objectives. Analytical standards have to be determined that will be used as the basis for questions, for instance, the use of explorative BI tools. For cross-sectoral questions a knowledge exchange with involved professional business divisions should be initiated to interpret data and assess their quality and relevance. A limited circle of involved persons has to be named to generate analyses from “one source.” Ideally, data and analyses should be documented to get a clear overview of initial strategy while preparing the strategy review. The primary objective of integrating BI technologies and tools should be to ensure simple and fast use and should be applied to entire strategy development process.

During the first phase of the strategy formulation and information analysis, ad hoc or explorative analysis tools are important to get a quick overview of market, benefit, or product information in order to define a strategy. To answer questions concerning health care needs or under-supply in the ambulant or stationary sector, the explorative analysis basis plays a central role for first analyses. The scenario creation with different cohorts is also important (interview health care management director). In this strategy phase, standardized reporting is not very helpful because standardized ratios or perspectives cannot be defined at this point of information analysis. At this stage, predictive analytics can be helpful in identifying data patterns or abnormalities in certain healthcare fields. This can be relevant to start specific campaigns to fulfil this “healthcare gap and need” (interview health care management director). Panoratio can be used as the mainstream tool to conduct cross-sectoral analyses from different ambulant or stationary sectors, which is especially adequate in the healthcare management. However, only two employees in the management accounting department use Panoratio regularly. The focus should be more on analytics and not reporting because companies tend to focus on generating reports from their data concerning past events. Much greater value emerges from analyzing data to pinpoint cause and effect and to enable predictions (Fanderl, Stone, & Pulido, 2013). In this phase, it will be helpful to



experiment with multiple alternatives and to get in-depth insights into data structures (interview agent to CEO). Even external data from the healthcare market observation should be considered here. This will provide evidence and information that will assist in creating healthcare in Lower-Saxony. Thus, an AOKN healthcare portfolio can be developed that will position the company as a pioneers in the local healthcare market. BI structures should be used to support strategic orientations with regard to content. However, a business strategy cannot be implemented from BI data alone (interview health care management director). In the first phase, BI tools and technologies contribute data driven support

### **7.2.2 Strategy/ concept development (phase 2)**

In the concept development phase, a certain healthcare field or case management approach was selected. Product development teams with employees from different business divisions discussed potential implementation approaches and/or business processes. It will be necessary to reinforce the need to work on scenarios, objectives and potential definitions with the help of scenario functions provided by Panoratio. This should be done on an explorative level, not with standardized reports. Predictive analytics can support the calculation of likelihoods of hospitalization to avoid or minimize hospitalization. In this area, AOKN's development lags behind the competition. In previous decades, AOKN used only external institutions to prepare those calculations. The SPSS Modeler can be helpful for data mining and predictive analytics here.

BI technologies and tools contribute to the concept development phase by establishing preconditions for a successful healthcare project controlling. To implement such controlling it is important to develop a clear concept, which includes objective definitions and potential interventions. Furthermore, developing target cohorts in the DWH, an economical model, or a relevant planning for the healthcare program will also be important.

### 7.2.3 Strategy implementation and operational business (phase 3)

In the implementation phase, healthcare business will be conducted as case management for customers, for instance. At this point, standard monitoring is necessary to ensure the controlling of business processes during the period. To play with the relevant data and information of the respective health care program, BI end users should be able to have access to dashboards as a main cockpit solution or Cognos Workspace Advanced for analyzing prepared graphics. Business process optimization should always be considered in the implementation phase. Report Studio will be the main instrument used by the management accounting employees. Further predictive analytics have been assessed as less important for an implemented health care program. The healthcare management division will define the requirements for an economic evaluation of the program that will occur approximately one decade after its inception. A currently installed PSM tool can find matching parameters and cohorts for a relevant comparison of participants and a selected control group. This this statistical technique and approach will not explored further in this research. In summary, BI tools plays a crucial role in the evaluation process of making data-driven decisions concerning economic or customer success. For management, an implemented dashboard solution can be relevant to get a visualized overview and assessment option of participant or control group. Figure 7.3 presents a monitoring card in German that includes an in-depth view of all categories with defined relevant ratios as absolute values and planned versus actual comparisons.

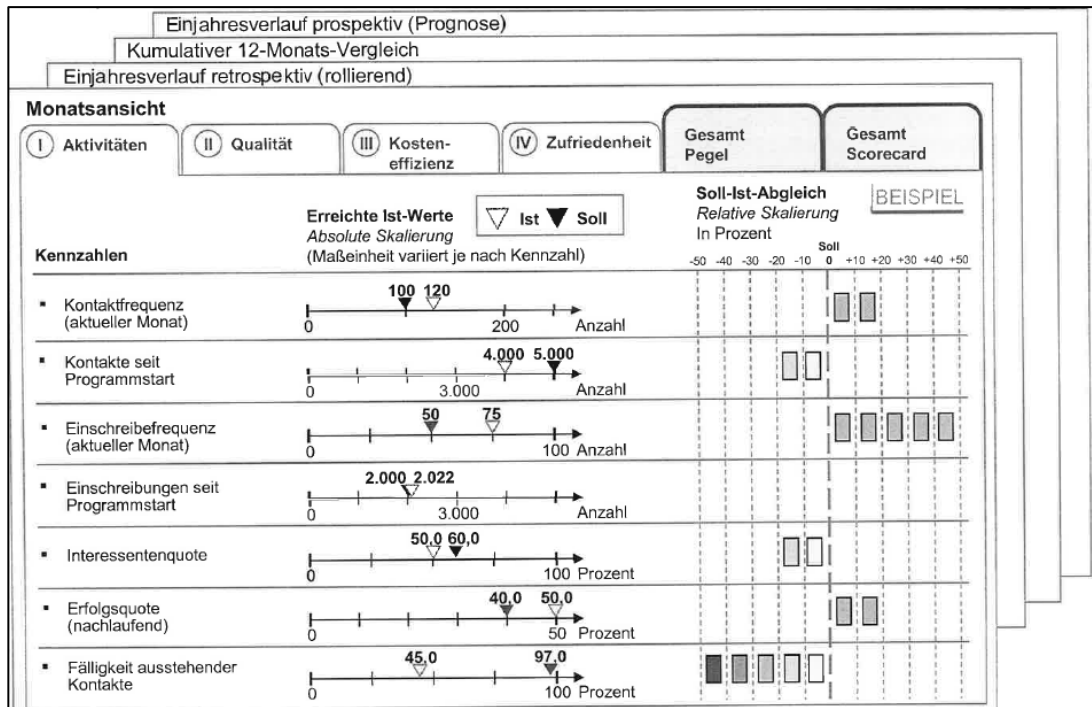


Figure 7.3: Monitoring card for ratio details (McKinsey, 2010b)

A Balanced Scorecard picks up the certain ratios and visualized the result of success controlling as an evaluation square (see Figure 7.4).

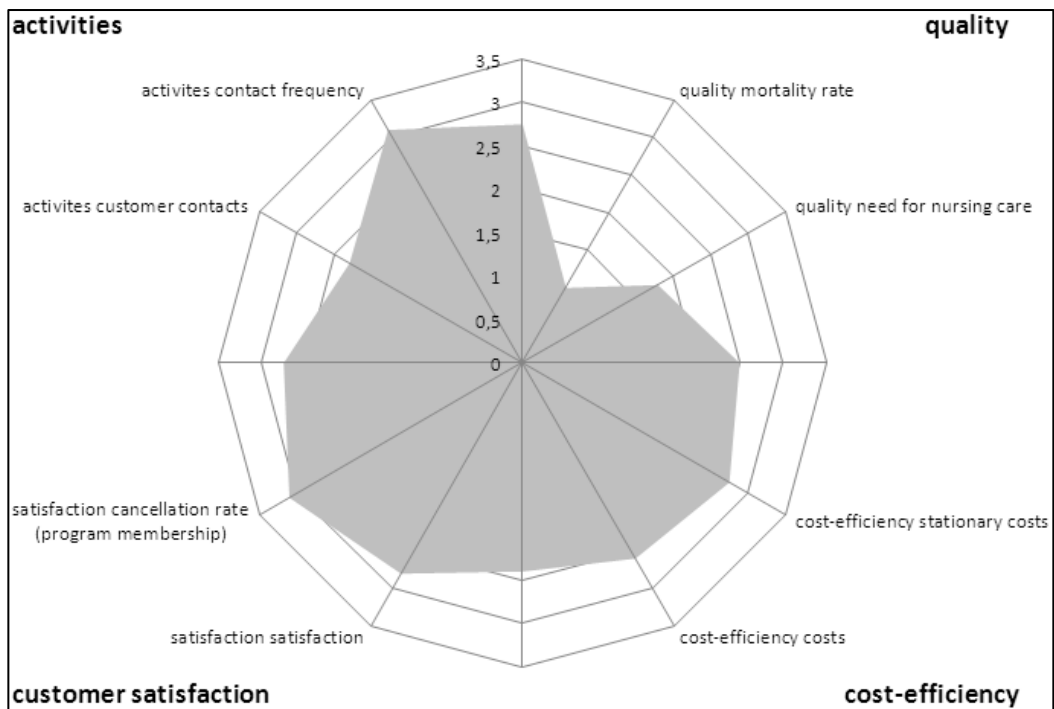


Figure 7.4: Balanced Scorecard as a square (according to McKinsey, 2010b)

These two proposals of McKinsey (2010b) offer comprehensive views to present the current status and evaluation of a healthcare project to AOKN business management. Users should be able to employ BI tools to develop and present such visual overviews. Graphic options and ideas can be found on the IBM website (see IBM AnalyticsZone, 2014). These are visualized analyses to present current contract and project status that should be implemented in AOKN. Currently, detailed data files and reports are prepared in order to evaluate a certain healthcare project concerning its objectives. Visualized solutions as shown in Figures 7.3 or 7.4 provide a quick insight into the current business case, especially for top management.

In this implementation phase, more process ratios and less result ratios should be developed and provided to management. This is more desirable for the management level. In the daily sickness benefit field, these ratios have been partially developed (interview management accounting director). In his interview, the authorized agent to CEO made comparisons with customer solutions in the automobile industry to stress the difficulties at AOKN that are related to acquiring appropriate customer information. BI applications should support this customer relationship process and deliver relevant data through different analysis forms (interview agent to CEO).

#### **7.2.4 Strategy review (phase 4)**

This phase will be discussed although currently it has been planned without BI technologies and tools at AOKN. Management accounting is not involved in this phase (interview management accounting employees). AOKN business management must be prepared for potential legal changes and should be aware of possible threats. This is only possible if a continuous information stream is provided to management, and could be improved with BI technology. A certain control of specific business divisions through management should also be done (Fueglistaller et al., 2005). Business divisions and management accounting must have approval to review strategies with the help of data from BI tools. For instance, initial objectives of the strategy have to be examined for whether they

can be achieved. If data are not available in BI systems to review the strategy, it must be found other ways. For example, data from customer surveys regarding service and products could assist in this process.

### **7.3 Third research question: addition of functions and solutions to current BI technologies and tools**

The following sub-sections analyze and evaluate the framework from the third research question.

#### **7.3.1 Technology**

The technological and basic pre-conditions will be shown in a comprehensive manner and will include a certain flexibility meant to enhance the current status of AOKN's technology. Thus, internal resources will be highly significant. The current technological infrastructure is adequate (interview BI consultant and management accounting employee). The planning application "TM1" that serves enterprise planning and forecasting was implemented in 2014, but much effort is still devoted to communicating and understanding build-up for the involved professional business divisions when using TM1.

The data integrity has to be enhanced for DWH and the explorative BI tool Panoratio. For instance, the business divisions of healthcare management or doctors often ask for data bases and contents for their own use (interview management accounting employee). In the doctor activity field, there are many data views on diagnoses, billed services, and doctor information that cannot be managed in one data base. Thus, BI users have to combine this information in a query. Further, diagnoses of patients are analyzed only on a quarterly basis. Thus, all diagnoses of a customer will be transferred for the first day of the quarter for data security and data transfer reasons (interview management accounting employee). Another example from stationary or integrated healthcare sector shows that different information needs to be defined and documented in order to make appropriate analyses from their "appropriate" data package; data view:

customer or case. In addition, all DWH available operational data tables should be screened together if these barriers can be decreased to extract all relevant attributes from these operational data tables. These examples underline the current data technical and technological challenges that will extend for several decades. These challenges have to be managed to provide clear and manageable information to the entire AOKN organization. Thus, analysis platforms for BI applications have to be enhanced to clearly provide opportunities for BI end users: customer-focused views with relevant services and benefits of previous years as well as further important attributes of customers that can be user-friendly and efficiently combined within an analysis template. Thus, as multiple departments and divisions implemented their individual BI tools for their internal needs goals were pursued in different manners using a variety of technologies. Or, as in many organizations, different tools were acquired as their business grew through acquisitions, resulting in toolset fragmentation (Boyer et al., 2010). Therefore, complete data packages are important for analysis enrichments, especially for analysis of the current healthcare management situation. For an ongoing project, ambulant, stationary, and integrated health care data were analyzed to see how and where customers go in treatments and which health care institutions have developed or expanded.

Communication of available technologies with their different data views and contents should be enforced within the company. This is the pre-condition of establishing common standards and an efficient technology at AOKN. The needs of the professional business divisions have to be considered, but management accounting should prioritize them according to their importance and contribution to capabilities. Therefore, the internal resources will be emphasized as an area that should be used efficiently to gain data completeness and integrity. This early data integrity and completeness is the main requirement to start a reliable decision-making process at AOKN. Disadvantages of the data availability due to doctor or pharmaceutical time lags, have to be reduced through negotiations with the contract partners of specific certain organizations in order to operate with current data.

For the TM1 planning software, the flexibility of a modular visualized planning and forecasting can be an advantage. BI power users in the management accounting department write individual planning programs for the professional business divisions. The distribution planning can be adjusted without additional effort during the fiscal year if circumstances require this process. With its interfaces to reports and analyses, TM1 is an integrative BI tool in this technology classification. In the market, three additional mainstream data warehouse architecture and technology approaches can be identified (Logica, 2010). Enterprise-oriented approaches are based on a company-wide, fully integrated DWH technology and will correspond to a top-down project approach. Data mart oriented approaches are intended to quickly add value to the business. They are often applied in a limited business scope and deliver fast results by using an iterative development process for deploying data marts. This type of architecture is well adapted to a bottom-up project approach (Logica, 2010), for instance for the current AOKN project of customer orientation. Data marts as BI technology provide in-depth analysis options that consider and integrate only relevant data. For the implemented doctor reporting, the most important information and cross-sectoral ratios can be developed for this specific reporting. This improves performances, structure and transparency for the data base and reporting.

As is to be expected, the enterprise architectures and technologies get high scores for aspects such as the wide disclosure of information, consistency, and integration of data. The disadvantages are: delivery time or the required knowledge and skills. The data mart technologies score better in time to deliver, costs, maintainability, and the level of knowledge and skill required. Lower scores are shown for scalability, data integration, and consistency. Depending on what is of importance within a specific organization or the weights for the criteria, this information can be used to perform a pre-selection of usable technologies (Logica, 2010).

### 7.3.2 Software

The previously described factors contribute to the next level in the conceptual framework, which makes business processes and analyses more transparent. This can be done with the help of adequate software solutions. Data views should be available quickly and should be fit to the customer for the respective analysis need. Software solutions such as Cognos, data mining, or other BI products, such as SAP or Office solutions, have to be critically assessed to see whether they fit corporate and healthcare industry needs. With regard to healthcare policies, it should be examined whether the BI information system can manage and support those topics data-technically. If pension conditions or legal rules change, internal business processes have to be adjusted as well. BI applications assist employees in the daily sickness benefit division by providing the appropriate information and signaling which customers have to be contacted. Thus, BI software should enhance business processes to control and counteract through responsible business managers (interview management accounting employee). Nevertheless, data bases should be served by user-friendly software solutions to keep information contents at a high level at the different business levels.

Data mining software can be an important solution to identify data patterns and correlations. As already discussed, data mining is an analysis step of the knowledge discovery in data bases processes (Fayyad, Piatetsky-Shapiro, & Smyth, 1996). It is a process of discovering new patterns from large data sets involving methods that reside at the intersection of artificial intelligence, machine learning, statistics, and data base systems. The goal of data mining is to extract knowledge from a data set or structure and involves data base and data management, data preprocessing, model and inference considerations, complexity considerations, post-processing of found structures, visualization and online updating (Agrawal, Gollapudi, Kannan & Kenthapadi, 2011). AOKN has to provide data mining solutions. In order to find links in different activity fields such as the likelihood of the cancellation of target customers or identifying excellences for care provider, the involved employees have to be encouraged and trained in statistics and in data sciences. After an intensive analysis, findings showed that a customer cancellation does not depend on the receipt of daily sickness benefits.



Furthermore, a report exists in this field that analyzes the range of results generated by individual employees in the regional teams. As a first step, the regional director can see the range of results produced by his team. Not every employee needs to be named in such a report, but the results should be analyzed deeper to find causes. The results could be attributed to the case management structure or to certain diseases that cannot be influenced by an employee in this field. It should be determined which BI applications could provide the appropriate links. Here again, management accounting department has to act as “moderator” (interview management accounting employee) that forces the communication process between all involved divisions. At AOKN, the degree to which data science expertise is necessary has been examined carefully (interviews management accounting employee and director health care). A data scientist is a high-ranking professional with the training and curiosity to make discoveries in the world of big data. The first step in addressing the need for data scientists is to understand what they do in businesses. Then it is important to determine the skills that they need (Davenport & Patil, 2012). The interview with the management accounting director health care showed that management accounting employees already fulfill these tasks in general, but do not yet conduct extensive algorithms to discover correlations and data patterns. However, current BI applications have to be used and exploited first. But different and new analysis ways can be examined and then evaluated in small projects. The benefits for AOKN must be observed to see if positive experiences emerge from these projects (interview management accounting director health care). However, in the next decade, data mining could be an analytics driver.

In 2014, the customer orientation project started. In this project, prediction models for cancellation and current times for daily sickness benefit processes will be developed. With the help of predictions and certain calculations in SPSS, the likelihood can be determined of whether customers would cancel or which diagnoses predict longer illnesses. Through these calculations, AOKN can present a target-oriented case management control for employees to set appropriate meetings with these customers.

Thus, to enhance transparency, business analytics are crucial factors in optimizing the sales approach. The point is to implement statistic methods to manage internal and external data with the objective to better understand potential customers and to control customer relationships more efficiently (Finger, 2014). Since December 2013, AOKN has been on Facebook. Beside the image and brand strengthening, AOKN will focus on active dialogues with customers. The company uses that platform to answer membership questions, service issues, or health care policies. Social networks such as Facebook are often used for big data management (Finger, 2014). A Facebook example showed one million fans (likes of the fan page); thereof about 150,000 active fans (postings, comments, shares). Every interaction only contains a few notes. This is the amount of data that can be analyzed with BI technologies (Finger, 2014). This network analysis allows visualizations that cannot be developed in common BI tools and reports. Such a figure can illustrate a cloud of points that shows the user of a social network and their status as “follower” or “friends”. Points show a posting of the recent past that express either positive or negative sentiments (Finger, 2014). The sentiment analysis is important because companies should be aware of comments published on the Internet that address their daily business such as: reviews, assessments, or recommendations of AOKN. Within blogs, social networks and other opinion forming platforms, users exchange opinions of brands and products. For many consumers, the recommendations of friends and family are trustworthy sources for reviews of brands and products. This effect is most effective for commercial companies (Schulte, 2014). Marketing effects can be consequences from using social communication media as well. If customers post their experiences and attitudes towards AOKN via Facebook, Twitter, the Internet, or comment on AOKN’s image, then predictive BI applications should analyze the key words, postings, and comments to derive different opinions of AOKN. With such an analysis, AOKN would be in uncharted waters, but it could improve image through direct contact with customer contacts (interview management accounting director health care).

Thus, social networks are promising data sources to use when conducting CRM analyses. Innovative concepts of the customer value analysis can be considered as well with the required data security (Finger, 2014). Even the interview

participants mentioned this topic as future-oriented analysis fundamental (interview BI consultant). The trend and importance of social analytics cannot be underestimated. Facebook and Twitter are only two examples that can be used to acquire customers who are Internet savvy. The own Facebook page and the customer network should be analyzed as well. These are primarily AOKN customers or people who were in contact with AOKN who give assessments, recommendations, and critics. Followers of AOKN should also be considered in order to perceive trends, atmospheres, and current attitudes toward AOKN. The experience and knowledge of employees can be integrated into such processes. The knowledge gained from social media is not useless, but can difficult to use for analyses. The social BI approach provides a method to use employees' knowledge for forecasts of business developments. This can also be used as a foundation for certain management business decisions (Seitz, 2012).

The Panoratio software and its quality management need to be discussed. The explorative analysis opportunities with Panoratio are comprehensive and the advantage for users the ability to experiment with multidimensional data and Panoratio data base images in order to simulate potentials and trends. Employees of healthcare management, in particular, have to answer cross-sectoral questions of financial or quantitative scenarios and reference analyses, concerning areas such as hospitals, DMP, pharmaceuticals, and ambulant data, while developing health care programs. Therefore, fast and multidimensional cross-sectoral analysis opportunities must be available in Panoratio. Afterward, qualitative assessments take place through explicit definitions of experts divisions. With the current data model in Panoratio, the performance has been increased and represents a clear capability. The respective quality management for reliable and structured data bases has to be implemented and enhanced. It is therefore necessary to further develop an analysis guide for Panoratio and other BI products used in AOKN (interviews management accounting employee and director health care). This is necessary to conduct fast "live" analysis in healthcare project teams to serve early phases in the strategy development process..

As presented, these solutions and features of potential additions or developments for current BI technologies do not imply that capabilities will be gained

immediately. New challenges can be organized in a project structure before they are manifested in AOKN's organization and processes. Experiences from the AOK nationwide system can be a basis for further developments. In September 2013, for instance, AOKN's business divisions of healthcare management and management accounting gained insights into new healthcare analysis applications in product and design management from the Federal Association of the AOK. The continuous need for tailored IT solutions led AOK to set up its own data and software house. AOK Systems offers a broad range of services from IT advice and implementation to training and specialized support services (Federal Association of the AOK, 2012). The need for innovative data analysis from healthcare management is currently a nationwide discussion in the AOK system. The objective of these new tools and its preparation is to evaluate and prove implementation opportunities to make them capable for discussions. AOKN should participate in such projects in order to develop innovations and functions of the applications. The following Table 7.1 includes some examples of current healthcare applications.

Table 7.1: Health care applications as projects

	<b>Products</b>	<b>Participants</b>	<b>Status</b>
<b>Health care applications</b>	<b>“AOK-Qualy”:</b> Indicator for overall health status to measure health benefits from health care	AOK Rhineland/ Hamburg (piloting), Federal Association of AOK	Conception, piloting in operation
	<b>“ALOH-A”:</b> Indicator for likelihood of hospitalization and expenditures prediction	AOK Northeast (piloting), WIdO	Development of prediction model and software, preparing for piloting phase
	<b>Complex case management:</b> Reducing costs through case management and defining relevant criteria	AOK Rhineland/ Hamburg (piloting), AOK PLUS, Federal Association of AOK	Planning phase
	<b>Evaluation of health care products:</b> Propensity score matching, control group analysis	AOK PLUS, Federal Association of AOK	Development completed, preparing for piloting phase

<b>portfolio</b>	<b>Patient quittance:</b> Providing customer service to make medical benefits transparent and strengthen patient rights. Benefits are dental benefits, pharmaceuticals, stationary benefits, physical therapy and adjuvants		
	<b>Doctor profiles:</b> standardized reports for doctor consulting, support of doctor consulting and execution and preparation of different campaigns	AOK Saxony-Anhalt, AOK Baden-Württemberg	Implementation of quality management, planning of rollout

*Source: Knöppler (2013)*

Thus, the Federal Association of the AOK provides different applications for pilot projects. However, AOKN is not currently involved in research and development, which would be a chance to implement new applications that can be important for healthcare management. AOKN could take the opportunity to be the innovator in enhancing these applications with BI technologies and tools. That would be a possibility to add new functions or solutions to current BI technologies and tools, and to provide an innovative or different analysis view.

Of course, people in an organization use BI technologies and tools in different ways based on their job functions. It is recognized that the right tool is necessary for the right use and business need. Some users need the ability to drill into detailed reports or to conduct advanced analyses on a daily basis, while other users need an overview of overall performance. There may be a consistent view within one department but multiple views across the company. At this point, communication should be initiated from management accounting. This communication should highlight the business processes and determine the software needs that should always follow professional requirements (interview management accounting director health care). Then in analytics, the professional business division needs to be guided through adequate BI applications in order “to do their business things right.”

In summary, software solutions comprise the step after the technology level in the matrix in generating corporate transparency of business processes or activities. This generation should be served by fast and efficient use of the respective technologies such as data mining or BI products, such as Cognos or SAP. Transparency is important because top management and BI end users need to understand how to structure and their strategy and business in order to be knowledgeable about current and future situation. As Guarda et al. (2013) stated, the use of obsolete software applications by companies could be the booster for radical change that organizations need to face the changing markets and technologies.

### **7.3.3 Ways of access**

The different ways of access to data, reports and analysis platforms should be transparent and clearly presented to the BI consumers. An active transmission is the classical and conventional way of access, especially for business managers. This can include receiving the monthly updated management report via email from management accounting. The crucial and competitive factors for information access are the abilities to get up-to-date information quickly and increase knowledge. In a narrow sense, data knowledge should be increased through defining how business managers can retrieve data and where that information resides, which can be within the BI portal or delivered automatically. It is important to know where reports are available and if individual analyses can be added to increase data self-confidence in the decision-making process. A significant competitive objective at this level is the speed and performance of decision-making.

There are currently some options to get information automatically via schedules or mail. Some employees have mobile access to mobile prepared reports and corporate ratios for tablets. An “Event Studio” is also in use in the management accounting division for receiving reports after the weekly or monthly data actualization process. This automatic data provision process should be

implemented in the future to free resources for more focused strategic tasks. The internal computing center plays a crucial role in this automatization process where certain jobs for operational data processing run “in the background,” which is the main requirement for clear data access. The information generation and provision can therefore be summarized as relevant capabilities on this level and plays a crucial role in the decision-making process. The self-service portal with reports and analysis portals should be communicated in business meetings regularly to ensure an early data availability for business departments.

The BI end users should be sensitized continuously to raise their acceptance of BI. Therefore, management accounting has to support, ask, and help. In 2012, the division produced seven BI Cognos video podcasts with introductions to BI analysis, reporting, functions, and assistance options. These podcasts were very popular and should be continued with support for generating report versions or report mailing functions (interview performance analyst).

#### **7.3.4 Report characteristics**

The tasks and objectives of reports are to ensure and monitor the execution of plans, and to ensure transparency of the current corporate situation on the basis of relevant ratios and prepared information. In addition, early warning functions should be implemented in a company. The quality of reports should be of a valid and informative value: Are the data up to date and reliable and distinctively presented and defined?

Generally, every ratio and information in a report should release a certain corporate activity. Customer needs should be identified and considered, complaints of certain products or services should be documented to analyze how many customers received their needed products. Business managers should be enabled to use reports interactively with their navigation or visualization opportunities to initiate effective countersteering measurements and activities and to quickly see discrepancies.

Another requirement to enhance the BI solutions is to guarantee performance that allows all BI end users to develop or execute reports within an appropriate timeframe. Since 2012, the server titled “Netezza,” has been performing well and should be maintained. However, dashboards can be slow when jumping to existing “live” reports with many ratios (interview performance analyst). Therefore, it is necessary to enhance the dashboard structure and performance and to check the Internet performance in conference rooms.

Apart from the necessary transparency for their organization and processes, BI end users should benefit from certain standards of reports to get orientation, structure, and even a recognition value within the reports of the different activity fields. In addition, a continuous status quo meeting for all activity fields should take place in the management accounting division to make the current challenges and focus transparent and prioritized in the division. This should be also reflected in the reports afterwards. At this information interface, a professional and analytical update should be guaranteed to fit the company’s need. Developing standardized reports requires less effort for data actualizations than in the past when using Microsoft Office products. The development is a one-time effort and the further actualization processes can be controlled automatically.

To develop scenarios and trends is also a crucial corporate activity and capability in the context of risk management. This activity should be completed by users in a Cognos Workspace Advanced platform. Developing scenarios and trends in current BI products is still a challenge for management accounting employees. Skills and the operable functions are missing or not well known, which makes it difficult to develop scenarios with AOKN corporate data.

Beside internal and financial risks, companies also have to consider external challenges and dangers: market conditions are changing, new competitors become stronger, and/or providers have problems with quality. IT based simulations and BI solutions have to analyze market and competition risks. Long-term performance and company value should increase (IBM, 2013b). Scenario techniques as reports should be enhanced with the help of BI applications. The scenario technique is an expert-based and systematic planning technique with



objectives that are justified with predictions and projections of different future assumptions. Signals will not be noticed. On the basis of information oriented towards the past and present, assumptions will be made about prospective events that will occur in the future. In this way, different plausible developments and directions and potential disturbing factors will be depicted gradually, for instance political disturbances, legislative frameworks, or measurements. Figure 7.5 exemplifies a scenario funnel that symbolizes the multiplicity of the future. The more a company goes into future the more complex and uncertain the situation will be (Schneck, 2009).

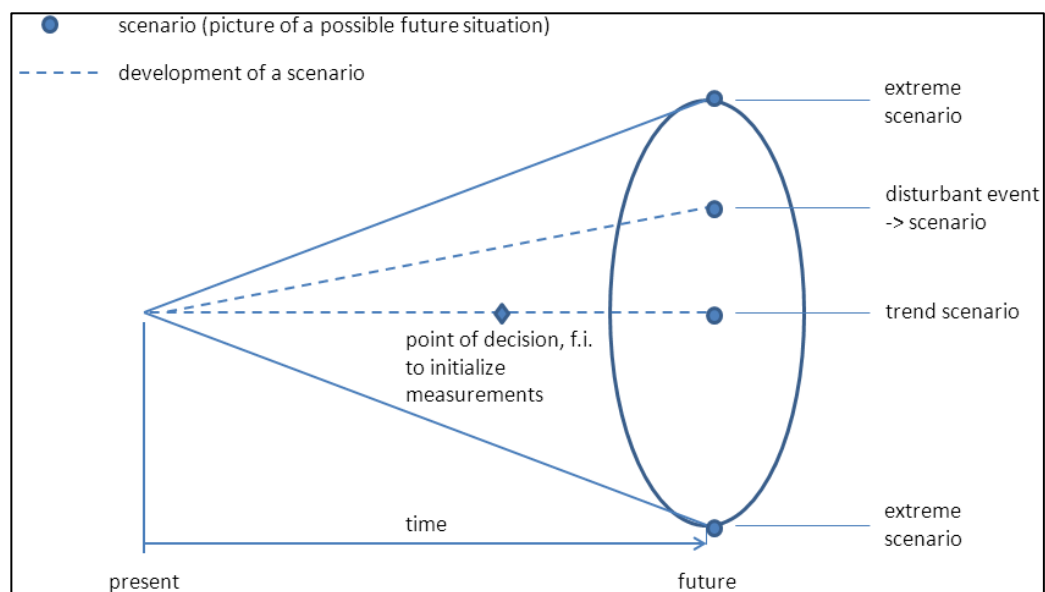


Figure 7.5: Model for illustration of scenarios (Schneck, 2009)

A BI based scenario and reference generator would be necessary for AOKN to understand the impact of an aging and changing population of customers in demand for services (interview management accounting employee). An example of the current insurance situation in AOKN is shown in Figure 7.6. On this basis, AOKN has to assess the frequency of insurance forms, from employees or pensioners, and further develop different scenarios of the future. A respective BI solution should be implemented.

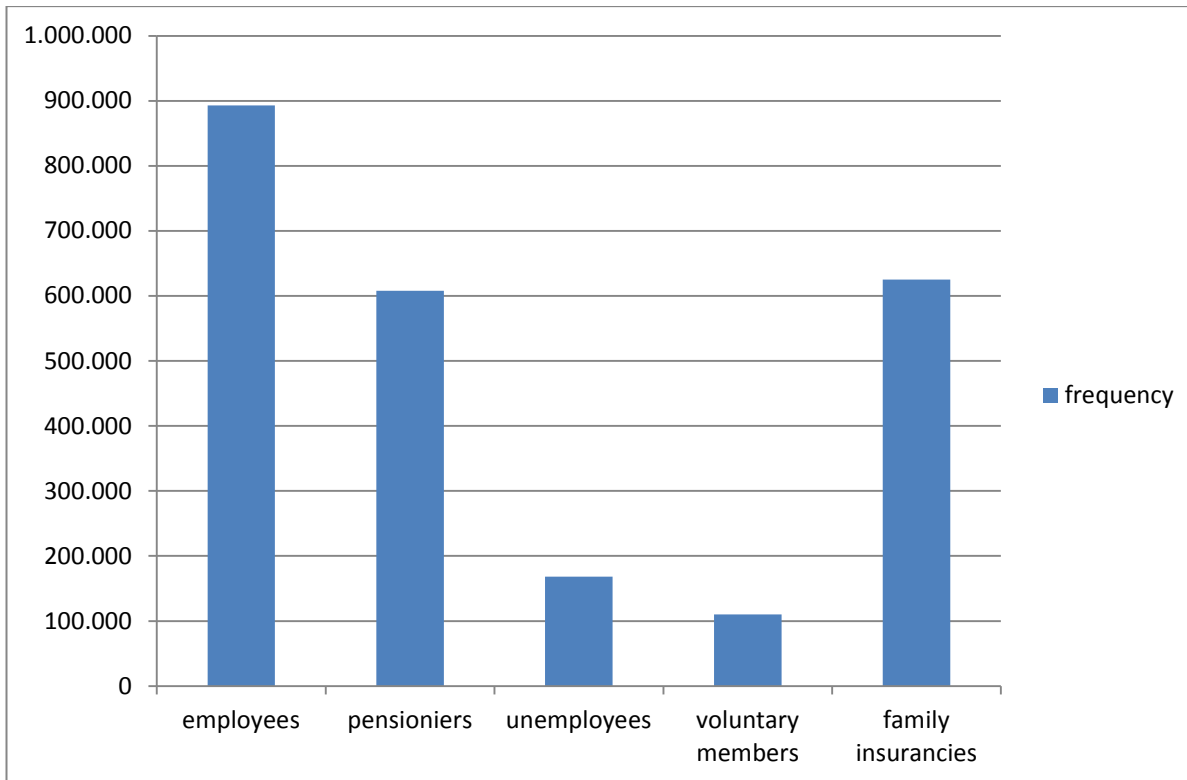


Figure 7.6: Frequency of insurance forms 2014

Visualizations in analytics play a crucial role in report development. The focus will be on presentations and different explicit data views essential for top and business management. An analytics zone can be the place for personal analytics. IBM provides a platform for free analytics software, mobile applications and a community to help BI users to get up and running. Furthermore, there is an abundance of compelling insight and guidance on the best practices in analytics (IBM AnalyticsZone, 2014).

Against the background of big data structures, AOKN's management accounting division provides aggregated data cubes and single data files. This aggregated infrastructure for analysis opportunities has to be executed to enable end users to go further with analytical skills and confidence. Analytic options and solutions should be impelled because analytics has rapidly become a competitive differentiator and is currently entering a new stage of maturity to develop organizations as high analytic performer. Previous analytics were marked by enterprises assembling BI systems and expertise to drive reporting and descriptive analytics. Other analytic forms involved the emergence of large, fast moving,

external, and unstructured data from various new and interesting sources (Harvard Business Review, Analytics 3.0: Measurable Business Impact from Analytics & Big Data, email, 27 September 2013).

Employees who are responsible for contracts and negotiations also need reports or appropriate tools to handle and to react “live” within a negotiation or business meeting with a contract partner. They have to assess the current price situation economically and quantitatively with calculated potentials or others. In the best case, benchmark calculations from other health insurance companies would be available in a BI tool to quickly adjust or review the business strategy in a meeting. Such tools will be currently implemented in the adjuvant sector, but they do not provide the necessary level of comfort, whole data integrity, and flexibility for multiple exceptions. It is essential to encourage BI power users, and the professional division in order to implement a pilot economic model for contract controlling (interviews).

This following example should be taken for increasing productivity and efficiency of business users: the automation of manual processes results in shorter sales cycles and/or faster finance processes. It is an objective of reports to design and build contents that can be used in the broader business community of a company. Examples of improved business performance from faster and more informed decision-making can be higher customer value, enhanced customer retention, or faster collections. With BI reports as a way to measure, monitor, plan, and execute corporate strategy, organizations can better achieve successful outcomes (Boyer et al., 2010).

The visualization of information and big data plays a crucial role in this context. This development is logical and consequent because it is difficult to get an overview of the amount of available data and to identify structures and links. Today, it is not possible to identify all relevant data patterns with automatic algorithms. The skills of employees are necessary for this process. Thus, it is important to focus on certain analysis activities and platforms. The graphic presentation is a good opportunity to visualize structures and trends, as opposed to simple tabulation. Against this background, visual BI with different visualization

options will be an important field in the future. The visualization process can be structured in four steps: data integration, classification, sorting, and coloration.

All in all, the interview participants also evaluated the potential capability as provided through BI reports, their KPI, and visualizations on a scale 1 to 10 where 10 clearly means yes. Currently, the average of all interview responses was 7.75 of all of interview responses for question no. 17, which represents a good basis.

In summary, functions and features of reports should be used with a high performance to serve the report's objectives such as developing activities, measurements, or big data management. Data and information have to be presented in an adequately visualized form with multiple customer views and trends. Dashboards, mobile portlets, or Cognos Workspace should be enhanced at AOKN in order to achieve these objectives. Results and conclusions can be more easily realized and produced faster business management.

### **7.3.5 Addressing BI end users/customers**

Addressing the needs of BI end users can be divided into several factors, and is discussed in the following section. The level of addressing BI end users and customers is an important challenge for establishing BI technologies and tools in AOKN. The first level of support must be implemented for knowledge generation, its "storage" in the company, and the skill sets of BI end users. The management accounting division has to transfer data, information, and messages in business meetings to draw the right conclusions from data. Contact persons should be designated contact persons in management accounting and in other professional business divisions, such as multipliers or analytic-affine employees.

Building a knowledge base that involves analytics and learning styles can be helpful in some business divisions. A certain analytical understanding is necessary for end users. Dashboards provide navigation and analysis approaches for them. The more complex the task, the more qualitative characteristics of analysis will be required. Support and consultation are appropriate, but should be performed on

the job. This is important to motivate approaching defined queries and questions with BI or even to lower a user's resistance to BI applications (interviews management accounting employees and director health care). Close collaboration among the analytics professionals who build the data bases and reports and the practitioner decision-makers who use them combines a "black box" data-modeling process or pure statistical analyses of large amounts of data, and a "smart box" filled with the knowledge of experienced practitioners.

To sell the benefits of BI tools within AOKN, the focus of the internal communication should be on common decisions for better results. Here, more experiences and knowledge can be integrated in the decision-making process. Today, collaboration occurs in global teams with different working times or external partners. Thus, aspects of collaborative BI are analyzing and interpreting information and reaching universal and useful result. This form of BI also promotes discussions, evaluations, and quality management of report and decision approvals (Rohrmoser, 2014).

Business managers have a responsibility to enhance their leadership style by making BI a part of their analytic business segment. Their organization and business division could be optimized on this basis, and BI end users will be inspired and addressed at the same time. Analytic styles can be conducted "live" in workshops or in business meetings in order to involve and integrate employees in the BI process and to promote the information dialogue.

However, the use of BI applications, the understanding, purpose, and objectives have to be continuously communicated and "sold" within AOKN business divisions. Otherwise, the best prepared processes and organizational adjustments for using BI applications remain ineffective concerning capabilities and benefits. In some business divisions, the desired benefits of BI can be recognized. However, in other divisions the BI implementation status is unsatisfactory. Figure 7.7 presents the results of an AOKN business management inquiry from October 2012, which includes the BI implementation status in 2012 on a scale from 0.5 (bad/ low) to 3.5 (good/ high) on the left, and the control/ management accounting relevance of

certain business divisions and activity fields. The current developments have to be observed carefully.

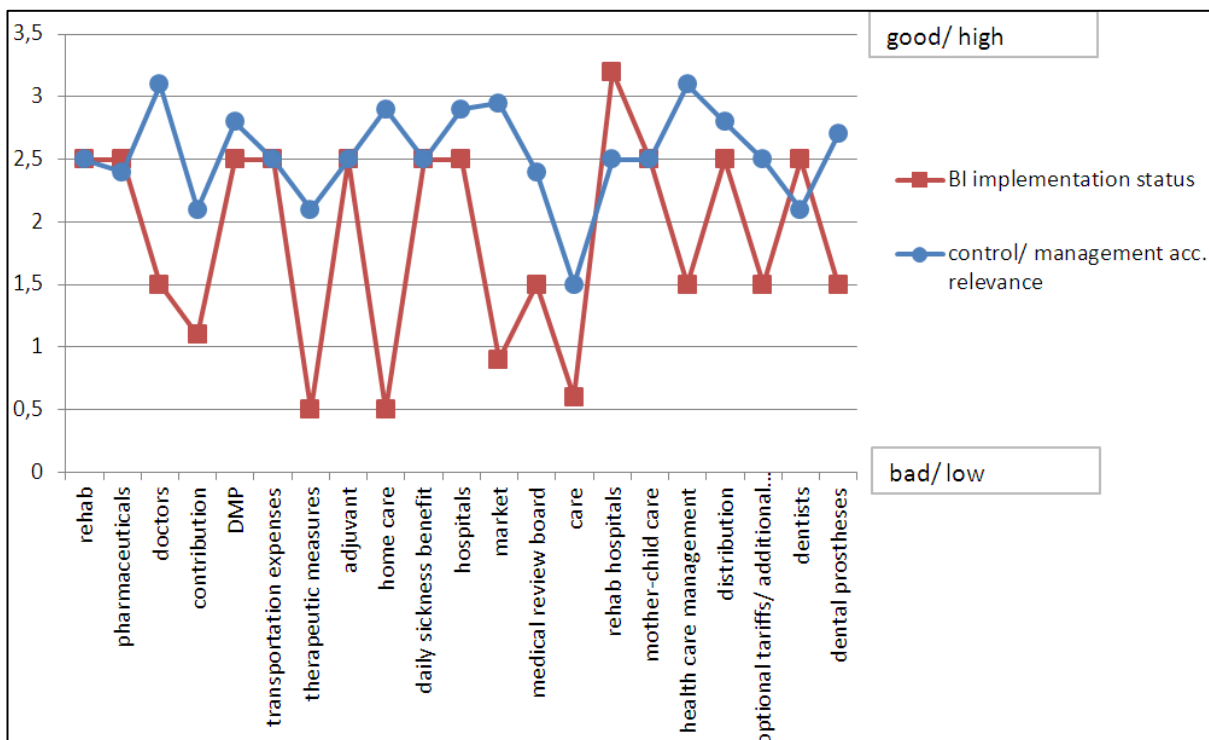


Figure 7.7: BI implementation status vs. management accounting relevance (inquiry business management)

It will be recommended at this point, that a similar inquiry should be conducted in 2015 to compare the current results. Is there still a certain discrepancy of the BI implementation status and control/ management accounting relevance? The control and management accounting relevance is comprised of an average of the criteria analysis intensity, feasibility of activities and measurements, company focus, and measurability. In some business divisions, there can be seen a high discrepancy of the current BI status and relevance. In some activity fields the promised BI benefit is achieved, but in other fields the implementation status is not satisfying for the end users. For instance, the field “doctors” expect a high level of analysis intensity, feasibility of measures, corporate focus, and measurability. However, the current implementation status presents a low level of these requirements (red line in Figure 7.7).

Basically, the knowledge discovery in data bases through end user skills is a main component. This component has to be identified and enhanced to generate relevant data for reliable decision-making. The knowledge discovery is a nontrivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns in data and to discover useful knowledge from data (Fayyad et al., 1996). BI powers users, management accounting employees as well as the management accounting director uses the interfaces to users and even top management to sell and present the BI framework with its opportunities to identify relevant information patterns.

Generally, there are further definitions of benefits of BI technologies and tools. Hočevar and Jaklič (2010) divide them into four groups: lowering costs, increasing revenue, improving customer satisfaction, and improving communication within the company. In addition to these four groups, one of the most frequently mentioned benefits of BI technologies and tools is the support for a sustainable decision-making process. Further, Hočevar and Jaklič (2010) categorized the benefits of BI technologies and tools as revenue and profit increasing, improved customer satisfaction, cost reduction, and market share increasing. However, at AOKN, effort and cost must be invested to improve the communication about BI within the company because the different BI products and functions have to be “sold” to the professional business divisions. An open business culture plays a crucial role at this point. Thus, BI changes the way people work as individuals, in groups, and in the organization. People perform their work following business processes that have are embedded in BI. BI technologies and tools extend beyond organizational boundaries and are used to connect and inform suppliers and customers (Watson, 2010).

Measuring the benefits of BI means additional challenges. Many effects attributed to BI consist mainly of non-financial and intangible benefits, such as the improved quality and timeliness of information. Although such non-financial effects could lead to advantageous financial outcomes there may be a time lag between the acquisition of information from BI and the related financial gain. Therefore, measuring BI benefits can be extremely difficult in practice (Lönqvist & Pirttimäki, 2006). Further, Hočevar and Jaklič (2010) state that the users of existing BI

technologies and tools often stress that non-measurable benefits are worth more than measurable benefits, so they should be considered in an evaluation process. Therefore, Figure 6.7 summarized these functions and solutions in chapter 6 to gain capability.



## 8. Conclusions

The conclusion summarizes the strategic capability achieved through BI applications and the contribution of the research results to theory and practice in sections 8.2 and 8.3. Figures 8.3 to 8.5 illustrate the contribution to practice and attainment of the research objectives in this thesis. The last Section looks at the limitations of this research and areas for future research.

### 8.1 Strategic capability through BI applications

This chapter builds upon the evidence of this research and in particular the key findings in a format that has the potential to be applied within practical business and professional settings. A contribution to the body of knowledge should be provided to the academic community.

This thesis has examined the potential strategic capabilities through BI applications in terms of a classification within an appropriate conceptual framework, the integration into AOKN's strategy development process, and additional functions and solutions of current BI technologies (the three research questions). These are the main elements of the research questions that are linked together to "realize a viable research workflow". A "total model" is presented in Figure 8.2 and includes the structures and the focus of this thesis. In this Section, the different capability perspectives will be discussed further. Focus will be centred on whether BI applications can achieve or influence those advantages, and how that can be accomplished.

The primary purpose of BI technologies and tools deployment is to provide data to improve decision-making processes and to answer essential business questions. The ability to present the right information to the right people at the right time using well-constructed dashboards and analytical platforms is an important element. A single version of the "truth" through transparent data management on a well-integrated and secured BI platform should also be provided.

BI integrates information utilities and a decision support system that can help organizations to manage, develop, and communicate their intangible assets such as information and knowledge. Thus, it can be considered as an imperative framework in the current knowledge-based economy arena (Alnoukari, 2009). BI combines and integrates the most important information success factors to help organizations maximize both its users' performance and the overall corporate performance. It will further galvanize the business strategy development and execution. The framework determines significantly what motivates and helps BI users to deal with information, data, or reports. Capabilities can be generated by incorporating external data into BI infrastructure (DWH); organizations are able to ascertain market reactions to competitive sales campaigns and benefits. BI applications deliver intuitive, role-based intelligence for BI users in an organization from front line employees to senior management and enables better decisions, actions, and business processes. Considering heterogeneous environments and even complex organized companies, BI solutions enable organizations to gain insight from a range of data sources and applications including Cognos, Microsoft, QlikView or third party systems such as SAP.

A case study approach is used in this thesis with the German health insurance company AOKN as single case study company that is examined with a social constructivist' view. To answer the three research questions and to achieve the research objectives, structured one-to-one interviews with AOKN employees were the main sources of information. The researcher's personal management accounting experiences and internal inquiries of BI involved employees also helped to answer the research questions. For the case study company AOKN, the implemented BI system plays a significant role for successful information management. Therefore, both for practice and theory, it is seen important to examine strategic capabilities through BI applications, which is done with this research thesis.

Chapter 1 gave an introduction to the health industry market and the general BI use as of 2013. The literature review in chapter 2 presented a definition of BI, its infrastructure, strategy, and capability. Generally, it is the overall goal of AOKN to support the four strategic target fields by BI applications in terms of planning,

reporting and analysis purposes. Figure 8.1 illustrates this support as an overall strategic target picture.

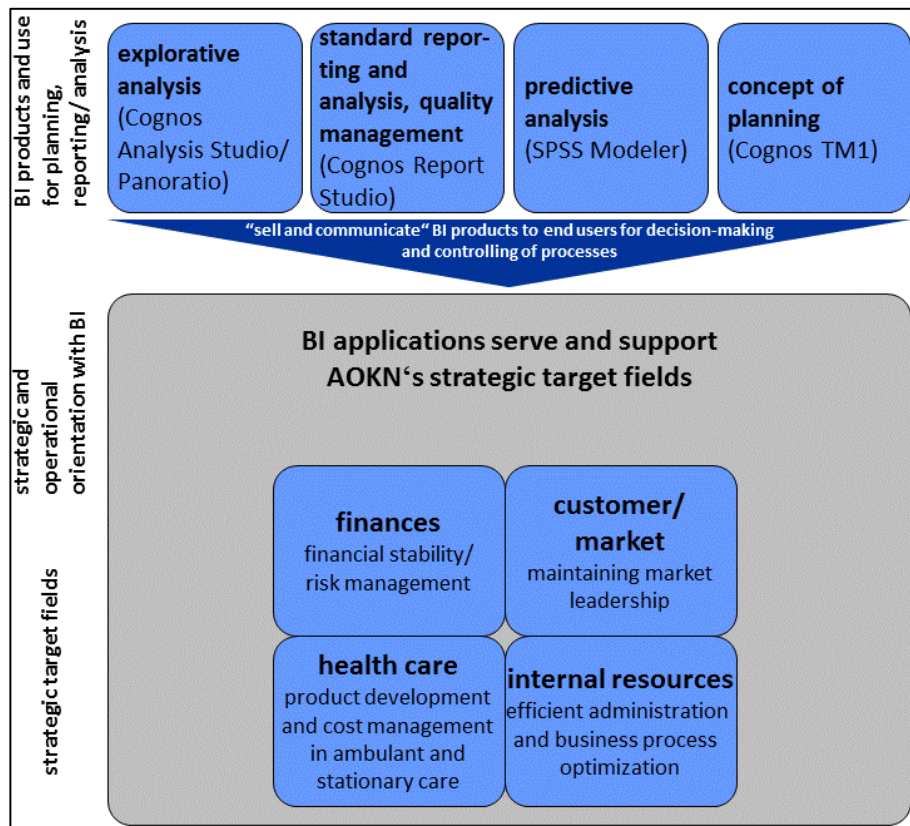


Figure 8.1: Strategic target fields and BI application support

The implementation of BI applications underlines AOKN as a future-oriented company with a consistent modern management instrument and information system. The BI implementation and enhancement will evolve as the organization becomes more competent in both the process and the technology. Changes in corporate-positioning or strategy can be implemented quickly for better and faster decision-making. The business user's role is strengthened by use of effective information in the BI solutions. Whether consuming a report as an end user or performing analytics as a business analyst or employee in management accounting, the BI end user roles provide flexibility for information delivery (Volitich, 2008). Failure to implement a performance management solution may put the organization at risk of being at a competitive disadvantage. For AOKN, BI means a clear advantage to answer relevant internal questions concerning market or competition situations. However, this can also be generalized to include a

broader spectrum of BI products on the market, not specifically Cognos products, but should be continuously monitored.

The case study identified a certain classification of BI technologies and tools that can be separated into planning, predictive, explorative, and standard applications as they are integrated in a conceptual framework for answering the first research question. To classify BI technologies and tools within an appropriate conceptual framework, five important issues need to be considered: an infrastructure, the provision of data, BI technologies and tools, reporting, and information receiver (see Figure 5.16). The overall classification levels can be further separated into strategic and operational business. The BI information system needs to be embedded into the organization and its contents, objectives, and benefits have to be clearly defined and communicated. Data and information of the BI system should be located within the management accounting department, which is seen as the primary tasks of this division. Within the management accounting department, the DWH as a BI fundamental will also be enhanced and nurtured. The different BI technologies and tools provide the main requirement and installation to back up an efficient strategic and operational reporting. The conceptual framework was enhanced by a competitive BI model for generalization. The structure and contents reflect many of the approaches in AOKN as well. However, there are some elements and success factors that are fundamental requirements for capability generation. The classification of BI technologies and tools is therefore “consequential” and plays a crucial role in this conceptual framework and provides a link to the strategy development process, which will be presented later as total model in this Section (Figure 8.2).

The second research question was examined under the consideration of an efficient BI integration and use within AOKN’s strategy development process. Four phases can be mentioned to describe the strategy development process and approaches. These phases start with information analysis, followed by strategy development, strategy implementation, and finally the strategy review. The four phases lead to the strategic “end-product” of AOKN, which are the strategic target fields. Each phase is extended by approaches, contents, and objectives of the specific phase. According to the explicit requirements of a project or business

case, a certain BI tool, such as a Cognos product, can be used during the phases if it is sufficient for the certain data selection and generation of the process.

The last research question was answered under the consideration of the potential addition of functions and solutions to current BI technologies and tools. The different functions and ways to get access to BI technologies and tools could also be classified within a matrix including technology, software, access, report characteristics, and the addressing of BI end users. From the interviews, different capabilities through BI usage in AOKN were stated which are classified within the capability matrix in five requirements and managements of BI technologies and tools. A general calculation and measurement of capabilities through information system use is quite difficult. Thus, both internal inquiries and structured one-to-one interviews with BI involved employees represented the main data sources and were used to generate benefits for practice at the same time. This research has shown that BI applications and solutions can provide benefits for AOKN. This was confirmed during the interviews with business management, BI power users and other end users. It was important to see that the use of BI applications is of strategic relevance for AOKN.

The increase of information values could also be recognized with the help of different analysis techniques that were identified with explorative or predictive analytics. These forms must be required in order to steadily raise analytic skills in AOKN. With the explanations of BI end users and experts it seems realistic that the BI solution could be a profitable system in terms of time saving and information values. A certain stability of the BI system with its applications must also be given in this context. To achieve and improve capabilities, AOKN has to play a pioneering role instead of taking a “wait-and-see attitude.” Small project structures would be adequate to evaluate and prove innovations and advantages of further BI applications to serve customer needs. Then, predictive analytic skills and approaches in different activity fields can be embedded in the AOKN organization. Three parameters can lead to success: to free up resources, to learn from the best, and to find new potentials with the help of a transparent reporting that focuses on the employee level. In this way, relevant information can be presented transparently to the regional director, department manager, and other involved

employees. Therefore, the flexibility of BI applications should be increased because printed reports are currently used in most cases. At this time, management accounting cannot “reach” the different AOKN regions because the benefits of the regional controlling cannot be seen by the regions. AOKN cannot always make the right decisions, but it can define its decisions as right or wrong in the context of previously conducted workplace analytics of relevant information.

The whole data provision cannot be ensured only with relevant ratios because single ratios are meaningless referring to business process quality or customer orientation and satisfaction. Even soft factors from different sources should be considered in this analysis context. An example can be mentioned from the hospital department. A management accounting employee made an analysis of deviations from targets, for instance. Derived from the standardized report and the included driver tree the trend of a certain index could be identified as cost driver. Further analyses of hospitals or diagnosis related groups could be demonstrated live in Cognos Analysis Studio by the management accounting employee. An efficient driver analysis is possible through systematic approaches and different functions with the help of Analysis Studio. The importance of such analyses can be stressed as support for AOKN’s business management in the controlling process. This support of business management can be mentioned as central role of management accounting and less the role of data provision and processing.

Finally, a total model for the three research questions was designed and is presented in Figure 8.2 to illustrate the overall context, objectives, and classifications concerning findings, results and links between the different frameworks. This total model is an economic theoretical model that integrates all economically relevant factors of the overall contexts and their links.

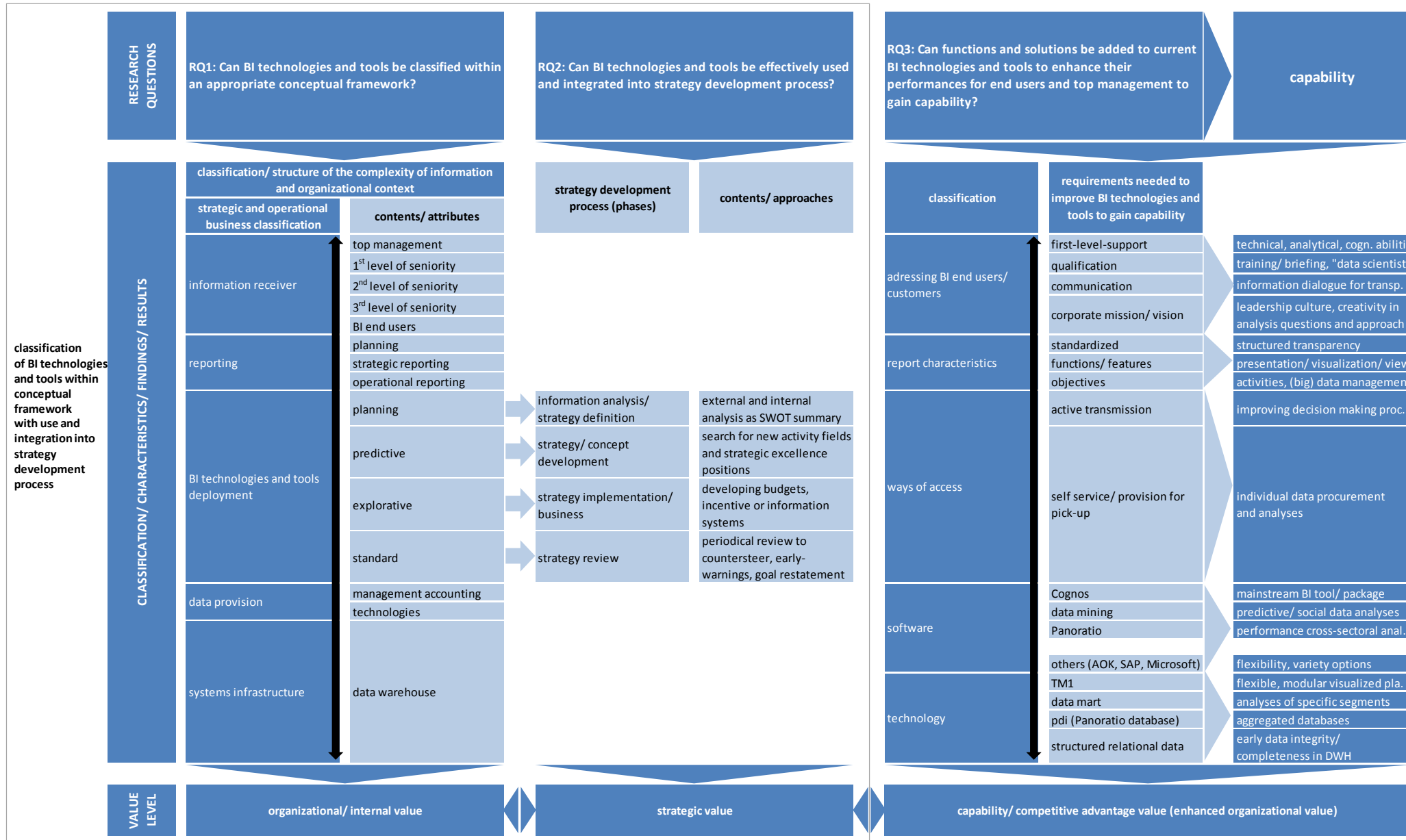


Figure 8.2: Total model for research question classification, findings and results

This “total model” presents the results and classifications with their attributes and contents for the three research questions. Furthermore, relationships, links, and the flow of the research questions are designed in the whole context. This chart is a summary of the specific responses and results for each research question and how they correlate to each other. Thus, these results harmonize with the previous chapters. However, new insights will be discussed on the basis of this model and how the classifications and attributes of the research questions relate to each other to give a summarized overview. This will be the main focus of the total model.

This model will be presented in this conclusion chapter in an understandable way. Thus, the model summarizes the main classifications and characteristics for each research question. The upper line includes the full formulations of the research questions. The third question specifically presents the capabilities so that a dark blue box “capability” is introduced on the upper right. Finally, the total model can be seen as summarized design of the certain matrices for the three research questions. Furthermore, the links are marked with arrows. The lower line develops a value level for each research question to stress the different classifications in an organizational or strategic way.

This total model represents the conclusion, results, and structure of the answers of the three research questions. Generally, an entire structure and classifications were presented. It was the objective to summarize all findings of the three research questions structurally and visually as one model. The BI system with its BI technologies and tools was integrated in the strategy development process and finally features were added to current BI technologies and tools. This flows into capabilities. The structure and matrix of the first and third research question is similar, which makes a development and flow of the model more visible as a central theme. In this way, capability can be “classified” primarily by research question 1 and 3, but a strategy development process of BI technologies and tools deployment has to be presented as vital process for AOKN as well. Thus, reporting can be presented as organizational and internal value as well as a capability or as enhanced organizational value.



Three different levels can be identified within this structure. The top level represents the overall BI technologies and tools research questions and their objectives. The research questions link to their respective classifications or different phases, which are underlined by contents, approaches, or certain requirements. Thus, the dark blue level in the middle presents the respective classification of BI technologies and tools within an appropriate conceptual framework with the use and integration into the strategy development process. The grey frame around the first and second research question emphasizes this link. In this comprehensive model, a link between the integrated BI technologies and tools in the conceptual framework for the first research question and the phases and approaches of the strategy development process can be illustrated with the help of the black arrows in the middle of the model. Therefore, it should not be concluded that the third research question, with its capability generation model, should be answered in isolation. Far from it, the structure of the frameworks for the first and third research question could be seen homogeneous to build up structures and a central theme. This central theme should be given by the conceptual framework of classified BI technologies and tools (RQ1) and the strategic use and integration (RQ2) to the explicit generation of capabilities on the same level (RQ3). Thus, the homogenous structure provides a meaningful model development. For this reason, capabilities can be allocated to RQ1 as well as RQ2 to see the links and overall context of the capability generation. The reporting, for instance, is an organizational and internal value, and is also a competitive factor designed to improve flexibility, performance, quality, and the needed transparency of business processes.

It is furthermore important to mention the internal links within the conceptual framework for RQ1 as well as within the matrix for RQ3. The certain classification levels cannot be regarded separately; every level represents an important requirement and mosaic to generate benefits of the conceptual framework and the capability matrix. For instance, the information receiver on the top level cannot be supported with relevant information and data without an implemented report system or available appropriate BI technologies and tools. Therefore, BI in this context is virtually a synonym for competitive intelligence, capability and competitive advantage because they both support the decision-making processes.

BI uses technologies, processes, and applications to analyze internal, structured data, and business processes; while competitive intelligence gathers, analyzes and disseminates information with a topical focus on company competitors (Kobielus, 2010).

BI technologies and tools deployment is currently in practice in many companies and industries. Figure 1.3 showed the current BI implementation status in the health industry. The structures of a BI conceptual framework, strategy development process, and the options of further BI features and solutions are similar in the healthcare industry. The total model can therefore be used as benchmark for other healthcare companies, and even for other industries.

The objective for AOKN should be to become a total networked and intelligent company on the basis of an appropriate and structured BI system. This is also helpful for business process optimization and corporate culture. This will be also necessary to manage complex, even big data structures. In the end, business processes will be enhanced through people who strive to express their individual creativity to achieve their goals. The important questions are: Can each employee develop a critical professional reflection? Can each involved employee handle BI and hold a serious and creative leadership dialogue to generate and transfer knowledge? Therefore, professional and data driven knowledge and decisions have come together for a fruitful exchange to identify relevant messages. Analytical abilities of employees have to be encouraged in order to minimize decision uncertainty for management. That will be a real capability and competitive advantage.

## **8.2 Contribution to theory**

The results of this research thesis can be transferred to other professional services and players in healthcare management. However, the results cannot necessarily be generalized completely to other companies in different branches because competition and services are defined differently, and benefits are not always determined by law. The generated research results reinforce the

importance of a reliable information system to support AOKN in its competition. In addition, the organizational basis has to be available or implemented to avoid an isolated BI application in this case.

At this point, the explicit contribution to theoretical knowledge will be summarized concerning “BI software and degree”, “BI technologies and tools with BI product usage”, the “strategy development process” and “BI competitive advantage and capability model”.

“BI software and degree” were presented in Figures 1.2 and 1.4 in this thesis and show existing levels of BI awareness within the industry. Figure 1.2 illustrated a development of BI solutions. More than half of selected consulted companies do not use BI solutions in their organizations, but see the potential for BI implementation in the future. Many companies have BI solutions from Microsoft or SAP. A similar picture can be recognized with the degree of brand awareness of Microsoft or SAP solutions. The BI products of IBM, Oracle or QlikTech follow with a large gap (Widdig & Röttger, 2012). In Figure 1.4, Gartner (2012) defined a BI platform as a software platform that delivers certain capabilities like integration, information delivery, or analysis components. Some companies can be classified in the matrix in Figure 1.4. A contribution to theoretical knowledge can be seen in Figure 1.3 which merely describes the use of BI in German health industry. The description based on an internet research to cover the BI use.

The user base of BI technologies and tools is varied. This may change in the future, as integration grows closer. IBM Cognos BI is represented by 96 participants in the 2013 survey. Figure 2.7 illustrates the user and use case demographics with the IBM BI product usage (BARC, 2014). With the help of the structured in-depth interviews and mainly literature review, a general classification and differentiation of BI technologies and tools could be developed (Table 5.1). This table describes the use of BI in the case company AOKN. This is also the basis for the case study findings, the development of new frameworks, and their analyses in chapters 5, 6, and 7.

In the literature review, the strategy development process was analyzed on the basis of four phases (see Figure 2.9 from Fueglistaller et al., 2005). AOKN represents its strategy development process in terms of four strategic target fields. Figure 8.1 shows that these strategic target fields could be generalized for the healthcare industry with specific BI application support.

Gonzales (2011) presented a BI competitive advantage and capability model that integrated the four factors of leadership, skills, value, and infrastructure (see Figure 2.11). The developed conceptual framework was enhanced with these four factors to classify BI technologies and tools (see Figure 6.1). On the basis of Gonzales (2011), it is possible to enhance the four factors with different classifications concerning systems infrastructure, data provision, reporting, information receiver, and particularly BI technologies and tools deployment. Thus, a “link” can be made between Gonzales (2011) and the developed conceptual framework of the first research questions. Furthermore, the “link” can be developed to the respective contents and attributes of each classification. That means, explorative BI tools can be allocated to BI technologies and tools deployment as well as strategy implementation. Figure 8.3 illustrates the contributions to theoretical knowledge.

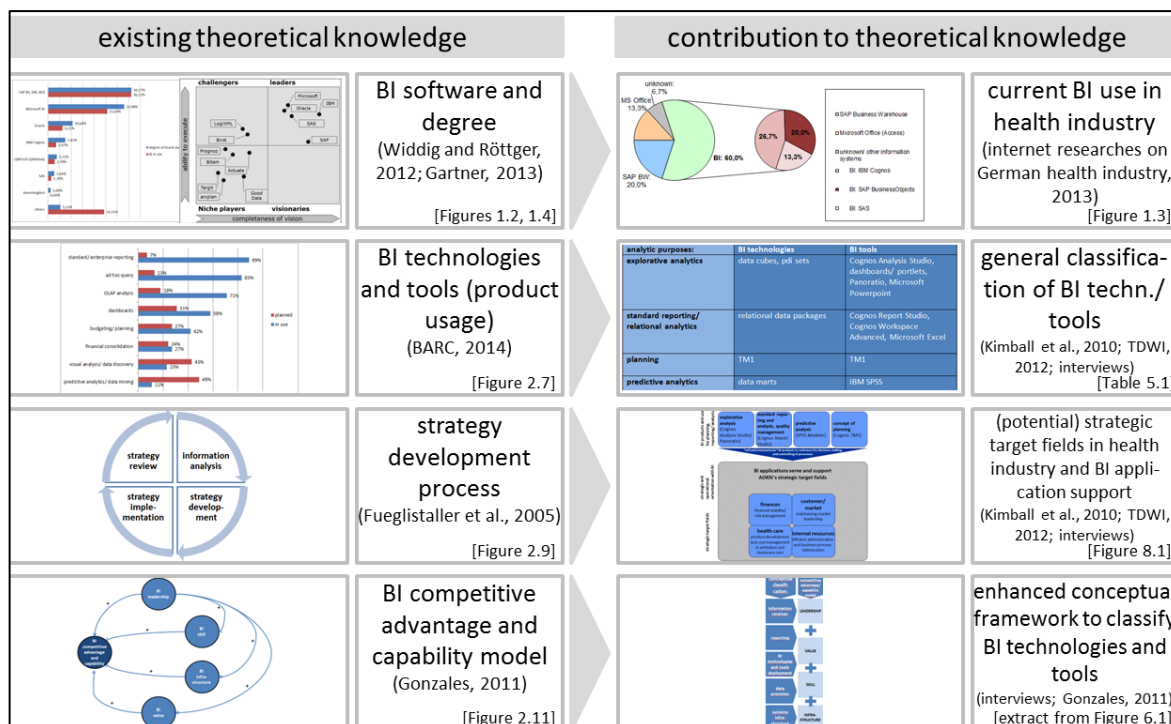


Figure 8.3: Contribution to theoretical knowledge

### 8.3 Contribution to practice

The case study findings and their analyses represent contributions to AOKN practice. From AOKN, the results of the first and second research question can be a benchmark for other companies because they establish BI technologies and tools on a general level. The classification within an appropriate “conceptual framework” can be transferred to other companies or branches with similar conditions such as DWH, data providers, or report development capabilities. The classification of BI technologies and tools is a proposal of how it can work within AOKN, a health insurance company.

The second research question showed the integration within the corporate strategy development process. As an end product the four strategic target fields of AOKN were used. Thus, other firms have the advantage to adjust this approach because they might have implemented a strict strategy development process that is more accurate than that of AOKN.

The third research question examined additional functions and solutions to current BI technologies and tools in AOKN. Nevertheless, there was a lot of general discussion as well so that further researches or companies could look after these results. However, the basis always came from the single case study, the company AOKN. Figure 8.4 summarizes the case study findings and analyses of the three research questions.

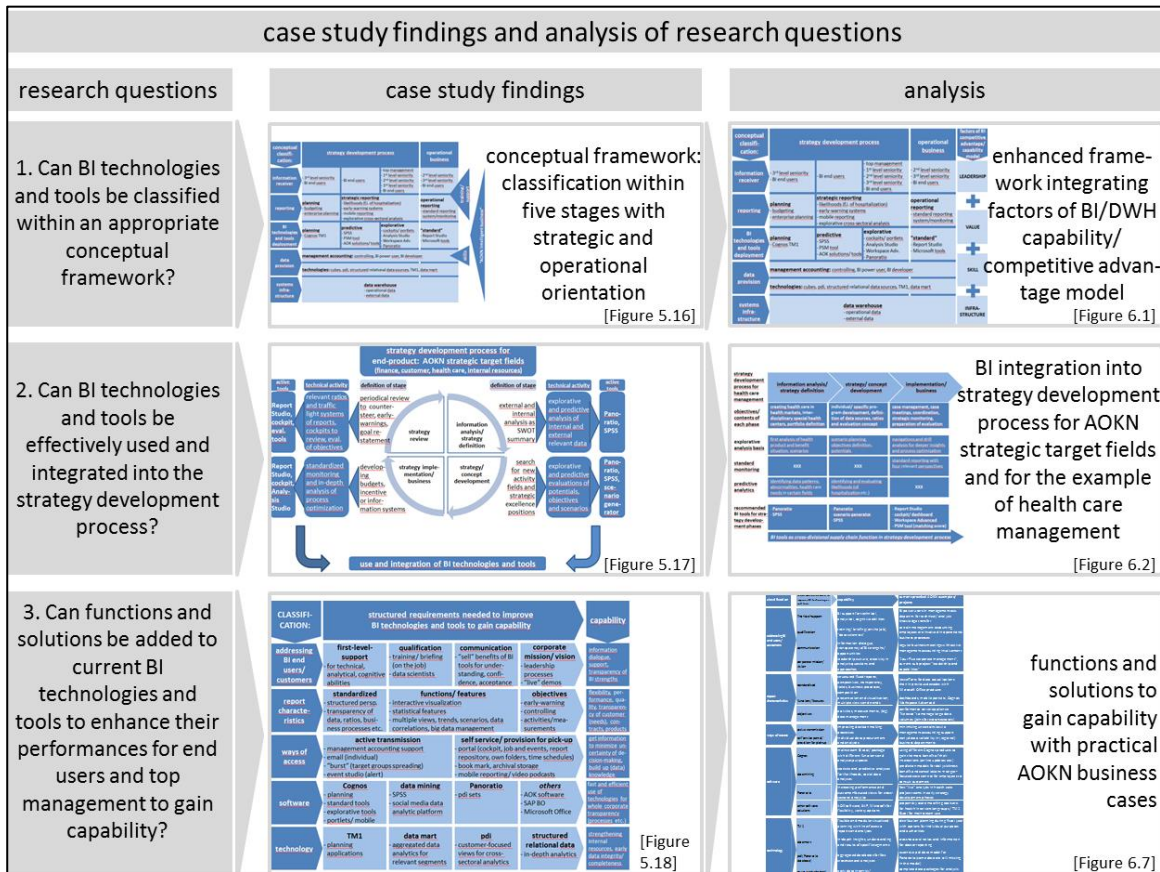


Figure 8.4: Contribution to practice

The three research questions on the left in Figure 8.4 were answered on the basis of case study findings and the respective analysis. For the answer of the first research question, Figure 5.16 represents the designed conceptual framework within which BI technologies and tools are integrated. A five layer classification illustrates the different stages to put in BI technologies and tools in a strategic and operational context of AOKN. This classification bases on the interviews and internal inquiries of AOKN participants. The analysis of integrates the four factors of the competitive and capability model of Gonzales (2011) to get a deeper

theoretical and analytical insight for the initial conceptual framework in Figure 5.16, and for practice.

The second research question examined the use and integration of BI technologies and tools into the strategy development process. Each of the four phases of this process were evaluated by the AOKN participants concerning BI activity and adequate BI tool. On the basis of the practical example of health care management, the strategy development process was analyzed to find the best option for BI technologies and tools integration. Certain analytic forms (the three box rows in the middle of the graphic – “explorative analysis basis, standard monitoring, and predictive analytics) are not recommended in phases of this healthcare example. Standard monitoring with fixed defined ratios will be useless for the strategy definition unless specific ideas can be found in current reports for a strategy formulation.

The findings of the third research question showed that many functions and solutions can be important elements of BI technologies and tools to improve them, and to gain capability. Figure 5.18 summarized the classification, solutions, and functions needed to gain a capability in a structured model. The direct impacts of capabilities on each solution and function of BI technologies and tools were emphasized in this model. Furthermore, examples of AOKN practical projects and proceedings that generate capabilities were presented in Figure 6.7. In this way, a contribution was made to the company in the form of a practical approach.

The research objectives (see Section 1.3) of this thesis will be summarized with some explanations in the following. The figures could already be found in the thesis. The respective chapters are indicated in Figure 8.5.

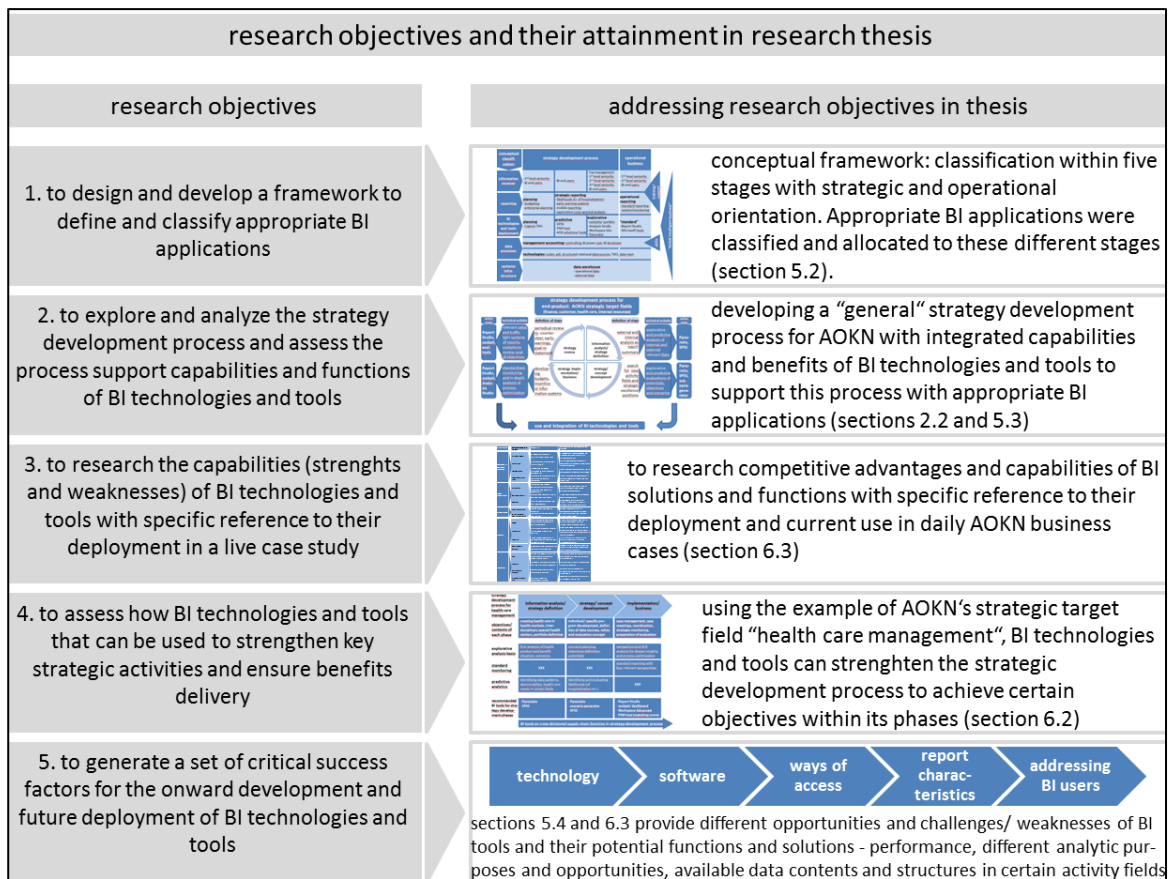


Figure 8.5: Research objectives and attainment in thesis

The first research objective designed and developed a conceptual framework with a five classification layer. Appropriate BI applications were classified and allocated to different stages; addressed in Figure 5.16.

Figure 5.17 developed a general or global strategy development process for AOKN with integrated capabilities of BI technologies and tools to support this process. Thus, this model explored and analyzed the strategy development process to assess the process support capabilities and functions of BI technologies and tools.

To research the capabilities of BI technologies and tools with specific reference to their deployment in a case study, Section 6.3 illustrates different AOKN business cases to address different functions and solutions of BI technologies and tools (see Figure 6.7).



The fourth research objective is addressed in Figure 6.2. The health care management was a representative process to assess how BI technologies and tools that can be used to strengthen key strategic activities and ensure benefits delivery.

The last research objective should generate a set of critical success factors for the onward development and future deployment of BI technologies and tools. A five classification layer illustrated structured requirements that are needed to improve BI technologies and tools to gain capability (see Figure 5.18). Sections 5.4 and 6.3 provide different opportunities and even challenges of BI technologies and tools and their functions and solutions to serve the different activity fields in AOKN.

These illustrated structures that answer the research questions and achieve the research objectives will contribute to theory and to practice. They will help to improve operations in AOKN, and potentially the German healthcare sector in general. Furthermore, the analysis helps BI end users and managers in a broader business and technology context. Concerning the business context, it will help employees on a day-to-day basis by providing access to a complete and consistent data model with user-friendly BI applications. This access will be on standardized, formatted reports with defined ratios and on analysis platforms to answer the business questions “live” in meetings, for instance. Dashboards can be a main driver to control meetings and developments. It means that meetings and decisions can be made on a more data-driven basis than in previous decades. This also includes a certain understanding of reports and information to draw the right conclusions. It would be necessary to involve management accounting employees to discuss certain ratios and developments.

Thus, BI can be seen as a process in which data from both inside and outside the company are integrated to generate information relevant to the decision-making process. It means reducing a huge volume of data into valuable knowledge through a process of analysis and creativity as well.

Concerning the technology context, it will support a more interactive and visual analysis process. In the past, parallel reporting in the regions with amounts of

Excel lists and single files were the basis to discuss or “negotiate” data and ratios with management accounting or business managers. A consistent data base was missing so certain filters (information from several data sources of doctors, hospitals or pharmaceuticals) were conducted by the computer center in Hanover. As presented in the literature review, the technological approach of BI integrates a set of tools that support the storage and analysis of data. The focus cannot be found in the process itself, but in the technologies that allow the recording, recovering, intervention, and analysis of information. Some classifications of BI technologies are interpreted as DWH, data mining, or CRM applications. For example, SPSS can be used to implement a prediction model for cancellations.

All in all, the analytical opportunities of different BI technologies and tools were clarified in this thesis. However, AOKN should not only focus on IBM products such as Cognos or TM1. Laube (2014) stressed the current limitations of IBM that have to be reviewed by AOKN. Key concepts of the new and fast technology era create challenges and opportunities: cloud computing, analytic tools for big data bases, security software, or social media and mobile devices. IBM has not found a recipe for success yet. In particular, rivals such as Amazon and Google push cloud-computing technologies. Customers can rent computers and tools via the Internet instead of purchasing expensive equipment or and consulting from IBM (Laube, 2014). This thesis provided and analyzed different BI products and solutions. Choosing the appropriate product must be considered accurately.

## 8.4 Limitations

This section presents the overall limitations of the research project. The case study as a research approach is subject to a number of limitations. An assumed weakness is that case studies take too long to conduct and that they result in massive, unreadable documents because of interview statements for instance (Yin, 2009). This opinion may be valid when applied to case studies conducted in the past (Feagin, Orum, & Sjoberg, 1991), but this does not have to be the normal case for this study or future studies. In the past, the case study method included specific methods of data collection, such as ethnography (Fetterman, 1989).

Ethnographies usually require long periods of time in the “field” and emphasize detailed evidence. In contrast, researchers can conduct valid and high-quality case studies without leaving the phone or internet, depending upon the topic being studied (Yin, 2009). Strategies to overcome such concerns are rigorous and systematic reporting on employed techniques and the disclosure of factors affecting the researcher’s decisions.

The choice of social constructivism as the overarching research philosophy implies natural limitations in many ways. Since this philosophy allows the researcher high levels of subjective assessment, the research findings inevitably depend on the individual researcher. Different people may process the same data sets in different ways. Because the proposed research strategy is aimed at a meaningful contribution to professional practice in the fields of strategic management and management accounting, it does not claim to provide absolute truths or a distinct theory contribution.

The methodological decision to rely on in-depth interviews comes at the cost of limited representation as compared to quantitative surveys. Further limitations arise from the national and cultural positioning of the empirical research stage. The fact that the empirical study is conducted in Germany means that results are potentially biased by the local culture or regional traditions. While goal-oriented activities are executed in a specific way at the AOKN region in the north of Lower-Saxony, these concepts may be radically different in the southern regions that can vary greatly with regard to culture or even religion.

Case studies can offer important evidence to complement experiments. Through establishing the efficacy of an intervention, experiments are limited in their ability to explain how or why the intervention worked, whereas case studies could investigate such issues (Shavelson & Townes, 2002). Therefore, case studies may be evaluated “as adjuncts to experiments rather than as alternatives to them” (Cook & Payne, 2002, p. 168). In clinical psychology, single case studies confirm predicted behavioural changes after the initiation of intervention, and may even provide additional evidence of efficaciousness (Veerman & van Yperen, 2007).

In retrospect, the results and contents from the literature review and practical approaches support the thesis of strategic capabilities through BI applications for AOKN. Indeed, the company has to keep an eye on the BI market, but BI must be understood as individual information system for the company (Kemper et al., 2004), however with a high potential to adjust and implement in further companies and industries.

Through the extensive transcripts, English translations, coding and use of interview materials, and internal inquiries (see Appendix), the approaches and results of the case study should be reviewed and confirmed from different positions. Whether the results and the BI implementation can be generalized and adjusted in other companies must be checked in individual cases. Potential follow-up examinations could determine external validities of this case study. The criteria of practicality of the results should also be proven. This research thesis focuses on professional practice development, which was established using “a mixture of theoretical and practical frameworks”. Theory must be supplemented with daily business practice at AOKN. First steps were made, but more BI end users must be generated in order to enhance an IT-driven self-service with BI technologies and tools. Together, top management and BI end users can generate strategic capabilities through BI deployment in different segments, as the findings and analyses of the research questions showed. If awareness and creativity can be raised by using BI technologies and tools, then BI solutions will generate fast, simple, and diverse advantages for AOKN. Decisions in business divisions will be made on a more transparent, qualified, and approved level than in the past at AOKN. And, in addition, a broad portfolio of BI applications and analysis opportunities will support and enrich the way to discover the right decision.

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## Appendix: Interview material

In the appendix the German interview guide as original guide within the interviews will be presented. The researcher first has defined the different research questions in English to derive them quickly from the original research title and research questions and objectives. Preparing the interviews with the participants carefully, the questions were translated into German then.

*Appendix Table 1: One-to-one interview guide translated into German*

Prozess	Fragen und Erklärungen/ Definitionen
I. Einführung und Präsentation	<p>Erklärungen und Hintergrundinformationen hinsichtlich Doktorarbeit, Thema, Inhalte und Ziele. Definitionen der „Case-Study“-Methode, des explorativen Forschungsansatzes und dieser Interviewform zur relevanten Datengenerierung. Der „Forscher“ möchte ein vertiefendes Verständnis für BI-Applikationen, Cognos-Produkte, Datenwissen, Datenquellen, strategische Ziele der AOKN sowie den Beitrag von Reports und Analysen für die Generierung von strategischen Wettbewerbsvorteilen gewinnen. Nach jeder gestellten Frage vergewissert sich der Forscher, ob der Interviewpartner die Fragen akustisch und inhaltlich verstanden hat. Es kann durchaus sein, dass sich einige Fragen inhaltlich etwas wiederholen, was auf die Theoriebildung der einzelnen Forschungsfragen abzielt. Den Teilnehmern werden zudem als Hilfestellung Übersichten und Informationen zu den vier strategischen Zielfeldern zur Verfügung gestellt, um den Interviewprozess plastischer zu gestalten.</p>
II. (primäre) Forschungsfragen	<p><b>Primäre Forschungsfrage 1:</b></p> <p><b>“Können BI-Technologien und Werkzeuge in einen angemessenen konzeptionellen Rahmen klassifiziert/ integriert werden?”</b></p> <ol style="list-style-type: none"> <li>1. Was verbinden Sie mit BI und seine Einsatzzwecke? (worunter sollte „intelligentes Business“ verstanden werden?)</li> <li>2. Welche BI-Werkzeuge sind Ihnen bekannt und wozu werden sie primär genutzt?</li> <li>3. Wofür werden Sie in Ihrem Bereich explizit genutzt und was ist Ihre Rolle dabei (Entwickler, Nutzer)?</li> <li>4. Was sind die Vorteile für Sie und für die AOKN insgesamt?</li> </ol>

5. Was sind generell Nachteile und/ oder Restriktionen?
6. Wie bewerten Sie die Verbindung und Schnittstelle zu den Usern?
7. Wie verhält sich die Performance für Ihr relevantes Reporting?
8. Worauf haben Sie mit BI-Werkzeuge Zugriff (Sichten, Datenformen)?
9. Wo werden die Daten vorgehalten und gibt es einen einfachen, schnellen Weg, um auf verschiedene Datenquellen und -strukturen zugreifen zu können?
10. Generieren Sie selbst Reports oder andere Analysen?
11. Welche Fähigkeiten/ Skills sind erforderlich?
12. Was für ein Datenwissen ist notwendig? Sind Sie in der Lage, mit großen Datenmengen effektiv umzugehen?
13. Welche Schulungen oder Einweisungen hatten Sie und ist es für Ihre Auswertungs- und Analysezwecke ausreichend?
14. Wie würden Sie die Qualität/ den Aufwand und die Bewertungen Ihrer Reports einschätzen?
15. Ist die Qualität der Reports nutzbar für Strategieentwicklung oder operatives Kennzahlencontrolling?
16. Wie bewerten Sie die Rolle/ Rollenwahrnehmung (und Unterstützung) des Controlling?
17. Leisten Reports, Analysen, Kennzahlen einen klaren Beitrag zu Wettbewerbsvorteilen? *Ebenfalls noch mit einer Bewertung auf einer Skala von 1 bis 10 (1: trägt überhaupt nicht bei / 10: trägt äußerst dazu bei)*
18. *Sonstige Anmerkungen und Ideen zu diesen Fragen*

**Primäre Forschungsfrage 2:**

**“Können BI-Technologien und Werkzeuge effektiv genutzt und in den Strategieentwicklungsprozess integriert werden oder nicht?”**

19. Wie würden Sie für sich selbst Strategie und den entsprechenden Entwicklungsprozess definieren? Gibt es in der AOKN einen streng definierten und gelebten Strategieentwicklungsprozess?
20. Macht es ggf. für die Zukunft Sinn, einen Strategieprozess zu definieren oder bestehenden Strategiekomponenten auf den Prüfstand zu stellen/ anzupassen (z.B. Implementierung BI-Strategie)?
21. Welches sind die strategischen Zielfelder des Unternehmens und deren Absichten? Wie können sie weiterentwickelt werden

(Stichwort: Balanced Scorecard)?

22. Wo sind Unterschiede im operativen und strategischen Controlling in der AOKN-Welt zu sehen? Werden Unterschiede überhaupt gemacht?
23. Können die aktuell entwickelten Reports, Analysen, Dashboards nützlich sein, um die Unternehmensstrategie und Prozesse zu nachhaltig zu stärken? -> „Data to decision“? Faktisch gesehen gehört die Entwicklung einer BI-Lösung zur Optimierung der internen Ressourcen, die ein strategisches Zielfeld an sich darstellen. Trotzdem: wie sieht hierbei die explizite Stärkung der vier strategischen Zielfelder aus?
24. Welche Art von Informationssystemen und Reports (Funktionen, Inhalte, Strukturen, Performance etc.) sollte entwickelt werden, um einen eindeutigen und klar erkennbaren Beitrag zur Unternehmensstrategie leisten zu können? (Wiederum in Bezug auf die vier strategischen Zielfelder)
25. Welcher Service und welche Unterstützung ist notwendig, um solche Reports in diesem Prozess generieren und nutzen zu können?
26. *Sonstige Anmerkungen und Ideen zu diesen Fragen – bitte die primäre Forschungsfrage nochmal beantworten!*

**Primäre Forschungsfrage 3:**

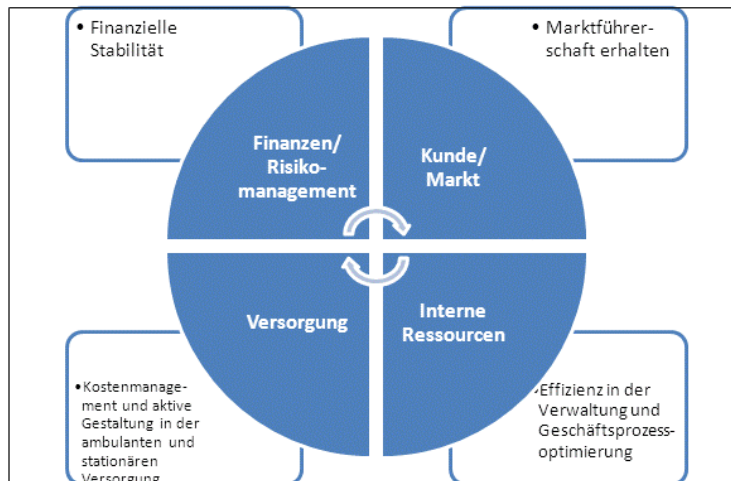
**“Können Funktionen und Lösungen den bestehenden BI-Technologien und Werkzeugen hinzugefügt werden, um ihre Performance für die User und Management zu erhöhen und somit unternehmerische Fähigkeiten zu generieren?”**

27. Was zeichnen Wettbewerbsvorteile (generell) aus?
28. Wie bewerten Sie die Wettbewerbssituation der AOKN der entsprechenden strategischen Zielfelder?
29. Welche Voraussetzungen sollten BI-Werkzeuge aufweisen, um Wettbewerbsvorteile tatsächlich generieren zu können (Datenquellen, „Big Data Management“, aggregierte Datenstrukturen, spezielle Funktionen etc.)?
30. Der Fokus liegt auf den „End-Usern“, die nicht „verloren“ werden dürfen. Wie sieht es hier mit der Forcierung von eigenständig zu entwickelnden multidimensionalen Analysen aus, um die Akzeptanz zu erhöhen? Sind bspw. aggregierte Datenstrukturen eine gute Basis/ ausreichende Datengrundlage für Entscheidungsfindungen

	<p>durch das Management, um somit den Strategieentwicklungsprozess zu fördern und Rechnung zu tragen? Wie ausbaufähig und nutzbar?</p> <p>31. Kann der Wissensaufbau von analytischen Fähigkeiten zum Verständnis und zielführenden Handling von Analysen eine fundamentale Lösung darstellen (“keeping up with the quants”)?</p> <p>32. Wie kann die BI-Nutzung in unterschiedlichsten Führungs- und Managementetagen erhöht und eine Art Sensibilisierung für Win-win-Situationen (z.B. Unternehmen/ Mitarbeiter/ BI) geschaffen werden?</p> <p>33. Was sind Ihre Erwartungen (und Bewertungen) der aktuell vorhandenen und ggf. potenziellen Funktionen der BI-Systeme? Ist ggf. die Betrachtungsweise zu überdenken mit dem Ziel nicht damit primär die internen Ressourcen zu optimieren, sondern den Kunden in den Mittelpunkt zu rücken und ihm attraktive Mehrwerte anzubieten und herauszufinden, was der Kunde wirklich von uns verlangt? → Wie Verknüpfung zu BI-Informationssystem?</p> <p>34. Kann vor diesem Hintergrund die Organisation optimiert werden, um bspw. unnütze Regeln, Aufgaben oder gewisse Restriktionen abzuschaffen?</p> <p>35. Welche Alternativen zu Informationssystemen bestehen (z.B. Panoratio, IBM SPSS Modeler/ Statistics) für Analysezwecke, um Datenschätze aus unstrukturierten Datenmengen zu schöpfen?</p> <p>36. Was halten Sie von “Data Scientists” (Datenwissenschaftler)?</p> <p>37. <i>Sonstige Anmerkungen und Ideen zu diesen Fragen – bitte die primäre Forschungsfrage nochmal beantworten!</i></p>
<p>III. Zusammenfassung und Anmerkungen</p>	<p>Die Hauptpunkte und Statements am Ende jeder primärer Forschungsfrage zusammenfassen. Außerdem sollten noch einmal potenzielle Missverständnisse oder Schwierigkeiten diskutiert werden.</p> <p>Der Interviewteilnehmer sollte Empfehlungen, Bewertungen und Anmerkungen zur Interviewstruktur/-durchführung, zu Inhalten und Antworten, Quellen, Literatur oder ggf. weiteren potenziellen Interviewpartnern geben können. Zum Abschluss kann eine Gesamtzusammenfassung von beiden Seiten erfolgen, um Missverständnisse oder unangemessenen Ableitungen oder Schlussfolgerungen zu vermeiden.</p>

*Diese Fragen sind demnach in deutscher Sprache gestellt worden da die AOKN ein in Deutschland, mit nahezu ausschließlich deutschsprachigen Kunden, operierendes Krankenversicherungsunternehmen ist. Dabei ist es für die Interviewteilnehmer um ein Vielfaches einfacher ihre Antworten, Gedanken und Ideen zu formulieren und dabei klare Absichten und Bewertungen auszudrücken. Außerdem können somit alle Parteien ein vertiefendes Verständnis für die Thematik und die Ziele gewinnen.*

The upcoming overview of AOKN's BSC and the company's position in the health competition in Appendix Figure 1 were provided to the interview participants to clarify current strategy development processes within the company.



<b>Schwerpunkt des Wettbewerbs</b>	<i>Marktführerschaft</i>	<b>AOK</b> „Strategie der regionalen Marktführerschaft“	<b>große Ersatzkassen</b> „Differenzierungsstrategie“
	<i>Nischenstrategie</i>	<b>Firmen-BKK</b> „AG-zentrierte Differenzierung“	<b>BKK / IKK</b> „Fusionsdruck aufgrund von Größe“
		<i>regionaler Markt</i>	<i>bundesweiter Markt</i>
		<b>Ort des Wettbewerbs</b>	

Appendix Figure 1: AOKN's strategic target fields and competitive position (according to AOKN presentation, 2012)



*Appendix Table 2: 15 most frequent responses and weight for RQ1*

	frequency of responses	BI relevance weighting (1 = irrelevant; 5 = relevant)	BI relevance (product)
standardization (reporting, ratios, dimensions)	20	3,1	<b>62</b>
analytical, autodidactic skills/ data knowledge, "learning by doing"	14	4,2	<b>58,8</b>
structured and centralized DWH as "single point of truth"	14	4,1	<b>57,4</b>
dashboarding (early warning system etc.)	12	4,1	<b>49,2</b>
Cognos products	15	3	<b>45</b>
data access	14	3,2	<b>44,8</b>
(reliable and qualitative) decision-making/ measurements	9	4,9	<b>44,1</b>
transparency	10	4,3	<b>43</b>
multidimensional analysis (aggregated data, cube)	10	4	<b>40</b>
trainings/ exchanges/ support	10	3,7	<b>37</b>
performance	9	3,9	<b>35,1</b>
prediction models (TM1 etc.)	8	4	<b>32</b>
controlling of objectives and results achievement (management accounting life cycle)	7	4,4	<b>30,8</b>
data generation/ processing	8	3,6	<b>28,8</b>
periodic data availability	7	3,6	<b>25,2</b>

*Source: own data collection and individual assessments (2013)*

*Appendix Table 3: 15 most frequent responses and weight for RQ2*

	frequency of responses	BI relevance weighting (1 = irrelevant; 5 = relevant)	BI relevance (product)
business strategy/ strategic target fields	22	4,7	<b>103,4</b>
transparency (contents, business processes)	15	4,3	<b>64,5</b>
prediction models (TM1 etc.)	9	4	<b>36</b>
(reliable and qualitative) decision-making/ measurements	7	4,9	<b>34,3</b>
financial stability	7	4,8	<b>33,6</b>
CIP	6	4,2	<b>25,2</b>
health care programs	7	3,6	<b>25,2</b>
trainings/ exchanges/ support	6	3,7	<b>22,2</b>
health benefit markets and developments	5	4,4	<b>22</b>
standardization (reporting, ratios, dimensions)	7	3,1	<b>21,7</b>
dashboarding (early warning system etc.)	5	4,1	<b>20,5</b>
communication/ consulting (to end user)	5	3,8	<b>19</b>
leadership processes (control circuits)	2	4,2	<b>8,4</b>
structured and centralized DWH as "single point of truth"	2	4,1	<b>8,2</b>
customer solutions/ satisfaction/ perspective	2	4	<b>8</b>

Source: own data collection and calculations (2013)

Appendix Table 4: 15 most frequent responses and weight for RQ3

	frequency of responses	BI relevance weighting (1 = irrelevant; 5 = relevant)	BI relevance (product)
transparency (contents, business processes)	15	4,3	<b>64,5</b>
(reliable and qualitative) decision-making/ measurements	12	4,9	<b>58,8</b>
leadership processes (control circuits)	14	4,2	<b>58,8</b>
health benefit markets and developments	10	4,4	<b>44</b>
trainings/ exchanges/ support	11	3,7	<b>40,7</b>
customer solutions/ satisfaction/ perspective	9	4	<b>36</b>
analytical, autodidactic skills/ data knowledge, "learning by doing"	8	4,2	<b>33,6</b>
financial stability	7	4,8	<b>33,6</b>
performance	8	3,9	<b>31,2</b>
standardization (reporting, ratios, dimensions)	10	3,1	<b>31</b>
dashboarding (early warning system etc.)	7	4,1	<b>28,7</b>
communication/ consulting (to end user)	7	3,8	<b>26,6</b>
data mining (different data correlations)	7	3,7	<b>25,9</b>
health care programs	7	3,6	<b>25,2</b>
acceptance	6	4	<b>24</b>

Source: own data collection and calculations (2013)

Appendix Table 5: Inquiry participants for assessment of BI issue relevances for AOKN

<i>relevant BI issues</i>	inquiry 1	inquiry 2	inquiry 3	inquiry 4	inquiry 5	inquiry 6	inquiry 7	inquiry 8	inquiry 9	inquiry 10	<i>AVERAGE</i>
(reliable and qualitative) decision-making/ measurements	5	5	5	5	5	5	5	5	5	4	<b>4,9</b>
analytical, autodidactic skills/ data knowledge, "learning by doing"	5	2	4	4	5	4	4	4	5	5	<b>4,2</b>
business strategy/ strategic target fields	5	5	5	5	5	5	4	5	4	4	<b>4,7</b>
CIP	5	4	4	4	--	4	4	5	3	5	<b>4,2</b>
Cognos products	4	1	4	4	3	3	3	2	4	2	<b>3,0</b>
communication/ consulting (to end user)	4	2	5	4	4	4	4	3	4	4	<b>3,8</b>
controlling of objectives and results achievement (management accounting life cycle)	4	4	4	4	5	4	4	5	5	5	<b>4,4</b>
dashboarding (early warning system etc.)	4	5	4	5	4	5	4	4	4	2	<b>4,1</b>
data access	3	1	4	4	4	3	5	3	3	2	<b>3,2</b>
data generation/ processing	3	2	4	4	4	3	5	3	4	4	<b>3,6</b>
data mining (different data correlations)	3	3	4	4	4	3	4	4	5	3	<b>3,7</b>
data quality	4	4	5	4	5	4	5	4	5	4	<b>4,4</b>
financial stability	5	5	5	5	5	5	3	5	5	5	<b>4,8</b>
health benefit markets and developments	5	4	4	5	5	4	3	5	5	4	<b>4,4</b>
health care programs	3	3	3	4	4	4	4	4	5	2	<b>3,6</b>
leadership processes (control multidimensional analysis (aggregated data, cubes)	5	3	3	4	5	5	4	5	4	4	<b>4,2</b>
performance	3	4	4	4	4	3	5	5	5	3	<b>4,0</b>
prediction models (TM1 etc.)	3	3	5	4	5	4	5	4	4	2	<b>3,9</b>
standardization (reporting, ratios, dimensions)	4	5	4	4	4	4	3	4	4	4	<b>4,0</b>
structured and centralized DWH as "single point of truth"	3	2	3	4	4	3	4	4	3	1	<b>3,1</b>
trainings/ exchanges/ support	4	3	5	4	4	4	4	5	4	4	<b>4,1</b>
transparency (contents, business processes)	3	2	5	4	4	3	4	3	5	4	<b>3,7</b>
total average	4	3	5	4	5	4	4	4	5	5	<b>4,3</b>

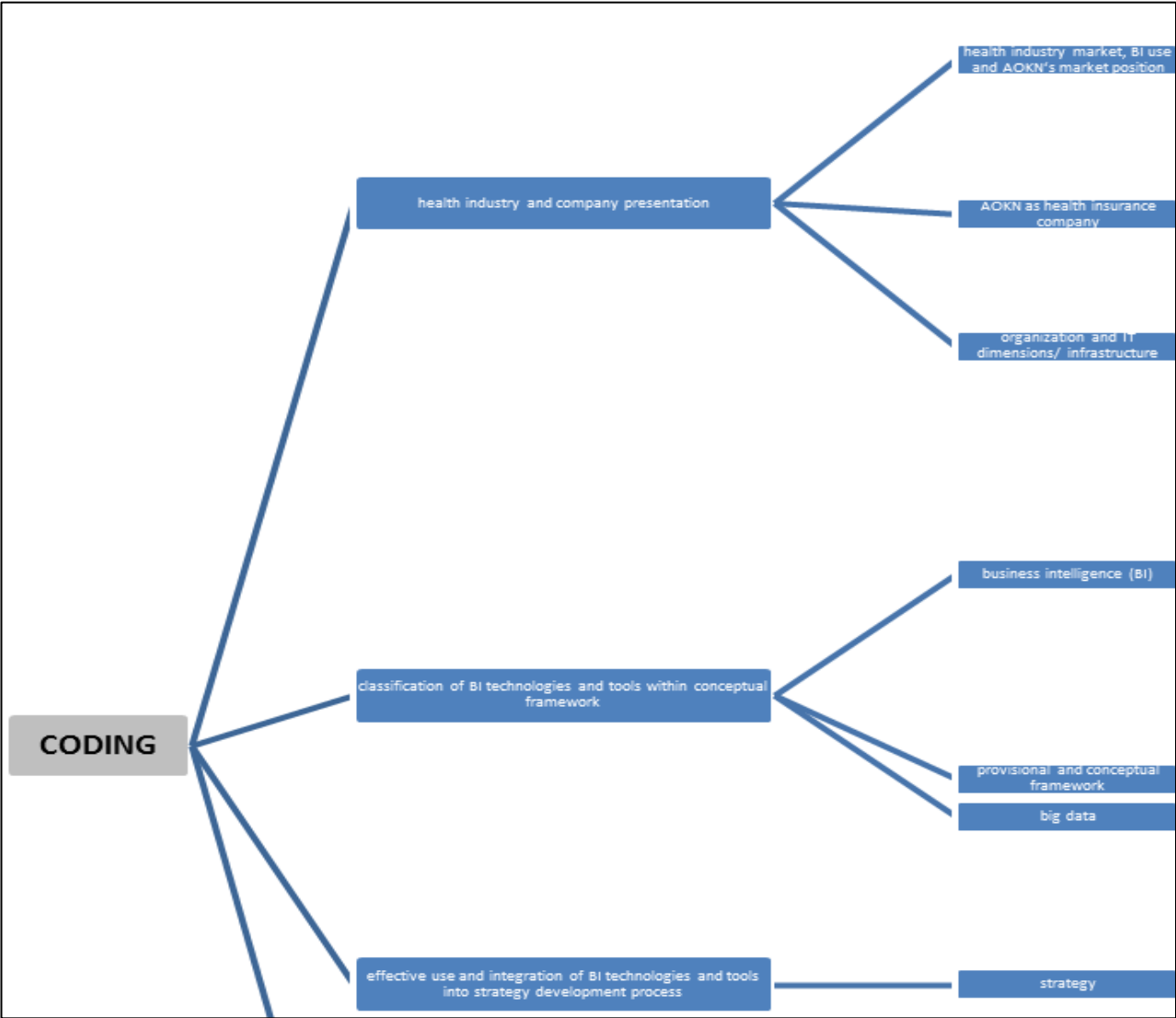
  

5 very relevant	31,4%	72
4 relevant	45,9%	105
3 neutral	16,6%	38
2 scarcely relevant	4,8%	11
1 irrelevant	1,3%	3
total	100,0%	229
total average	4,01	
standard deviation	0,89	

Source: internal inquiry (2013)



Appendix Figure 6: Categorization, structure and coding scheme (extract)





*Appendix Table 7: Interview output*

**RQ1: Can BI technologies and tools be classified within an appropriate conceptual framework?**

**Q1: What do you associate with BI and its purposes? Can you define an “intelligent business”?**

- ✓ providing opportunities to find good customer solutions in due consideration of efficiency
- ✓ no limitation of customer needs, running customer requests
- ✓ well-informed customers about AOKN’s supply
- ✓ health will be seen as production and cure process where BI must give data driven “answers”
  
- ✓ how will I get relevant corporate ratios periodically?
  
- ✓ BI is a generic clause for: employees deploying tools, to organize and prepare data, to generate management performance and support for decision-making
  
- ✓ Suitable, best fitting data modulation for decision-making and achievement of objectives and results
  
- ✓ BI to achieve an equal information status of all employees at any time
- ✓ Fast data access and same entrance screen to get the respective information
  
- ✓ BI as technical based data processing. The benefits can be used in the information system for economic models (driver trees). Here a fast quantitative sensitivity analysis is possible with different types of driver trees. The data availability plays also a crucial role. Without the technical processing benefits cannot be generated and employees cannot hypothesize -> to gain knowledge and awareness!
  
- ✓ Valuable BI system with its structured and centralized DWH which is available for years but after the BI project in 2011 the DWH was extensively redesigned.
- ✓ A consequent anonymization
- ✓ Standard dimensions
- ✓ Multiplied-data-access (different data sources)
- ✓ Efficient analysis of corporate data to comprehensively and reliably answer of top management
  
- ✓ Structured data procession and analysis
  
- ✓ Strategic and operational controlling of the company, identifying abnormalities or undesirable developments and initiate activities
  
- ✓ general term for controlling tools to support future-oriented management decisions and current processes, costs or quantity developments with high transparency, comprehensive and flexible analysis opportunities on the basis of verified and prepared data bases
  
- ✓ worthwhile connection of different data sources to receive a good overall picture

**Q2: What BI tools do you use?**

- ✓ data available can be used indeed (join from different data sources while routine data are limited -> medical data one year later)
- ✓ limitation in patient data and information: AOKN cannot see how a patient was treated in hospital, how he felt about the benefits and how his information status is and was (health

process)

- ✓ subjective assessments of customers and patients are missing out of data (only with questionnaires)
- ✓ in comparison with automobile industry the retailer have more and transparent information about customers and their interests
- ✓ AOKN: complaint management, follow-up contacts or test purchases do not provide information about bought medical benefits
- ✓ using Cognos products to create transparency in my department (activities, results, ratios) for further controlling of my employees
- ✓ IBM Cognos, SAP BO, Microsoft BI products, QlikView® from open source for small and medium-sized enterprises, Oracle products are data base driven
- ✓ Cognos for standardized and explorative reporting and support for business divisions concerning operational control (customer campaigns etc.)
- ✓ Dashboards useful but sometimes long-runnings so that screenshots with relevant ratios for presentations are created
- ✓ Data are completely available, hardly information needs
- ✓ Cognos for defined ratio frameworks to hypothesizing
- ✓ SPSS will be currently checked
- ✓ Reporting will be basically seen as BI tool collection, management accounting is part of management and leadership which also include communication, discussion or consulting. In order to serve the whole management accounting life cycle activities can be created through control circuits or business meetings.
- ✓ TM1 for development of data-aggregated prediction models
- ✓ Cognos for current information and predictions and further analysis
- ✓ Risk evaluation tool "R2C" to identify medium-term risks not defined in household planning
- ✓ Analysis from the physical therapy tool "Kompass302"
- ✓ Panoratio for first analysis of needs to develop an idea or certain project and to prioritize topics. The controlling of health care contracts, the implementation of a reporting during a period and a comprehensive evaluation of contracts is essential to see what is going on in certain business fields

**Q3: What are they used for (and thus, what is your role/ task/ job)?**

- ✓ end-user and further preparing of analysis
- ✓ team leader BI for data processing for management accounting employees, coordination with management accounting and IT (corporate data processing service center)
- ✓ developer for reports and end user
- ✓ end user, only own analysis for human resource inventory target



- ✓ Management accounting employees define requirements for BI developer -> transparency of business logic, definition of ratios, functions of terms
- ✓ Management accounting: moderator, presenter an innovation generator in this process, organization and planning of meetings, to illustrate deficits, early warning generator is the ideal conception! Analysis, ideas transfer between different AOK regions.
- ✓ Participation development of TM1 cube, testing data with regards to content, knowledge transfer to end user in trainings or with the help of best practice reports, supporting end user
- ✓ End user with professional support

**Q4: What are the benefits and advantages for you/ for AOKN?**

- ✓ advantages to answer the third and fourth upcoming question in a meeting or business control circuit with the help of navigation dashboards or even ad hoc analysis apart from standardized reports. Focus on data.
- ✓ dashboards are the main management accounting tool for result and trend overviews and navigation opportunities. But CIP has to be considered. Vision of dashboarding: the information system of daily working and activities and decision basis in business meetings/ professional control circuits. They solve problems of previous enhancing data files of standardized reports with non-relevant information ("no pages of raw data but precise results from the analysis").
- ✓ results will be presented and updated every week which saves time. BI tools make controlling of employees and the whole company easier than before with Microsoft Office tools. Trends and developments will be illustrated and visual and strategic basis for decisions will be generated.
- ✓ Structured application, standard data base as DWH
- ✓ Standardized data processing for "standardized" and equivalent results and decisions
- ✓ One centralized and harmonized data base (DWH) for a single point of truth within the company! (Before several data sources which differed themselves)
- ✓ Standardization and one-time effort for a periodic data actualization
- ✓ Same data basis so that meetings and control circuits discuss the same results!
- ✓ Time is missing for analyzing and identifying potential from the daily sickness benefit cascade model
- ✓ Previous year values and developments are integrated in dashboards
- ✓ For operational business: performance, quality management, qualitative instead quantitative dialogs in control circuits or meetings (rich in content)
- ✓ Capable of acting because of defined standards, unique dimensions, documentations for third persons without exorbitant previous knowledge, data processing, organizational fundamentals in management accounting division (management accounting employees and BI developer)
- ✓ Fast data access and control impulses according management accounting life circle
- ✓ Nonessential times for data processing in management accounting

- ✓ Presenting management consolidated and dispositive data structures to initiate counteract activities
- ✓ Practical benefits because of qualitative discussions in control circuits and prompt answering of relevant result questions. In previous decades management accounting had homework of different analysis to do which was a loss of time
- ✓ With the BI portal as standardized platform, dashboards are the main company reporting tool with integrated analysis forms for top management to regional division manager covering different degrees of demands
- ✓ Transparency is the most essential benefit. In previous decades there was much administrative effort every week. The enhancement of transparency and processes can be forced now.
- ✓ Early warning system with the help of dashboards
- ✓ more transparency of the current corporate situation and certain business divisions
- ✓ opportunities to connect developments from previous years with own experiences to make informed and strategic-oriented decisions. The systematic structure of comparable data is essential for a long-term retrospective view, particularly for the development of authoritative forecasts.
- ✓ No long-running filter any more to get relevant information and data generation in particular.

**Q5: What are the drawbacks/ restrictions?**

- ✓ disadvantages that data and joins are only a part of truth. Sometimes good to discuss about the results another day not to “lapse” into first data results and analysis
- ✓ data security (anonymized customers), but it is no challenge and difficulty because there are opportunities for certain divisions to get personal data in some cases -> now focus on core business of controlling their business and activities
- ✓ large efforts for report development with previous documentations of relevant data interfaces
- ✓ big data has to be managed individually through Panoratio or a specific data modulation (f.i. historical time slices) but it is a CIP
- ✓ acceptance of BI system because the provided data are not “my own generated data”!
- ✓ dashboards are confusing with amounts of information, the complete overview of all regions with relevant target ratios is currently missing
- ✓ long-runnings in dashboards during “live” presentations in meetings
- ✓ the drop down to report folder is not sufficient – deviations of predictions can better be recognized directly in the standardized reports
- ✓ data quality, acceptance, ability of end users to generate “their findings” and transfer into practical works
- ✓ considering investments in BI system: is information an important factor of production? Cognos licenses, human resources, costs for consulting etc.
- ✓ fear of transparency, investments in human resources and BI systems but AOKN knows what it

does... (diagnosis related analysis etc.)

- ✓ authorization concept (not every employee should have a BI access)
- ✓ adjustments or systematical mistakes/ faults and anomalies in data basis are often intransparent. Because of this constellation one can run the risk of not assessing the data right or even wrong for relevant strategic decisions
- ✓ not every form of data and information are available and current routine data in the DWH are only partly informative
- ✓ many questions could not be ad-hoc answered and efforts are high for implementing a standardized reporting

**Q6: What do you think of the user interface?**

- ✓ apart from standardized reporting with relevant ratios (even with “traffic light status” characterized), it is difficult to generate further control-related analysis in routine data -> certain cancer medicinal products are used to treat children with a certain diseases. Therefore, additional/ secondary diagnosis have to be identified for this specific medicinal product (focus on second view on the data analysis)
- ✓ BI power user as connector to management accounting employees for report generating
- ✓ End users have management accounting as contact person which has to be forced. Individual opportunities of ad hoc analysis on aggregate data model if standardized reports are not sufficient
- ✓ Advantages and opportunities should be better communicated to business divisions but in some divisions the demands are not increasing (historically established)
- ✓ Support and consulting from management accounting to results control employee good!
- ✓ Good support, trainings and exchanges
- ✓ Task to communicate advantages and opportunities so that investments will be clarified to end users
- ✓ To see end user through BI process (trainings, individual analysis opportunities etc.)
- ✓ Interface exists with trainings on relevant BI products and its enhancement. Analysis on relational data bases. Day-to-day business with end user flows smoothly.
- ✓ There is still potential for the interface – sometimes time and free space is needed for a comprehensive report description and common consultation to get the appropriate status as BI end user. Which accesses are possible and what is the current overview of the situation?

**Q7: What is the performance level for your reporting like?**

- ✓ Increasing performance since new appliance Netezza implemented in 2012
- ✓ Before relational data structures for pharmaceuticals or diagnosis could not be handled, cubes were on too high aggregated level so that details were missing
- ✓ In some fields long times

**Q8: What data can you access with the BI tools?**

- ✓ Analysis, results and ratios can be presented and downloaded in different formats (Excel, HTML etc.)
- ✓ Administrator rights but no know how in respect of data contents
- ✓ Health care management includes sector comprehensive analysis from different data sources
- ✓ Aggregated data structures
- ✓ All data files except human resource data
- ✓ Individual reports for certain benefits, activity fields or accounts of quantities, developments and individual data files, reports for certain processes and dashboards for an overall development

**Q9: Where is the data stored and is there an “easy” way to access data sources?**

- ✓ default Cognos links on computer for fast data access
- ✓ data stored in DWH and even SAP BW (official statistics) that has to be integrated into DWH soon
- ✓ DWH integrates different data sources, mainly operational SAP source tables but also flat files and manual inputs. All data can be joined with surrogate keys like anonymized social security numbers or identification numbers of care suppliers.
- ✓ if in the operational system new acquisitions are integrated then the DWH has to be adjusted as well
- ✓ storage in Cognos and operational systems – a fixed contact person in the management accounting department

**Q10: Do you generate reports or data analysis yourself?**

- ✓ further processing of Cognos reports
- ✓ support on handling long-running reports
- ✓ reporting for BI system analysis
- ✓ sometimes Analysis Studio, SAP for budgeting and accounting, human resource analysis in Cognos
- ✓ no
- ✓ constantly analysis to validate own ideas
- ✓ use of prepared reports or query of BI developer

**Q11: What skills are needed to use BI technologies and tools?**

- ✓ despite standardized reports Office know how (Excel and Access) is necessary

- ✓ expert knowledge of respective sphere of activities, ability of transferring “Excel-thinking” to Cognos
- ✓ reports are 80 to 90 percent standardized but ratios are often not self-explanatory -> ask management accounting
- ✓ the previous “direct” and standardized reporting will be more and more substituted with individual analysis opportunities so that analytical skills will be needed, demands increase with data variety and complexity
- ✓ analytical and autodidactic understanding for more complex software solutions -> in management accounting division two employees as Cognos power user for first level support (logical reporting but wrong results...?)
- ✓ to know how to use BI tools and to know data generation (mainly employees of management accounting)
- ✓ just conduct the right links
- ✓ numerical comprehension per se and rough understanding of data definitions, structures and characteristics. And who is the right contact person for data etc.?

**Q12: What knowledge of the data is needed? Are you able to make sense of all this quantitative information?**

- ✓ difficult assessment of effective handling. Further processing “in all conscience”
- ✓ understanding for report generating
- ✓ deepened data understanding for relational reporting (which has increased) -> incorrect join would be fatal
- ✓ deepened understanding of DWH and data structures with regard to contents -> what means movements of number of cases? Which comparative parameters have to be taken as a basis?
- ✓ What is data modeling or processing? Dimensions vs. ratios?
- ✓ Different management accounting employees as contact persons for certain data contents
- ✓ Now: building up methodical knowledge? Data mining project in pharmaceutical field, what options do we have here?
- ✓ End user have to trust BI system knowing where data come from to initiate appropriate activities
- ✓ Management accounting: cohesive whole data understanding to identify abnormalities and inplausibilities
- ✓ Data sources and data generation have to be known
- ✓ Quantitative information can be handled with Cognos Report Studio
- ✓ Knowing the data bases and sources for right evaluations and interpretations. Difficulties of data definitions or contents can be fatal. The right definitions of data and ratios need to be integrated in the respective BI application not only in the official documentation papers that are difficult to read and understand.

- ✓ For health care management for instance it is necessary to have a cross-sectoral data understanding (doctor data have a different status than hospital data for instance)

**Q13: What training or briefing have you had and is it adequate for your purposes?**

- ✓ trainings are worthwhile on location to force individual and more creative analysis such as cascade data models for potential identification
- ✓ external trainings for regional managers (intermediation of basic knowledge) which is sufficient
- ✓ Cognos Report Studio, Panoratio trainings, power user for technical questions
- ✓ “learning by doing” to gain BI confidence
- ✓ Focus on “learning by doing” – IT training offers with practical input are missing in the seminar guide of AOKN
- ✓ Only in the context of JourFixe

**Q14: What do you think of the current quality of reports in AOKN?**

- ✓ no conclusion of contracts without preliminary data analysis
- ✓ but at the end it still remains an entrepreneurial freedom to make managerial decisions without analysis
- ✓ BI can only present the data past – even prediction models can function on the basis of reliable “past” information
- ✓ Effort is manageable, weekly 30 to 60 minutes, quality is good, helpful for regional result control
- ✓ Market-oriented, qualitative high level
- ✓ Complex reports try to answer questions for business divisions with parameters and ratios previously but this cannot be management for all fields currently
- ✓ Dashboard system will be enhanced to a version 2.0
- ✓ Standardized report can also be an entrance to data and relevant ratios, after meetings results, process chains and details will be discussed again to enhance current analysis and decisions
- ✓ High quality. The innovative capacity and CIP is developable. In which areas or spots operational activities can be improved?
- ✓ Potential for visualized and graphic data presentations for better “reading” of reports and results. More efficient presentation and design!
- ✓ “We have a Ferrari in the garage but still drive a 2CV duck” – using the driver tree logic a lot of standardized reports are not up-to-date because they were developed ten years ago - dashboards can replace reports to get a data overview and then go into detail
- ✓ Standardized reports are not of great efforts after generation
- ✓ Evaluation of an integrated health care contract means great effort

- ✓ Good quality. Only partly targeted and too much analysis. Relevant and concrete questions will be answered often with an amount of data. One loses oneself in filling page reports because of missing transparency of the data definitions and different data bases to verify the right result. However, AOKN has been developed in a positive way.
- ✓ A standardized report for all health care projects is not possible because of their individuality but an individual reporting is necessary for currently about 80 contracts

**Q15: Are these used for strategy development or operational KPI reporting?**

- ✓ Operational KPI reporting
- ✓ Strategy development because reporting and relevant ratios are defined together with management accounting and business divisions
- ✓ Both processes but especially operational KPI reporting
- ✓ Enrichment of DWH with external data for benchmarking and developing scenarios
- ✓ Not sufficient for strategy because reports were not appropriately designed. A half-yearly strategy report would be helpful for centralized business divisions
- ✓ Not every ratio causes an activity, support when red traffic light then X activity...
- ✓ Yes but required adjustments are possible due to management accounting division.
- ✓ Panoratio is helpful for defining a strategy to identify the cost-driving disease patterns and to focus on the right fields. Panoratio is helpful for the strategy process

**Q16: What do you think of the role, role perception (and support) of management accounting?**

- ✓ Good support and it can be assessed positive
- ✓ Good control from contents but consulting activities and “to do a lot of persuading” (BI is partly seen as limited system) have to be enhanced
- ✓ Questions from top management can be answered in short-term
- ✓ Predominantly management accounting does not act as consultant or even supporter!
- ✓ Communication has to be forced: standardized four perspectives for contract reporting etc. (activities, quality, cost-efficiency and customer satisfaction) – what and where are “time sinks” that avoid to be the economical consultants?
- ✓ Optimal role, developed for years
- ✓ Rare close collaboration and management accounting employees are noticed as report generator and “data delivery men”.
- ✓ Good professional competencies and fast access in case of short-term questions. But if adjustments in reports or data are necessary, often the required personnel resources are missing in the management accounting division.

- ✓ The collaboration is good. For the standardized reporting there must be a more efficient ratio finding process, for instance a common access on Panoratio data bases which can be relieved for management accounting division.

**Q17: Do they (reports, analysis, KPI) clearly provide any competitive advantage and capability, do you think? Likewise an estimation on a scale 1 to 10 (10: very high / 1: very low).**

- ✓ No “pure” competitive advantages. Reports, analysis and ratios are necessary and basic requirements for a “quantitative-ratio-oriented” corporation
- ✓ To gain understand when data will be actualized
- ✓ On the basis of subprime information we cannot generate premium decisions! Activity fields are made transparent and we can ask: what are we doing on which fields? Many questions could not be answered five years ago but now AOKN has got the nationwide biggest data model (particularly for Panoratio). Basis in BI project 2011, it is now a clear competitive advantage!
- ✓ Distinctive data situation
- ✓ Customer/ market: yes but continuously challenging because of customer campaigns etc.
- ✓ Health care: yes
- ✓ Internal resources: dashboard in human resources is strongly used for objectives or status of employee’s illness
- ✓ Finances: financial planning for standardized management report will be implemented in Cognos soon
- ✓ Yes, transparency of health benefit markets provides in-depth information about care supplier and contractual partner activities and behaviors.
- ✓ Competitive advantage through transparent presentation and visualization of different decisions. It is difficult to measure customer data for health care to see what is a target-oriented ratio or measurement. There are some difficulties to catch the customers right to increase customer satisfaction and benefits. This customer satisfaction cannot be measured transparently and appropriate for strategic target fields of BSC despite the official customer satisfaction index etc. It would be helpful to contrast efforts with benefits for AOKN. This challenge and approach should be integrated in business strategy and respective information should be integrated in BI system as well.
- ✓ The consequent BSC orientation is essential to find the appropriate balance but it is missing “where does AOKN stand exactly?” It is difficult to find the “right” balance and keep it alive because of many snap shots and black and white thinking instead long-termed orientation. Therefore, a transparent overall view on the whole situation is missing! Perhaps it makes sense to invest in know-how and staff to develop strategies and their assessments. Then, it should be implemented a customer value evaluation to see if millions of euros will be spend for programs or products and what exact benefit can be measured in the context of cancellation rates or customer satisfaction? What does it mean to have a competitive situation and in particular advantage? Thus, the certain equivalent value is still missing for a cohesive whole evaluation and measurement!

**Q18: Miscellaneous remarks and/ or ideas relating to these research questions?**

- ✓ ...

**Scale average 1 to 10 (BI provision competitive advantage and capability AOKN): 6 (pilot) + 10 + 4 + 8 + 8 + 7,5 + 8 + 10 + 7,5 + 10 + 7 + 7 = 93 / 12 = 7,75**



## RQ2: Can BI technologies and tools be effectively used and integrated into the strategy development process or not?

### Q19: How do you define strategy and the development process yourself? Is there a strictly defined and implemented strategy development process in AOKN?

- ✓ strategy is defined as “first follower“ due to financial situation (except 2009 and 2013 AOKN expenses always underlay health expenses)
  - ✓ under pressure improve customer satisfaction and certain health products (f.i. program for depressive patients – this is a strategy driven health care model)
  - ✓ there is no explicit strategy development process implemented
  - ✓ in the context of product development (f.i. health programs) the four strategic target fields will be considered (bottom-up strategy)
  - ✓ but not the other way around: AOKN has a business strategy which allows the development of a certain health program
  - ✓ strategic target fields are “sufficient”
  - ✓ consideration of social law and non-profit effect: business is not as flexible as it would be in private economy, focus on financial aspects: under these circumstances the price is the market driver -> declining customer developments but other health insurance companies lost customers at 5 percent at one go by demanding additional contributions
  
  - ✓ Federal Association of AOK define the nationwide strategic guidelines (IT strategy etc.) for AOKs
  
  - ✓ BI supports the whole management and finance area to make decision-finding transparent (planning and results control)
  
  - ✓ Market strategy, business process optimization in market and distribution to enhance customer satisfaction and internal results
  
  - ✓ Strategy development process is not strictly implemented. Certain aspects will be enhanced.
  
  - ✓ It is an issue on leadership panels but a long-term planning is not possible. Political disturbances have to be reacted in short-term.
  
  - ✓ Only through financial perspective a five-years-prediction can be made, considering processes and BI applications -> f.i. it is not transparent how the process “pension” is defined in relation to daily sickness benefit field. What are the benefits here? Cannot be answered because this task will not be worked so that the relevance and definition of this process is questionable.
  
  - ✓ No involvements of management accounting employees in professional strategy development process
  
  - ✓ Not familiar
- Problem -> (driver) analysis -> options for action -> decision -> planning implementation -> implementation -> controlling/ countersteer ... and back again**
- ✓ The BSC is adequate. In certain implementation processes for health care a common approach strategy is missing. Only isolated strategies from the ambulant or stationary business divisions can be recognized

### Q20: Does it make sense to define a strategy process in future or to adjust the current “strategic

### **components" in AOKN?**

- ✓ Remain flexible and dynamic but at the same time not to lose "central thread"
- ✓ Every business division has to develop its own strategy according to business strategy
- ✓ BI strategy makes sense
- ✓ BI has to be seen as internal resource to fulfill certain tasks (BI has the same function like a pencil or telephone)
- ✓ Good method to gain an overview of all relevant fields
- ✓ It makes sense but how much clear and long-term a strategy has to be defined? How much can AOKN influence strategy without requirements and frames by social law?
- ✓ Results of the strategic coordinate system. In 2010, top management recognized the strengths of a BI system that are helpful to control the company's internal processes more effectively. For a further development of the BSC to an integrative planning or predictive model, the corporate development division has to prove the respective requirements for the BI landscape then.
- ✓ Yes to avoid dangers that during decades several directions would be followed. Strategy definition at an early stage.
- ✓ All strategy components should be proved continuously
- ✓ Support or organization of goal setting process would be helpful for certain business divisions. The meaning and benefit depend on flexibility and individuality. Otherwise a further process will be "satisfied" where it is not appropriate and constructive.
- ✓ Strategic orientation with regards to content and BI structures can be used in a supporting way because from BI data alone the business strategy cannot be defined

### **Q21: What are AOKN's business strategy (strategic target fields) its objectives, and how can business strategy be enhanced?**

- ✓ Integration and network of strategic target fields are challenges
- ✓ In internal resources are needs for action. Corporate identification is missing. Employee groups rest on their "laurels", enthusiasm is missing. Behavior "paralyzes" the company.
- ✓ Business strategy, BI strategy will be seen as subitem
- ✓ Ok
- ✓ Enhancement of stronger integration of BSC fields. Support through BI landscape which has to be proved then if BI can create or enhance a strategy development process.
- ✓ Financial stability and qualitative cost control, demographical change, to offer modern health treatments, maintaining market leadership, improvements of service activities
- ✓ BSC with its strategic target fields is germane. It must be "lived" which depends on the balance of the different targets. However, the target fields health care and market cannot be deposited with numbers or facts to create transparency. Therefore, the corporate focus is only on

economic components. Thus, no adjustments of the target fields are necessary rather a data base for the “soft factors” to develop a transparent balance of the targets.

**Q22: What is the difference between operational vs. strategic reporting in AOKN's world?**

- ✓ Operational management accounting is located in seventeen AOKN regions: regional manager, regional management accounting employee and division manager (for market, business clients etc.)
- ✓ Strategic management accounting is located in head office Hanover. Marginal participation of regions, merely information
- ✓ What questions should be answered? Operational reporting is short-term-oriented (f.i. controlling of budget objectives) as high degree of detail while strategic reporting is long-term-oriented for predictions or trends
- ✓ Differentiations of management accounting tasks (just generating reports vs. holistic support of an activity field)
- ✓ Difficult to differentiate, no explicit differentiation
- ✓ Differences cannot be recognized: operational reporting, if existent, is even more detailed than strategic reporting. Individual ratios are rare to find (f.i. processing times) or driver or potential measurements are not clear
- ✓ It makes sense to implement such a differentiation. Operational controlling has got different information needs than strategic controlling. The management reporting is even operationalized in the regional objectives.

**Q23: Can current BI reports, analysis, dashboards etc. be useful to strengthen the business strategy and/ or its development process?**

- ✓ Yes, people rely on data and facts
- ✓ Data to decision: in doctor data the availability is a problem – ratios should produce activities and counteracting measures which does not take place (data time lag!)
- ✓ Data driven decisions will be daily made, in the control circuit market the CEO defines the current market driver with regards to content, management accounting is present as well
- ✓ Yes, f.i. investments in more benefits (AOKN advantages “plus factors”)? Data are relevant for this decision.
- ✓ Political relevance of certain topics will be transparent -> mother and child health programs, without data AOKN would be helpless
- ✓ AOKN cannot undock from funds allocations any longer -> BI configurations
- ✓ Not in relation to daily sickness benefit because there are no data driven decisions, an employee for strategic conceptual development is missing
- ✓ Reporting is essential
- ✓ It is appropriate

**Q24: Which forms of reports (functions, contents, structures, performances etc.) should be developed to generate a clear contribution to business strategy?**

- ✓ use of social media to understand customer needs (force doctor assessments, customer perspectives)
- ✓ balance between market oriented business management and internal resources (enhancements of BI system)
- ✓ adequate reaction with BI system to satisfy customer needs (offering relevant hospitals or therapy centers for customers)
  
- ✓ business strategy has to be transparently and comprehensibly communicated to employees which creates corporate identification
- ✓ predictive analysis should be forced, join between several data sources (doctors verify with contracts, identify cases of fraud), statistical tools
- ✓ data mining as potential process
- ✓ enhancing standardized reports to serve relevant markets, to raise efficiency in analysis forms
- ✓ to benefit from data (“to coax treasures”)
  
- ✓ data quality has to be improved (hospitalization information are missing) to find correlations
- ✓ this has to be solved in negotiations to develop ways of data providing and streaming and to keep to contracts
  
- ✓ important to get an overview of all relevant ratios of target fields
  
- ✓ more analytical and explorative tools. The analysis way between standardized and analysis tool has to be improved and enhanced! Overall on a high level.
  
- ✓ Breakeven analysis/ marginal costing should be integrated in DWH but data security plays a crucial role here
  
- ✓ A long-termed prediction and planning model for costs, contribution revenues, pensions, medical service etc.). A respective benefit cannot be seen currently.
  
- ✓ Clearly structured reports with relevant ratios and high-performance dashboards
  
- ✓ It would be optimal to have an ad-hoc BI instrument to highlight several situations with graphics, visualizations and scenarios to “play”

**Q25: What service and support is required to use reports in this process?**

- ✓ to be in pilot with mobile reporting (iPad solutions for top management)
- ✓ to improve dashboard processes
  
- ✓ to increase data affinity with the help of technical and consulting support
- ✓ “keep it simple”, no abstract definitions or explanations, “sell and communicate” reports
  
- ✓ Support if derivations are not be seen by management -> deeper analysis but sometimes impulse is missing from management accounting as well as respective business division
  
- ✓ Trainings for data contents and structures are relevant to gain analysis and interpretation confidence which helps to develop practical measurements and activities.

- ✓ Findings and knowledge have to be derived from data analysis and therefore a prediction model has to be developed
- ✓ Enhancement of DWH and an established technical infrastructure
- ✓ For health care management it would be appropriate to have an implemented user-optimized platform which can be served with only less technical know-how to create developments, trends and individual graphics (Cognos Workspace has to be checked for this purpose?)

**Q26: Miscellaneous remarks and ideas relating to these research questions – please answer the research question!**

- ✓ yes! Decision-making support through BI deployment but BI does not substitute managerial decisions. Customer satisfactions have to be matched.
- ✓ AOKN is on the way to make its processes transparent: to define explicit ratios together with business divisions to identify the needs. A leading ratio for all processes has to be developed to enhance and control respective rate trends.

**RQ3: Can functions and solutions be added to current BI technologies and tools to enhance their performances for end users and top management to gain capability?**

**Q27: What do you know about competitive advantage and capability (in general)?**

- ✓ having such a BI system germane performance should be available
- ✓ generating extensive analysis in a fast way does not gain competitive advantages automatically
- ✓ it is crucial to have a completed BI system presenting reliable data and information
- ✓ a cohesive whole overview will be necessary to minimize the uncertainty of an important decision but make a decision on a reliable basis -> As a starting point there will be X customers to "control" them into corporate programs and to control respective budget
- ✓ competitive advantages if the company has a better product and service than competitors and its customers are well-informed about company offers
- ✓ fast and rapid access on relevant data for valid decision-making
- ✓ to make information available earlier and more reliable to company
- ✓ customers who provide data in negotiations across-the-board (health insurance market in Germany)
- ✓ big market share in Lower-Saxony
- ✓ regional presence, local and cultural mentality
- ✓ political influences on care provider to identify and contact relevant patients
- ✓ financial stability to invest in strategic target fields (health care)
- ✓ image and brand relevant to politics and care provider
- ✓ relevant question: how extensive is a basis for decision? Other health insurance companies gave feedback to AOKN's information system that all data were consequently integrated in DWH to create short-termed decision phases (abnormality to activity)! What reaction times do AOKN have? -> minimize!
- ✓ To know own processes

- ✓ To exploit financial and benefit frameworks
- ✓ To offer good service
- ✓ Similar basis for data -> building up professional and political knowledge and competencies -> AOKN is premium contact person, AOKN knows "what is going on"!
  
- ✓ Just focus on management: keep it simple and it can be simple. There was an article on Harvard Business manager that describes management as simple as playing frisbee. The game requires two unlimited variable factors: the flight path of the frisbee and the movements and activities of the catcher. How will people or playing dogs master this challenge without generating big data?! They will use a simple method: they move so that they constantly keep an eye on the frisbee (Denning, 2013). Therefore data and a performant BI system is not the whole truth but they can support management in a germane way!
  
- ✓ Characterized by unique selling propositions or essential corporate highlights. Enterprise size and therefore buyer power alone mean competitive advantage.
  
- ✓ It would be an ideal case to implement a difficult-reproducible scope for actions. "AOK – Die Gesundheitskasse" has been proved of value. Effects and customer perception of small but professional things and consultations makes the difference in the competition. Image is a crucial factor, TK is a good example to present smaller internal processes as good offer for customers. Daily sickness benefit coaching is nothing else than a case management.

**Q28: What do you think about the competitive situation of AOKN in certain strategic fields?**

- ✓ AOKN is in a good financial situation but entire competitive situation is not unique to assess. AOKN is market leader in Lower-Saxony but number of customers is decreasing.
- ✓ In the context of health care AOKN is in a well situation because of its size
- ✓ Internal resources can be improved because there is a lack of identification and solidarity (in some divisions)
  
- ✓ Strong competitive environment (TK, Barmer etc.) therefore increasing importance of competitiveness
  
- ✓ Distribution division will be optimized because questions arose why so many cancellations? Bad image. Focus on relevant fields.
  
- ✓ Because of corporate size the current competitive situation is good -> helpful for contract management/ conclusions with different provider
  
- ✓ Information basis good. Company can see fast developments in number of cases or interdependencies to initiate activities in control circuits.
- ✓ How can AOKN succeed in foreseeing valuable developments in health benefit markets perspectively? Field with potentials but costs has to be considered here as well.
  
- ✓ Better image than five years ago, financial stability, modern company providing services -> CIP
  
- ✓ Through innovative health care programs AOKN can generate competitive advantages
  
- ✓ It is an ambivalent picture because a great product portfolio has to be considered against increasing cancellation rates of members. Simple benefits are not being sold germane and even the behavior towards customers often seems not to be appropriate. It does not have to be the big bang in product development but simple things and good service should be non-

bureaucratic. This has to be filled with life!

**Q29: What requirements do BI reports have to have to generate competitive advantage and capability (data sources, big data structures, aggregate data structures, special functions etc.)?**

- ✓ So called PowerPlay Cubes for aggregate data analysis opportunities, doctor-focused view on quarter level
- ✓ Be flexible for a multifaceted use, standardization and automation
- ✓ To have the ability to handle big data and just to answer relevant corporate questions
- ✓ Trends and developments of regions and whole AOKN of different previous decades are important -> the visualization of these trends should be focused to "read and understand" the current situation!
- ✓ BI useful to control business processes (distribution, develop health care programs) and to create transparency and control opportunities to keep processes for the purpose of competitiveness. Implementation of disclosure management for efficient and integrative report development.
- ✓ No self-satisfaction because it is a fast moving business. Critical assessments of market developments. Which benefit can be seen by developing predictive analysis forms? Enhancing BI constantly.
- ✓ All data, functions and opportunities have to be integrated into one cockpit ("dashboard") with all relevant screens, ratios and trends of AOKN! A cockpit like on a plane where the left wing cannot be disregarded. Internal service, distribution and market have to be overviewed and integrated. A potential weakness has to be compensated by a strength respectively the weakness has to be improved! -> "the processes have to be known"
- ✓ BI applications have to handle big and manifold data structures (size and performance). Simple handling.
- ✓ Reporting for supporting of trends or even refusals and information of products and markets should be implemented. Where are bad customer values and many refusals etc. to make the negative benefit sale and internal processes transparent. Registrations and reference values have to be confronted.

**Q30: The focus is on end users ("don't lose them!"). What about strengthening multidimensional analysis options? Are these aggregated data structures a good basis for decision-making and therefore strategy development through top management?**

- ✓ a cultural change through BI applications: an executive manager gets the opportunity to achieve goals and to lead a constructive and creative leadership dialog
- ✓ standards have to be defined and implemented that have to be determined in short-term
- ✓ observations of market developments
- ✓ predeterminations of reports are well-implemented but all different ratios and requirements cannot be predetermined in reporting
- ✓ to a very large degree it is balanced. Preliminary analysis and calculations have to be forced. Predeterminations and support from management accounting is relevant not to lose end

users.

- ✓ End user should be able to answer hypothesis driven questions but analysis end not in themselves
- ✓ AOKN just has started with individual multidimensional analysis, deficits in technical and analytical understanding and conclusions
- ✓ End user can use aggregate data models (data cubes) in Analysis Studio and in some case the opportunity to “drill-down” to individual data files.
- ✓ Be careful not leave BI end users alone with BI applications but also regulations and restrictions can also have disadvantages

**Q31: Can knowledge building of analytical skills to understand and use analytics (“keeping up with the quants”) be a fundamental solution?**

- ✓ Knowledge build-up can be an advantage in some divisions
- ✓ Analytical understand can be helpful for end users but through dashboards the navigation and analysis way will be predetermined for users
- ✓ The more complexity of tasks the more qualitative characteristics of analysis
- ✓ Building up abilities for end users to tap full BI benefit potentials (develop codes of Cognos BI and even Panoratio practice!)
- ✓ Not necessary
- ✓ Yes, in a way supporting
- ✓ Yes but not with the help of “front” trainings but with trainings on the job. To approach queries and questions with BI, to lower resistances and to motivate
- ✓ Yes for sure
- ✓ To build up for specific employee groups in a superficial but even detailed manner

**Q32: How can deployment in business departments and certain management levels be increased and sensitized to force “win-win-situations”?**

- ✓ most BI benefits will currently be generated in the head office and its business divisions which have different tasks of results control than “local” divisions in Lower-Saxony.
- ✓ but there is no implemented and appropriate management accounting life cycle. The awareness of a flexible leadership dialog is missing and has to be forced. The current understanding of employees is available only because of the demands of their executive manager (evolved over decades)
- ✓ the benefits have to be presented, perhaps after a previous job analysis
- ✓ through management accounting organization answers and demands of top management will be answered in short-term
- ✓ during control circuits BI applications should be used “live” to answer questions directly with



dashboards. Increasing acceptance and “familiarization effects”. Top management has to exemplify BI use!

- ✓ The understanding and drive to present reports or dashboards “live” in a meeting should be forced (raise concerns over system ability and running). To be sure what you want to do and see, know the data, ratios and different dimensions to increase BI system familiarity and confidence
- ✓ Further generating ratios can be helpful and conducted well with a dashboard
- ✓ Yes! Trainings for business manager to guarantee and enhance objectives and measurements
- ✓ Support in visualized illustrations and driver tree logics
- ✓ To demonstrate and exemplify benefits and opportunities of BI applications (it is “your and our” tool)
- ✓ Simply useful and high-performance information systems are fundamental requirements
- ✓ Benefits have to be noticed for the individual daily work and how is the implementation process in AOKN? Leadership processes have to be focused on this situation to evaluate objectives and reporting during a period

**Q33: What are the expectations (and evaluations) of current and potential functions? Do we have to change perspectives with the aim to offer additional benefits and to find out what customers really want?**

- ✓ Perspectives have to review but internal resources and customer perspective are of equal value
- ✓ Both perspectives have to be balanced – what do business divisions need to work and control results? BI applications and its functions should be exhausted.
- ✓ Aim: to put workflows on processes where ratios can be checked or questions can be asked
- ✓ Active reports for mobile reporting will be checked currently
- ✓ Business manager will be provided with information so that market demands can be formulated locally. Management accounting orients its strategic planning towards these demands again.
- ✓ Force customer contacts and to explain the customers AOKN’s products and benefits, to take complaint management seriously
- ✓ Of course, AOKN controls with BI! It is an appliance to get processes under control. AOKN should not become set on BI system but initiate benefit offensive as a reaction on market developments and to control the company in this way.
- ✓ Using Identified data patterns and to coax data treasures. In small projects different and new analysis ways can be examined and then evaluated. Benefits for AOKN? Positive experiences through these projects?
- ✓ BI brings the ability to develop group-related strategies in order to initiate appropriate activities, dashboards are here a germane tool again

- ✓ In previous decade such comprehensive data structures and analysis opportunities were not available. However performances of some applications and therefore the acceptance have to be improved (i.e. dashboards, can alternatives of visualizations be useful here?).
- ✓ Developing scenarios will be essential to make relevant decisions for specific health care contracts. It would be helpful to develop such scenarios on the basis of dummy ratios and to conduct evaluations with the help of statistical approaches.

**Q34: Can an organization “relaunch” be useful to abolish rules or certain authorities?**

- ✓ organizational adjustments are not necessary at the moment
- ✓ a question of mentality to use BI, process will be enhanced through people who has to force their individual creativity to achieve their goals which also helps business management as well.
- ✓ The important questions are: can each employee develop a critical professional reflection? Can each involved employee handle with BI and hold a serious and creative leadership dialog to generate and transfer knowledge?
- ✓ Professional and data driven knowledge and decisions have come together for a fruitful exchange to identify relevant message (force analytical abilities)
- ✓ To minimize scope for management (worst and best case) to state and decide more precisely
- ✓ Continuously check of optimizing opportunities because rules, scopes and customer demands are changing
- ✓ Data security purposeful
- ✓ At first it was a subjective limitation of individual data analysis and provision (“data are missing now”). Now it is too early adjust management accounting organization because BI has been used since 2009.
- ✓ CIP, capable of acting but optimization indigent
- ✓ Well-implemented network with business divisions. It is necessary to understand which relevant questions and challenges exist in the business divisions. Consequent communication and transfer of BI products to business divisions is also important
- ✓ Because of “new” created transparency unnecessary and ineffective activities will be identified and adjusted/ abolished.
- ✓ No, IT has to follow organization and business strategy

**Q35: Which analysis alternatives (f.i. Panoratio, SPSS Modeler/ Statistics) can be enhanced to handle unstructured data?**

- ✓ Panoratio, SPSS, data mining -> BI is Business Analytics in this context
- ✓ Predictive approaches, interpretation of data is relevant but the assessment of a cancellation rate rests with the analyst himself -> qualitative assessments
- ✓ Scenario and reference analysis
- ✓ To find correlations for likelihood of cancellation or to identify excellences for care provider
- ✓ Professional know how limitations -> statistic employees helpful
- ✓ Explicit recruit an employee for distribution optimization to gain and transfer background knowledge

- ✓ Rather additional points: which tools will be needed for which purposes in future? PureData techniques with BO, an analysis and information process chain is worthwhile (data mining, reporting, explorative analysis), how about consolidation activities? Currently the financial prediction will be implemented in Cognos.
- ✓ Too much innovation is not appropriate. Current BI applications and solutions should be enhanced and certain learning phases must be developed for amounts of data. With results of pilot projects this learning processes should be supported.

**Q36: What do think about data scientists? Is it necessary to develop data algorithms?**

- ✓ Data are relevant but that's not all
- ✓ Mathematicians search for data patterns with the help of algorithm
- ✓ Task will be fulfilled by management accounting employees currently – try to find treasures and correlations in the data structures (especially health care management in ambulant or stationary care)
- ✓ Trend analysis will get more relevance, to develop scenarios on past data to make valuable decisions
- ✓ Early measurements and reactions necessary in an early-warning system
- ✓ Yes necessary but AOKN also needs know how for respective statistical interpretations
- ✓ Is it exaggerated? What are the health insurance market requirements? Trends or opportunities are not allowed to be missed or “slept away”. New challenges can be organized in project structure before manifested in AOKN organization. Can positive experiences from AOK nationwide system be a basis for further developments?
- ✓ Yes, AOKN does not coax all data treasures and correlations -> cancellation rate in daily sickness benefit field is almost as high as the official rate. Finding: a cancellation does not depend on the receipt of daily sickness benefit. Such correlations have to be forced which can be made through BI applications deployment (f.i. BI package). Business divisions fear of transparency. Management accounting is not the “problem” but business management and its BI system use. Here again management accounting as moderator that forces the communication process between all involved divisions.
- ✓ Future-oriented jobs of data scientists are necessary because of increasing amounts and diversity of data
- ✓ To make it on AOKN's own vs. temporary make-or-buy decisions have to be critically balanced continuously. External data bases and professional expertise have been bought to measure the likelihood of hospitalization in a case management project, for instance.

**Q37: Miscellaneous remarks and/ or ideas relating to these research questions?**

- ✓ Yes
- ✓ The involved employees have to be sensitized and taken on the BI ride to raise acceptance. The management accounting has to support, ask and help continuously. “What's the matter?” Management accounting has produced seven BI Cognos video podcasts with introduction to BI analysis, reporting, functions and assistances. These podcasts were very popular and should be

continued with support for generating report versions or report mailing functions etc.

*Appendix Table 8: raw German interview material (researcher transcription)*

**01: pilot interview**

1. Verbindung und Verwendung von Daten
2. Cognos (Reporterstellung, Berichtsansichten für Management, TM1 für Planung, Prognose)
3. Controller f. operatives Controlling, Berichtserstellung
4. Als Anwender: Schnelligkeit im Vergleich zu Office-Produkten z.B., Bedienung, nicht so techniklastig, für die AOKN Schnelligkeit der Datenverfügbarkeit, Informationen können zeitnah ausgewertet werden, strukturiert
5. Grds. alles verfügbar, Datenbereitstellung, verspätete Aktualisierung hindert schnelle operative Steuerung, der Prozesskomplexität und unterschiedlichen Datenstruktur geschuldet
6. Kurzer Draht, in diesem Beispiel hat User selber Zugang zu Report Studio
7. Bei wenig Betrieb grds. schnell, bei Wochenanfang und Datenaktualisierung kann es schonmal langsamer laufen
8. Alle Sichten: Einzel- und aggregierte Sichten, Versicherten- und Arztsicht, Diagnosen etc. im Controlling gesamter Zugriff
9. DWH, Source-DB, über die Datenbank haben wir gesamten Zugriff, ansonsten besteht hier kurzer Weg zu den Entwicklern, um ggf. direkt in den Quelldaten zu schauen
10. JA
11. Programmkenntnisse, ggf. Formeln, Grundverständnis von Teilkompetenzen: logisches Denken, systematisch-methodisches Vorgehen, um einen Bericht aufzubauen (Join, Anpassung oder Modellierung von Daten, um gewünschte Informationen oder Sichten darzustellen)
12. Bestimmte Attribute auswählen und anschauen, um Vogelperspektive zu entwickeln und dann Schritt für Schritt tiefer einzusteigen – Treiberbaumlogik, ökonomisches Modell
13. Cognos-Schulung für Report Studio, grds. System und Analyseoptionen, dann nochmal Expertenschulung (Filterkriterien, Berechnungslogiken, Entwickeln von Kennzahlen (Case-Anweisungen) – bei Problemen in der täglichen Arbeit stehen mehrere Experten zur Verfügung, die originär keine Handlungsfelder verantworten
14. Hohe Qualität, weil grds. alles abgebildet werden kann (Kennzahlen, Treiberbaum), durchschn. 2 Tage für Fachbericht in Cognos, vorausgesetzt das Fachkonzept und die Erfassungsstandards sind im Vorfeld definiert und abgestimmt, Aufwand ist allerdings unterschiedlich, Ziel und Konzept muss vorher definiert werden
15. Operative Berichte zur Akquisearbeitentwicklung, bei Evaluation jedoch kann eine Strategie entwickelt werden
16. Betriebswirtschaftliche Berater, in einigen HF machen wir es, in anderen HF laufen wir noch hinterher und spielen den Dienstleister zur Auswertungen oder Berichte bauen, Informationssysteme, Markt/ Vertrieb, Krankengeld wird gut gesteuert (z.B. Kaskadenmodell)
17. Skala: 6 – in einigen Bereichen ja, aber in anderen Bereichen wird nicht aktiv gesteuert, liegt nicht an BI, sondern ggf. auch an Konzeption und Akzeptanz
18. ---
19. Strategieprozess: vorhanden, aber nicht präsent und nicht bekannt, ob und wie durchgeführt, aber z.B. Versorgungsstrategie, Versorgerkasse bekannt – Bsp. VM: inkonsequente Umsetzung von Verträgen
20. Transparenz der Strategieentwicklung steigern und besser kommunizieren, grds. über Vorstand und dann über einzelne UBs
21. Kommunikation der Balanced Scorecard, welche Strategien werden in den einzelnen HF verfolgt?

22. Keine klare Abgrenzung in den Controllingtätigkeiten erkennbar, zwar „operatives“ Controlling, trotzdem wird hier Evaluation HI durchgeführt, was strategische Komponenten enthält
23. JA, „Data to decision“, bspw. finanzielle Stabilität, Finanzprognose, Markteingriff möglich
24. Weiterentwicklung Dashboards, genauer Überblick fehlt jedoch, schnelle Information für Management
25. Schulung Dashboards zur Erstellung und Pflege, die von einem MA durchgeführt wurden, User brauchen keine große Schulung, da interaktive Navigation möglich ist
26. Ja, können genutzt werden, werden noch nicht effektiv und verständnisvoll genutzt
27. Anreize für Versicherten, bspw. Prämien oder (Satzungsmehr-)leistungen abhängig je Zielgruppen Kinder, Familien, ältere Menschen, Kurse
28. FS: bedingter Vorteil, weil keine Prämienausschüttung, aber wir brauchen keinen Zusatzbeitrag erheben / KM: Wettbewerbsvorteile bei Verhandlungen ggü. KV, Geschäftsstellennetz ist flächendeckend, Schulservice / Versorgung: Verhandlungsposition ggü. Vertragspartner, VM über Größe bevorteilt, Versorgung kann breit aufgestellt werden / IR: durch Kassengröße kann Verwaltung effektiv erfolgen, Fachabteilungen bedingen effektiver Ressourceneinsatz
29. Panoratio zwecks analytische Optionen, um schnell Entscheidungen zu treffen, Kündigungswahrscheinlichkeiten ermitteln etc., Datenquellen grds. alle vorhanden, nur Zugriff und konsequente Nutzung sollte geprüft werden
30. Akzeptanz kann durch Schnelligkeit von Analysen erhöht werden, multidimensionale Analysen wären hier prädestiniert, mit den Nutzern sinnvolle Schulungen, aktive Einbindung Controlling in Steuerkreisen etc.
31. Förderung von analytischen Fähigkeit durch aktive Nutzung und Unterstützung durch UB Controlling, Erläuterung und Verständnis von Kernkennzahlen
32. Siehe Antworten 30 und 31, KLAGs mit Mitarbeitern (UB-Leiter, Führungskräfte), Berichtsansichten und Konzepte transparent gestalten
33. Ausrichtung BI-Systeme auf AOK-Kundensicht, Bedürfnisse herausfinden und dann definieren/ beurteilen, ob die technische Umsetzung erfolgen kann – Bsp. AOK-Pluspunkt
34. ---
35. SPSS Modeler forcieren, externer Dienstleister „Data to decision“ und deren technisches und softes Know-how nutzen und einkaufen, um sich selbst weiterzuentwickeln
36. Ja, weil dadurch pot. HF erkannt werden können, die Daten und Algorithmen entscheiden, wo Gewinne und Synergien geschöpft werden können. Potenziale und Entwicklungsfelder erkennen!
37. Ja, Alternativen wurden aufgezeigt und diese können dazu führen, Wettbewerbsvorteile zu erhöhen! BI is not the end, muss nur abgewägt werden, tiefer in Kosten-Nutzen-Analyse einzusteigen, lohnt es sich, das bestehenden System beibehalten oder gar zu erweitern, sollen wir investieren?

**Protocol: YES**

**Audio recorded: NO**

## **02: authorized agent to CEO and manager of corporate development division**

1. „Intelligentes Business“ soll Möglichkeiten schaffen, gute Kundenlösungen zu finden unter der GKV-Prämisse der Wirtschaftlichkeit! Vergleich mit Porsche – gute Kundenlösung, da sich der 911er seit 10 Jahren gut verkauft! Das Bedürfnis von Krankenkassenkunden ist nicht limitiert, sodass „Neubildungen“ immer versorgt werden sollten, es kommt jetzt verstärkt, dass sich die Nachfrage über das Angebot informiert! Mit dem informierten Patienten muss sensibel mit umgegangen werden, kritisch muss die Gesundheit als Produktionsprozess/ Heilungsprozess gesehen werden = BI muss datengetrieben Antworten geben

2. Die Daten, die wir haben und verwenden, KÖNNEN auch wirklich verwendet werden (auch Verknüpfungen aus mehreren Datenquellen und -töpfen, Routinedaten sind allerdings begrenzt! Bspw. erhalten wir die Ärztedaten 1 Jahr zu spät (aktuell Juli 2013 -> Daten bis zum 3. Quartal 2012) – Im Gegensatz dazu wird ein Porsche in einer Prozesskette produziert – nach der Produktion muss Porsche nochmal gecheckt werden etc. - Wir in der GKV sehen allerdings nicht, in welchem Zustand der Patient ein Krankenhaus verlässt! Es sollten die richtigen Informationen vor, während und nach seiner Behandlung vorliegen und auch entsprechende Infos an den Patienten gegeben werden (welches Krankenhaus in seiner Nähe ist am effektivsten und besten?) Wie hat der Patient die Leistungen empfangen, empfunden, ist er informiert? Subjektive Einschätzungen fehlen! Diese Daten haben wir einfach nicht!! Autohändler haben Prozess besser im Griff aufgrund Erscheinungstermine in meinem Autohaus! 500 neue Kunden habe ich dazugewonnen! GKV: Beschwerden, NKB, Testkäufe liefern nicht Infos über eingekaufte Leistungen beim Arzt!

3. ----

4. Vorteile, um im Gegensatz zum standardisierten Bericht die zweite und dritte Frage zu beantworten! Standardberichte sind fix und beantworten Kennzahlen und Steuerungsprozess – BI an sich für Dialog gut!! Navigationsbereich gut! Fokussiert mehr Blick auf Daten!

5. Nicht schlecht, nochmal 2-3 Schleifen zu drehen, um „Verführungen“ des Ganzen zu entgehen. Daten und Verknüpfungen sind nur ein Teil der Wahrheit!

6. bis 12.: wenn ich die relevanten Standardkennzahlen verlasse, die mit Rot und Grün behaftet sind und mir auf diese Weise meinen aktuellen Stand vermitteln, wird es zunächst schwer, weitere steuerungsrelevante Informationen zu generieren – Bsp. EiSi – Krebspräparat bei Kindern auffällig, da für Warzenbehandlung benötigt! Am Ende so eine Analytik, den Raum verlassen, den Kopf frei bekommen und danach einfach nochmal draufschauen – habe ich Nullen oder Einsen gesucht! Schau zu dem Medikament, welche Neben-/Begleitdiagnosen sind vorhanden!!

13. Trainings und Begleitung vor Ort sind sinnvoll, Fertigkeiten VL -> die haben ihre Steuerungsassistenten!! Kaskadenmodelle forcieren so wie Krankengeld! – Bericht A ist oberflächlicher als Bericht B!

14. bis 18.: Skala 10 für UE-Bereich! Wir schließen ohne Analysen auch keine Verträge mehr ab! Am Ende ist es immer noch unternehmerische Freiheit, Entscheidungen trotz Analysen zu treffen. BI kann nur wahrhaftig die Vergangenheit zeigen! Auch Prädiktionsmodelle können nur aufgrund von Vergangenheitsdaten funktionieren! Umzüge in andere Regionen von depressiven Menschen kann kein Modell präsentieren! – wo viele Therapeuten sind, sind auch Depressive!

19. bis 23.: es gibt keinen Strategieentwicklungsprozess, unsere Strategie wird als „first follower“ bezeichnet, was auch aus der finanziellen Situation heraus geschuldet ist! Depression ist strategiegetriebenes Versorgungsmodell, gutes Angebot (geringere Wartezeiten) für Versicherte! Auf der anderen Seite müssen allerdings auch finanzielle Generierungen für AOKN erfolgen! Im Rahmen der Produktentwicklung werden alle strategischen Zielfelder mit berücksichtigt! Aber nicht: wir haben eine Strategie oder strategische Zielfelder und daraus entwickeln wir bspw. ein VM- Modell! Das Produkt hat sich entlang der Strategie entwickelt – Bottom-up-Strategie!? Das Zielbild reicht an der Stelle aus! Geschäft ist wenig manövrierfähig! Selbst wenn ich ´ne super Produktidee habe, kann ich keine Finanzierung generieren, wo soll das Geld herkommen? Aus der Gemengelage ist der Preis der Markttreiber!!! Zwar Versichertenentwicklung jedes Jahr rückläufig zwischen -0,5 und 1,5%, aber die KKH verliert mit Erhebung Zusatzbeitrag auf einen Schlag 5% ihrer Versicherten!

24. bis 26.: Träumerei auf Bundesebene: Soziale Medien nutzen! Bsp. Zalando oder Google – Kundenbedürfnisse noch stärker verstehen, Arztbewertungen forcieren, Kundenperspektiven demnach berücksichtigen -> Artikel aus HBM: Die Krise des Marketings kann sich auch auf die AOKN niederschlagen – marktorientierte Unternehmensführung von Meffert und Kotler zitieren! Darauf dann mit Informationssystem reagieren und entsprechende Analysen fahren! „Zu dem Arzt nicht gehen, der ist nicht gut!“ Grenze von Wissen und Daten ist langsam erreicht, aber dann

haben wir wenigstens auf der anderen Seite für den Versicherten was geschaffen, Tool/ Modul, damit er Optionen hat, Informationen sollten in unser Geschäft mit einbezogen werden – selektiv ist selektiv und darunter ist kein Qualitätsvertrag möglich! Nicht nur unsere vorrätigen Daten, sondern auch Daten des Versicherten bspw. über seinen Behandlungsverlauf widerspiegeln. ENTSCHEIDUNGSUNTERSTÜTZUNG DURCH BI, aber es ersetzt nicht die Entscheidung! SUV Sport Utility Vehicle des VW Golf (ein PKW mit einem einer Limousine ähnlichen Fahrkomfort), das kam 15 Jahre zu früh! Kundenbedürfnisse müssen getroffen werden!

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27. bis 29.: zunächst: wenn ich so ein System habe, sollte Performance vorhanden sein! „Heute Abend will ich ein Tarif voll auskalkuliert haben, damit und auf diese Weise generiere ich ja erstmal keine Wettbewerbsvorteile!“ Entscheidend ist aber, dass ich ein vollständiges BI-System habe, das mir zwar die Vergangenheit zeigt, aber bitte auch vollständig. Brauche genaues Bild, eine Entscheidung fällt immer unter Unsicherheit, aber blöd ist, wenn Blick auf die Vergangenheit auch schon unsicher ist! Unsicherheiten minimieren, Entscheidungen auf einer gesicherten Basis fällen zu können!! Ausgangspunkt sind dann X Versicherte, um Verhandlungen über Budget zu führen zu können! Nicht wie Schizo, dass falsch strukturierte Versicherte in der Hochlaufplanung gesteuert werden!

30. bis 31.: ich führe Ziele ein, ich baue ein Controlling daneben! Kulturwandel durch BI: gib mir als Führungskraft die Möglichkeit, meine Ziele zu erreichen aber gib mir auch die Option, verlässlich zu sehen, wo ich verlässlich im Controllingregelkreis genau stehe!

32. bis 33.: der größte Nutzen durch BI wird immer noch hier in der UE generiert, die aber auch einen anderen Auftrag zur Steuerung haben. Regional: FIS-Krankengeld / FIS Markt, wir entscheiden jetzt so, weil sie das Wissen nicht haben oder weil sie irgendetwas gehört haben – es entsteht kein richtiger Steuerungskreislauf! Führungsverständnis aus dem öffentlichen Verständnis – GF hat das Sagen und reden auch nur in Meetings!! Kreativer Prozess muss entstehen, wo alle involvierten End User beteiligt sind und steuerungsrelevant eingreifen sollen! Der aktuelle Führungs- und Steuerungsprozess ist nach wie vor von hierarchischen Dogmatismen der Vergangenheit geprägt.

34. Organisation sollte allerdings nicht verändert werden, denn es ist zum großen Teil eine Mentalitätsfrage wie mit dem BI-Umgang vorangeschritten wird! Der Steuerungsprozess wird nach wie vor von „Menschen gestaltet“, der Mensch ist von Grund auf gut! Es liegt also in der Kreativität des Einzelnen, wie er es schafft, seine Ziele zu erreichen und entsprechende individuelle Analysen aufzubauen, die der Führungsebene weiterhilft! Die generelle Frage: ist der Mensch als solches fähig, sich selbst zu reflektieren? Wie gehe ich selber mit BI um und wie führe ich künftig einen Führungsdialog?? „Schärferes Schwert“ der Führungskräfte, aber auch die Chance, einen viel ehrlicheren Führungsprozess zu entwickeln! Wir haben jetzt die Chance, aus dem Führungsprozess einen kreativeren Prozess zu machen, um Wissen zu generieren! Oder aber wir zerschlagen viel Porzellan, das kann auch die Kehrseite der Medaille sein!

35. bis 37.: Bsp. wieder Krebspräparat: durch das Auffinden der entsprechenden Daten und an sich logischen Abfolge im BI-System entsteht noch kein Wert an sich! Am Ende muss wieder Jemand her, der sich mit den Daten auskennt, das Produkt und die strategischen Zielfelder im Blick hat – aus der Datenwerkstatt das Wesentliche erkennen. Dieser Jemand geht aber grds. wiederum in die Daten rein. Es gibt daher fachliche und datengetriebene Hypothesen und an irgendeiner Stelle müssen sie zueinander kommen. Ergebnisloses Data Mining kann jeder und X Auffälligkeiten feststellen! Wie kann Mortalität gesenkt werden? Gar nicht!! DMP-Programme! „Müssen wir wirklich alle Depressiven behandeln?“

In dem Sinne: (BI) ist unerlässlich, weil Entscheidungen zu wichtig sind, als sie dem Zufall zu überlassen! Aber auf der anderen Seite das Bewusstsein entwickeln, was und worüber man gerade entscheidet! Explorativ mit Panoratio einfach mal spielen zu können, um Verhandlungspotenziale zu simulieren. System muss vorhanden sein, um mein Geschäft zu verstehen! Keiner weiß bei 50 € Zuschlag je Depressivsituation beim Arzt, was da noch passieren

kann! Kombination Einnahmesicherung und Ausgabenkalkulation sowie Simulation von Schritten macht Vorteile erkennbar! Spielraum für Entscheidungen durch Management wird dadurch kleiner und somit präziser! Best- und Worst-Case-Spanne wird eingedämmt und kleiner – GKV-Korridor ist relativ klein! Finanzierung und Politik spielen Rolle! Andere Branchen sind da nicht so von betroffen, McDonald's bringt einen nicht erfolgreichen Burger, aber die Leute kaufen dafür dann trotzdem was anderes, falls er ihnen vor Ort dann nicht schmeckt Hier in der AOKN: bei Inko oder HzV muss Produkt „sitzen“ und Entscheidung fundiert datengetreu formuliert werden!! Wiederum die Schleifen drehen, um gewissenhaft vernünftig kreativ und vertrauensvoll die dann auch richtigen Entscheidungen zu treffen!!

**Protocol: YES**

**Audio recorded: NO**

### **03: marketing director**

Zu 1.)

Wie komme ich wiederkehrend an die wichtigsten Kennzahlen in meinem Unternehmen.

Zu 2.)

Ich nutze in erster Linie IBM Cognos zur Schaffung einer Transparenz in meinem Verantwortungsbereich

(Aktivitäten, Ergebnisse, Kennzahlen) bzw. zur weiteren Steuerung meiner Mitarbeiter.

Zu 3.)

Die Nutzung ist unter Punkt 2 angegeben. Ich bin ein Nutzer von IBM Cognos, bereite bestimmte Zahlenwerke aber weiter auf.

Zu 4.)

Die Ergebnisse werden mir wöchentlich aktualisiert zur Verfügung gestellt, insofern erfahre ich persönlich

eine Zeitersparnis. Die Werkzeuge erleichtern den Führungskräften vor Ort, aber auch der AOKN insgesamt, die Steuerung der Mitarbeiter und des Unternehmens. Entwicklungen werden sichtbar, strategische Entscheidungsgrundlagen entstehen.

Zu 5.)

Datenschutz.

Zu 6.)

Keine Angabe.

Zu 7.)

Keine Angabe.

Zu 8.)

Die Auswertungen, die Ergebnisse & Kennzahlen können in verschiedenen Formaten (z.B. Excel) angezeigt und heruntergeladen werden.

Zu 9.)

Die Verlinkung ist auf dem Rechner voreingestellt. Man kann schnell auf die Daten zugreifen.

Zu 10.)

Die zur Verfügung gestellten Reports werden zum Teil weiterverarbeitet.

Zu 11.)

Microsoft-Office-Kenntnisse sind erforderlich, insbesondere Excel und Access.

Zu 12.)

Der effektive Umgang kann nicht beurteilt werden. Die Weiterverarbeitung wird „nach bestem Wissen und Gewissen“ vorgenommen.

Zu 13.)

Es wurden u.a. externe Schulungen wahrgenommen. Hierbei handelte es sich um die Vermittlung von Basiswissen. Für die Weiterverarbeitung ist der Kenntnisstand ausreichend, sofern ich dies



beurteilen  
kann.

Zu 14.)

Der Aufwand ist überschaubar, wöchentlich ca. 30 – 60 Minuten. Die Qualität ist gut. Die Reports sind für meine regionalen Steuerung absolut hilfreich.

Zu 15.)

Operatives Kennzahlencontrolling.

Zu 16.)

Der Unternehmensbereich Controlling unterstützt, „wo es geht“ und ist absolut positiv zu beurteilen.

Zu 17.)

Ich möchte nicht von Wettbewerbsvorteilen sprechen. Die Reports, Analysen und Kennzahlen sind absolute Grundvoraussetzung für ein zahlenorientiertes Unternehmen.

Skala: 4

Zu 18.)

Keine Angabe.

Zu 19.)

Schwierige Frage, vielleicht auch nicht eindeutig, in Bezug auf BI? Keine Angabe.

Zu 20.)

Die AOKN muss dynamisch bleiben, darf ihren „roten Faden“ trotzdem nicht verlieren. Zu einer möglichen

BI-Strategie kann ich keine Stellung beziehen.

Zu 21.)

Finanzen, Kunde/Markt, Versorgung, Interne Ressourcen. Die Absichten sind in der Appendix Figure

1 dargestellt. Die Vernetzung dieser Themen ist sicherlich die große Herausforderung. Nach meiner

Meinung besteht in dem Strategiefeld interne Ressourcen stärkerer Handlungsbedarf. Es fehlt zum

Teil an Identifikation mit dem Unternehmen, mit der AOK. Mitarbeitergruppen „ruhen sich auf ihren

Lorbeeren aus“, es fehlt an Begeisterungsfähigkeit. Das Verhalten lähmt das Unternehmen.

Zu 22.)

Das operative Controlling findet in den 17 Regionen der AOKN statt: Regionaldirektoren, Steuerungsassistenten

& Bereichsleiter. Das strategische Controlling obliegt der Direktion, Standort Hannover.

Die Regionen werden kaum beteiligt, lediglich informiert.

Zu 23.)

Ja, denn der Mensch verlässt sich auf die Fakten.

Zu 24.)

Die Unternehmensstrategie muss „bis zum letzten Mitarbeiter“ transparent und nachvollziehbar kommuniziert werden, das schafft Identifikation.

Zu 25.)

Keine Angabe.

Zu 26.)

Ja.

Zu 27.)

Von Wettbewerbsvorteilen spreche ich, wenn das Unternehmen ein besseres Produkt/eine bessere

Dienstleistung als der Mitbewerber hat und der Verbraucher den Sachverhalt kennt.

Zu 28.)

Die AOKN ist finanziell gut aufgestellt, die Bilanzzahlen der Mitbewerber sind mir nicht bekannt,

insofern

ist die Wettbewerbssituation nicht eindeutig zu beurteilen. Die AOKN ist Marktführer in Niedersachsen,

jedoch ist die KM1 leicht rückläufig. Im Rahmen der Versorgung ist die AOKN aufgrund ihrer Größe sehr gut aufgestellt. Die interne Ressource (Mitarbeiter) ist meiner Meinung nach eine

„Baustelle“, es fehlt an Identifikation und Solidarität (Teilbereiche).

Zu 29.)

Keine Angabe.

Zu 30.)

Keine Angabe.

Zu 31.)

Die fundamentale Lösung stelle ich infrage, aber ein Wissensaufbau wäre in einigen Bereichen sicher

von Vorteil.

Zu 32.)

Der Nutzen müsste dargestellt werden, vielleicht nach einer vorherigen Arbeitsplatzanalyse.

Zu 33.)

Die Betrachtungsweise ist m.E. nicht zu überdenken. Die interne Ressource und der Kunde stehen „gleichwertig Seite an Seite“.

Zu 34.)

Die Organisation muss regelmäßig auf Optimierungsmöglichkeiten überprüft werden. Regeln, Rahmen,

Kundenwünsche ändern sich.

Zu 35.)

Keine Angabe.

Zu 36.)

Daten sind wichtig, aber nicht alles.

Zu 37.)

Nein.

**Protocol: YES**

**Audio recorded: NO**

#### **04: BI consultant (from novem business applications GmbH)**

1. BI Schirmbegriff: Mitarbeiter, die Tools bedienen – Informationen organisieren, Managementperformance und Unterstützung der Entscheidungsfindung sicherstellen

2. IBM Cognos, SAP BO etc., Microsoft BI, qlicview aus open Source entstanden für kleinere Bereiche/ kleinere Unternehmen, oracle – datenbankgetrieben

3. Teamleiter BI für Datenbereitstellung Fachcontroller, Koordination mit UB CO und RZ, welche Version setzen wir ein etc.?

4. Strukturierte Anwendung, ein Toolset für Datenbank, eDB!! DWH – SPOT – Aufbereitung für Entscheidungsfindung einheitlich an einer Stelle, gleiche Ergebnisse validierte Daten an einer Stelle zusammengefließen

5. Weiterentwickeltes System – Datenschutz, pseudonymisierter Versicherter, Herausforderungen

6. BI-Team als Entwickler, Hartmut und Christian als Bindeglied vom Bau zum Report! UB CO ist verantwortlich für gesamte Berichterstellung, End-User haben eher den Controller als „fachlicher“ Ansprechpartner, was forciert werden muss! RiMa, UB Ärzte – aber aggregierte Daten sind vorgegeben im Analysis Studio als Analysetool falls Report nicht komplett ausreichen

7. Performance: durch Netezza haben wir Sprung nach vorne gemacht
  8. Admin-Rechte zwar, aber mit inhaltlichen Fragestellungen wird sich nicht groß beschäftigt
  9. eDB und SAP-BW (amtliche Statistiken), die aber ins DWH integriert werden sollen KJ1, KV45
  10. nur Hilfestellungen bei Langläufern, Reporting als Systemauswertungen
  11. fachliche Fähigkeiten im entsprechenden Fachbereich (Besonderheiten), „Exceldenke“ auf Cognos anwenden
  12. Vorwissen ist aus diversen Unternehmen da!
  13. Vorwissen ist aus diversen Unternehmen da!
  14. Marktfokussiert, qualitativ gut!
  15. Kommt drauf an –
  16. Aus Inhalte gut gesteuert, aber Beratertätigkeit ausweiten – Anfragen vom Management können kurzfristig beantwortet werden
  17. Kunde Markt JA sehr viel! Trotzdem neue Anforderungen aus Kampagnen heraus – Versorgung JA – HR Dashboards stark genutzt! Personalziele, Krankheitsstände – ppg Finanzplanung wird umgestellt für MMB und Planung (ausbaufähig!!!) SKALA: AOKN insgesamt = 8, inhaltlich aber bereits = 10
  18. Nein
- 
19. JEIN, AOKBV liegt davor, IT Strategien werden dort definiert, übergestülpt
  20. Ja, jeder Unternehmensbereich muss für sich selbst eine Strategie entwickeln, auf Basis der gesamten Unternehmensstrategie!! Wie auch VM-Projekte, BI-Strategie macht Sinn, aber aktuell eher zwischen den Stühlen
  21. Unternehmensstrategie! BI-Strategie wird als Unterpunkt gesehen!!
  22. Welche Fragestellungen sollen beantwortet werden? Operatives Controlling (kurzfristig!) – was ist grad gewesen – strategisch – Prognosen/ Entwicklungen
  23. Bereits bei 20 beantwortet!
  24. Thema „predictive Analytics“ forcieren! Verknüpfungen! Ärzte mit Verträgen abgleichen! Betrugsfälle identifizieren? Statistiktools! Data Mining als Potenzial!! Aber auch Standardberichte weiterentwickeln! Markt bedienen! Aus Daten Nutzen ziehen! Effizienz in den Auswertungen steigern! Betrugsfälle!
  25. Welche neue Möglichkeiten? Mobiles Reporting ausrollen! iPad unterstützt mit Daten! Dashboardsansätze verbessern!
  26. JA
- 
27. Schneller Zugriff auf Daten für valide Entscheidungsfindung, Datenerhaltung kurzfristig zu bekommen
  28. Starker Wettbewerb von generell größeren Kassen!
  29. und 30. PowerPlay Cubes für aggregierte Daten – arztzentrierte Sicht auf Quartalsebene!
  31. analytisch denken durch Dashboardsfunktion geben wir Analyse- und Navigationsweg vor! Das dient dem analytischen Denken! Andere Leuten steigen aber direkt in die Daten ein! Förderung ok
  32. solche und solche! Analytische MA, top management würde sich nicht Daten selber aufbereiten! Durch Organisation des Controlling können auch weitere Nachfragen beantwortet werden.
  33. beides! Was brauchen explizit die Fachbereiche, um operativ arbeiten und steuern zu können? Funktionen hat Tool mehr als wir aktuell nutzen! Ziel: Workflow aufsetzen, wo Kennzahlen geprüft werden und Fragen eingestellt werden können! Active Reports werden grad zwecks mobiles Reporting geprüft!
  34. Datenschutz hat Zweck! Das sind alles Herausforderungen, Informationen müssen im guten Austausch erzeugt werden! HR macht viel selber, weil wir keinen Einblick in Personaldaten haben dürfen!

35. Panoratio, SPSS, Data mining -> BI wird in diesem Kontext zu Business Analytics!! Prädiktive Ansätze – Interpretation von Daten ist relevant und wichtig! Die Bewertung einer Kündigungsquote obliegt letztendlich der Person selbst -> qualitative Bewertungen!

36. Mathematiker mit Algorithmen suchen Datenschätze, Aufgaben erfüllen aktuell auch schon grds. die Fachcontroller! Zusammenhänge finden und suchen!

37. JA! Aktuell werden weitere Funktionen geprüft!

**Protocol: YES**

**Audio recorded: YES**

## **05: management accounting employee**

1. Anforderungsgerechte Modulation für das MM Daten zur Entscheidungsfindung von Ziel- bis hin zur Ergebnismessung

2. Cognos zur Nutzung Aufbau Standardberichte und auch zur explorativen Zwecke (wobei eher hier Panoratio) und auch Hilfestellung für Fachbereiche (Kampagnenunterstützung) – Unterstützung der operativen Arbeit

3. Fachcontroller für Ärzte und IV, eher Anwender und Entwickler (ETL) nicht, aber standardisiert Analysen zur Verfügung – aber auch Controlling im Fachbereich Ärzte (HzV, explorative Analysen)

4. Eine zentrale Datenbank (eDB), eine einheitliche Wahrheit im Unternehmen! Früher aus mehreren Datenquellen, die sich aber irgendwie doch unterschieden haben! Standardisierung und Automatisierung von Berichten – einmaliges Aufbauen und dann Aktualisierung laufend

5. Großer aber einmaliger Aufwand zur Berichtserstellung, vorherige Dokumentation, Datenschutzregelungen aber über PSEUDO-Regelung gut gelöst, wobei es immer Möglichkeiten zur Entpseudonymisierung gibt! Große Datenmengen vorhanden und müssen technisch und individuell gehandelt werden – explorative Analysen helfen über Panoratio, Langläufer zu identifizieren und über Data Marts, Zeitscheiben (KVP)

6. Liegt jeweils an Fachbereich – im Ärztebereich gibt es noch nicht so viele Berichte. Es setzt sich noch nicht so gut durch, welche Möglichkeiten es gibt. Es wird noch nicht soviel nachgefragt. Aus Historie gewachsen

7. Seit Netezza deutlich verbessert (Herbst 2012), vorher relationale Daten (Diagnosen, AZM) kaum zu handhaben! Cubes waren auf zu hoher Aggregationsebene, Details fehlten

8. Bereich IV beinhaltet sektorübergreifende Analysen, Handlungsfeld geschuldet, Restriktion bei Zugriff auf ents. Daten

9. DWH als eDB das in einer Appliance Lösung Netezza steht – es sind aber noch nicht alle Daten in der eDB vorhanden (Formblatt3-Daten im Ärztebereich, in ARIADNE kommen neue Felder dazu – wenn operatives System angepasst wird!

10. Ja

11. und 12. Endanwender – Berichtsausführung (Daten schon vorgegeben) // Relative Berichte neu erstellen – tieferes Datenverständnis, welche Daten schaue ich mir an? Fehlerhafter Join wäre gravierend // explorative Analysen – sehr gutes inhaltliches Verständnis der eDB und einzelnen HF

13. Cognos Report Studio, Panoratio – PowerUser bei Fragen ansprechen, ansonsten sind wir aktuell gut aufgestellt, Standards in Schulung sind individuell gut aneigbar

14. aufwendige Berichte versuchen sehr gut, soviel wie möglich Fragestellungen des Endanwenders im Vorfeld zu beantworten. Ist aber für Bereiche nicht durchgängig feststellbar. Dashboard-Systematik wird überarbeitet und das braucht Zeit!

15. und 17 JA!! Berichte sind in ZUSAMMENARBEIT MIT FACHBEREICH erstellt worden SKALA HF bezogen = 8

16. es gibt Bereiche, die sich gut drauf einlassen! BI wird auch als einschränkend gesehen, Überzeugungsarbeit notwendig

19. BI unterstützt gesamten Managementbereich – Entscheidungsfindungen transparent machen

(Zielerreichung etc.) – BI-Bereich unterstützt gesamten Finanzbereich (von der Planung bis zur Zielerreichung)

20. BI muss als interne Ressource angesehen werden, um sämtliche Aufgaben zu erfüllen (selbe Funktion wie Bleistift oder Telefon)

21. nein keine Weiterentwicklung

22. Staffelung op./stra. Controlling vorhanden! Unterschiedlich gelebt. Es ist schon ein Unterschied, jeden Monat nur ein Bericht auszuführen, oder HF mit bewegt! Typenunterschiede in Stellenbeschreibung

23. Data to decision – IV/ Ärztebereich = Verfügbarkeit Problem, Kennzahl muss kurzfristig Entscheidung auslösen, was es aber nicht macht!!

24. Versorgungssicht! Datenqualität verbessern! Einweiserinformationen ins KH fehlen, um Zusammenhänge festzustellen. Teilweise auf Verhandlungswege entscheiden, dass Datenstränge entwickelt werden oder dass auch mal Verträge eingehalten werden

25. großer Teil von MA, die keine große Datenaffinität haben, die muss man an die Hand nehmen und Vorteile verdeutlichen! Solange es abstrakt bleibt, ist es ein Strohfeder! Großer Anteil an Berichten, die aber nicht genutzt werden – neu bewerben und kommunizieren!

26. JA!

27. Informationen früher und verlässlicher dem Unternehmen zur Verfügung stellen. Meine Kunden sind die einzigen, die in Verhandlungsrunden Daten liefern können – bei kassenübergreifenden Verhandlungen

28. keine Angabe!

29. flexibel sein zur vielfältigen Nutzung, Standardisierung und Automatisierung, in der Lage sein, große Datenmengen zu verarbeiten, statistische Funktionen aufweisen! Fragen beantworten!

30. Standards müssen vorhanden sein, die von jedem Endanwendern kurzfristig ermittelbar sind! Marktgeschehen!

31. je komplexer die Aufgabe, desto höher die Qualitätseigenschaften für Analysen. Standards müssen wie gesagt kommuniziert werden! Bei PowerUsern Fähigkeiten aufbauen, um volle Leistungsfähigkeit von BI ausschöpfen zu können! Schulungsleitfäden Cognos/ Panoratio entwickeln!

32. In Steuerkreise sollten BI-Tools „live“ verwendet werden. Konkrete Anfragen sollten gleich schon live beantwortet werden können! Dann wird sich ein Akzeptanz- und Gewöhnungseffekt einstellen! Wenn es von oben gelebt und kommuniziert wird, steigert es natürlich auch die Akzeptanz!

33. MATRIX VON STEFAN VON ABFRAGE AN FÜHRUNGSKRÄFTEN!! CO-RELEVANZ!! (gleiches läuft auf Fachcontrollerebene auch, dass solche Abfragen gestartet werden!) Führungskräfte werden mit Daten versorgt, sodass da dann der Bedarf am Markt formuliert wird. Darauf richten wir dann auch unsere strategische Planung im UB Controlling aus!

34. organisatorisch Reaktion zur Rechteerweiterung für MA Analyse HzV – Befugnisse waren vorher nicht vorhanden „ich kann jetzt weniger auswerten als vorher!“ = erstmal subjektive Minderung ist eingetreten! Mir fehlen Informationen =Schulungsbedarf! Jetzt zu früh, um Controlling umzustrukturieren, dafür haben wir BI noch nicht lange genug. Man könnte in Zukunft aber darüber nachdenken!

35. für Standardberichtswesen ja! Im VM-Bereich an Grenzen stoßen, Bereich Data Mining hat noch keine Struktur, weiter einsteigen. Vergleichsanalysen, Zusammenhänge erstellen (Kü.-wahrscheinlichkeiten, Exzellenzen ermitteln für Top-Leistungserbringer etc.) SPSS mögliche Option aber fachliche Grenzen des Anwenders. STATISTIKER würde gut tun, hier Know-how aufbauen!

36. würde weiterhelfen, weil Fragestellungen immer komplexer werden! Tools verlangen höhere Qualifikation an Anwender! Gerade dann wenn ich nur auf Vergangenheitsdaten angewiesen bin, bekommen Trendanalysen einen deutlich höheren Stellenwert – auf älteren Daten Szenarien und Prognosen anstellen! Wenn es die Daten noch nicht gibt, muss ich auf Basis alter Daten eine halbwegs fundierte Entscheidung treffen können!

37. JA!

ERGÄNZUNG: MBL Stolzenau = ich kann aktuell nichts mehr sehen – Akzeptanz der Zahlen, weil es nicht meine eigenen Zahlen sind! Welche 2 Akquisen fehlen denn bei mir als MA? Aber Problem von Regelungen, die in der Vergangenheit zumindest nicht so strikt kommuniziert wurden! Früher war es wohl auch nicht richtig, personenbezogene Daten anzuschauen oder weiterzugeben, aber es gab keine entsprechenden Regelungen, an die sich Nutzer halten mussten.

**Protocol: YES**

**Audio recorded: NO**

#### **06: director of the management accounting department**

1. BI als Stufenprogramm – aus Daten technisch fundierte Aufbereitung mittels BI! Nutzen im Kennzahlensystem für Treiberbäume für Logiken und schnellere Analysen und Verfügbarkeiten – ohne Technik für die Datenaufbereitung würdest du gar nicht Erfolge verbuchen und keine Hypothesen aufstellen können – technikerunterstützte (BI) Erkenntnisgewinnung
2. Definierte Kennzahlengerüste! // Hypothesen be- oder widerlegen: fundierte Anfänge // SPSS planen wir jetzt auch
3. Nutzer
4. Operativ: Geschwindigkeit, Qualitätssicherung, im Führungsdialog können qualitative statt quantitative Diskussionen geführt werden, gehaltvollere Diskussionen
5. Datenqualität, Akzeptanz, Befähigung der Nutzer, Erkenntnisse zu generieren und in die praktische Arbeiten zu überführen, was aber wiederum von HF zu HF unterschiedlich verläuft
6. Verbindung gut! Intensive Schulungen und Austausch
7. Gute Performance
8. Auf alle Datensichten Zugriff
9. DWH Nutzung überwiegend
10. Nein
11. Bsp. KG = direktes Berichtswesen vorher – jetzt mehr analytische Fähigkeiten (Kaskadenmodell) je komplexer die Daten, desto mehr müssen sich die Leute damit befassen und sich auch anpassen, der Anspruch steigt mit der Datenvielfalt und -komplexität!
12. Datenwissen notwendig, was bedeuten Veränderungen in den Fallzahlen, welche Vergleichsparameter muss ich heranziehen?
13. Report Studio und interne Trainings sind ausreichend
14. und 15 Gute Qualität und ausreichend! Innovationskraft/ KVP ist ausbaufähig! An welchen Stellen kann man operative Dinge besser machen
16. Überwiegend nicht beratend oder unterstützend tätig!
17. JA, SKALA: 8!
18. Nein-----
19. Strategie nicht gelebt, es werden einzelne Aspekte weiterentwickelt
20. Sinn ja, aber wie klar formuliert und langfristig muss eine Strategie definiert werden – wieviel Einfluss habe ich und muss ich nicht auf den gesetzlichen GKV-Rahmen achten!?
21. Ok
22. DEFINITION!!?? Risikomanagement, keine klare Abgrenzung
23. JA, Bsp. Pluspunkte investieren?? Daten hier hilfreich!! Auch politische Bedeutung von Themen wird erkennbar – MuKi-Kuren, hier wären wir ohne Dateneinsichten hilflos
24. Mehr analytische, explorative Tools! Pfad zwischen Standardbericht und Analysetool ist bedürftig!! Insgesamt aber gutes Niveau!
25. Schulungen über Dateninhalte sind relevant! Stärker forcieren: Analyse- und Interpretationssicherheit, um die Ableitung von Maßnahmen in Praxis sicherzustellen

26. JA-----
27. Marktanteil gigantisch, regionale Stellung!, Politischer Einfluss auf LE, genügend Patienten! Finanzielle Stabilität, denn damit in bestimmte Bereiche investieren zu können! „Vor-Ort-Mentalität“ entscheidend, Präsenz, Marke bei LE und Politik ein Vorteil!
28. Wir sind die „größten“! Ein Vertrag haben – geht LE zur BKK Mobil Oil oder eher zur AOKN, um Vertrag abzuschließen?
29. BI nutzen, um in interne Prozesse steuern zu können – wir können mit BI den Vertrieb steuern, VM-Programm auferlegen (wenn wir es wollen) – wir schaffen Transparenz und Steuerungsmöglichkeiten, um Prozesse zwecks Wettbewerbsfähigkeit zu erhalten!
30. Weitestgehend ausgewogenes Maß! Zwischenanalyse stärken! Nicht zu frei End User analysieren lassen, sonst verlieren sie Anschluss!
31. JA!
32. JA! Anfang August Schulung der GF in den Tools, wie sich Ziele und Maßnahmen nachhalten können!
33. Klar, wir steuern mit dem System! BI ist Hilfsmittel, um Prozesse in den Griff zu kriegen! Wir dürfen uns nicht auf das System versteifen, sondern mit Leistungsoffensive reagieren wir auf Marktgeschehen und steuern das Unternehmen
34. Weiterentwicklungsprozess, gut handlungsfähig, aber optimierungsbedürftig!
35. Das sind eher ergänzende Punkte – welche Tools brauchen wir für Anwendungszwecke?? PureData mit BO, Informations- und Analyseketten ist sinnvoll (Data Mining, Reports, Analysen) Anbieter ist eigentlich egal! Wie gehe ich mit Konsolidierungsmaßnahmen um? Aktuell wird Finanzprognose umgestellt!!
36. JA, Statistiker und Mathematiker brauchen wir, aber wir brauchen dann auch Know-how für Interpretationshilfen!
37. JA

**Protocol: YES**

**Audio recorded: NO**

### **07: performance analyst**

1. BI als gleichen Informationsstand, zu jeder Zeit den gleichen Infostand, wenn in Steuerkreisen Infos gebraucht werden sie dann auch abrufen zu können, schneller Zugriff, die gleiche Einstiegsmaske – Dashboards zu unübersichtlich mit Tachos! Blick ist auf alle 17 Regionen mit den Zielfeldern erwünscht! Unübersichtliche Sichten – schade, dass im Absprung nur der Berichtsordner erscheint – schaut dann lieber im Bericht, woran Abgleichung zu Prognose liegt!
2. Standardberichte nutzbar! Dashboards ok aber eher Screenshots um Laufzeiten zu vermeiden - > Berichte Wochenberichte zu lang für Präse, Fokuskennzahlen für Präses aufbauen!!! Daten sind aber komplett vorhanden!! Kaum Informationsbedarf!!!
3. Anwender! Das einzige, was wir selber machen, ist Personalbestandsziel! Sonst keine eigenen Analysen selber! HR Cognos Bericht ist nicht standardisiert, für InBox Einträge viel Aufwand!
4. Gleiche Datenbasis! Über diese Zahlen sprechen wir! Vorher absprechen mit GF! Dann kommt RD wieder mit anderen Excellisten, bei uns sieht das aber anders aus! Unterjährige Prognoseabweichungen beachten – Konzentration auf FIS-Berichte, Zeit fehlt aber, um z.B. Kaskadenmodell anzuschauen. Reports: Vorjahresdiagramme Entwicklungen bei Berufsstärtern
5. Berichtsausführungen Dashboards Vertrieb dauern lange, wenn live in Sitzungen!
6. Gute Ansprechpartner im Controlling – gut!
7. In einigen Bereichen lange
8. Grds. alle Informationen auf aggregierte Ebene, wird aber mehr auch nicht benötigt!
9. Lediglich Cognos – also eDB Nutzung – SAP für Buchungen/ Budget (regionale Werbebudget)
10. Ab und zu Analysis Studio, Kaskadenmodell, bedarfsmäßig Budget, HR Cognos

11. 80-90% Vorgaben, die Dashboards können verstanden werden, Kennzahlen sind oft nicht selbsterklärend! Nachfragen!
12. Datenwissen muss vorhanden sein, Nachfragen im Controlling, laufende Fälle! Bei weiteren Clusterungen brauchst du weitere geschlossene Fälle etc.
13. Interne Schulungen, learning by doing!
14. 2-3 Schleifen werden nach Steuerkreis noch gedreht – mit Standardbericht wird Einstieg gefunden, Qualität gut – je nach HF werden Prozessketten und Detailtiefen diskutiert!
15. Nutzbar für operatives Geschäft und Strategieentwicklung!
16. Gute Ansprechpartner!
17. Schwierig, aber in Sitzungen sind theoretisch alle Daten vorhanden, Bewusstsein, ob und wie Daten vorhanden sind. Verständnis dafür gewinnen, wann genau Daten neu kommen – Skala: oberes Level!
- 18.-----
19. Marktstrategie = GPO-Prozesse im Markt durch alle Bereiche, Vertrieboptimierung, sowohl KuZi als auch interne Prozesse und Ergebnisse sicherzustellen !
20. Guter Weg, um alle Felder im Blick zu haben
21. Teil der gesamten Unternehmensstrategie
22. Nicht genau abzugrenzen!
23. Datengetriebene Entscheidungen sind alltäglich! Großer Steuerkreis Markt durch Herrn Dr. Peter getrieben, wie bestimmte Inhalte voranzutreiben sind, Stefan ist hier dabei!
24. WICHTIG: 1x Blick auf alle und jede Kennzahlen der Zielfelder!
25. Unterstützung der engen Kommunikation bei Auffälligkeiten! ZE Prognose wird schlechter, das muss Grund haben, enger Komm., tiefgehende Analysen! Bilateral mit Controller! Impuls fehlt von Controller und auch Fachbereich!!
26. JA-----
27. Keine Angabe!
28. VERTRIEB brennt, weniger Mitglieder an Barmer! Mehr Kündigungen, warum?? Warum schlechtes Image? Physiotherapeut sagt, den meisten Ärger mit AOKN, Genehmigungen, Rechnungen gekürzt!! Fängt schon mit Wartschleife an, ICC pushen! VT und KG sind Fokusfelder.
29. Entwicklungen von Regionen und AOKN zu Vormonaten wichtig! Hier viel visuell und graphisch IS Nachholbedarf. Im Idealfall selber Graphiken zusammenstellen! VJ, VM-Entwicklungen etc.
30. Vorgaben gut, vorgefertigten Abfragen für Analysis Studio KG (laufende Fälle). Aber man kann nicht alles vorgeben, wieviele Graphiken wollen wir denn einbauen? FmK Analysen
31. Nein nicht notwendig
32. Systemabhängig, Präse ist da und hast Zeitersparnis! Live ist „schwitzig“, sollte aber forciert werden trotz Risiko. DU musst dir 100%ig sicher sein, was du tust! ALLE VERTRIEBSINFORMATIONEN UND ZIELKENNZAHLEN FÜR ALLE REGIONEN!! Und auch nur Zielregionen der MR-NORD! Weiterführende Fragestellungen können aber in den Dashboards sehr gut beantwortet! Think-cell Lösung für Präse, das nehmen die in ihren regionalen Steuerkreisen!! SYSTEMVERTRAUTHEIT!! Kommunikation und Bewerbung bei GF und Steuerungsassistenten! Leute alleine lassen ist schade um das gute Produkt!
33. Balance Kunde und IS (Win-win) muss gewährleistet werden! Schlechtes Image! Im Kundenkontakt klären, Beschwerdemanagement!!
34. Viele Sachen kompliziert! Controlling geht nicht Einzeldatensätze!
35. Prädiktive Analysen in der UE! MA aus Vertrieb Hannover wird explizit für Vertrieboptimierung im GFB Marktstrategie angestellt für ein paar Monate!!
36. JA, brauchen wir! Frühzeitige Maßnahmen und Reaktionen! Für Frühwarnsystem nutzen!
37. JA LEUTE MITNEHMEN, AKZEPTANZ, immer wieder sagen, nachfragen, unterstützen, helfen die Systeme und Daten? Was ist offen? ZIEL: alle nutzen und IS soll optimiert werden!! Die Video-Podcasts von Christian Melloh kamen sehr gut an! Hier eine Auffrischung sowie auch bei den Schulungen zwecks Kaskadenmodell oder Berichtszusendungen (wie lasse ich mir und/ oder meinen Mitarbeitern automatisiert Berichtsversionen zukommen?!)!



**Protocol: YES**

**Audio recorded: NO**

### **08: director of management accounting for health care**

1. BI = strukturiertes DWH – zwar schon länger, aber sektorübergreifende Analysen – BI Projekt 2011 Grundstein zum Neuaufbau DWH! Konsequente Pseudonymisierung, einheitliche Dimensionen, VM Multifaktenanalysen – effizientes Auswerten von Unternehmensdaten, um Fragen des MM umfangreich und verlässlich beantworten
2. Cognos BI, Report Studio, Analysis Studio, Dashboarding, Panoratio für schnelle, multidimensionale sektorübergreifende Analysen
3. User und Nutzer von Standardberichtswesen – Fachcontroller stellen Anforderungen und diese werden als PowerUser dem Fachbereich zur Verfügung gestellt! Wie funktioniert die Businesslogik? Wie sind Kennzahlen definiert? Wie müssen Ausdrücke funktionieren?
4. Handlungsfähiger geworden, definierte Standards, einheitliche Dimensionen, Dokumentationen für Dritte ohne exorbitantes Vorwissen, Datenaufbereitungsprozess, organisatorische Grundlagen, Know-how war früher auf versch. Stellentypen verteilt (ETL etc.), HEUTE: BI-Team die sich auf ETL-Programmieren konzentrieren! Professionelle Gestaltung, effizienter Prozess zur Datenbereitstellung, Verfügbarkeit, Performance ist ein Thema, heute gut, Toollandschaft beeinflussen schnellen Zugriff auf Daten -> Steuerungsimpulse über Controllingregelkreis auslösen – früher VBA-Kenntnisse übertrieben aufgebaut! Prozessketten lang, lange Laufzeiten von Datenbanken – heute mächtige Produkte zur Unternehmenssteuerung für Standardberichtswesen und/ oder Analysen – einmaliger Aufwand für Cube- oder Faktenerstellung, Definition/ Testung und Abnahme definiert und dokumentiert! Für Führungskräfte konsolidierte Informationen präsentieren, tendenziell besser, Gegensteuerungsmaßnahmen ergreifen!! PRAKTISCHER NUTZEN mit effizienteren Gesprächen in Steuerkreisen, zeitnahe Beantwortung von Fragen über Cube oder Analysis-Vorlage! Früher: eher Hypothesen aufgestellt und Controller haben Hausaufgaben mitbekommen -> großer Zeitverlust CONTROLLINGSTANDARDS!! BI-Portal für Cognos = Dashboards als standardisiertes Unternehmensberichtswesen – von Top-Management bis Bereichsleiter in einem System die unterschiedlichen Bedarfe abdecken zu können.
5. Grds. besteht Möglichkeit zur Entpseudonymisierung, für einige Fachbereiche Zäsur, nicht ohne weiteres Versichertendaten zu bekommen – aber auch jetzt wiederum nützlich, um wieder sich auf Kerngeschäft der Führung und Steuerung zu konzentrieren! Weg von Einzelfällen hin zu Gesamtentwicklung, aber auch über Navigation wieder bei Einzelfällen zur konkreten Einsicht und Steuerung! Auffälligkeiten plausibilisieren über Listengenerierung – Nachteil: Kosten im Auge behalten, Investitionen ins BI-System abwägen – wichtig für Informationen, die in Massen in GKV vorhanden – ist Information ein wichtiger Produktionsfaktor – Investitionen kritisch hinterfragen (SPSS Modeler nötig??) Eher prospektiv zu schauen – nicht ganz einfach, Kosten-Nutzen-Kalkulation aufzustellen – personelle Ressourcen wurden teilweise aufgestockt – Cognos-Lizenzen erweitern, Consulting-Kosten
6. Schnittstelle von PowerUsern zu End Usern gut aber unterschiedlich – manche Bereiche müssen sich noch an Standardisierung gewöhnen! Aufgabe im Controlling, dass Vorteile und Möglichkeiten bei End Usern ankommen und gut kommuniziert werden – Investitionen beim Endanwender „müssen ankommen“ - im Einzelfall?
7. Baustelle! Im Einzelfall kann Vorlage aber zeitaufwendig (welche Umsätze haben Ärzte?) Sensibel hinschauen!
8. Grds. alle Zugriffe auf Daten, in GBL-Funktion wichtig
9. Momentane alle relevante Daten drin – aus dem Projekt noch Datenbestände, die noch nicht aufgebaut sind = sind aber nicht groß relevant, dass Unternehmenssteuerung abhängig ist

10. Kein Standardberichtswesen!

11. Neben analytischen Verständnis, autodidaktisches Fähigkeiten, da Softwarelösungen immer komplexer werden – 2 Kollegen haben dies als Kernaufgabe sozusagen als First Level Support – Logik in Reports richtig aber es kommen „komische“ Werte raus!

12. Differenziert! Datenverständnis ist insgesamt bei Kollegen gewachsen! Was bedeutet Datenmodellierung? Wann spreche ich von Dimensionen? Umfangreiches Datenverständnis notwendig, um Qualität des Verständnisses zu erhöhen! VM-Feld ist umfangreich – wir gehen auf Fachcontroller dann zu! Jetzt an der Stelle, wo wir fragen, ob methodisches Know-how aufbauen zu können? Stichwort Data Mining im AZM Bereich, welche Möglichkeiten haben wir in diesem Bereich? WASSERPAUSE!!

13. JA Report Studio ausreichend!

14. Gut, aber Entwicklungspotenziale! Bunter Strauß! Potenzial an graphischen Aufbereitungen!! Bildhafte ist schönes Bild, um „Lesbarkeiten von Reports“ zu erhöhen!! Komplexe, dynamische Reports sind gut und haben teilweise übertrieben! Effizientere Gestaltung im Blick!

15. Grds. schon, aber auch hier Verbesserungsbedarf! Standardbericht über gesamtes Versorgungsgeschehen aufzubauen, aber hier wieder Datengrundlage ausschlaggebend! Hier mehr Anreicherung der eDB von externen Daten! Mehr Benchmark dadurch generieren! Szenarien entwickeln!!

16. 1/3-Logik früher – Kommunikation als „letztes Drittel“ stärken, da wir auch durch die andersweitige Datenaufbereitung jetzt mehr Hände freigeben, um sich verstärkt mit Informationen auseinander zu setzen! Projekt Hilfsmittel, VC – Weg weitergehen! Wo sind bei uns Zeitfresser, die uns davon abhalten, die Rolle des BWL-Beraters zu schlüpfen

17. Skala: 10! BI-Forum: Konsolidierungspotenziale?? Auf der Grundlage von zweitklassigen Informationen kann ich keine erstklassigen Entscheidungen treffen!! Heute alle Geschäftsfelder transparent, aber wir stellen entsprechende Controllingstandards zur Verfügung! Was tun wir wogegen? Viele Fragen im VM-Bereich konnten wir vor 5 Jahren nicht beantworten! Stichwort Panoratio: bundesweit das größte Datenmodell! So performant und vollständig Daten herzustellen, ist ein klarer Wettbewerbsvorteil. So wie die AOKN heute dasteht, hat auch was mit Projekt in 2011 zu tun

18. -----

19. Kann nicht 100%-ig bejaht werden! Vom Vorstand zwar thematisiert auf Führungsforum, aber langfristige Planung ist nicht möglich! Politische Störgrößen müssen mit kurzfristigen Anpassungen reagiert werden!

20. Mittelbar ist Implementierung BI-System notwendig, um Unternehmen zu steuern!

21. Weiterentwicklung der stärkeren Verknüpfung von BSC-Feldern! Wie kann dies mit BI-Landkarte strategisch unterstützt wird, ist fraglich, muss dann geschaut werden, ob BI den Strategieprozess entwickeln und lenken kann

22. Keine Angabe

23. Können uns nicht dauerhaft von Fondszuweisungen abkoppeln! PBZ annähern durch BI Ausstattung

24. DB-Rechnung und Fondszuweisung im DWH aufbauen! Datenschutz maßgebend!

25.

26. -----

27. Wie breit ist Entscheidungsgrundlage? Feedback von Holger durch Vertreter anderer Kasse! Konsequenter alle relevanten Informationen und Daten ins DWH aufnehmen. Relevante kurze Entscheidungsphasen – von der Auffälligkeit bis zur Aktivität! Welche Reaktionszeiten haben wir? Diese müssen wir minimieren!

28. Riesensprung gemacht – Entwicklungen in KH-Fallanstieg und Wechselwirkungen werden sofort gesehen! Maßnahmen werden dann sofort im Steuerkreis initiiert! Perspektivisch: wie gelingt es uns, sehr treffsichere Entwicklungen im Leistungsgeschehen vorauszusehen!?? Aber hier auch Aufwand und Ergebnis im Blick behalten!! Entwicklungsfeld. Hat auch was mit der Größe der AON zu tun

29. Keine Selbstzufriedenheit! Schnelllebiges Geschäft, am Puls der Zeit bleiben und bei Marktneuerungen sich kritisch damit auseinandersetzen – SPSS welcher Nutzen lässt sich generieren! BI fortwährend weiterentwickeln! Planning -> TM1

30. Multi gutes Instrument, die Fachbereiche zu befähigen, um hypothesengetriebene Fragen beantworten zu können! Allerdings dürfen wir nicht übertreiben – Auswertungen sind nie Selbstzweck!

31. Stückweite Begleitung – also nicht nur forcieren!

32. Konsequenter auf Basis Dashboards in Steuerkreisen zu diskutieren – ausgehend vom verdichteten Ausblick (Zielsetzung, Ziele, Treiber) – wo haben wir Auffälligkeiten und wie sind sie begründet? Fokussierte Sicht muss unterstrichen werden, um dann evtl. gezielter schauen zu können! Stärker Unterstützung von graphischen Aufbereitungen - Treiberbaumlogik

33. Erkannte Muster anwenden!! Datenschätze schöpfen! Wie kann ich im Einzelfall organisieren, in kleineren Projekten bestimmte Fragen zu beantworten und konkreten Projekterfolg und-nutzen feststellen zu können! Konkreter Nutzen muss nachgewiesen sein! Positive Erfahrungen müssen abgewartet werden! Performance bei multidimensionalen Analysen ist eine Baustelle!

34. Gute Vernetzung zu Fachbereichen – hohes Verständnis, welche Fragestellungen und Probleme bestehen in den Fachbereichen? Gutes Geschäftsverständnis. BI Team im Controlling war gute organisatorische Entscheidung – aber auch hier wieder das Einwirken, das BI-Produkte und deren Inhalte und Möglichkeiten an die Fachbereiche verkauft/ kommuniziert und transferiert werden müssen!

35. und 36 übertrieben. Was will der Markt? Kein Trend verschlafen, keine Möglichkeiten liegenlassen! Wenn es konkrete Projektidee gibt, die uns weiterhilft und in Projektstruktur pilotieren das hilft uns auch schon weiter! Kurzfristig ist dies eher in Projektform zu sehen um es dann organisatorisch zu manifestieren! Gibt es vllt. auch positive Erfahrungen von anderen im AOK-System??

**Protocol: YES**

**Audio recorded: YES**

## **09: management accounting employee**

1. Viele Daten vorhanden – Aufbereitung damit richtige Zahlen abschließend vorhanden sind (aggregierte Form)

2. Grds. Berichtswesen als Toolsammlung – Controlling als Teilbereich der Führung, dazu gehört auch Gespräch! Als Werkzeug also auch MA-, Bereichsgespräche und auch Steuerkreise! -> Maßnahmeninitiierung damit komplettieren (Controllingregelkreis)

3. Moderator in dieser Rolle, Organisation des Miteinanderredens, Defizite aufzeigen, keine fachliche Aufgaben! Defizite werden überwiegend durch Berichte an sich festgestellt aber Führungskräfte werden schon damit gedrillt, Maßnahmen zu initiieren – Controller ist Impulsgeber, Hinweise zu Ergebnisse geben, „Frühwarner“ ist Idealvorstellung, Vermittler zwischen Regionen (Sachen, Analysen und Ergebnisse transferieren)

4. Transparenz ist A und O! Früher nur Teilbereich der Transparenz! Früher viel administrativer Aufwand und das auch jede Woche! Mehr techniklastig als Steuerungsprozess! Wir kommen somit mehr Gas in Weiterentwicklung geben, da Transparenzprozesse vorangetrieben werden!

5. Angst vor Transparenz! -> besänftigten! Investitionen in Manpower und Kosten für BI System – aber wir sind auch fast die einzigen, was wir von unserer Arbeit denken! Diagnosebezogene Auswertungen!

6. Glaube wir werden als Berater gesehen – Analysen mit Regionen auf Arbeitsebene stattfindend! Regionen helfen und nicht „pieksen“. Dieses Bild muss gepflegt werden, deutlich werden, dass wir alle an gleichen Zielen arbeiten. Mehr lotsen, dass individuelle Analysen forciert

werden, Schulungen!!

7. Stark! Montags sind Daten da!

8. Alle Zugriffe bis auf Personaldaten

9. Ja DWH! Rohbilanzen...

10. Für mich ständig weil eigene Ideen verfolgt und umgesetzt werden! Erst-BRGs ohne J-Diagnosen!

11. Analytisches Verständnis für alle MA!

12. End user: dem System vertrauen, er muss grob wissen, woher und wie Daten generiert werden, damit folgende Aktivitäten initiiert werden können // UB Controlling: wir müssen Unplausibilitäten erkennen können, somit detailliertes Datenwissen erforderlich!

13. Gute Schulungen für Basiswissen. Für Details gut betreut (PowerUser etc.) – Einzelkämpfer somit ist autodidaktisches Vorgehen sinnvoll

14. Ferrari in der Garage aber fahren noch Ente! Wenn man sauber nach Treiberbaumsystematik aufteilen würde, wären FIS-Berichte und/ oder Analysen nicht mehr aktuell -> Prüfstand! Aber Dashboards verfolgen wir andere Wege, die Standardberichtsweisen mittelfristig ablösen sollen! Hin zur Dashboardanalysen und dann tiefer in die Analysen gehen wenn Auffälligkeiten erkennbar sind!

15. Für Strategie nicht ausreichen weil auch Berichte auch so nicht konzipiert. Für KG einen halbjährlichen Strategiebericht relevant für UB Kundenservice oder GFB Marktstrategie! Die operativen Berichte sind gut aber nicht jede Kennzahl löst eine Aktivität aus! Hier wiederum Hilfestellungen geben, wenn dies rot dann sollten X Aktivitäten ausgelöst werden

16. Optimale Situation derzeit was auch Jahrzehnte gedauert hat!

17. Wettbewerbliche Vorteile SKALA 7-8, unsere Datenlage und unser IS ist sehr ausgeprägt

18. -----

19. Nein nur Finanzen: 5-Jahres Prognose! Müssen unsere Prozesse und Werkzeuge im Auge behalten! Es ist nicht transparent, wie z.B. der Prozess Rente im KG definiert ist! Was sparen wir auf Dauer in diesem Bereich? Können wir nicht beantworten, da das Feld nicht regelmäßig bearbeiten!

20. Ja auf jeden Fall! Gefahr, dass im ersten Jahr in eine und im nächsten Jahr in die andere Richtung! Strukturelle Lücke im KG, frühzeitig überleben!

21. Muss zusammen passen, Ausrichtung an Unternehmensstrategie, wir können im BI System nicht einfach Kunden ignorieren!

22. Im KG kein strategisches Controlling (nur strukturelle Lücke schließen) Analyse Erst-BRGs sind typisches operatives Controlling

23. Nein! Speziell auf KG nicht, da strategisch nicht datengetriebene Entscheidungen gefällt werden – im UB Kundenservice fehlt strategischer MA zur Konzeptentwicklung, Controlling aber zuwenig ausgeprägt!

24. Ein langfristig ausgelegtes Prognosesystem (Leistungsausgaben, Beitragseinnahmen, MDK, Rente) – Nutzen kann derzeit nicht eindeutig erkannt werden!

25. Erkenntnisse müssen aus Daten abgeleitet werden und Prognosemodell auf diese Weise entwickelt werden

26. Wir sind auf dem Weg, die Prozesse transparent zu machen! Im Prozess Rente wird eine exakte Kennzahl erarbeitet, ob Prozess gut oder schlecht ist. KG-Fälle mit Laufzeit > ½ Jahr und schaue, wieviele Fälle mit einem Rentengrund beendet werden -> so eine führende Kennzahl sollte für alle Prozesse entwickelt werden, wenn sich diese entsprechende Quoten nach untern entwickeln, muss dieser Prozess geprüft werden!

27. -----dass wir unsere Prozesse kennen, finanzielle und Leistungsrahmen ausschöpfen, guter Service anbieten! Gute Datenlage, dann wissen wir mehr, gute Kompetenz, d.h. wir werden auch mehr gefragt, also stärkere politische und fachliche Kompetenzen! Wir wissen einfach, was Sache ist!

28. Aktuell ist Situation gut! Besseres Image als noch vor 5 Jahren, finanzielle Stabilität, modern aufgestellt aber natürlich CIP!

29. Es muss alles integriert sein und muss in ein übersichtliches Cockpit zusammengefasst sein – mehrere Anzeigen die für das Unternehmen wichtig sind (es darf mal eben nicht die rechte Tragfläche vernachlässigt werden) Interner Service, Vertrieb etc. muss komplett integriert werden, sodass wir reagieren können. Wenn Rädchen ausfällt, muss anderes Rädchen es korrigieren/ kompensieren!

30. Wir fangen erst mit solchen Analysen an! Fachbereichsleiter weisen noch Mängel und Bedarf auf, was Umgang mit Technik und analytische Rückschlüsse angeht

31. Ja aber nicht mit einer Frontschulung sondern situationsbezogen mit „trainings on the job“, sich einfach mal mit einer Abfrage an Lösung rantasten! Hemmungen abbauen und motivieren!

32. Vormachen und vorleben (von GF über RD bis MA), wie sinnvoll und hilfreich dieses System ist! Wenn man merkt, es gibt irgendwo Barrieren, dann nachhaken. Überzeugen, dass es „ihr“ Tool ist, z.B. Ignoranz von Steuerungsassistenten ausbügeln.

33. BI hat uns andere Betrachtungsweise gegeben. Bislang eher Einzelfallanalysen. Grundsätzliche Denkweise hat sich aber geändert, wir fangen mit BI an, eigene gruppenbezogene Strategien zu entwickeln: „bei 100 Fällen erkennen wir, dass Auffälligkeiten da sind und eben auch andere Maßnahmen zur Folge haben!“ Erwartung: diese Möglichkeit durch neue Tools vorangetrieben wird. Dashboard guter Anfang.

34. JA! Durch andere Transparenz erkennen wir unnütze Aktivitäten, wo wir vorher nie hintergekommen wären. 85% der Aktivitäten im Prozess Rente werden nicht bearbeitet! Warum? Weil es nicht hilfreich ist! Dann ist ja nicht die richtige und effektive Aufgabe eingestellt worden!

35. und 36 brauchen wir? Wir schöpfen aber noch nicht alle Datenschätze aus? Kü-Quote von KG-Beziehern nicht hoch und die ist sogar ähnlich wie offizielle Quote. Also ist eine Kündigung unabhängig von KG-Bezug! Mit solchen Zusammenhängen fangen wir grad erst an!!! Mit BI Werkzeugen ausreichend (Controlling BI Presentation Package)! Fachleute haben Angst vor Transparenz! Problem ist nicht Controlling, sondern die Führungskräfte mit dem Umgang des BI-Systems! Controlling ist Moderator, wir stellen Kommunikationsprozess zwischen uns aber auch unterschiedlichen Bereichen her!

**Protocol: YES**

**Audio recorded: YES**

### **10: management accounting employee**

1. Eine systematische Analyse und Auswertung von Daten in elektronischer Form. Einsatz: Steuerung des Unternehmens in operativer und strategischer Sicht. Erkennen von Fehlentwicklungen und daraus sich entwickelnde Gegensteuerungsmaßnahmen.

2. BI-Werkzeuge sind die im Einsatz befindlichen Cognos-Produkte. Analysis-Studio, Reportstudio, Query Studio und TM1. Genutzt zur operativen Steuerung, Ergebnismessung, Maßnahmensteuerung. Mit TM 1 wurden cubebasierte Prognosesysteme entwickelt.

3. An der Entwicklung eines Cube basierten Prognosesystems war ich beteiligt. DWH Erstellung ( nicht der technische Teil), also Testen der Daten auf Vollständigkeit und Validität. Wissenstransfer an Enduser durch Schulungen, Musterberichte usw. Bei Bedarf Unterstützung der Fachbereiche durch Auswertungen auf relationaler Datenbasis .

4. Es besteht ein umfassendes DWH mit Daten aus verschiedenen Unternehmensbereichen, die sich untereinander verknüpfen lassen. Transparenz, Daten sind jederzeit aktuell abrufbar. Cube basierte Daten sind mit Analysis Studio auf einfache Art und Weise auswertbar. Darüber hinaus gehende Auswertungen sind durch die Controller einfach zu erstellen. Frühwarnsystem über Dashboards.

5. Nicht jeder Mitarbeiter hat (und sollte) Zugriff auf das DWH und auf BI Werkzeuge. Hierzu

wurde ein Berechtigungskonzept erstellt. Selbstverständlich werden die Regeln des Datenschutzes eingehalten.

6. Die Verbindung zu den Usern besteht insbesondere in Produktschulung und in deren Weiterentwicklung. Darüber hinaus können in seltenen Fällen Auswertungen auf rel. Basis erforderlich sein. Das Tagesgeschäft meiner Kunden läuft reibungslos.

7. Nach einer Hardwareoptimierung ist die Performance zufriedenstellend.

8. Primär Zugriff auf alle Krankenhausdaten des Unternehmens, des weiteren auf alle anderen Leitungs- und Versicherungsdaten. (Cube sowie relational.)

9. Die Daten werden in einem einheitlichen DWH in relationaler und Cube Form vorgehalten. DWH wird aus verschiedenen Datenquellen gefüllt. Hauptsächlich ist Quelle das BW also Daten aus Oscare. Aber ebenso Flatfiles, Oscare-Quellentabellen und manuelle Eingaben. Alle Daten sind mit Schlüsseln miteinander verknüpfbar z.B. BIDs, KVNR, IKNR usw.

10. Ja, das ist Tagesgeschäft.

11. Fachwissen über das Arbeitsgebiet der Kunden ist unverzichtbar. Cognos Werkzeuge müssen beherrscht werden. Datengenerierung muss bekannt sein. Analytisches Denken schadet nicht.

12. Datenwissen ist unbedingt erforderlich, Datenquellen und Datengenerierung müssen bekannt sein. Große Datenmengen sind über das DWH mit Reportstudio beherrschbar.

13. Für Reportstudio gab es eine nicht ausreichende Grundschulung. Ansonsten "learning by doing". Unterstützung durch Poweruser.

14. Das ist schwer einzuschätzen und richtet sich nach den Anforderungen. Monatliches Berichtswesen läuft nach Erstellung ohne großen Aufwand. Die Beurteilung eines IV Vertrags bedeutet einen enormen Aufwand.

15. Sowohl als auch, aber vornehmlich für ein operatives Kennzahlencontrolling

16. In dem von mir betreuten Bereichen ist das schwer zu bewerten, es besteht keine kooperative Zusammenarbeit. Controller werden als Berichtsersteller und Datenlieferant wahrgenommen.

17. Das wird ganz sicher so sein. Die Transparenz über das Leistungsgeschehen liefert detaillierte Informationen über das Verhalten der Leistungsanbieter (Vertragspartner).(10)

18. keine

19. Ja, es gibt einen Strategieentwicklungsprozess. Ich bin dort nicht beteiligt.

20. Alle Strategiekomponenten sollten stets und ständig einer Prüfung unterliegen.

21. finanzielle Stabilität – qualitative Kostensteuerung. Vor dem Hintergrund einer sich wandelnden Gesellschaft, Stichwort: Demografie – neue Behandlungsformen anbieten. Marktführerschaft erreichen, Verbesserung des Versicherungenservice

22. strategische Ziele sind immer langfristige Ziele währenddessen operative Ziele eher kurzfristig sind. zB. Einhaltung Ziele aus Haushaltsplanung. Das operative Controlling hat demzufolge einen sehr hohen Detaillierungsgrad

23. Klares ja. Nicht nur nützlich sondern unverzichtbar.

24. Einfache klar strukturierte Berichte mit nur wenigen Kennzahlen, so wie die dashboards allerdings in einer performanten Form. Darüber hinaus die dashboards ergänzende Berichte.

25. Die Schaffung eines DWH und eine bestehende technische Infrastruktur

26. keine Anmerkung

27. Wettbewerbsvorteile zeichnen sich durch Alleinstellungsmerkmale oder besondere Hervorhebungen aus. Allein schon die Größe und die damit verbundene Nachfragemacht bedeutet einen Wettbewerbsvorteil.

28. Finanzielle Stabilität ist vorhanden, die AOKN erwirtschaftet (noch) Überschüsse. Ein Zusatzbeitrag konnte vermieden werden. Ein Marktanteil von über 25% bedeutet Marktführerschaft. Durch neue innovative Versorgungsformen Vorteile gegenüber Mitbewerbern.

29. Hardwareseitig muss mit der Menge und Vielfalt der Daten umgegangen werden können. Anwendungen müssen performant ablaufen. BI Werkzeuge sollten darüber hinaus einfach zu bedienen sein.

30. Den Endusern stehen als aggregierte Daten entsprechende Cubes zur Verfügung. Auswertungen, Analysen sind mit z.B. Analysis Studio möglich. In vielen Bereichen besteht die

Möglichkeit für Enduser in die Einzeldaten zu drillen.

31. ja, ganz sicher.

32. Einfach zu beherrschende, performante Informationssysteme sind grundlegende Voraussetzung hierfür.

33. So umfassende Daten und Analysemöglichkeiten wie aktuell hat es noch nicht gegeben. Trotzdem ist die Performance einiger Anwendungen und damit die Akzeptanz verbesserungswürdig. Hauptsächlich gemeint sind die dashboards. Hier sollte über Alternativen in der Darstellung nachgedacht werden.

34. nein

35. Als Alternative steht panoratio zur Verfügung

36. Die zunehmenden Datenmengen und Vielfalt der Daten macht den Job des Datenwissenschaftlers notwendig.

**Protocol: YES**

**Audio recorded: NO**

### **11: director of the health care management department**

1. BI = sinnvolle Verknüpfung versch. Datentöpfe, um gutes Gesamtbild zubekommen

2. Wir selber wenig Einsatz, Panoratio für erste Bedarfsanalysen, dort reingehen und zweitens eine Ideenentwicklung voranzutreiben, Priorisierung welche Themen ich angehen möchte, Steuerung von Verträgen, unterjährige Informationen wichtig, wie laufen Verträge, Evaluation

3. Anwender, fachliche Definition unterstützend

4. Vergleich mit früher mit elendlich langen Filterläufen für Weiterverarbeitung – Datenaufbereitung und Ergebniserzeugung

5. Nicht alle Daten liegen vor – Routinedaten begrenzt aussagefähig. Nicht immer so flexible in der Gestaltung der jeweiligen Datentöpfe – weitere Fragen würden ad-hoc nicht immer beantwortet werden können – teilweise für Aufbau Berichtswesen erstmalig hoch

6. Potenzial nach oben – Zeit fehlt zur intensiven Berichtsbeschreibung und gemeinsame Beratung, um den wünschenswerten Status als Endanwender zu bekommen – welche Zugriffe sind möglich, aber aktueller Überblick fehlt!

7. Grds. gut und schnell

8. Klar definierte Zugriffe auf VM-Berichte

9. DWH

10. Eher weniger, lässt nur bestehende laufen

11. Zahlenverständnis per se mitbringen, grobes Verständnis für Datentöpfe, fachliche Beurteilung von Nöten – Probleme? Wen ansprechen??

12. VM – breites Wissen für versch. Datentöpfe notwendig! Heutiger Datenstand akut oder Nachläufe? Ärztliche Daten als Nachlauf! „kommt drauf an, welche Abteilung ich angehöre!“

13. Nur kurz im Rahmen JourFixe, für mehr ist es eigentlich auch nötig!

14. Über Standardberichte von allen VM-Verträge ist nicht möglich, individuelle Sicht notwendig!

15. Für die Strategiefindung weitergeholfen hat Panoratio! Für kostentreibenden Krankheitsbilder und um welche Handlungsfelder müssen wir uns kümmern? -> Strategieprozess hilfreich!

16. Gemeinsame Zusammenarbeit gut, für Standardberichtswesen muss es effizientere Kennzahlenfindungen geben, gemeinsamer Zugriff auf Panoratio! Damit nicht Controlling nicht für jede Piselfrage erhalten muss!

17. 7

18. --

19. Großwetterlage BSC gut! In der einzelnen Umsetzung für Versorgung fehlt gemeinsames Vorgehen! Folien VM – Inselstrategien von GMs oder GMa – große Klammer fehlt!

20. Auf der inhaltlichen Ebene strategisch ausrichten, BI Strukturen dazu unterstützend nutzen – aus BI Daten fällt keine Unternehmensstrategie ab
21. Zielfelder sind die richtigen!
22. Macht grds. Sinn! Op. ganz andere Informationsbedarfe, gut unterwegs aber noch nicht im Optimum angekommen – Stärke im operative Controlling – MMB ist operationalisiert runtergebrochen
23. Geeignet
24. Art ad-hoc Instrument hätte, wo man verschiedene Situation – Workspace Advanced Graphiken und Szenarios!!
25. Für VM klasse: benutzerfreundliche Oberfläche, mit wenig technischem Know-how versch. Analysen und Szenarien zu erstellen! WORKSPACE ADVANCED!!??
26. --
27. Idealfall: schwer kopierbarer Handlungsspielräume, die F. noch sieht – AOK – Die Gesundheitskasse hat sich bewährt – Wirkung und Wahrnehmung von kleinen aber fachlich fundierten Dingen macht den Wettbewerb aus! Image wirkt sich gut aus! TK ist Beispiel. Ihr Profil gut zu stärken! Kleiner Modellprojekte machen in der Öffentlichkeit Eindruck – KG-Coaching ist nix anderes als Fallsteuerung!
28. Ambivalent! Gute Produktpalette aber hohe Kündigungszahlen sind bedenklich. Banale Leistungen werden nicht angemessen verkauft und auch das Verhalten ggü. Kunden ist nicht immer angemessen. Kein großer Produktnall aber einfach simple Sachen und gute Betreuung unbürokratisch leben! Tatsächliche Umsetzung forcieren
29. Berichte zur Unterstützung Tendenzen von Ablehnungen oder Infos von P+M, wo sind Kundenwerte schlecht sind und auch hohe Ablehnungen – neg. Leistungsverkauf transparent machen – interne Prozesse transparent machen. Versorgungsprodukt – Einschreibungen und Hochlauf gegenüber stellen
30. Zweischneidig: aufpassen, dass Anwender Eigenleben entwickelt aber auch zu reglementiert kann Nachteile haben, dass Ansprechpartner fehlen und er sich somit die Bericht irgendwann gar nicht mehr anschaut
31. Auf spez. MA-Gruppen anwenden, oberflächlich aber auch detailliert
32. 2 Punkte – Nutzen muss erkennbar sein für tägliche Arbeit // wie wird in der AOKN in Gänze damit umgegangen – Führungsprozess daraus ausrichten, unterjährige Zielerreichung und Berichtswesen-Umgang
33. Szenarienbildung, Entscheidungen für Schizo-Vertrag: hilfreich, mittels Dummy-Werten auch Szenarien entwickeln zu können, Vergleichsgruppenbildungen – „Mini-Evaluierungen“
34. Grds. nicht – IT muss Orga folgen!
35. Zuviel neues ist nicht nötig, Bestehendes leben und Lernphasen für Datenwust entwickeln! Ergebnisse aus Pilotprojekten abwarten und lernen!
36. Selbermachen vs. know-how einkaufen! Vom WidO ALOH-A DB, braucht man know-how dauerhaft oder kann man sich das nicht temporär einkaufen? Spezialwissen kann auch extern zurückgegriffen werden!
37. -----

**Protocol: YES**

**Audio recorded: NO**

## **12: director of physical therapy department**

Zu 1) Sammelbegriff für Controllinginstrumente, die auf Grundlage von verifizierten, bereinigten Daten, isoliert von der Anwendungslandschaft flexible Auswertungen in unterschiedlicher Eindringtiefe und unter Berücksichtigung von unterschiedlichen, definierbaren Treibern eine schnelle Information sowie umfassende Analyse der bestehenden Prozesse, Kosten und



Mengenverläufe und Risiken ermöglicht um durch größtmögliche Transparenz über aktuelle und vergangene die zukünftigen Managemententscheidungen zu unterstützen.

Zu 2) Genutzt wird zurzeit insbesondere IBM Cognos für aktuelle Informationen/Prognosen und weitergehende Analysen durch den UB Controlling und jetzt neu das Risikobewertungstool R2C um auch mittelfristige Risiken, die durch den Haushaltsplanungsprozess nicht erfasst werden, erfassen und bewerten zu können. Zudem Analysen aus Kompass302 (Abrechnungstool mit Auswertungsmöglichkeiten im Bereich Abrechnung Heilmittel).

Zu 3) Siehe 2. Meine Rolle ist dabei eher Nutzer.

Zu 4) Mehr Transparenz über die momentane Situation des Unternehmens, des eigenen Bereiches. Aber auch die Möglichkeit, Entwicklungen aus den Vorjahren mit den eigenen Erfahrungen zu verknüpfen, um so fundiertere strategische Entscheidungen zu treffen. Dabei ist der systematische Aufbau von vergleichbaren Daten für eine langfristige rückwirkende Betrachtung sehr wertvoll, insbesondere für die Erstellung von belastbaren Prognosen.

Zu 5) Änderungen oder systematische Fehler oder Besonderheiten in der Datenbasis sind oft nicht transparent. Dadurch läuft man schnell Gefahr, die Aussagekraft nicht bewerten zu können, oder schlimmer: eine falsche oder nur unzureichende Aussagekraft zu sehr in strategische Entscheidungen einfließen zu lassen.

Zu 6) Inzwischen ist das System Cognos erstaunlich schnell. Kompass302 ist auch sehr schnell.

Zu 7) Einzelberichte zu bestimmten Leistungen bzw. Konten (Menge, Entwicklung, teilweise bis runter auf Einzeldatensätze), Berichte zu bestimmten Prozessen (MDK), Dashboards für Gesamtentwicklung (GMA gesamt, UB Heilmittel, Personal). Zudem die kompletten Heilmitteldaten/-berichte aus Kompass302

Zu 8) Die Daten werden in Cognos und Kompass302 vorgehalten. Auf beide Systeme habe ich jederzeit und bequem vom eigenen PC aus Zugriff, oder habe einen festen Ansprechpartner im UB CO.

Zu 10) Nicht mehr. Ich nutze fertige Reports oder beauftrage die Entwicklung.

Zu 11) Man muss den PC einschalten und einen Link aufrufen können... ;-)

Zu 12) Man muss die Datengrundlage genau kennen, sonst sind Fehler oder Fehlinterpretationen vorprogrammiert (z.B. DMP: Beginn-DAT oder Gen-DAT. Wenn man die Falldauer über die Zeitpunkte Beginn-DAT bis Ende-DAT ermittelt – was naheliegen würde – hätte man einen falschen Zeitraum ermittelt) Bei Heilmittelverordnungen sind ähnliche Definitionsschwierigkeiten zu finden. Eine Erläuterung dazu fehlt in der Anwendung selber. Diese findet man evtl. erst in den Schnittstellendokumenten, die schwer verständlich sind.

Zu 13) 3-Tägige Cognosschulung mit Testdaten, die sich auf einen Outdoorhersteller bezogen, und eine einstündige Kompass302-Einweisung. Rest ist learning by doing. Das ist nicht ausreichend. Der Bereich IT wird im Bildungsangebot der AOKN komplett vernachlässigt. Hier wären Einsteigerseminare (mehrtägig) und Aufbauseminare mit Praxisbezug(!) erforderlich.

Zu 14) Grundsätzlich als gut. Es wird zum Teil zu viel und nicht zielgerichtet genug analysiert. Konkrete Fragestellungen werden oft mit einem Zahlenhaufen beantwortet. Man verliert sich in mehrseitigen Berichten und aufgrund der fehlenden Transparenz in den Datengrundlagen und unterschiedlicher Ergebnisse aus unterschiedlichen Datenbanken, dann das richtige Ergebnis oft nicht verifiziert werden. Aber grundsätzlich hat sich die AOKN sehr positiv entwickelt.

Zu 15) Ja. Evtl. erforderliche Anpassungen sind dank Unterstützung vom UB CO mittelfristig und weitestgehend nach eigenen Bedürfnissen möglich.

Zu 16) Gute Fachkompetenz und schneller Zugriff bei kurzfristigen Fragen. Aber bei Anpassungsbedarf fehlen oft die nötigen Ressourcen im Bereich.

Zu 17) Ja, Skala: 7

Zu 18) Keine.

Zu 19) Mag es geben. Ist mir nicht bekannt.

(Problem) -> (Treiber-)Analyse -> Handlungsoptionen -> Entscheidung -> Umsetzungsplanung -> Umsetzung -> Kontrolle -> und von vorne...

Zu 20) Ja, eine Unterstützung bzw. Organisation des Zielfindungsprozesses wäre sicherlich auch

für einzelne Unternehmensbereiche hilfreich. Der Sinn/Nutzen hängt aber von der Flexibilität und Individualität ab. Ansonsten wir da, wo es nicht zielführend/passend ist, einfach ein weiterer Prozess befriedigt.

Zu 21) Ich finde die Balance Scorecard mit den Zielen Finanzen/Markt/Versorgung/Interne Ressourcen absolut passend. Sie muss nicht verbessert, sondern gelebt werden. Auf die Balance zwischen den Zielen kommt es an. Dadurch, dass die Zielfelder Versorgung und Markt (derzeit) nicht mit Zahlen/Daten hinterlegt werden (können?), beschränkt man sich zu oft nur auf die wirtschaftliche Komponente. Aus meiner Sicht ist daher keine Anpassung der strategischen Zielfelder erforderlich, sondern eine Datengrundlage für wie „weichen Faktoren“ erforderlich, damit die Ziele besser bzw. transparenter gegeneinander abgewogen werden können.

Zu 22) Unterschiede sind nach meiner Meinung zumeist nicht zu erkennen. Operative Controlling, sofern in den Bereichen existent, ist nur noch detaillierter. Eigene Kennzahlen findet man nur selten (z.B. Bearbeitungszeiten) und wenn, dann sind zudem oft die Treiber oder mögliche Maßnahmen nicht klar.

Zu 23) ...

WV dadurch, dass Entscheidungen transparent dargestellt werden können.

Schwierigkeiten, Kundendaten für VM zu messen – Messbarkeit Kostenziele vs. Kundenzufriedenheit, was ist zielführend bzgl Kulanz

Warum laufen uns die Versicherten weg? Kein Allheilmittel, wir tun uns schwer, Kunden richtig zu erreichen -> „Risk to chance“ mehr nutzen! KuZi schwer messbar, Markt und Versorgung, es wäre hilfreich, Aufwand und Kundennutzen ggü. zu stellen! Nicht messbar leider – in Strategie einfließen lassen! Infos, Daten müssen mittelfristig dem BI-System integriert werden!

Konsequente Ausrichtung an BSC – Balance, aber wo stehen wir denn da? Schwer, die Waage zu finden und halten!! Sind immer nur Momentaufnahmen! Wir kennen hier nur das Schwarz-Weiß-Denken „Kunden laufen uns weg“ Spagat schwierig und nicht messbar, transparenter Blick darauf fehlt!

Vllt. Hier in spezielles Know-how und MA investieren! MA Strategieentwicklung und –bewertung!! Kunden-Nutzen-Bewertung (wir schütten 11 Mio. € aus und was kriegen wir raus an Kunden?) – „mit wieviel Millionen möchte ich gut am Markt darstehen?“ – Gegenwert fehlt!

**Protocol: YES**

**Audio recorded: NO**

Appendix Table 9: Information systems and use of BI in German health industry

	products for reporting/ providing information and data (information systems)					
	BI: IBM (Cognos etc.)	BI: SAP (Business Objects etc.)	BI: SAS	SAP Business Warehouse	Microsoft Office (Access etc.)	unknown/ other information systems
AOK Niedersachsen	1				1	
AOK Hessen		1				
AOK Baden-Württemberg		1				
AOK Nordost	1					
AOK Bremen/ Bremerhaven				1		
AOK Bayern				1		
AOK Rheinland/ Hamburg				1	1	
AOK NordWest						1
AOK Rheinland-Pfalz/ Saarland						1
AOK PLUS						1
AOK Sachsen-Anhalt						1
Barmer GEK		1				
DAK Gesundheit	1		1			
Techniker Krankenkasse			1			
Betriebskrankenkasse	1					
	15	4	3	2	3	4
# HI companies	26,67%	20,00%	13,33%	20,00%	13,33%	6,67%
<b>60,00% Use of BI</b>						
<b>Quellen:</b>						
Techniker Krankenkasse	<a href="http://www.sas.com/offices/europe/germany/success/tk.html">http://www.sas.com/offices/europe/germany/success/tk.html</a>					13 Feb 2013
Barmer GEK	<a href="http://www.sas.com/offices/europe/germany/success/tk-planung.html">http://www.sas.com/offices/europe/germany/success/tk-planung.html</a>					18 Feb 2013
DAK Gesundheit	DAK BICC als strategisches Instrument der Unternehmensentwicklung.pdf					25 Jul 2011
	internal research/ <a href="http://www.bitmarck.de/leistungen/consulting/business-intelligence.html">http://www.bitmarck.de/leistungen/consulting/business-intelligence.html</a>					18 Feb 2013
Barmer GEK	<a href="http://www.sap.com/austria/services/consulting/pdfs/50083177.pdf">http://www.sap.com/austria/services/consulting/pdfs/50083177.pdf</a>					13 Feb 2013
Betriebskrankenkasse	internal research/ <a href="http://www.bitmarck.de/leistungen/consulting/business-intelligence.html">http://www.bitmarck.de/leistungen/consulting/business-intelligence.html</a>					18 Feb 2013
products for reporting Use of information systems						
SAP Business Ware		20,0%				
Microsoft Office (Acc		13,3%				
unknown/ other inform		6,7%				
BI: IBM Cognos		26,7%				
BI: SAP Business		20,0%				
BI: SAS		13,3%				
<p>Legend:</p> <ul style="list-style-type: none"> <li>SAP Business Warehouse</li> <li>Microsoft Office (Access)</li> <li>unknown/ other information systems</li> <li>BI: IBM Cognos</li> <li>BI: SAP BusinessObjects</li> <li>BI: SAS</li> </ul>						

Appendix Table 10: Deviation averages from top and lower level in AOKN

relevant BI issues for AOKN	AVERAGE		AVERAGE		deviation average from senior mgt. to BI end users
	OVERALL AVERAGE	BI end users	business management	senior management	
(qualitative) decision-making	4,9	5,0	5,0	4,7	-0,3
analytical skills/ data knowl.	4,2	3,8	4,5	4,7	0,9
business strategy	4,7	4,8	5,0	4,3	-0,5
CIP	4,2	4,2	5,0	4,0	-0,2
Cognos products	3,0	3,2	2,5	3,0	-0,2
BI communication	3,8	3,8	3,5	4,0	0,2
controlling of objectives	4,4	4,0	5,0	4,7	0,7
early warning system	4,1	4,4	4,0	3,7	-0,7
data access	3,2	3,4	3,5	2,7	-0,7
data processing	3,6	3,6	3,5	3,7	0,1
data mining	3,7	3,6	4,0	3,7	0,1
data quality	4,4	4,4	4,5	4,3	-0,1
financial stability	4,8	4,6	5,0	5,0	0,4
health markets	4,4	4,2	5,0	4,3	0,1
health care programs	3,6	3,4	4,0	3,7	0,3
leadership processes	4,2	3,8	5,0	4,3	0,5
multidim. analysis	4,0	4,0	4,5	3,7	-0,3
performance	3,9	4,0	4,5	3,3	-0,7
prediction models	4,0	4,0	4,0	4,0	0,0
standardization (ratios)	3,1	3,2	4,0	2,3	-0,9
DWH	4,1	4,0	4,5	4,0	0,0
trainings/ exchanges	3,7	3,6	3,5	4,0	0,4
transparency (processes)	4,3	4,0	4,5	4,7	0,7

5 very relevant 4 relevant 3 neutral 2 scarcely relevant 1 irrelevant	0,62 standard deviation
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