

Critical Success Factors affecting Decision Support System Success, from an end-user perspective

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Abstract

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- Abstract:** In the history of DSS literature numerous of researchers have investigated the state of DSS and attempts have been made to develop an understanding for the role of certain critical success factors affecting the implementation success. However, the cumulative knowledge is in the literature suggested to be limited and regularly placing the end-user outside the centre of focus. This thesis have included these reporting and concentrated on building a cumulative theoretical framework of IS research applicable to the field of DSS, starting from Wixom & Watson's research model from 2001. Via a multi-method entailing the built up theoretical framework and two expert interviews a research model was designed, which subsequently was tested and evaluated through a survey in order find the answer to which critical success factors that significantly affects end-users perceived net benefits of a DSS post-implementation. By analyzing the survey result, this study identified three factors that significantly affect end-users perceived net benefits, namely Data Quality, Problem Match and Support Quality. The thesis finishes with a discussion and conclusion of how the findings can contribute to the field of research and practice, and how further studies can follow on where this thesis finishes.

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Björn Gustafsson

Johannes Johansson

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ABBREVIATIONS

AVE – Average Variance extracted

CSF – Critical Success Factor:

DQ – Data Quality

DSS – Decision Support System

DW – Data Warehouse

EIS – Executives Information Systems

IS – Information Systems

LV – Latent Variable

MIS – Management Information Systems

OS – Organization Size

PLS – Partial least square

PM – Problem Match

PNB – Perceived Net Benefits

SQ – System Quality

SU – Support Quality

TI – Time

In this very first chapter of the thesis an explanation of why and what is unfold. It starts by introducing the subject of decision support systems and critical success factors. Thereon is the problem discussion outlined, which sequentially lead to our purpose and research question.

1. Introduction

In order to make a good decision one needs to have information about that specific environment (Marakas, 2002; Park, 2005). This very fundamental idea about making decisions is what has formed a multibillion dollar industry with a substantial amount of organizations involved. The market was 2006 estimated to 12 billion dollars (Yeoh et al., 2006) and the closely linked Data Warehouse (DW) market to a near 29 billion dollars (Ramamurthy et al 2007). Large actors such as Business Object, SAP, Microsoft and Oracle are all participants and are continuously striving to be at the leading edge in this field. Decision support systems (DSS) have during the last years emerged as a vital part of a decision makers toolkit and their role are just like the name reveals, to provide support for decision makers (Marakas, 2002).

So why do organizations use this type of application? Hartono et al. (2006) and Arnott (2004) states that organizations implement various DSS in order to improve the delivery of information to decision makers and to support their decision making activities. As a common knowledge it is said that, the wheel of change is spinning faster and faster as time moves forward. This statement is also applicable within the field of decision making. Marakas (2002) gives us the following statement in his book *Decision Support System In the 21st Century*.

“The speed with which today’s information becomes yesterdays news continues to increase at a staggering rate. Tomorrows managers will confront an ever-narrowing window of opportunity within which effective decisions will need to be made” (p. 4)

Here we can start to understand the role and the actual importance of a DSS. Ralph et al. (1995) outlines the reason for DSS growth is due to that it increases the effectiveness and efficiency of the upper-level information workers who tend to be highly paid. Thus, if their work is more effective and efficient the organization saves money.

Studies have shown that information and System Quality affects an individual’s performance. Thus, improving these should lead to enhanced decision quality, and maybe contribute to an overall system success (Park, 2005). Inevitably there are reasons to believe that DSS actually facilitate decision making in various situation. Although, studies have also proposed to state the opposite and more over that these systems are not always considered successfully after they are implemented, meaning, that the anticipated net benefits are not always realized. This subsequently leads to the quest of knowing; what

affects a successful DSS after they are implemented? I.e. what will ultimately give the organizations their perceived net benefits (Hartono et al., 2006)? This search is what will define and pilot this thesis.

1.1 Problem discussion

Software development in general and DSS in particular has been studied widely over the last decades (Arnott & Pervan, 2005) with DSS becoming as a significant IS scholarship. Despite all research within the field of critical success factors in IS and DSS (examples of such studies are Wixom & Todd, 2005; Seddon, 1997; Delone & McLean, 1992) there is still a high percentage of the IT projects that fails in the sense that they do not meet their requirements or are not considered a success from an end-user perspective. A study by Poon (2000) showed that a staggering 70 percent of all information systems fail in meeting their pre-defined goals, which is also something that McBried (1997) elicit. In order to prevent this in the future, information systems far more needs to reflect what end-users actually need and want. In order to know what users actually need and want one has to know what the users consider as a system success. This is something that has caught our attention not only as researchers but also as information system users.

Research that identifies and puts the end-user in the centre of the research is according to Arnott & Pervan (2005) limited. Arnott & Pervan (2005) investigated 1020 articles from 14 major journals from 1990 to 2003 with the soul purpose of describing the state of DSS, notable here is that all of the 14 journals investigated were high quality journals indicating that a very low amount of articles are selected out of the ones applying.

Previous research, for instance Poon (2000) and Wixom & Watson (2001) among others, look at critical success factors out of an implementation perspective not giving post-implementation as much space that it might need, if any. Hartono et al. (2006) uses an extensive literature review within the field of IS success factors to marshal and rank which factors that affect Management support system success (including DSS). But like many of the authors that Hartono et al. (2006) include in their research, they, also have a view that looks deep into the implementation step to find success factors, neglecting the post-implementation perspective.

Notable is that Arnott & Pervan (2005) stresses that the DSS research lack relevance in the academic research out of the simple fact that there has not been a significant cumulative approach that yields strong models that leads the practical prescription. Hartono et al. (2006) also makes a comment on the fact that research done within the DSS discipline is fragmented and the cumulative knowledge is therefore limited. Arnott & Pervan (2005) further argues that a strategy to increase the relative relevance of DSS in contrast to other IS fields are to increase the numbers of case studies. Studies have shown that the DSS field is the IS area where the least case studies have been conducted over the last years (Arnott & Pervan, 2005). Due to the lack of case studies the DSS field is lagging behind other IS areas in the adoption of this research paradigm.

On what is stated above, this study recognized the importance of putting the end-user in the centre of the research. Continuing on the current state of DSS academia, we took a post-implementation approach as the focus of this study, not neglecting what has pre-

viously been done within this field. By selecting a certain DSS application as a case, we hoped to identify which CSF's that affects end-user perceived net benefits. This was to be realized via both interviews and a survey.

1.2 Purpose

By considering the above stated discussion, one apparent gap in the previous research has been recognized. Wixom & Watson (2001) among others, have investigated system success from an implementation perspective but although the literature have pointed out the importance of investigating system success post-implementation, any major efforts filling this gap has been sidestepped. In addressing this gap, exploring system success post-implementation, the angle of this study is from an end-user perspective giving it an interesting and less studied approach. System success evolves, and goes hand-in-hand, with a more measurable aspect namely *perceived net benefits*. If end-users productivity increases or the work procedures positively change (Wixom & Watson, 2001), the perceived net benefits will consequently be higher and the system will be seen as more successful.

Consequently, the general purpose of this study was to produce new knowledge that can help DSS vendors in a higher degree contribute to end-users perceived net benefits (i.e. system success). To achieve this, the aim was to find which *critical success factors* (CSF) that positively lead to higher perceived net benefits out of an end-user perspective after the DSS has been implemented (post-implementation).

In order to identify these critical success factors a revised version of Wixom & Watson's (2001) research model was developed and the following research question was used.

1.2.1 Research question

Which critical factors significantly affect perceived net benefits from an end-user and post implementation perspective?

To handle a complex question as the one stated above, we saw it necessary to break it down into smaller and more manageable subject areas, namely:

- Q1: How well do the factors in the literature review correspond to those found in the DSS practice?
- Q2: Are these factors something that reflects the end-users perception of perceived net benefits?

The above stated questions acted as a roadmap to ultimately answer the overall research question. Each question corresponds to a particular section of the thesis. Q1 is addressed in chapter 2 and 4, where CSF's found in the literature review meets the industries perceptions of CSF's. Q2 is addressed in chapter 5 and 6 where the end-user was taken into account. The latter one was a very central part of this study since its result was the final critical success factors, presented in chapter 7.

1.2.2 Expected contributions

The outcome contributions of this research were suggested to be twofold. Firstly, by contributing to the field of research. By answering Q1 and Q2, we seek to develop a theoretical understanding of the current status of CSF's within our research area but also to provide new cumulative knowledge to future IS researchers who are interested in the field of DSS. The second contribution of this study is aimed at the field of practice. By answering the overall research question, we might enlighten DSS-vendors about what parts of the post-implementation phase they should concentrate on to increase the success of the system and end-users perceived net benefits.

1.3 Delimitations

Our intention in this thesis was focused towards the section of the statistically significant model that Wixom and Watson (2001) presented as system success (figure 2.1). This part of the model takes an end-user view on system success and perceived net benefits in a Data Warehouse context. By delimiting us towards the end-user, we were able to give a richer and a more extensive explanation that ultimately provided a better result. Further, if this first delimitation had not been realized the time limit of ten weeks would be substantially exceeded.

In order to enlighten our area in the best possible way, we grounded our literature review as much as possible in literature made after the initial model was purposed. Thus, making it a cumulative approach of data gathering, that gives the reader a more up to date review.

Since Wixom and Watson's (2001) article was written there has been substantial research done within this field, both in IS success factors and within DSS. Clark (2007) presents a multidimensional model that includes a vast majority of the IS success related factors which is built up by an extensive review of the relevant literature and available research. This type of model would have been appropriate if our goal was to focus on the whole area of Decision support system. Though, since we focused on the end-user we delimited various models that describe the whole area to the part that corresponds to our purpose.

1.4 Research design

To elucidate and picture the general idea of this study, from literature review to final conclusions, an explanation of the research design is fundamental to obtain high validity. The study used a multi-method research approach entailing two major steps (as shown in figure 1.1), moving from model A, to model B, and ending up in a statistically tested model C. The first step regarded our research model development. By starting from Wixom & Watson's (2001) original model (model A, figure 2.2), we could via past literature and interviews develop a hypothesized research model (model B figure 5.1). The second and final step was an evaluation step where the hypothesized model B was tested against the reality (via surveys), ending up in a final significant and casual model (model C). A more thorough explanation is outlined under section 3.

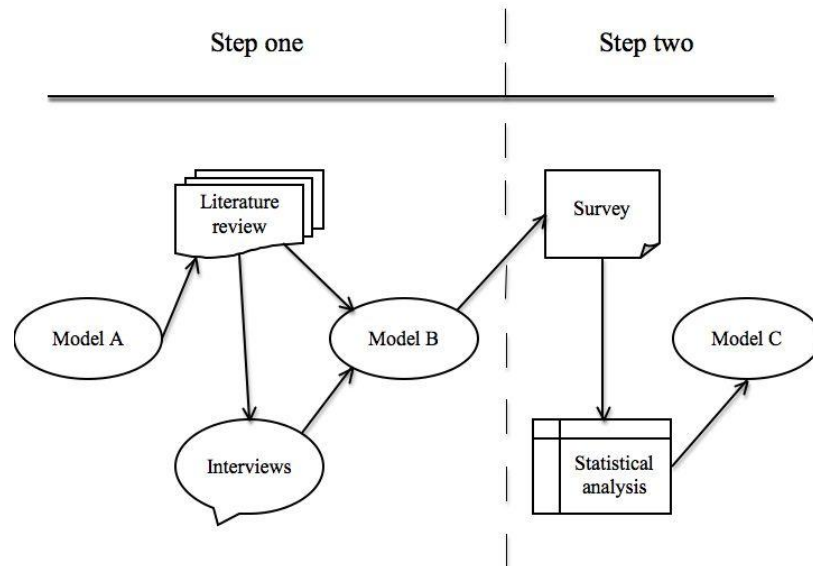


Figure 1.1 – Research Design

As stated in the previous chapter, this second chapter partly helped us answer our first research question (Q1). By conducting a literature review that covers the fields of DSS, DW, CSF's and previous models used to assess CSF's. The chapter ends by presenting the reader with a list of factors that was found in the literature, which furthermore acted as a foundation in the rest of our study.

2. Literature review

In order to provide the thesis with a rational theoretical framework we saw it as necessary to conduct a thorough literature review. The focus of the literature review was to highlight the field of study with a more current and relevant academia. This is a crucial step for a researcher, since it helps the researcher not inventing the wheel over and over again, and making the knowledge more cumulative (Bryman, 2006). Backman (1998) argues that this step is one of the most vital parts of the research process, because it is how we could identify gaps in the academia and get a feel of which terminology to use.

When going at this task, we started out by using the *ISI Web of Knowledge*¹ where we searched for papers that have cited the original model presented by Wixom & Watson (2001) and it resulted in 71 hits of various articles. Out of them, somewhat 10 articles was of interest in the scene that they also examined CSF's from a context that was suitable and aligned with the purpose of this thesis. These articles worked as a foundation for further literature research, continuing and building on their references and so on.

As a complement to the previous work approach, major article databases (ELIN, ELSEVIER, etc.) and journals within information science (MIS, Decision Support Systems, Information Systems Research; among others) were used to gather information about CSF's, DSS, Data Warehouse, Success antecedent and general information system success. Also, additional literature e.g. books were used to further describe the major subjects of this thesis. Notable is that we tried to select articles that were written after the initial model was outlined in order to obtain an "as up-to-date" literature as possible fulfilling our cumulative goal.

2.1 Theoretical definitions

In order to get a clear view of the terms and concepts used in this research, this subchapter provides an updated theoretical definition from modern references in the area. This subchapter also serves as the foundation when discussing and analysing our result. Below are two distinct areas described, namely DSS and DW. This was done in order to bridge and show that factors, models, and concepts that are used within the field of DW are also applicable within in the field of DSS.

¹ (isiwebofknowledge.com)

2.1.1 Decision support systems

As data warehouse relates to bringing data in, the procedure of decision support systems is basically of getting the data out. DSS have during the years been defined in many near, but diverse, terms. The following is a classic definition of DSS:

“Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions. It is a computer-based support system for management decision makers who deal with semi structured problems.” (Keen & Scott-Morton, 1978, referred in Turban et al., 2007, p. 20)

In spite of the above statement, the term decision support system is a content-free expression (i.e. it means different things to different people). Hence there is no general accepted definition of DSS (Turban et al., 2007). However, a more abstract and novel explanation of the term DSS is expressed in Moreau (2006, p. 594, who cites Edwards, 1992, description) as *“a system that provides users with access to the data and models they need to make better decisions.”* Although these expressions are only examples of different definitions the key purpose of a DSS is unmistakable, namely to provide decision makers with relevant information in decision situations.

According to Turban et al., (2007) the term *DSS* can be used as an umbrella term for any computerized system that supports decision-making. It is normally developed to support the solutions of a particular problem or to estimate an opportunity. In brief the DSS have its own databases, uses data, provides an easy interface, and can encompass the users own knowledge (Turban et al., 2007). The following is a good example on what a DSS can do:

“An organization may have a knowledge management system to guide all its personnel in their problem solving. It may have separate support systems for marketing, finance, and accounting; a supply-chain management (SCM) systems for production; and several expert systems for product repair diagnostics and help desks. DSS encompasses them all.” (Turban et al., 2007, p. 21)

Williams et al. (2007) argues, however, that one should not jump to the conclusion that all DSS will support decision makers in making better decisions. Presumably, DSS is a great support for organizing and structure the information load on decision makers but as Williams et al. (2007) demonstrated, DSS can also be a foundation for mistakes when users makes routine tasks and interact with the system.

Even if the focal point of a DSS is clear, the term DSS, however, is vast and ambiguous and incorporates several characteristics and various capabilities. The following list provides some understanding to the ideal sets of some of these characteristics and capabilities.

- DSS provides support for decision makers primarily in semi structured and unstructured situations, where other methods fail, by bringing together human judgement and computerized information.
- Support is provided for various managerial levels, and to individuals as well as groups.
- DSS provide support to interdependent and sequential decisions.
- DSS supports the entire decision making process: from scanning all the data to taking the decision.
- A DSS is adaptive, thus the decision maker can be reactive and able to confront changing conditions quickly. It is also flexible, so the user can add, delete, change, combine, or rearrange basic elements.
- DSS should have strong graphical capabilities and a high usability.
- DSS attempts to improve the effectiveness of decision making, rather than its efficiency of making decisions.
- A DSS aims to support and not to replace the decision maker, which means that the decision maker has complete control over the process.
- Models for analyzing decision-making situation can be utilized by a DSS.
- The DSS should provide access to a variety of data sources, formats, and types.

(Turban et al, 2007)

Subsequently, as being presented above, the characteristics and capabilities of DSS are many and various but they do however address some frequent themes. The first theme of DSS is grounded in the construction of the problem and concentrate on providing support to the decision maker on the structural parts of the decision. Hence, the decision maker can focus on the really unstructured parts of the problem. The second theme centre on the decision outcome, and the third relate to the managerial control. Based on these three themes, Marakas (2002) state that the following is a formal definition of DSS:

“A decision support system is a system under the control of one or more decision makers that assists in the activity of decision making by providing an organized set of tools intended to impose structure on portions of the decision-making situation and to improve the ultimate effectiveness of the decision outcome.”

(p. 4)

2.1.2 Categorization of the Case DSS

Marakas (2002) meant that it is important to understand the type of DSS to determine the best design and approach of a new DSS. Accordingly, to be able to investigate the critical success factors of DSS in this study, the categorizations in this section are in correlation with Marakas (2002) opinion. We identified three substantial distinctions of the DSS investigated in this case study: *User Interface Integration*, *Pervasive DSS* and *Executive information systems (EIS)*.

The alterations between DSS applications on the market differ partly because of their type of integration. Thus, they require different levels of changes to the core applications/systems. While certain DSS integrations requires a total makeover, integrating all

the previous installed systems, some DSS applications work as a top lid that is just placed on top of the existing systems. The later type of DSS integration, which was the centre of attention in this study, is the kind that is related to *user interface integration* (Linthicum, 2000). User interface integration is the most primitive level of application integration, which does not require any changes to the source or target applications (Linthicum, 2000) and is primarily developed to display data from numerous non-integrated systems to the user (Linthicum, 2001, referred to in Henningsson 2008). Hence, the system can handle and query vast amounts of data without the use of a data warehouse.

The second distinction found, further categorized the DSS in this case study and was central to distinguishing it from other DSS research. Watson & Wixom (2007) in their article about the current state of Business Intelligence (BI) they mention a pervasive BI. A pervasive BI distributes to a larger user base, providing users with the information they need to perform their jobs better. Real-time data are always available and together with “*easy-to-understand*” dashboards they contribute to important information democracy. (Watson & Wixom, 2007)

As a result, the DSS investigated in this case study are very alike a pervasive BI and since a BI describes all analytic applications and DSS is one of them (Watson & Wixom, 2007), we therefore revised pervasive BI into pervasive DSS. The DSS studied also corresponded to the specific type of DSS, characterized by its use by executive decision makers, and is called *EIS*. An EIS is generally designed as a DSS that serves the information needs of top executives. It supplies rapid access to up-to-date information, which is supported by graphics and drill-down capabilities all with a high usability. Drill-down is an important feature of EIS and allows the user to break down data to details, which support the user to identify problems/opportunities and their sources. (Turban & Aronson, 1998)

In the context of this case study, and from the eyes of the end-users, the category of DSS studied was a *user interface integration application* with the features from both a *Pervasive DSS* and a *EIS*.

2.1.3 Data warehouse

Historically, the major purpose of data warehouse has been lucidly described as establish a *data repository* that makes operational data manageable in a form that is meaningful for decision support systems (Turban & Aronson, 1998; Wixom & Watson, 2001; Inmon, 1992, referred to in Marakas 2002).

In simple terms, a DW is a library of data created to support decision-making but also a repository of current and historical data of interest for the whole organization (Turban et al., 2007). This data is generally extracted from various sources, transformed into relevant formats, loaded and ready for analytical processing activities (Turban et al., 2007). The process of getting data in, “*data warehousing*”, combines the moving of data from various data source systems into a single integrated data warehouse (Turban & Aronson, 1998). These data sources can reside within the organization, be provided by external suppliers, or come from a business partner (Watson & Wixom, 2007). A DW is:

“[...] a subject-oriented, integrated, time-variant, non-volatile collection of data in support of management’s decision-making process.” (Turban et al., 2007, p. 209)

A data warehouse is accordingly a repository of data, but *data warehousing* on the other hand is more accurately the full process (Turban et al., 2007). Thus, the outcome from data warehousing is applications that provide decision support capability, access to information and create business insight (Turban et al., 2007).

2.1.4 Bridging DSS and DW

According to Ramamurthy et al. (2007) DW falls into the infrastructure type of innovation category, meaning that the infrastructure has to change with the DW implementation. On the other hand the investigated type of DSS are part of the *user integration application* (Linthicum, 2000) category, which means that it is simply placed on top of previous installed systems and databases. This indicates that it is not an infrastructure type of innovation.

From the above point (no. 3) Hoffer et al. (2007) states that DSS is a type of client software that utilise data from a DW to support end-users with information. Based on this, empirical critical success factors, which are ground for DW success, would seemingly also be applicable to DSS that uses a DW. However, as described above, the type of DSS examined in this study is not using a DW but rather interconnects several data sources and clean the data without the use of going through a DW. By reviewing different literature, a clear ambiguity arises between the concepts of DW and DSS. For instance: Arnott & Prevan (2005) states that a DW is in fact a DSS, Hartono et al. (2006) on the contrary distinguish them but argues that both supports the decision-making process. Further, the initial model that Wixom & Watson (2001) describes, which is presented below (2.3), separate DW from DSS and also point out that DSS is not an infrastructure type of innovation as DW. Wixom & Watson (2001), general IS researchers, DW and DSS philosophers, among others, which build their research concerning critical success factors does however often undertake one and the same source, namely DeLone & McLean (1992) which possibly may be the most cited study within the field of IS.

Consequently even if there is an ambiguity between the concepts, DW is linked to DSS and visa-a-versa. DW relate to bringing data in and transforming it to be meaningful for decision makers and DSS concern the process of bringing this data out so it can be used and create value to the decision makers (Watson & Wixom, 2007). In the scope (investigating system success and perceived net benefits) of this research decision support systems and data warehouse have been seen related since they both supports the decision-making process by bringing data in and getting data out. In that consideration, critical success factors for DW could and should be applicable to the DSS area and therefore are DW literature as relevant as DSS literature.

2.1.5 Critical Success Factors as a concept

According to Yeoh et al. (2006) the concept of Critical Success Factors (CSF’s) was popularized by Rockart (1979) as a mechanism to identify the information needs of

CEOs. Since then CSF's have been extensively used within the field of IS research. The concept is developed so that only managers should concentrate on the most critical factors of project success. This makes it easier for managers to prioritize vital aspects of a project (Yeoh et al. 2006). Although, this does not implicate that just because a project has established their CSF's the whole project will automatically succeed. The only thing that the CSF's state is that it would be erroneously to neglect one of the CSF's. It has also been stated that by identifying CSF's this should facilitate the assessment of resources needed in a project. Hartono et al. (2006) uses the following words to describe their interpretation of CSF's:

“Success antecedents are those key factors that organizations can manage so that the management information system is favourably received and the implementation is deemed as successful” (p. 257)

Since the use of CSF's are common in the IS research (Wixom & Watson, 2001; DeLone & McLean, 1992; Seddon, 1997; Biehl 2007; Yeoh et al. 2006; Poon, 2000; among others) and the purpose of this thesis was very much in accordance with the explanation of CSF's, we therefore saw it appropriate to use this concept for factors found in our investigation. In the following sections we present; Perceived Net Benefits, Wixom & Watson's model (model A), and previous CSF's antecedents from both the IS literature in general and in the DSS literature in particular.

2.2 Perceived Net Benefits & Framework

As previously stated, this thesis applied and revised the model first presented by Wixom & Watson (2001). There are multiple models covered in the research literature that apply the concept of CSF's or key determinants in a IS context. The reason why to use Wixom & Watson's (2001) model was partly because they adopt the concept of *“perceived net benefits”* which according to Seddon (1995), who advocates this construct, is a very suitable measure when investigating IS success, which is exactly what we aimed for. So what is perceived net benefits? Seddon (1995) outlines the following definition for this concept:

“[...] PNB is defined as the sum of all future benefits less all future costs expected to flow from use of an information technology application.” (p. 354)

Seddon (1995) further state that Perceived Net Benefits is more likely to be a reliable predictor of IS use than perceived usefulness, and a sounder measure of IS success than user satisfaction. Recognized researchers such as DeLone & McLean (1992) and Nelson & Todd (1992) have all used this construct and the latter also indicate that Perceived Net Benefits is in some cases the most appropriate measure of IS effectiveness, which also was a concern in this thesis (discussed in later chapters). The concept is shown in the following figure:

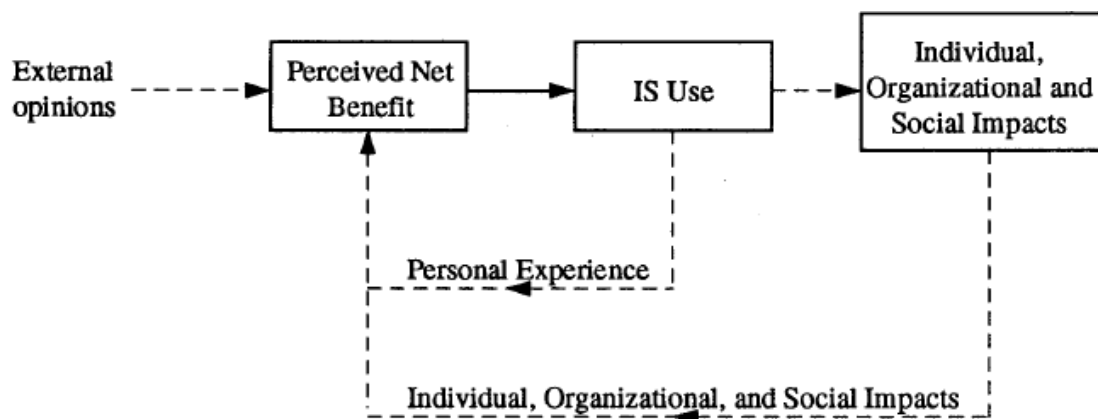


Figure 2.1 – PNB framework (Seddon, 1995, p. 354)

As can be seen from the figure above (figure 2.1) there is a solid line between Perceived Net Benefits and IS use, which indicates a casual relationship. Furthermore, this framework should be interpreted with a progression of time. This means that Perceived Net Benefits will evolve, preferably increase, over time. When end-users start using the system, the two feedback paths starts feeding into Perceived Net Benefits and this consequently increase the two prior. Since there is a time aspect connected to this framework it makes it an appropriate ex post measure of IS Success (Seddon, 1995), which is also in line with the uniqueness of this thesis.

Like mentioned above, various authors have presented the research realm with a herd of articles that use different models and key determinants. As described above, one of the reasons for choosing Wixom & Watson (2001) was because of the Perceived Net Benefits use. Another additional reason for choosing their initial model (figure 2.2) was due to their model testing, they provided statistical measure that were fairly easy and a straight forward to reflect and compare. For instance, Staples et al. (2002) present the reader with a paper that investigates Perceived Net Benefits out of an end-user, post-implementation perspective, very much like ours. Their article would have been a perfect foundation in this thesis if they provided a model as their result, which would have made a comparison that much easier. Furthermore, Wixom & Watson (2001) investigates DW in their article, which is a fairly close related area to DSS, making their result highly interesting. Further reason for choosing the model presented in Wixom & Watson (2001) as a foundation was the fact that they use DeLone & McLean (1992) as their inspirational source. DeLone & McLean's (1992) paper on IS success could be seen as a forefather to the general concept of IS success with more than 2000 citation², thus building upon this paper is highly appropriate.

2.3 Initial Model (model A)

As previously stated, this thesis applies and revises the model presented first in Wixom & Watson (2001). This section richly describes how the original model was presented and how it initially was intended to work. As mentioned in the background there are

2

http://scholar.google.se/scholar?hl=sv&lr=&q=information+system+success+the+quest+for&as_ylo=1992&as_yhi=&btnG=S%C3%B6k

reasons for believing that this model to some extent would be applicable within our field of study. Presented below in figure 2.2 is the initial model.

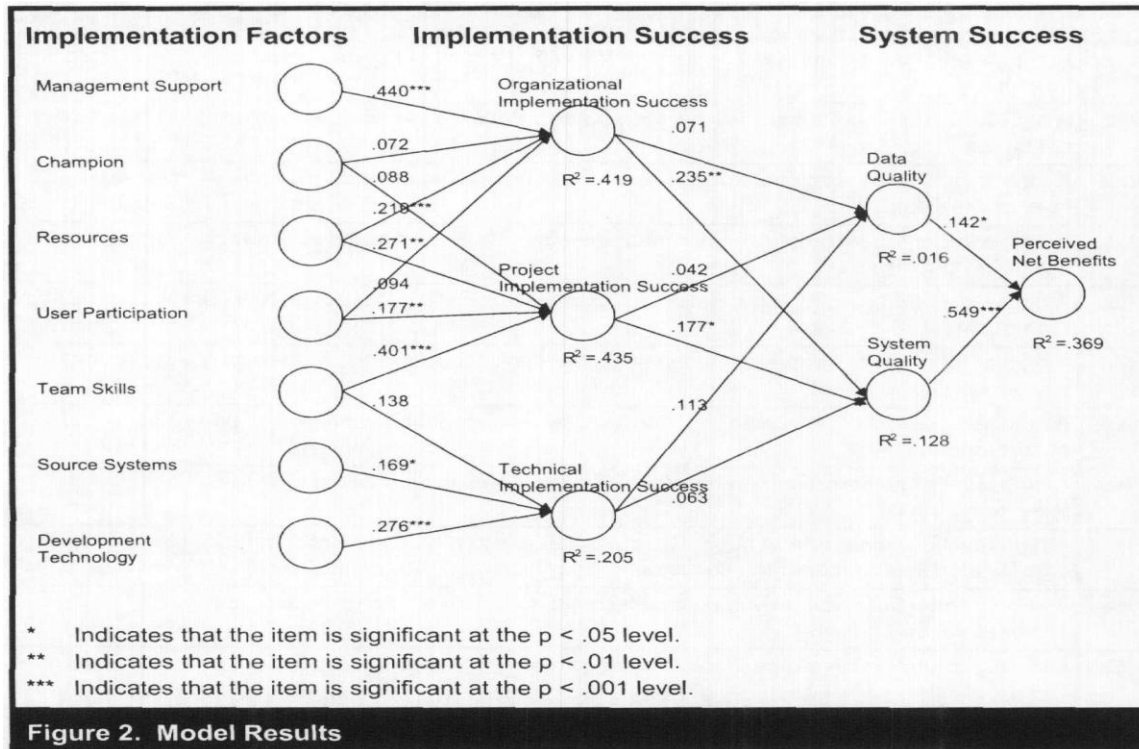


Figure 2.2 – Initial model (Wixom & Watson, 2001, p. 33)

As notable from the figure above statistical numbers are presented, this, because by using them we can easily show statistical relationships that were found in the initial model. Clearly one can see that the authors have used three different levels of significance when testing their different path coefficients; .05, .01, .001 with the latest as the most significant. Also R^2 is used to test factors in *implementation success* and in *system success*, which is done in order to get an estimate of how well the model is able to predict (explain variance). A low value of the R^2 indicates a low explanation of the variance and a high value correspondingly indicates a high statistical explanation of the variance.

The presentation of the model goes from left to right, describing the different factors and their categorization, which was also the initial thought when designing the model (Wixom & Watson, 2001). When moving from left to right we sequentially, moving the dependent and independent construct relationship in the same direction. E.g. in the first step implementation success factors are the dependent factors and the implementation factors (to the far left) are the independent variables.

Implementation factors

This category is supposed to contain factors that should influence implementation success. Although Wixom & Watson (2001) stresses that a data warehouse project are different from that of an application implementation they also points out that there are some common factors that are consistent in both type of projects. These factors are presented in this section.

Management support:

According to Wixom & Watson (2001) this factor reflects the overall sponsorship for the project among managers. This factor has been widely recognized in the IS literature to have a significant affect of the overall success pre-implementation.

Champion:

A champion is someone how actively supports the project and supplies it with various resources. This person is as important to a data warehouse project as to any other IT project. The champion is likely to have a closer tie (on a daily basis) to the project than that of a manager. (ibid)

Resources:

A common and widespread factor is that of the resource allocation for a certain IT project. Resources include the money, people and time that are required to successfully complete the project, where, the more the merrier. (ibid)

User participation:

User participation occurs when users are assigned different project roles and tasks, this leads to a better communication of their needs and helps to ensure that the system is implemented successfully. The importance of this factor stretches further than just in the implementation situation. By obtaining a high user participation in the implementation phase the system is more likely to be accepted once implemented. (ibid)

Team Skills:

Having the right people with the right sets of skills in a project is of great significance. Projects with the right people have been recognized in the IT literature to have a major impact on the overall success of the system. (ibid)

Source Systems:

Studies have shown that existing data quality in an organization have a profound effect on the success of a new system. Data needs to be consistent in the whole organization in order to benefit from, e.g. new functionality. (ibid)

Development technology:

The technology on which the system is built will affect the overall performance of the system. It is evident that the hardware meets the requirements of the software, e.g. heavy database simulations needs powerful hardware. (ibid)

Implementation Success

The factors presented below were according Wixom & Watson (2001) all hypothesized to be associated with system success, although this was not the outcome of the study, as could be seen in figure 2.2.

Organizational implementation success:

The implementation is not successful unless the system it produces is accepted in the organization. An IS can cause extensive organizational change and there seem to be a relationship between organizational change and system size. Data warehouse implementations have the potential to modify business processes and shift data owners, moving ownership from the end users to more executive personal which could end up in resistance from various users. (ibid)

Project implementation success:

Success in projects can be measured by how well the different teams meet budgets, critical deadlines and functional goals. IS projects tend to be highly complex and problem often arise that needs to be handled quickly, therefore it is important to have well-managed teams that could adapt fast. If the project meets all their requirements this should lead to a system success. (ibid)

Technical Implementation Success:

Data Warehouse implementations are rather large-scaled since they need to incorporate underlying systems, this also increases the complexity of such implementations. Technical problems may emerge when heterogeneous data sources must be combined and when new technology for data warehousing must be fit into an existing technical infrastructure. These profound problems could have an effect on the repository of high-quality data that is needed in these types of systems. (ibid)

System Success

This dimension was built upon the general IS success literature grounded partially on the work of Seddon (1997) that builds upon the famous work of DeLone & McLean (1992). It is proposed in the literature that higher level of data quality and system quality leads to higher perceived net benefits (Wixom & Watson, 2001).

This dimension differs slightly from the previous two since this dimension focus on the end user of the DW system and what they believe and assess to be their perceived net benefits. The prior two takes on the dimension of the developer team and what they should work with in order to obtain success. (Wixom & Watson, 2001)

Data quality:

This is the utterly and far most fundamental factor in a DW project. It concerns the quality of data that are provided from the DW. This is the very reason to build a DW; to get high quality data deliver to end users. This factor has been widely researched and has many different definitions regarding its underlying variables. (ibid)

System quality:

This factors focus is on the system itself and is commonly measured by the systems flexibility, integration, response time and reliability. System quality is one of the most important advantages for a DW because a warehouse provides the infrastructure that integrates data from multiple sources and flexibly supports current and future users and applications. In this factor were various functional definitions also placed that make the system specific and unique (ibid).

Perceived Net benefits:

It is stated in Wixom & Watson (2001) that a system with high Data Quality and System Quality can lead to perceived net benefits for various users such as stakeholders, decision makers and ultimately the organization. One of the aims of this factors is to increase the decision maker's productivity and change how people perform system related tasks. A data warehouse significantly affects how decision making for the end users is supported in the organization because IT professionals no longer have to extract data and run queries for users as in the past. (ibid)

2.4 Theoretical advancement

As a reason for revising the initial model (figure 2.2) is that from the time when the initial model (see 2.3) was proposed in 2001, IS researchers within the field of DSS have been attempting to identify more up-to-date and modern factors that lead to new models and further knowledge within DSS success. As support for the previously reasoning, Barbara H. Wixom (Co-author and founder of the model) stated in an e-mail (appendix 5) that a more up to date model would suite the field of DSS better and that there had been advancements within the field that would need to be incorporated in order to achieve and develop some kind of cumulative knowledge. McBride (1997) also suggested that success or failure of an IS should not, and cannot, be explained purely in a technical term, which is the only angle Wixom & Watson (2001) describes it from. Based on this, we set out to find new factors that could suit the initial model by complementing it, where it today lack coverage.

Previous research on DSS has been mainly focused on factors for successful implementations of DSS. Park (2005) have for instance cited a number of authors who identified aspects such as project factors, organizational factors and infrastructure factors have had significant impact on successful implementation. Further, Park (2005) also found indications of that the external environment and prototyping were critical for successful implementation. Biehl (2007) studied the factors of a global implementation success and failures, and brought into existence the importance that project managers (of vendor companies) need to conduct a process analysis and detailed planning. Factors like these, and the implementation part of the previous model, was, however, disregarded in this study and therefore was the findings of previous research within our delimitations extra limited. Hence, the factors that were suitable and relevant for this investigation were accordingly those that relate to the system success part of the previous model (figure 2.1) and concentrates on what affects the *perceived net benefits* within an end-user context.

2.4.1 Previously stated factors

As grounded in Wixom & Watson (2001) System Quality and Data Quality are two factors that directly affect perceived net benefits in relation to system success, thus making them highly interesting in our potential research model. Below we describe the different factors more thoroughly and show how they came to be and why they were important in this thesis.

2.4.1.1 System Quality

The System Quality factor has antecedent in the IS literature reaching as far back as 1949 (DeLone & McLean, 1992). Our aim was not to take a historical approach. Therefore our focus when developing this factor was to stretch it from DeLone & McLean's (1992) definition up until today. This factor has been used and discussed in numerous IS contexts (Seddon, 1997; Wixom & Todd, 2005; Clark, 2007) which indicate that this factor is not specific to DW, also making it applicable in our research area. According to DeLone & McLean (1992) System Quality is the measures of the information processing system itself. The following variables listed in the table below (Table 2.1) is

grouped under System Quality in the initial definition made by DeLone & McLean (1992)

Table 2.1 – Summarization of initial variables

<i>System Quality</i>		
Convenience of access	Integration of systems	System reliability
Ease of learning	Resource utilization	System sophistication
Ease of use	Response time	Turnaround time
Data accuracy	Realization of user requirements	Usefulness of system features and functions
Database Content	System accuracy	
Data Currency	System efficiency	
Human factors	System flexibility	

By reviewing the table above (table 2.1) one can see that, there are many variables that are grouped under the System Quality factor. However, DeLone & McLean (1992) states that one needs to do an evaluation of which variables that fits the purpose of the study, the object being studied and the method being used. Thus, not all variables need to be included.

According to Vandenbosch & Huff (1997) appropriate measures when evaluating various DSS from a system quality view are *differentiation*, *integration* and *flexibility*. Wixom & Watson (2001) takes this a bit further and selects *integration* and *flexibility* as variables that should represent System Quality on the basis that, systems that integrate data from diverse sources can improve organizational decision making. Flexibility allows decision makers to easily modify applications as their information needs change Vandenbosch & Huff (1997). As previously stated in the purposes of this thesis the model of Wixom & Watson (2001) is acting as a foundation when assessing various CSF's that might affect perceived net benefits. The most accurate way of doing this would be to adopt the same variables in our future model that Wixom & Watson (2001) used in their definition of System Quality. Another reason for adopting the same variables that has previous been used is that they have been proven statistically to be valid in their present form. The System Quality and the Data Quality (presented below) together explained 37% of the perceived net benefits variance in the original model. And the System Quality factor had a significant impact on perceived net benefits with a path coefficient of 0.549 at a significance level of ($p < .001$). Further, since the System Quality factor was not DW explicit we believed that the same result could be achieved in our research. Thus, our System Quality consisted of two variables, namely flexibility and integration. A short list of the variables and a definition of these are provided in table 2.2 for reflective purposes.

Table 2.2 – Summarization of System Quality variables

<i>Variables</i>	<i>Definition</i>
Flexibility	Exists if the data are independent of the use to which they are put, and/or if the system provides analytic and modelling capability.
Integration	The ability for a system to collect data from various sources and present it in a uniform manner. (Vandenbosch & Huff 1997)

2.4.1.2 Data Quality

Like the System Quality factor, data quality has antecedents in the IS literature. DeLone & McLean (1992) builds their Information Quality factor on work dating back to 1949. The information quality factor was originally built up and popularized by DeLone & McLean (1992). Like the System Quality factor the Information Quality factor has widely been used within the IS success literature (Wang et al. 1995; Wand, 1996; Clark 2007, Wixom & Todd 2005; Ramamurthy et al. 2007) indicating that it is not a specific factor only affecting DW, thus, making it interesting in a model within our area of research. In its original construct the Information Quality factor was defined as a measurement of the information system output and was built up by the following variables, see table 2.3 (DeLone & McLean, 1992).

Table 2.3 – Summarization of Information Quality variables

<i>Information Quality</i>		
Accuracy	Importance	Sufficiency
Appearance	Informativeness	Timeliness
Clarity	Format	Quantitativeness
Comparability	Freedom from bias	Usableness
Completeness	Precision	Usefulness
Conciseness	Readability	Understandability
Content	Relevance	Uniqueness
Currency	Reliability	

It is said by Seddon (1997) that not all systems have the ability to produce information, thus, not making it possible to use this factor. If one examines the model that Wixom & Watson (2001) presents it becomes clear that they have excluded the information system factor. Or rather changed it to what they call Data Quality. Why they have done so is unclear. It could be that Wixom & Watson (2001) thought the term Data Quality was more appropriate when discussing data warehouse system success or that they felt that DW is producing data rather than information. As a reference to their Data Quality factor they have used Wand & Wang (1996) who tries to anchor Data Quality as an ontological foundation. Although, looking at Wand & Wang's (1996) definition, they used the same variables that are stated in the table above (table 2.3). And Wand & Wang make no difference when using the Data quality and Information quality notions in the same sentences. Based on this, we bracketed, merged Information Quality and Data Quality. From here on, we only refer to this concept as Data Quality even though some authors denote it as Information Quality. This is also done because we liked to keep a consistency between the initial model (figure 2.2) and the future model (figure 5.1). When taking a closer look at the Data Quality factor, Wixom & Watson (2001) have constructed it out of the following variables: *accuracy*, *comprehensiveness*, *consistency* and *completeness* of the data. The Data Quality factor had a significant impact on perceived net benefits with a path coefficient of 0.142 at a significance level of ($p < .05$) and since the data quality variable was not DW explicit we believed that the same result could be achieved in our research. In the table 2.4 below a somewhat more in-depth explanation of the various variables that constitutes Data Quality is described.

Table 2.4 – Summarization of Data Quality variables

<i>Variables</i>	<i>Definition</i>
Accuracy	Occurs when the recorded value is in conformity with the actual value (Wang et al, 1995)
Comprehensiveness	Is a measure of how well the data model encompasses enough information to accommodate the current needs of all the users of a data set, as well as a broad or extensible enough to provide for future user needs. (Loshin, 2000)
Consistency	Occurs when the representation of the data value is the same in all cases (Wang et al, 1995)
Completeness	Occurs when all values for a certain variable are recorded (Wang et al, 1995)

2.4.2 New potential factors

2.4.2.1 Support Quality

Support Quality refers to the quality in support that should be provided to the users in form of training in how to use the system and the available data, but also given access to people who can assist with support (Watson & Wixom, 2007). This factor has received confident attention in the literature and especially *training* has been distinguished as exceptionally important. Yeoh et al. (2006) identified that training for end-users cannot, and must not, be ignored. Training might also hasten the perceived net benefits by “*doing rather than by talking*” (Rouibah & Ould-ali, 2002). Yi & Davis (2003), in a IS general research on computer software training, imply that computer skills is key to organizational performance. More, literature evidence has described this as an effect of computer skill training (Yi & Davis, 2003). Such performance success might for that reason be concurrent to system success (enhanced benefits). Evidently experts have indicated that adequate training can help users speed up the adoption of the system, moreover, many experts have underscored that training should be viewed as an investment rather than a cost to acquire higher benefits because the users are accountable for making the system successful (Yeoh et al., 2006).

Wixom & Todd (2005) furthermore bear up this potential factor and has *Service Quality* as an external variable to user satisfaction (which is an ingredient of perceived net benefits). Subsequently, Service Quality contains several characteristics that Wixom & Todd (2005) have found. The most applicable for this study, which can be associated to giving access to people who can assist with support (as stated before), that they mention as an underlying character to Service Quality is vendor support. In table 2.5 one could get a brief overview of the two variables and reflect upon their definition.

Table 2.5 – Summarization of Support Quality variables

<i>Variables</i>	<i>Definition</i>
System training	This variable refers to the importance of supporting the end-users with all the necessary training that is needed to use and understand the system.
Service quality	It is stressed by authors that to obtain user satisfaction (perceived net benefits), some sort of service towards the end-users when help is needed shall be available. Thus, the users should be given access to support people from the vendors.

2.4.2.2 Problem Match

In order to perceive any benefits, several authors mean that a clear purpose or a problem linked to the DSS is essential. Evidence in previous literature indicates that the value and benefits of an IS, otherwise, will be difficult to quantify and justify (Yeoh et al., 2006). This can be carefully interrelated to outcome expectations (Wixom & Todd, 2005), which indicate that underlying variables such as user expectations and a users understanding of the system to a high degree might have an impact on the DSS success. Clark et al. (2007) have signified, through an extensive literature review that DSS needs to match the considered problem and also be equivalent to the benefits that are anticipated from the system. Furthermore, the user's knowledge about the problem space, its complexity, and the level of understanding of the problem space that the users need to perform their tasks is all an influence to the expected outcome from the system (Clark et al., 2007).

Seemingly if a problem owner (user) has a distinct problem and high expectations on the DSS solving the problem, the perceived net benefits will be towered if the DSS can manage the problem and reach its climax or vice versa (Staples et al., 2002). Staples et al. (2002) further distinguish that there is for a fact a relationship between expectations and perceived net benefits. Staples et al. (2002) described the relationship as the following, if an end-user has high expectations on a system and this system does not deliver/meet the expectations the affect on perceived net benefits will be negative. Hence, this may be a critical success factor for the perceived net benefits and therefore highly relevant in this study. The table 2.6 below gives the reader a summary of the variables and a short definition. This is supposed to be used for reflective purposes.

Table 2.6 – Summarization Problem Match variables

<i>Variables</i>	<i>Definition</i>
Clear purpose and problem area	A defined purpose and problem that the DSS can solve is needed.
Outcome expectations and anticipated benefits	This is closely related and should arrive from the above variable, but is more centred about to what degree and which benefits the user expects from the system.

2.4.3 Alternative Factors

Although our research question entailed to critical success factors, there might also be other factors that are relevant to the research area of this study. We are not entitling the following two factors as critical since the evidence found in the literature was contradicting eachother. Despite that the evidence in the literature disagrees, there have been studies showing that the following two factors are just that, factors. On this basis an elicitation is necessary.

2.4.3.1 Time

Seddon (1997), who ground his research on DeLone & McLean's (1992) IS success model, identified a positive linear relationship between time spent using a system and the benefits it provides. However Wixom & Watson (2001) did not find any significance that time would impact the perceived net benefits in their research model, which

additionally also was the occasion in Park's (2005) investigation. Since DSS in various user-organizations has been operational for different periods of time, it might be an affecting factor for the perceived net benefits. This since a long-time use might affect the ultimate perceived net benefits in a higher degree than a DSS use in a short period of time, and vice versa. Based on this reasoning, Time is considered since it possibly has an impact. Nevertheless, Time could not, in the context of this study, be considered as a *critical* success factor since a user wants perceived benefits close to proximate and not after a certain time.

2.4.3.2 Organization size

In an empirical investigation of key determinants (factors) of adoption, Ramamurthy et al. (2007) recognized Organization Size to be an important determinant. This emphasizes the fact that not only is larger organization more able to afford recourses to implement a system, but they can also capitalize it better after its implementation (Ramamurthy et al., 2007). In the history others (Choe, 1996; Xu, 2003; Loh & Koh, 2004; Mabert & Soni, 2003) have also tested Organization Size as an influencing success factor. Even though this reflects upon implementation success, we still saw Organizational Size as an interesting comparative factor that could provide different outcomes in form of various levels of users perceived net benefits.

2.4.4 Summary

The development of the theory inside the field of DSS that might affect end-users perceived net benefits has contributed to the following factors (table 2.7) for further investigation in this thesis:

Table 2.7 – Summarization of potential affecting factors

<i>Success Factors</i>	<i>Alternative factors</i>	<i>Reference</i>
System quality		Wixom & Watson, 2001; Wixom & Todd, 2005 DeLone & McLean , 1992; Vandenbosch & Huff, 1997; Clark et al., 2007
Data quality		Wixom & Watson, 2001; Wixom & Todd, 2005; Yeoh et al., 2006, DeLone & McLean , 1992; Clark et al., 2007; Seddon, 1997
Support quality		Yeoh et al., 2006; Wixom & Todd, 2005; Watson & Wixom, 2007; Rouibah & Ould-ali, 2002; Yi & Davis, 2003; Clark et al., 2007; Olson & Zhao, 2007; DeLone & McLean, 2002
Problem match		Yeoh et al., 2006; Wixom & Todd, 2005; Clark et al., 2007
	Time	Wixom & Watson, 2001; Park, 2005; Seddon, 1997
	Organization size	Ramamurthy et al., 2007; Xu, 2003; Loh & Koh, 2004; Mabert & Soni, 2003

In chapter two we presented the fundamental concepts concerning our research area. We explored the field of DSS and elicited some factors that partially have in the literature been cited as critical to DSS success out of an end-user perspective. In this section we move forward and shift focus to show the reader how we have proceeded in order to answer our research question via various research methods and strategies.

3. Research Method

3.1 Approach

In this part of the method chapter we describe sequentially how the major parts of the thesis are connected and how they will together contribute to our result. In order to answer the research question “Which critical factors significantly affect perceived net benefits out of an end-user and post implementation perspective?” we developed a research design, which is presented below (figure 3.1). The design is divided into two steps that includes both a literature review and interviews but also a second survey step. In step one, an initial literature review was outlined together with the initial model (model A, figure 2.2) that resulted in six different factors. The next phase of the first step in the research procedure was to develop interview questions (described in 3.4.2) that was built up and grouped into suiting themes, reflecting previously found factors (from the literature review) and an exploration of potential new ones. After the interview questions were constructed the interviews were conducted with experts within the DSS organization that acted as our case. Two interviews were conducted (see 3.4.3) that provided further information regarding our previously stated factors. The interviews also contributed with input about new information that was not previously stated in our literature study, but also indicated that our literature findings was suitable for the DSS field. This new information, together with factors found in the literature, contributed to the development of our hypothesized model (model B, see figure 4.1).

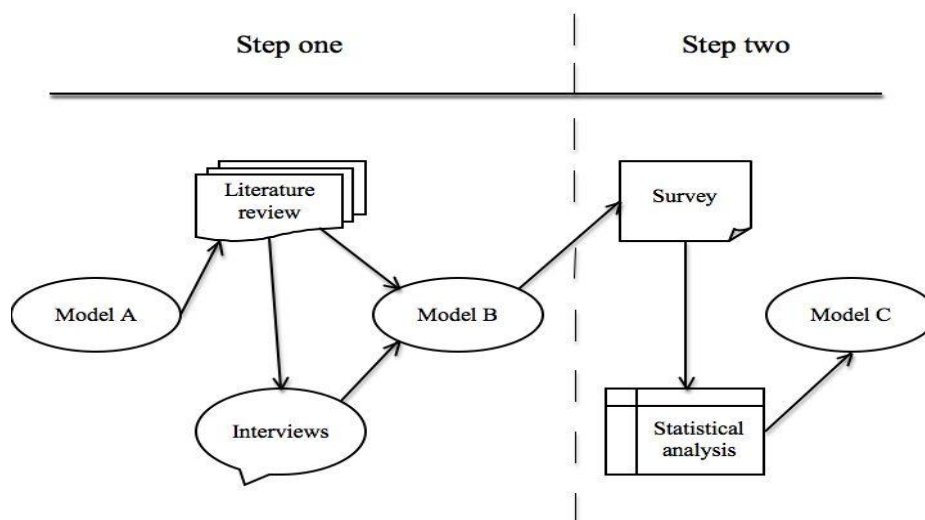


Figure 3.1 – Research Design

After the development of model B (figure 4.1) we entered the second step, step two of the research design, which was devoted to test and evaluate Model B. In order to do this, hypotheses were stated that reflected the relationship between the factors identified and perceived net benefits. These hypotheses were then statistically tested using a survey (see below under 3.5) with participating end-users of the case DSS. How this survey was constructed is consequently presented after model B in this thesis, since it was built upon the findings collected in step one. I.e. findings from step one needs to be analysed in order to know what to ask the survey participants. Those factors that showed statistical significance were subsequently presented in the final and statistical tested Model C (figure 5.1). Model C, consequentially, contain factors that affect the end-users perceived net benefits.

Above, a brief walk-through is explained of how we went from model A to model C in order to answer and present the critical success factors that reflects our research question, thus the explanation above is rather vital to have in the back of the head while reading this thesis. The following sections of this chapter describe more precise how all the different procedures of the research process were conducted, taking into consideration what research quality is and how it has been achieved.

3.2 Research quality

When exploring the realm of research there are a couple of things that are vital in order to make one's research as trustworthy as possible. Björklund & Paulsson (2003) among others states that reliability and validity are two measures that always should be considered if the goal is to make the research trustworthy. In our research *validity* concerned in which extent we really measured what we set out to measure, and *reliability* related to which degree our results would be the same if someone else attempted to do the investigation again with the same set of instruments. Björklund & Paulsson (2003) uses a very illustrative "dart throwing" example when describing the two prior concepts (see figure 3.2).

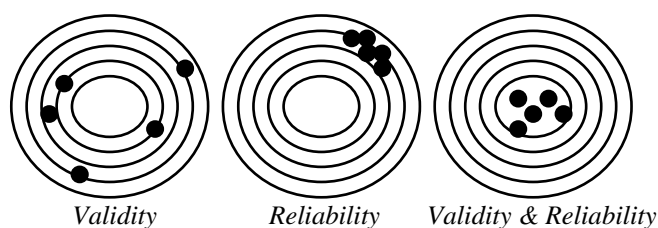


Figure 3.2 – Reliability and validity (Revised from Björklund & Paulsson, 2003, p. 60)

The figure above describes that, if the darts are closely gathered, high reliability is achieved. High validity is obtained if the darts hit the bulls-eye of the dartboard. Thus, a combination of high reliability and validity would show all the darts in the middle, which of course would be the most preferable outcome for this study. Implying that what was set out to be measured was really measured using the right instruments. Bryman (2006) argues that the concept of reliability and validity do not have the same infer when describing research quality out of a quantitative contra a qualitative perspective. Hence, since we used both research methods in our study we particularly considered the different implications that were associated with our approach. In the following subsec-

tions we present a more thorough description of how we worked to achieve high reliability and validity in our thesis. The descriptions are categorized by our two sets of data gathering methods.

3.2.1 Interviews

When discussing research quality using a qualitative method the measurements are not as clear and precise as when dealing with the same concepts in the quantitative method. We aimed at following Bryman's (2006) recommendations, who uses LeCompte & Goetz (1982) explanation, in order to reach four different dimensions of research quality in this thesis. First we worked with the *external reliability*, which is associated with to which extent the study can be replicated, and to accomplish a high degree of external reliability we strived to explain and describe our procedures as accurate and detailed as possible. Maybe the largest implication in the replication is that the social environment never is the same, it is not "frozen" as Bryman (2006) describes it. Secondly, we also considered the *internal reliability*, which "measure" how well we (the researchers) correspond when analyzing what we observed (Bryman, 2006). As an effect of Bryman's (2006) suggestions we dealt with the internal reliability by separately analyze the collected data and then combine and unify them.

The third research quality dimension is the *internal validity* or the *credibility* (Lincoln & Guba, 1985), which is associated with how the result of the study is credible or believable out of the participant's perspective. Since it is out of this perspective, Bryman (2006) means that the researcher tries to explain a phenomenon. To obtain a credible study we therefore asked the interview participants for their validation of our transcripts and interpretations, which also is referred to what Seale (1999) describes as member validation. The last and fourth research quality dimension that Bryman (2006) describes is *external validity*, which indicates how well our result of the study could be generalized to other social environments and situations. In order to increase the generalization applicable to the result of our interviews, we, after Seale's (1999) advice, described the social context and the subjects being studied as true as possible.

3.2.2 Survey

As stated in 3.2, research quality using a quantitative method is dissimilar to the qualitative one. However, the techniques for obtaining reliability and validity in our qualitative approach are also used in this quantitative approach. For instance, we strived at obtaining a high external reliability and validity by accurately describe and give details about how we constructed the survey, how it was conducted, analyzed, and maybe what is most important in a quantitative research: how it can be generalized. To be able to generalize our survey results we had to be observant when making our selection of sample size, i.e. selecting our survey respondents. If our sample size selection was biased or in some way not representative of the whole population (i.e. everyone using the DSS investigated), then it could be hard to make inferences that are generally accepted (Bryman & Bell, 2003).

Since our quantitative data are analyzed using computerized statistical software, which is described in 3.6.2, we also took advantage of four of the reliability and validity measurements it provided. First, by calculating *Cronbach's alpha* we achieved to measure

the internal consistency, which indicates the reliability of our survey findings (Rudner & Schafer, 2001; Bryman & Bell, 2003). Cronbach's alpha focuses on the degree to which constructs (our survey questions) are correlated. Researchers try to obtain as high of an alpha as possible, thus making the research more reliable. Normal alpha values that are acceptable are according to Bryman & Bell (2003) 0.70 and above where 1.0 is the highest. Second, we calculated the *average variance extracted (AVE)* which measures the *convergent validity* (Fornell and Larcker, 1981). If any AVE values below 0.50 are calculated the factor it concerns should be excluded from our final model (model C). Thirdly, by calculating the cross loadings, which are accepted above 0.50, we also received the *discriminant validity* that explains how well the constructs are associated to each factor. Fourth and last, by calculating the R-Square value that is generated in a regression analysis we determined the percentage of all variances that could be explained by independent factors (Andersson et al., 2007). The regression analysis also shows how significant each independent factor was towards perceived net benefits. By using this type of regression analysis we strengthen our research in aspects of its validity (Bryman & Bell, 2003). The reliability and validity calculations are displayed in the analytical chapter 5.

3.2.3 Bias

According to Backman (1998) and Oates (2006) a researcher should advance into a research with a clear and open mind in order to avoid any bias to influence the end result. There is no obvious definition of the concept bias but it can be related to preconception and prejudice (Hammersley & Gomm, 1997). By focusing on possible biases of a research, Norris (1997) means that a researcher easier can enhance the validity in a study. Norris (1997) further states that the only true approach to actually avoid biases is to be very self-critic to all the different approaches made in a research. Hence, to avoid any biases in our data collection and data analysis we focused on continuously question our choices and approaches. Our reflections about bias in the research is further described throughout the next sections and also discussed in chapter 6

3.3 Case Organization

As stated in our problem discussion there has been little research done within the field of DSS that takes a single case to elaborate on and that elicits which CSF's that affect the perceived net benefits of an end-user post-implementation. When setting of to search for a company that could act as our case we had some preferences. Thus, requirements were set on what type of organization and application that was suitable for this type of research. The following requirements were stated:

- The organization had to be active within the decision support field, and be able to provide a full DSS solution to its clients.
- The DSS application had to be considered as successful
- The application had to have a large and diverse user base which was easy to tap into by us as researchers.
- The organization had to be located within Sweden due to limited resources and a limitation of time. Thus making organizations located closely more favourable and interesting.

One of the organizations that suited our purposes very well was *QlikTech Nordic AB*, which is a well-reputed organization within the field of DSS and also had a broad and diverse user-base with easy access. The organization had also won an extensive amount of awards and received a substantial amount of recognition in professional papers regarding their DSS application *QlikView*. For more information about QlikTech and QlikView, visit www.qlikview.com. This was an indicator pointing towards somewhat of a success. Another contributing aspect was that they were located in close connection to the university, making it a very easy to access candidate. The classification of the DSS application can be read under section 2.1.2. We used the classification of the application in order to make inferences about generalization of the result outside our case, consequently making the result more interesting.

3.4 Interview procedure

According to Kvale & Brinkmann (2008) researchers perform qualitative interviews to produce knowledge by unfolding and uncover the “world” of the interview participants into scientific explanations. The qualitative interview approach used in this study is called semi-structured, which had the purpose of acquiring explanations of the “world” from the participants in order to understand the meaning of the research phenomena (Kvale & Brinkmann, 2008). It had many similarities to a regular every-day conversation, but it entailed a scientific purpose, approach and technique including an interview guide (Kvale & Brinkmann, 2008).

The interviews were registered using an audio recorder, which not only enhanced the validity of the interviews (Seale, 1999) but also gave the interview itself a richer quality since any focus on things except the topic and the conversation could be avoided (Kvale, 1996). By recording the interview the procedure of analysing the data also provided a higher grade of accuracy, since our recorded interview could be returned to again and again for re-listening (Kvale, 1996). Further, even the internal reliability was enhanced by using audio recording because the data gathered became preserved in its raw form and thereby we prevented any personal perspectives (bias) to influence the reporting (Seale, 1999). The ethical question regarding the recording of the interview subjects is handled and explained below, see 3.6.

To conduct the interview process in the right way, Bryman’s (2006) guidelines were used to plan the interview, form the interview questions, and transcribe the interview material. Also, advice from Kvale & Brinkmann (2008) regarding the interview questions was considered to enhance the quality of the interview. The subsections below further describe the interview guide, how the questions were developed, and the interview participants.

3.4.1 Interview Guide

An interview guide was used in order to help us as researchers to keep track of various subjects of discussion that were crucial for the topic of the thesis. Kvale (1996) argues that researchers should pose questions within both a thematic and a dynamic dimension: thematically with regards to the questions relevance for the research theme, and dynamically with regards to the interpersonal relationship in the interview. Kvale (1996)

further argues that a good interview question should contribute thematically to knowledge production and dynamically to promoting a good interview interaction. In order to work as dynamical as possible the questions were structured according to the following: short, easy and avoiding academically language as much as possible, this to avoid misunderstandings. The interview guide (appendix 1) was written in Swedish and the reason for it was that the participants that were interviewed are Swedish and it is easier for persons to express themselves in their mother tongue, consequentially eliminating language barriers.

3.4.2 Question development

Kvale & Brinkmann (2008) argue that the first five minutes are crucial in an interview, that is because the participants want to feel pleased in the situation and therefore is it important to make a first good impression. After the first somewhat five minutes, the interviewer introduces the topic and make sure the participant is ready for the actual interview. At the end of an interview it is often good to round up with a debrief of what the interviewer have learnt and what the main points were, and consequently ask the interviewee if this was his/her meanings with the answers and if he/she have anything to add (Kvale & Brinkmann, 2008).

Accordingly, following above recommendations, the first four questions in the interview guide are introducing questions that are simple and allowed the participants to grow into the interview with ease. Questions 5-21 had a validation purpose for the factors previously found in the literature, but also generate new factors not distinguished in the literature review. Thus, these questions tried to catch the respondent's opinions about the factors and underlying variables stated in chapter 2 making them valid and applicable to the field of DSS. We also, to its fullest extent, avoided asking any leading questions that could bias the respondent's answers. Hence, our questions were as open-ended as possible. Lastly, question 22 and 23 summarized the interview and attempted to grasp any missed thoughts or reflections from the participants. The original interview guide (appendix 1A) was written in Swedish, but in appendix 1B is a translated English version of the interview questions displayed together with what factor they relates to. As an example:

Table 3.1 – Example of the interview questions and their corresponding theme

<i>Questions</i>	<i>Theme</i>	<i>Definition (why? how?)</i>
1. What is your professional background?	Introduction	This question is asked partly to get a picture of the participant but also because the participant shall feel satisfied in the interview situation, adapting what Kvale (1996) describes as “dynamical”.
6. Are there any specific factors, or such, which you focus extra hard on to please the end-user?	General, system and data quality	This question tries to narrow the answer from the first question more, to find factors or similar which can be linked to the theory.

The table above (3.1) refers to an Introduction question and to the System and Data Quality factor. Before the interviews were conducted and the guide was used, our thesis supervisor validated the interview guide. This was done for two reasons, one to unfold any odd or hard questions, two for expose any logical error that might exist in the survey.

3.4.3 Interview participants

According to Kvale (1996) the ideal interview subjects do not exist since different persons are suitable for different types of interviews. Based on this we saw it necessary to decide whom the participants would be based on recommendations from a well-informed person in the case organization. Following Kvale (1996) arguments on what makes the best interview subjects, we expressed that a cooperative, well motivated, and knowledgeable participant would be best suited. As a result and by recommendations, to highlight both the technical and strategic area of the DSS, and to increase the spreading and quality of the answers, a selection was made to use both a developer and a project manager as interview subjects. Due to confidentiality (see 3.6.1 below) these interview subjects cannot be further described.

The two interviews were conducted on different premises. The first one, a telephone interview, was conducted since the respondent was off-location and therefore not able to carry out a face-to-face interview. The second interview, however, were carried out face-to-face at the respondents workplace. There are positive and negative sides with interviews face-to-face or over telephone, and especially with the latter. The negative with telephone interviews are for example that the non-verbal communication (such as physical reactions etc) is impossible to read and interpret (Oates, 2006). The positive, for instance, with telephone interviews, is that they are in general cheaper and less time-consuming (Bryman, 2006).

3.5 Survey procedure

To carry out the survey, we used an online tool for web-based surveys. The advantage of using an online survey was that we had easy access to respondents, low cost, and the possibility of downloading the complete data collection into an Excel sheet facilitating further analysis. Below in 3.5.1 is a further description of which survey tool we used.

An introduction e-mail explaining the purpose of the survey (appendix 3A), together with the link to the actual survey, was sent out to the potential participants (end-users). The letter further enlightened why the survey was important to participate in and how the respondents were chosen. A reminding e-mail was sent out a week after the first one, and a third e-mail a couple of days after the second one to improve the answering frequency. This is a proven procedure, which has significant effect on the answering frequency (Bryman, 2006).

3.5.1 Choice of online survey tool

Web-based survey tools are an easy way of reaching a large population by e-mailing the survey link to all the possible participants. However, finding the most appropriate tool was a more difficult task. By google “online survey tool” an end-less list of several web-based survey tools were displayed. By further narrowing the search for survey tools that could support our requirements (unlimited questions and answers, download-

able result reports, etc) we discovered *QuestionPro*³ with its professional account to be the best option.

3.5.2 Survey development

Besides continuing from Wixom & Watson's (2001) survey, we followed Bryman's (2006) guidelines when developing the survey. The actual development of the questionnaire was logically made after we collected our empirical data from the interviews and the survey questions we asked is therefore presented after the interview chapter (chapter 4) accordingly in part two of this thesis. According to Bryman (2006) a standard issue with surveys is the high rate of loss of participants. However there are solutions to come around or at least reduce this loss, and we strived to follow these recommendations to their full extent. The following is an explanation of how these guidelines by Bryman (2006) were fulfilled.

Firstly, the survey was developed into an attractive, professional and effortless view (which was confirmed during pilot testing). Thus, a higher and more accurate response rate is feasible if the survey seems easy to conduct and authentic (Bryman, 2006). Secondly, and more importantly, is that the presentations of the questions were lucidly presented and that the layout was coherent and clear. The questionnaire used for this survey, which is displayed in appendix 3B, was designed in a lucid way with altered fonts, size and style in order to distinguish questions from directions and directions from general information. Thirdly, and which relates to the previous guideline, clear and obvious instructions was included in the directions. Also to further avoid any implications and corrupt data, the online survey tool made it impossible to select more than one option. Finally, since a majority of the questions were closed (predetermined answering alternatives), there was the issue of arranging the answering alternatives in the right way. For most of the closed questions in the survey we choose to use a seven point Likert scale (as Wixom & Watson, 2001), with the answering alternative vertically beneath each question in order to avoid any obscurities with which answer that correlates to which question. The seven point Likert scale was used since each answer could be coded and given a number, from 1 (strongly disagree) to 7 (strongly agree).

Our supervisor and our teacher in quantitative methods at the Department of Informatics, together with the DSS-experts reviewed the survey and after some restructuring and refinement it resulted in a modified survey. The modified survey was then pilot-tested by master students of Lunds University Department of Informatics to identify issues with the surveys' language, layout, content, instructions and directives. The pilot participants conducted talk-aloud tests, to comment about the survey, and after the second phase of testing our survey we additionally revised it into the final validated version, ready for the actual participants.

³ www.questionpro.com

3.5.3 Survey population

Just like with the selection of interview subjects, the survey population were found with help of recommendations by the case organization. This approach ensured that the respondents of the survey actually were end-users and it also helped us to certify the population amount. Knowing the population is important in order to be able to generalize the test sample (the respondents), and make it representative to the whole population (to all end-users) (Bryman, 2006). By letting the case organization contact and e-mail the survey, on our behalf, to their customer contacts we could instruct them to distribute the survey to end-users of the system. Accordingly, this ensured that the surveys really came through to the correct respondents.

The actual choice of population was made by both a convenience selection (Anderson et al., 2007) and partly by a random sample selection because of their accessibility and to eliminate any bias from us as researchers. The population selected was accordingly end-users of the DSS investigated in this study and they were part of the public sector in Sweden. Since time was a limitation of the survey, the case organization also found it necessary to delimit the public sector in Sweden to only comprehend the Region of Skåne.

3.6 Data analysis

3.6.1 Interview analysis

In order to analyse the data collected and transform it into valuable information, a couple of necessary procedures was essential to accomplish. First, the recorded interview was transcribed into a written form so it secondly could be coded for its meaning.

3.6.1.1 Transcription

Transcriptions are constructions from a verbal conversation to a written text (Kvale & Brinkmann, 2008). The procedures of transcribing our interviews started directly after as the interviews were conducted, because this is a very time consuming process (Bryman, 2006). An estimate was made that our two interviews of about 1 hour each nearly took 12 hours total. By start transcribing after the first interview we also obtained a better interview technique for the second interview, which often is the case (Kvale & Brinkmann, 2008). According to Kvale & Brinmann (2008) there are no obvious rules or form to follow for transcription of research interviews. However, there are some standard choices to be made in securing the reliability and the ethical issues (Kvale & Brinkmann, 2008).

To assure a high degree of reliability, as possible, the choice was made to transcribe the interviews verbatim and word-by-word (including pauses, stutters, etc). Further, both of us were present during the transcribing which enhanced the accuracy of the interpretations and the completeness. Although the transcripts are word-by-word translations of the interviews, some ethical issues were taken into account. Therefore, any sensitive

topics or evidence that can expose the confidentiality between us, as researchers, and the interview subjects has been masked or deleted in the transcripts. As Bryman (2006) mentions as an important part, we also returned the transcripts to our respondents to get it confirmed and validated.

The transcripts are found in the appendix 2A and 2B and references in the interview findings to the raw data are constructed according to the pattern [1:X], where “1” relates to the number of the appendix and “X” regard the line number.

3.6.1.2 Coding

Coding and categorization of the transcripts is a well-used approach in social sciences (Kvale & Brinkmann, 2008). Following Oates (2006) recommendations, we started by categorizing the transcribed data into two different themes: *relevant* (+) and *irrelevant* (-). Thereby, all further focus could be centred on what was relevant for this thesis. To improve the validity, the categorization was first made independently and then together to achieve a joint interpretation of what data that is applicable or not in the purpose of this study.

Coding involves attaching one or more keywords to a text segment in order to be able to identify important statements afterwards (Kvale & Brinkmann, 2008). The coding procedure was executed by concept-driven coding, which means that we developed the codes in advance (Kvale & Brinkmann, 2008). The codes were developed regarding which theme in the interview guide they correlated to, and the purpose was noticeably to clarify the respondent’s statements. A collection of the codes is displayed in table 3.2 together with an example of the transcripts and coding in table 3.3.

Table 3.2 – Codes used in the transcript

<i>Code</i>	<i>Definition</i>
SQ	General for system quality
DQ	General for data quality
SQ-F	System quality and flexibility
SQ-I	System quality and integration
DQ-A	Data quality and accuracy
DQ-COMP	Data quality and comprehensiveness
DQ-CONS	Data quality and consistency
DQ-NESS	Data quality and completeness
SU	Support
PM	Problem match
TI	Time
OS	Organisation size
NF	New findings

Table 3.3 – Example of our transcript

96	B	If data is, how should I put it, if data always is as precise, for instance in how its presented, if it is, if it ties together all from the different system that acts as a foundation. Is it always as precise, is there a consistency in the data.	-	
97	R	Yes, so the consistency builds upon how you have linked this and we are as precise as what has been feed into the front system.	+	SQ-I DQ- CONS

				DQ-A
98	J B	Mmm Mmm	-	
99	R	So there is no perversion on the way, however we could refine, we could wash the data, everything is dependent on how you have entered the data from the beginning	+	SQ
100	B	Okey so you don't lose any information by using this typ of systems!?	-	
101	R	Noo, there we are a little, we twist this, if you look at DSS through history the OLAP technology has many times forced you to aggregate the information in various cubes in order to be able to handle it, in order for it to be able to handle. XY with its technique that we use we are able to handle this down to the lowest level, we do not want to aggregate it before we use it in XY we allow XY to aggregate when the user clicks and use here objects.	+	DQ-A SQ,

3.6.2 Survey analysis

The previous model (model A), which we partly grounded our thesis on, was analysed by Wixom & Watson (2001) by using a structural modelling technique well suited for highly complex predictive models (Wold & Joreskog 1982, referred to in Wixom & Watson 2001) called *Partial Least Square (PLS)*. Because we wanted our research findings to be contrastable to model A, we found it useful to apply the same analyse method in our study. Further, as PLS was well suited for Wixom & Watson (2001) it is also very appropriate to our survey analysis since PLS can handle formative constructs and small sample sizes (Wixom & Watson, 2001). A rule of thumb is that PLS requires a sample size that equals 10 times greater the number of independent latent factors affecting a dependent factors (Chin, 1997). This means, for instance, that if we wanted to test our potential 4 critical success factors summarised in 2.4.4 we needed a sample size of 40 (10 times 4) participants.

The PLS technique analyzes the strengths and directions of the relationships among the factors (Lohmoller 1989, referred to in Wixom & Watson 2001), including the path coefficient and the R^2 value. The path coefficient show the strength of the relationship between the independent factors and the dependent factor (which should be significant) and the R^2 value show the amount of variance explained by the independent factors against the dependent one, e.g. the predictive power of the model and how well it is performing (Wixom & Watson, 2001). To compute the analysis we used the statistical software *SmartPLS version 2.0*. A bootstrapping method was also used to calculate the path significance between the independent and the dependent factor. The result and the analysis of the survey data are presented in chapter 5.

Since the factors Organization Size and Time were not coherent in the way that they were measured in comparison to the other factors that was measured on a seven point Likert scale, we used another technique than PLS when testing them. Organization Size and Time have been tested in previous research, for instance in Ramamurthy et al. 2007, with the statistical method Chi-square, which also was the technique that we applied when measuring these two factors.

3.7 Ethical considerations

Before, during and after a research, *ethical codes* or guidelines have to be considered in order to handle ethical issues relevant to an empirical research (Kvale, 1996; Singer & Vinson, 2002). Singer and Vinson (2002) argues that it is important to consider upon the ethical issues of the research in the very beginning, so all subjects and hosting organizations can be informed of their rights and responsibilities before they decide to participate in the research. The guidelines that Kvale (1996) mentions are: *informed consent*, *confidentiality*, and *the role of the researcher*. The latter one, the role of the researcher, regards that the researchers alone is responsible for the material, quality and moral in the study (Kvale, 1996). Israel and Hay (2006) also mentions how researchers should handle subjects who are not research subjects, but are however affected by the research. According to Israel and Hay (2006), researchers are obligated to their colleagues to handle themselves with integrity. To achieve this, integrity, we have carefully avoided any fabrication, falsification, and plagiarism.

By establishing the above, Israel and Hay (2006) means that we not only assured trust and promoted integrity in our research but we also help other researchers to build their research on accurately performed research. Below follows a deeper explanation of how we have reflected and worked with the other two guidelines, informed consent and confidentiality, to uphold an ethical correct research study.

3.7.1 *Informed consent and confidentiality*

Before any research could be conducted, we saw it as ethically correct to get the participants consent about participating in the study. According to Israel & Hay (2006) and Kvale (1996) this activity involves two steps: First, the participants need to understand the premises and grant their participation. Secondly, they need to comprehend what they have approved. In order to achieve this informed consent, we described the purpose of the study, what it included, and the consequences of participate. We informed our interview subjects about the meaning of the interview first over telephone, but also through a more detailed e-mail. The survey participants did, however, only get this information via e-mail (see appendix 3A).

During the research, we attempted to work very strict with maintaining the research participant's trust and secure their confidentiality (which they wanted) that we built up through the informed consent. By securing the confidentiality towards the participants we assure that no sensitive and vulnerable information that could identify and damage the individuals, is available or exposed in this thesis. Israel & Hay (2006) also mean that by securing a good relationship towards the participants, future researchers will not be affected by our consequences.

The following chapter is part of the first research question (Q1), and it outlines both the interview findings and they are sequentially discussed. The chapter is divided into seven subsections, where the first section of this chapter provide insight of a new potential finding that was not grounded in the literature but still might affect perceived net benefits. In sections 2-7 is confirmation and validation for each one of the factors that were previously found in the literature review presented. Based on these findings, we also stated hypotheses that altogether built our research model (see figure 4.1).

4. Interview findings and research model presentation

4.1 New Findings

By questioning the respondents about the System Quality factor, a new variable not found in the literature review appeared. Respondent A and B explained that we (users and humans per se) use an associative way of thinking when we search for data/information, which they try to integrate and offer the users via the system [2A: 286, 2B: 93]. Respondent A described associative thinking like this: When you look at the information a vast amount of questions might arise. What result do I get if I do this? What if I do that? etc, and this way of thinking and analysing is what the DSS really can support. [2A: 62,5]

This way of designing the system and offering the end-user to think as we are used to think was according to respondent B exclusive to their DSS [2B: 95, 108]. The dissimilarity, or advantage, to common ways of searching in a database is that the user does not need to perform the search hierarchically (start from the top and move down) but rather associate it to nearby data [2B: 95]. Respondent A stated that by supplying users with this feature in the DSS, the DSS becomes easier to use [2A: 62,5].

Discussion

At the beginning, the anticipation was to find some missing factors in prior research within the borders of this thesis by interviewing two experts within the field of DSS. Although, new factors affecting the post-implementation success of a decision support system did not surface. What was discovered, by analysing the previous stated factors, was however a new underlying variable to the factor System Quality, namely *associative thinking*. This variable gives the system another dimension when a user searches and/or analyses data, which enhances the easiness and consequently the quality of the system. Thus, since this is just a variable to the System Quality factor this new variable was tested under the System Quality hypothesis in the section below (4.2).

4.2 System Quality

In the literature review (chapter 2) we presented information on the factor System Quality and its underlying variables *flexibility* and *integration*. In the interviews we found strong support for both of the underlying variables.

Flexibility

Respondent B indicated that the system flexibility variable is one of the most important aspects of a system, and that flexibility is what makes the system powerful [2B:42]. Respondent B further elicited that the flexibility of the system is related to that the user always has access to the full database at all times. And that this actually is what flexibility is all about [2B:53, 2A:281]. Where Respondent B cheered the system flexibility, Respondent A raised a red flag, stating that a great system flexibility can make the user confused and that it could lead to a complexity for the end-user instead of a increased flexibility [2A:72]. Thus, it is more important that the right user has the right type of access to flexibility, than that all users have all the possible flexibility options at all time [2A:74, 78]. Respondent A argued that DSS de facto are not so flexible, static reports are often what the users have to settle for. Respondent A clearly marked that in order for a system to be flexible the information has to be able to dynamically change at any given time i.e. no more static reports [2A:295-301].

Integration

Both of the respondent clearly stated that the integration variable is one of the most important aspect of a DSS [2A:85, 2B:59] and that it absolutely affects the end-user. Respondent A who has worked with the public sector since the early 1990s recognized the integration demand early on [2A:85], where decision makers requested one system that could integrate data from various sources within the organization [2A:85]. Respondent A stated that integration contributes to the efficiency of a decision maker in the way that he or she does not have to consult all systems in order to get the entire view of a problem [2A:85]. This was something that we also found proof for in the second interview with respondent B who described the concept by using a careflow⁴, where up to 8 systems is required in order to get the full picture of patients' careflow [2B:59].

More obvious aspect of System Quality was also outlined in the interviews, such as that the simplicity of a system makes it a good one [2B:53, 2A:61, 42]. And that a quality of a system is that it can address various business and user needs [2B:53:55]. Respondent A addressed the response time of the system, stating that quality should also be concerned with the perceived rapidness of the system [2A:44].

Discussion

The System Quality factor, which was formed by system flexibility, integration, and now also associative thinking, had strong representations throughout most of the literature found regarding CSF's along with DSS (as can be seen in chapter two). Since the empirical findings, from two DSS experts, also strongly supported this representation it was unmistakable that System Quality is one of the factors affecting end-users perceived net benefits. Thus, it could be suggested that a high level of System Quality is

⁴) Describes e.g. the information flow of a patient, where information is collected in various system. Commonly used within the health care IT.

associated with a high degree of perceived net benefits, and vice versa. Based on the above, we hypothesized:

H1: A high level of system quality is associated with a high level of perceived net benefits.

4.3 Data Quality

The Data Quality factor was in the literature chapter built up from four underlying variables; *accuracy*, *comprehensiveness*, *consistency*, *completeness*. The interviews validated these variables showing strong support for the majority.

Accuracy

Respondent A explained that accuracy in the data is vital to the end-user, he further stressed that the data will only be as accurate as it is in the initial systems. Thus it is important to ensure high accuracy in the data from the source [2A: 97]. If the data is not accurate the user will notice this rather quickly and a way to solve this is to wash the data before presenting it in the DSS [2A:99]. Respondent B also commented on the fact that sometimes it is necessary to wash data from various sources in order to present the user with accurate data, one common example where different system uses different formats of data is when dealing with dates [2B:68-72]. Respondent B meant that it is better to insert correct data in the source system then washing it in a data layer before presenting it in the DSS, because the latter is more time consuming [2B:74].

Comprehensiveness

The comprehensiveness of the data was according to Respondent A something that will continuously grow and change, when users demand swifts, new data should be made available [2A:109]. It is important that the data set allows for this to be made possible in order for the data to be as comprehensive as possible [2A:109].

Consistency / Completeness

In terms of how the consistency of data will affect the end-user, respondent A outlined that the initial thought is always to make the data as consistent as possible so that the end-user always will be presented with the same data in the same manner [2A:113-115]. It is more or less a must that the data is presented in the same way in order to consistently make good decision [2B:125]. Respondent B further elicited that data needs to be consistent over time, and take into account various organizational changes [2B:125-129]. The last variable in Data Quality is *data completeness* and was according to Respondent B essential when one makes decisions. Without complete data the result will be incomplete which consequently leads to incomplete decisions [2B:170]

Discussion

As could be viewed in the literature section (2.4.1.2) Data Quality with its underlying variables; *accuracy*, *comprehensiveness*, *consistency*, *completeness* should significantly affect the end-user perceived net benefits. This reasoning was also supported in the interviews stated above. This gave strong evidence that this could and should be a significant factor. Although some variables in Data Quality were more evident in the interviews than other, e.g. the accuracy variables were mentioned more often in the interviews than for instance the consistency variable. De facto that some variables were

more emphasized and more thoroughly discussed in the interviews was not something that we elicited further since this was not an objective in this thesis. The mere fact that all variables was mentioned and validated by the respondents is evidence enough. On this basis we stated the following hypothesis:

H2: A high level of data quality is associated with a high level of perceived net benefits.

4.4 Support Quality

Training / Service

The Support Quality factor, which is portrayed in 2.4.2.1, embodies two variables: training and service. Obvious evidence from both respondents indicated that the support factor is important and something that they offer to the end-users in a very high degree. Respondent A explained that via a support service (over telephone or online community) to the users, the vendor organization provides a service that helps the users by themselves change the system application [2A: 78, 131, 135]. Respondent B further stated that this service is open for users twenty four seven [2B: 241]. Both interviews indicated that training in how to use the system, is always offered and often do the end-users get this training from an in-house “super user” who is responsible for the system use at the customer organization [2A: 124, 2B: 199, 201]. This “super user” is trained by the vendor organization to know the basics and possibly support the end-users with most of their questions [2A: 124, 2B: 199, 201, 205]. Hence, the end-users and customer becomes more self-driven which respondent B meant is the best solution for both parties [2B: 201, 203]. It is important to be aware of that when it comes to service over telephone or via the community, the problems can only concern the system per se [2A: 126, 2B: 241]. When there is a problem with a specific software application, built for a customer, a more advanced support from partners or support people from the vendor are available and needed [2A: 129, 2B: 258].

Data from the interviews further proved that end-users of the system may appreciate the system without any training, implying, learning-by-doing and so on [2A: 138]. However, the users get trained, or learn by doing, to consume the data provided to them by the system but they do not get any training in how to create new graphs etc, unless there is a demand for it [2A: 186, 188].

Discussion

As elicited in the literature (2.4.2.1) Support Quality should be a relevant factor affecting the perceived net benefits from an end-user perspective. Both respondent A and B confirmed that Support Quality and its underlying constructs *service* and *training* could affect and be important when dealing with perceived net benefit. Thus, we hypothesized:

H3: A high level of support quality is associated with a high level of perceived net benefits.

4.5 Problem Match

Purpose / Expectations

As described in chapter two, problem match relates to the importance that the users' problem spaces and expectations of the DSS are matched. To the question: *which factors do you think affect the user perceived net benefits of the DSS?* Respondent B clarified that it is very vital that the DSS can match the users' problem space, solve their questions, and truly give them something valuable [2B:17, 19, 21, 23, 40]. Respondent A also indicated that they always try to provide additional value to the users [2A:53]. Moreover, respondent A stated that it is very important to find and match the areas (i.e. where information is missing or is insufficient) where users have it extra difficult (e.g. the actual problem areas), to create this value to the users [2A:53,54]. To satisfy the users and heighten their perceived benefits, both respondents explained that they do not only match the users' expatiations but further tries to surpass them and give the users something extra [2A:152, 162, 166; 2B:279, 281, 285, 287]. Respondent A further meant that the perceived net benefits of the DSS, varies dependent on the users expectations and ambitions [2A:162, 195].

Discussion

Obvious confirmation in the empirical data supported the Problem Match factor identified in the literature review and was therefore highly relevant to continue with. Both interviews resulted in evidence, which implied that the expectations on the DSS and the problem area needs to be matched and solved to create success. Hence, to increase end-user perceived net benefits the DSS needs to in a high degree match the expectations and the areas that are extra difficult. All together, with evidence from the literature (see 2.4.2.2) pointing in the same direction, we hypothesized:

H4: A high level of problem match is associated with a high level of perceived net benefits.

4.6 Time

Although *time* was not seen as a critical success factor in this thesis, we still questioned how a long- versus a short-time use of the DSS can/may affect the users' perceived net benefits in the two interviews. Respondent B meant that some users gain benefits from the system earlier than others [2B: 318]. For instance might someone who are used to work with SQL questions see the advantages in how quick and easy the DSS really are, faster than someone who cannot put it in contrast to something similar [2B: 314]. This process might, according to respondent B, take a couple of weeks up to a year depending on the organization type and the user's ability to handle data [2B: 318].

Respondent A explained that there are users who have used the DSS several years but still not obtained max out of the system [2A: 172]. This since, along with time moves forward, the scope of use of the DSS change. Therefore can the DSS be used for other areas as well, such as solving new problems [2A: 172]. However, respondent A meant that if the purpose is to solve a specific problem the perceived net benefit should be maximized after one day using the DSS [2A: 176].

Discussion

The interviews provided information about the Time factor. The statements were, however, diverse and did not provide any clear underlying principles that a long time use affects the perceived net benefits in a higher degree than a short time use or vice versa. Even though the literature also was diverse on this subject, we still found a relationship (in Seddon, 1997) connecting the time spent using a system and the benefits it provides. Therefore we wanted to investigate if this was the case also from the end-user point of view post-implementation. Thus we hypothesized:

H5: A longer time spent using the DSS is associated with a higher level of perceived net benefits.

4.7 Organization size

Respondent A enlightened us that there is a difference in the degree of perceived net benefits between larger organizations and smaller ones [2A: 199, 201]. A large organization can more easily create and find the “super user” that was discussed earlier (see support quality above 4.4) but a small organization on the contrary might not have room for this type of employment and therefore they need to purchase this service [2A: 199, 201].

Respondent B agreed with respondent A about that there is a difference between large and small organizations when discussing perceived net benefits, but describes the divergence with another illustration and mean that not all organizations will reap the benefits of a DSS. A larger organization will consequently have more data and sources, and this will according to Respondent B create more chaos [2B: 321]. Presumably, if the DSS can solve and handle this chaos, a larger issue generates greater perceived net benefits [2B: 325, 332]. Respondent B further stated that, since the amount of data during the last decade has exploded, even small organizations might have similar chaos [2B: 325, 327]. However, if the organization is too small, the CEO will probably have all information in his mind and the perceived net benefits of the DSS will consequently be less [2B: 327, 329].

Discussion

The two DSS experts both provided evidence that a larger organization is most likely to gain more success from the DSS than a smaller organization. Evidently, by reviewing the findings concerning Organization Size, an apparent positive relationship between Organization Size and users perceived net benefits were noticed. Even though not all organizations follow the same pattern, the general notion was that larger organization creates more chaos than smaller organization and consequently reaps the benefits from the DSS to a larger extent. Since the Organization Size factor has been tested and has been found important before (see 2.4.3.2) together with the empirical findings, we hypothesized:

H6: A larger organization is associated with a higher level of perceived net benefits.

4.8 Research model (model B)

This chapter presented and discussed the interview findings of our four potential CSF's; *System Quality*, *Data Quality*, *Support Quality*, and *Problem Match*, together with the *Time* and *Organization Size* factors, which we identified in the literature review. The analysis of the data also identified *associative thinking* as a new underlying variable to the System Quality factor. Thus, any new factors were not discovered in the empirical data. Since the rationale for the factors have been confirmed and described by both previous literature and empirical data from DSS experts, we in figure 5.1 present our hypothesized research model including the relationships between the factors and perceived net benefits. This research model is accordingly, to our research design (see figure 3.1), what summarized step 1 of the thesis and are in the next step (step 2) statistically confirmed by end-users of the decision support system via a survey.

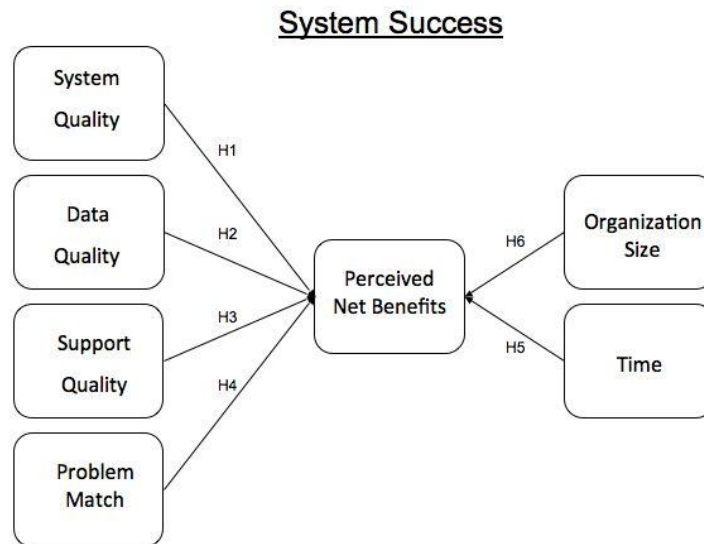


Figure 4.1 – Research model (model B)

In the previous step we presented a research model that was grounded both via a literature review (chapter 2) and through interviews (chapter 4). Focus has now shifted towards the second research question (Q2). In this second step of the thesis is the hypothesized research model tested on end-users via a questionnaire and validated using statistically measures. The results are further analyzed, discussed (chapter 7) and result in the conclusions (chapter 8) of this thesis. In the following chapter the questionnaire is presented and the analysis outlined, which hopefully gives a deeper understanding of our findings.

5. Survey development, findings and analysis

5.1 Questionnaire development

To test the hypothesized research model (model B figure 4.1) in a significant way, using numbers, a survey questionnaire was developed that reflects the various factors found in previous work. By using numbers to test the research model, we could increase the quality and build a secure sense of purpose (Seale, 1999) towards using our previously qualitative approach.

The questionnaire (appendix 3B) was constructed partly by revising Wixom & Watson's (2001) original questionnaire (received personally by e-mailing Barbara M. Wixom at bwixom@mindspring.com, see appendix 5). This was done to increase the transparency back to the initial research model, and also to in a high degree undertake a survey proved functional before. The questionnaire was, however, updated with new questions based on the DSS literature (in chapter 2) and on empirical inputs from interviews with DSS experts (chapter 4) that were found missing in the original model (figure 2.2) that Wixom & Watson presented in 2001. Additionally, we translated the questionnaire into Swedish on the same basis as with the interview questions, i.e. to avoid any language barriers. Notable is that existing questions, i.e. questions that was gathered from Wixom & Watson were not used unless they were well supported by either the DSS literature or the DSS experts. In the table below (5.1) one can see all questions and its corresponding factor translated back to English. The first two questions 1 and 2 (not provided in the table below, see appendix 3B) were background questions that were needed, for us as distributors of the survey, in order to keep track of the respondents. Question 3-27 (see below) was part of the actual investigation, and was coded to be tested statistically in the analysis (see below 5.2). The questions could also be seen in Appendix 3B, there, in Swedish.

Table 5.1 – Survey Questions

<i>Factor</i>	<i>Variable</i>	<i>Question</i>
System Quality (SQ)		
13	Flexibility	QlikView is versatile in addressing data needs as they arise.
10	Flexibility	QlikView could flexible change to new business demands and user requirements.
15	Associative	QlikView provides me with the possibility to find closely related data.
14	Integration	QlikView effectively integrates data from various organizational data repositories
11	Integration	QlikView effectively integrates data from system services different areas
Data Quality (DQ)		
6	Accuracy	I have more accurate data today from QlikView than before QlikView was installed
7	Comprehensiveness	QlikView provides me with more comprehensive data than before QlikView was installed
8	Completeness	QlikView provides me with more complete data than before QlikView was installed.
9	Consistency	QlikView has improved the consistency of data.
Support Quality (SU)		
16	System training	As a user of QlikView I have received vital training in understanding the output of the system.
18	System training	The training I have received has affected how satisfied I am with QlikView
17	System training	As a user of QlikView I have received vital training/education in using the system.
20	Service quality	Support help and support contacts has affected how satisfied I am as a user
19	Service quality	As a user I can always get help (support) from a support contact with questions regarding usage of QlikView.
Problem Match (PM)		
25	Clear purpose and problem area	QlikView has fulfilled the purpose and those demands I had on the system.
N/A	Outcome expectations and anticipated benefits	N/A
Time (TI)		
4	N/A	Approximately how long have you been using QlikView?
Organization Size (OS)		
3	N/A	How many employees does your organization have?
Perceived net benefits (PNB)		
21	N/A	QlikView has changed/affected my job significantly
22	N/A	QlikView has reduced the time it takes to make a decision for me as a user
23	N/A	QlikView has made it easier for me as a user to take a decision
24	N/A	QlikView has affected business processes
26	N/A	QlikView contributes to a better organization
27	N/A	As a user of QlikView I am satisfied

N/A: not applicable

As could be seen from the table above (table 5.1) all the factors that were presented in the hypothesized research model (figure 4.1) were incorporated in the questionnaire. The result of this questionnaire is outlined below, where it also is analysed.

5.2 Findings and analysis

Altogether we found six factors that were in some way essential and affecting the end-users perceived net benefits. These 6 factors, or latent factor (a more correct definition in a statistical context is latent variable) which grounded our research model (figure 4.1), requires as a rule of thumb (Chin, 1997) a recommended sample size of ten times the number of latent factor pointing to a single dependent factor (in our case Perceived net Benefits) to be tested. Only four (SQ, DQ, PM, SU) of the latent factors were included in the PLS algorithm (the once measured by the seven point Likert scale) which implies that a sufficient sample size would be 40 when testing models. Although, the general rule states that with more responses the greater is the reliability. In order to calculate the path coefficients significance the bootstrapped⁵ method was used with 63 cases and 1000 resample's (iterations). The survey was distributed to 300 end-users out of these 128 viewed the survey and out of these 63 participated, which give a response rate of 21 %. This implies that an adequate sample size of 63 was collected which exceeds the recommended sample size of 40. Table 5.2 presents the result of the data gathered from the 63 participants.

Table 5.2 – Survey constructs ($n = 63$)

<i>Constucts</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Cronbach's alpha</i>	<i>AVE</i>	<i>T-Stat p-value</i>	<i>Chi-Square</i>
System Quality^a			0.908	0,69	0,313	
Q10	5.00	1.68			19,555***	
Q11	5.08	1.35			22,094***	
Q13	5.13	1.41			27,525***	
Q14	4.78	1.38			15,586***	
Q15	4.87	1.42			17,015***	
Data Quality^a			0.879	0,73	5,144***	
Q6	4.90	1.92			15,107***	
Q7	5.51	1.50			19,710***	
Q8	4.32	1.86			12,578***	
Q9	4.95	1.80			35,307***	
Support Quality^a			0.840	0,61	3,466***	
Q16	4.48	1.67			33,261***	
Q17	4.30	1.61			37,310***	
Q18	4.49	1.79			13,514***	
Q19	4.16	1.50			5,786***	
Q20	3.63	1.70			5,000***	
Problem Match^a			N/A	N/A	4,677***	
Q25	4.79	1.62			0	
Time^b			N/A	N/A	N/A	$\chi^2 = 0,359$
Q4	3.67	0.70			N/A	
Organization Size^c			N/A	N/A	N/A	$\chi^2 = 0,489$
Q3	2.85	1.12			N/A	
Perceived Net Benefits^a			0.943	0,78	N/A	

⁵ Further information could be found from (<http://faculty.chass.ncsu.edu/garson/PA765/resamp.htm>)

Q21	4.59	2.00			52,209***	
Q22	4.76	1.86			68,859***	
Q23	4.59	1.86			13,860***	
Q24	3.90	1.68			21,582***	
Q26	4.33	1.72			22,526***	
Q27	5.44	1.63			15,282***	

^a. Tested by a seven point Likert scale: from 1 (strongly disagree) to 7 (strongly agree).

^b. Tested by a Chi-Square test α 95%: 1= 0-12 months, 2 = more than 12 months.

^c. Tested by a Chi-square test α 95%: 1= 0 – 250 emp, 2 = more than 250 emp.

*** Indicates that the item is significant at ($p < 0,001$)

What can be deduced by reviewing the mean values above, is that only two questions (20 and 24) were given a mean below the average of 4 (4 being the average on a seven point Likert scale) which indicates that the end-users were more pleased than intermediate with the different meanings of our questions.

To measure the internal consistency of the constructs (our questions) a calculation of Cronbach's alpha was conducted and revealed values of .908 for System Quality, .879 for Data Quality, .840 for Support Quality, and .943 for Perceived Net Benefits, which were all above the acceptable .70 standard (Bryman & Bell, 2003). This implies that the constructs used provided a high reliability. Since there was only one underlying construct to the factors Problem Match, Time, and Organization Size, Cronbach's alpha could not be calculated. It measures the degree to which different constructs are correlated and a measurement of these would end up in a perfect value, e.g. 1.0 that does not imply anything in this context.

Convergent validity is adequate when latent factors (SQ, DQ, PM, SU) have an average variance extracted (AVE) of at least .5 (Fornell and Larcker, 1981), this was also calculated using the PLS algorithm. As could be seen from table 5.2 all of the latent factors have an AVE that well exceeds the .50 threshold. This indicates a good convergent validity in all of the latent factors, making an exclusion of any of these unnecessary.

We also measured the discriminant validity, which is satisfied when constructs load higher on their corresponding latent factor and less on other latent factors. This is presented in the table 5.3 below, where associated constructs are highlighted in bold. Discriminant and convergent validity are further confirmed when individual constructs load above .50 on their associated latent factor which all of the constructs below does (Wixom & Todd, 2005). This implies that both discriminant and convergent validity was established.

Table 5.3 – Discriminant validity “Cross loadings”

		Data Quality	Problem Match	Percived Net Benefits	System Quality	Support
DQ	Q6	0,852980	0,190499	0,484415	0,259581	0,222461
	Q7	0,851915	0,455504	0,715771	0,522601	0,559168
	Q8	0,816367	0,183258	0,433916	0,379073	0,189218
	Q9	0,893339	0,312253	0,625104	0,463737	0,328536
PM	Q25	0,358034	1,000000	0,722862	0,631133	0,554557
PNB	Q21	0,578888	0,652065	0,928540	0,655214	0,666133
	Q22	0,640041	0,625170	0,939194	0,604868	0,665131

	Q23	0,624569	0,607908	0,876852	0,475345	0,566749
	Q24	0,588859	0,597123	0,871560	0,507581	0,573353
	Q26	0,652223	0,621074	0,874233	0,566847	0,601291
	Q27	0,543947	0,724571	0,805334	0,650744	0,572128
SQ	Q10	0,531125	0,526564	0,631798	0,847661	0,537206
	Q11	0,379904	0,606770	0,524622	0,869870	0,540552
	Q13	0,392780	0,500046	0,498149	0,894463	0,474270
	Q14	0,306591	0,439913	0,426593	0,811959	0,504263
	Q15	0,390219	0,514974	0,568318	0,820549	0,601617
SU	Q16	0,319326	0,495420	0,617497	0,584110	0,898324
	Q17	0,413999	0,543415	0,682631	0,642070	0,908126
	Q18	0,298677	0,418727	0,548183	0,338597	0,811149
	Q19	0,274254	0,411103	0,372434	0,493835	0,644274
	Q20	0,294789	0,265784	0,403832	0,261819	0,606388

5.3 Research model result (model C)

The following model (figure 5.1) is the result of the PLS test. On the left side one can see the constructs that was measured with the seven point Likert scale, visible is also their path coefficient. For Organization Size and Time the χ^2 is presented in order to give the reader a better overview of the model. On the dependent variable Perceived Net Benefits the R^2 is presented, which is further elaborated below in figure 5.1.

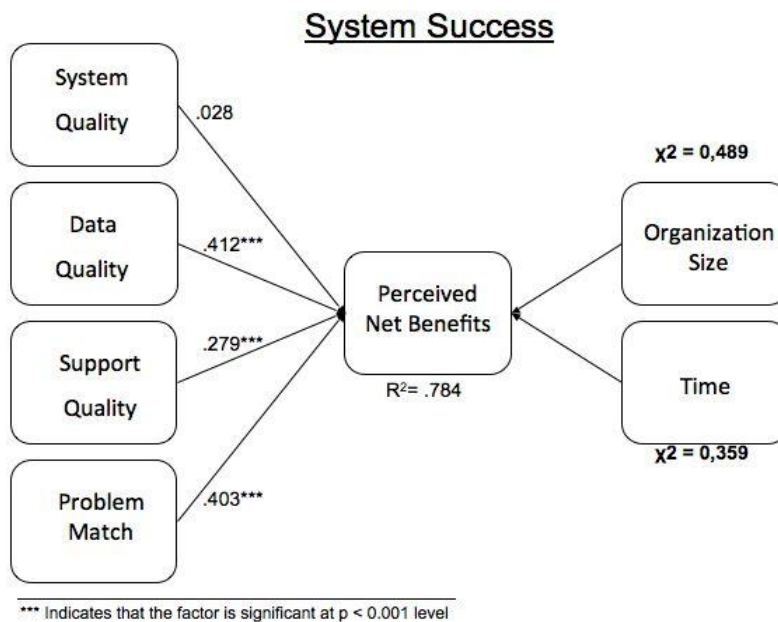


Figure 5.1 – Research model result (model C)

As hypothesized, Data Quality, Problem Match and Support Quality was significantly associated with Perceived Net Benefits. All three relationships had positive effects, with path coefficients of .412, .403, and .279. Hence, hypotheses 2, 3, and 4 were supported. What was not expected, and towards our hypotheses, was that System Quality was not significantly affecting the end-users perceived net benefits. System Quality had a path coefficient of .028, which is shown by the non-significant path between System Quality and Perceived Net Benefits. Accordingly, hypothesis 1 was not supported. Since this study also investigated if there were any differences between Organization Size and Time towards the Perceived Net Benefits, a chi-square test was conducted to test the potential influences. The result implicates that there was no such difference, since none of the null hypotheses could be rejected at the 95% significance level. Organization Size gave .489, which is above the .05 level. Similar result was derived from the chi-square testing the Time factor, where we obtained a .359 value that also exceeds the .05 level. Thus, hypotheses 5 and 6 are not statistically supported.

Together the four factors (SQ, DQ, SU, PM) explained 78.4 % (see figure 5.1 above) of the dependent variable Perceived Net Benefits, which suggest that they to a high degree explains the variance for end-users perceived net benefits. However, it also implies that there is an external influence of 21.6 % from other factor(s) that have not been identified throughout the study. System Quality did not significant influence Perceived Net Benefits and had a non-significant path coefficient. A summary of which hypotheses that were supported and not could be found below in table 5.4:

Table 5.4 – Hypotheses Results

<i>Hypothesis</i>	<i>Definition</i>	<i>Supported?</i>
H1	A high level of System Quality is associated with a high level of Perceived Net Benefits.	No
H2	A high level of Data Quality is associated with a high level of Perceived Net Benefits.	Yes
H3	A high level of Support Quality is associated with a high level of Perceived Net Benefits.	Yes
H4	A high level of Problem Match is associated with a high level of Perceived Net Benefits.	Yes
H5	A longer Time spent using the DSS is associated with a higher level of Perceived Net Benefits.	No
H6	A larger Organization is associated with a higher level of Perceived Net Benefits.	No

The previous chapter outlined which factors that had a significant affect on perceived net benefits and which did not, further, our hypotheses were either rejected or confirmed. In this section we continue to elaborate and discuss the second research question (Q2), giving a deeper understanding of the findings found in the previous chapter. This is realised by taking our overall research question into account. In particular, we highlight the factors examined but we also discuss alternative factors, limitations and implications of the research, and the ability to generalize our findings towards a broader DSS field.

6. Discussion

6.1 General discussion of the findings

As declared in 4.1.1, an optimistic anticipation in the beginning was to find new factor(s) from the qualitative interviews to test on the end-users of the application via a survey. However, we could not achieve to dig out any new factors to see the light but instead we obtained additional supporting evidence for the factors found during the literature review.

As stated in the previous chapter, our findings explained 78.4% of the perceived net benefits and consequently there are 21.6% of the variance that is not explained which implies that our research model has room for improvement if the purpose is to find a model that explain to a 100 % the CSF's that affect the perceived net benefits. To enhance the explained variance, thus finding the missing factor(s), we suggest that a deeper approach like using focus groups of DSS-experts together with end-users generating non-investigated factors would be more appropriate. However, this approach would clearly be more time-consuming and therefore less applicable within the time-frames of our research. With more knowledge and understanding about the field of DSS at this time being, we suggest that new factors also might materialize if the cultural diversities in the organizations where the DSS is implemented are studied. McBride (1997) bear up this idea and declare that no model concerning IS success can be developed unless issues of contexts and culture are addressed. Notable is that McBride (1997) suggestions were developed out of a qualitative approach rather than for a quantitative approach, which was used in this thesis.

From the survey analysis we obtained a response rate of 21%, it would obviously be more fulfilling with a higher response rate, although considering our limited time frame and the reminding e-mail we as researchers could not have worked different to increase this number. Furthermore, both interesting and unexpected outcomes was derived that might have been variant and interpreted differently if a qualitative approach would have been used. The quantitative approach did whatsoever provide us with a preliminary viability of the research model within the context of decision support systems post-implementation. Findings show that three of six factors, Data Quality, Support Quality, and Problem Match, appeared to be important and associated with a high level of end-

users perceived net benefits, much in accordance with the hypotheses stated. Together with System Quality they explained a good piece of the perceived net benefits variance. Any significant correlations for System Quality, Time, and Organization Size towards end-users perceived net benefits were however not supported in the findings. The most interesting finding from testing our research model compared to the initial model (model A) was the significant influence of Support Quality and Problem Match had to Perceived Net Benefits, since Wixom & Watson (2001) did not include them in their research. The most surprising finding was however the lack of significance in the influence of System Quality since this factor often has been cited as important (see table 2.7 in the end of chapter 2). The negative associations between Time and Organization Size towards Perceived Net Benefits seems however quite expected recalling that we did not see them as critical in the first place and considering that they have not been cited and tested as much as the other factors (see also table 2.7). Below follows a separate discussion of each of the six factors and what and why the results were differentiated from each other and from the initial model.

6.1.1 System Quality

The result from the survey analysis were somewhat surprising in that System Quality, which had a very high significance (above the .001 level) in Wixom & Watson (2001), had a low significance in our test and consequently contradicts hypothesis 1, that a higher degree of System Quality is associated with a higher level of Perceived Net Benefits. So why was it that the System Quality factor showed little affects to almost non in our study when it is significant in the original model? One explanation could be due to the high mean value of System Quality (5,7 and above) in our survey. This in combination with a low variance in the factor, i.e. there were few cases where a low value of System Quality was connect to a low value of Perceived Net Benefits and vice versa, which could tend to be quite logical if one looks at the high mean value. This implies that a factor like System Quality that is almost like a constant (i.e. has many similar values) would have problems revealing any variance in another factor (in this case, Perceived net benefits). Although it could be that the System Quality factor has contributed with its high mean value to the overall system success even though it was not possible to show it by using the statistical approach used in this thesis.

The DSS experts interviewed, see chapter 4, both indicated that the quality of the DSS was very important and enhances the success of the system. Why the result of the survey evidently suggests differently is however as mentioned above diffused. An alternative explanation could be that respondent A might be right when raising a red flag stating that the high flexibility of the DSS might confuse the end-users and decrease their perceived net benefits. Another possibility is that the end-users perceived net benefits of the DSS are dependent on what context they rate it against. If they for instance evaluate this DSS against a system they had earlier and they are as pleased now as before, then, of course, the perceived net benefits will not be boosted just because of the DSS investigated in this thesis had a high system quality. The third possibility to why the results are disagreeing might be because this thesis centres on a different perspective, namely an end-user and post-implementation perspective, and previous research together with DSS-vendor aspects are more concentrated on a pre-implementation or on an implementation perspective. Hence, the perceived net benefits investigated were viewed from various angels. Our study contradict the previous literature on System Quality but more

research is needed, theoretically and practically, to investigate exactly how and why this is the case. Thus, we cannot consider the System Quality factor as a CSF.

6.1.2 Data Quality

Both DSS-experts (see 4.3) stand behind the literature found and mean that the underlying variables to Data Quality is essential, important, and is a must to achieve a high quality in the data. As the System Quality factor, Data Quality has evidence in the IS-research literature referencing back to 1949 (Delone & McLean, 1992) and has since then been widely used. In section 2.4.1.2 we described that Wixom & Watson (2001) received a path coefficient of .142 and a significance level less than .05 when testing Data Quality against data warehousing. Our survey analysis provided us with a path coefficient of .412 (strongest in our model) and a significance level less than .001, which is generally in line with previous research but if compared to Wixom & Watson (2001) indicates on a much higher significance. Strong support for hypothesis 2 clearly denotes that there is a positive relationship between high data quality and end-users perceived net benefits. Thus, this suggests that the Data Quality of the DSS have positively affected and helped end-users to perform their jobs which therefore means that we see Data Quality as a CSF in context of our thesis. Hence, DQ is a factor that significantly affects the end-user perceived net benefit, post implementation.

6.1.3 Support Quality

In the initial model, Wixom & Watson (2001) did not include any support factor, or related, to the system success part of their model. Since this thesis is dissimilar in the meaning that we struck system success from the end-users point of view, instead of a vendor and/or implementation angle, we found it fundamental to add Support Quality to our research model. We previous demonstrated that latter research, which emerged after 2001, backs up this “new” support factor and why it might be essential in our research. Additional to these facts were that both respondents in the interviews gave indications that this was important when dealing with perceived net benefits. In accordance with this we also found that our hypothesis 3 was supported, with a path coefficient of .279 at a significance of ($p < 0.001$) indicating that Support Quality had a significant relationship with Perceived Net Benefits. It also confirms that Support Quality is an important factor towards system success from an end-user viewpoint.

Qualitative support is of course extra crucial, and more useful for end-users, if the System Quality and Data Quality of the DSS are poor. If, for instance, the easiness of the DSS is poor and the data is inaccurate then the end-users are more in the need of good training in using the system and also access to support people. Hence, we therefore saw it as an interesting test to see how much of the variance in the dependent variable (Perceived Net Benefit) that could be explained by Support Quality. The result was that without any Support Quality factor the existing three factors System Quality, Data Quality, and Problem Match only explained 74.1% (to be compared with 78.4% when the Support Quality is included) of the Perceived Net Benefits, which consequently suggests that Support Quality is important in the relationship. Based on our findings we consider Support Quality as a CSF that significantly affects the end-user perceived net benefits, post implementation.

6.1.4 Problem Match

The association between Problem Match and Perceived Net Benefits was strongly supported and showed a positive path coefficient of .404 at a significance level of ($p < 0.001$) proposing that the less explored factor in previous research indeed is important and affects end-users perceived benefits of the DSS. This result goes well in line with what Staples et al (2002) argues for, that expectation is in fact related to the dependent variable Perceived Net Benefits.

However when constructing the survey not all variables that could be associated with this factor were taken into consideration only one of the two variables was incorporated into the survey, and since we described it as containing two variables there obviously should have been at least two questions controlling it. Therefore the good result should partly be seen with a reflection of the 1.00 Cronbach's alpha and with an understanding that the significance level is not entirely reliable. Even though it seems quite natural to think that without any clear problem space to fill with the DSS, or any expectations of that the DSS will solve the problem, any perceived net benefits would hardly be realized from the problem owner (i.e. the end-user in this context). This is in line with what Yeoh et al. (2006) and Wixom & Todd (2005) suggested (see 2.4.2.2), and what we interpreted from both interviewees in step 1. Thus, since this factor was not included in the initial model A, and not cited as much as the other three suggested CSF's it was still an interesting finding even though our result regarding Problem Match is not fully reliable. Based on these findings we consider Problem Match as a CSF that significantly affects the end-user perceived net benefits, post implementation. Even though more confirmation is needed.

6.1.5 Time

The DSS-experts interviewed (see 4.6) were at variance and the literature concerning the Time factor is also of different opinions regarding the degree of influence time spent using the system has on end-users perceived net benefits. Seddon (1997) did identify a positive relationship, whereas Wixom & Watson (2001) and Park (2005) did not. Since the users investigated had been using the DSS for different periods of time, we hypothesised diversity in the level of users' perceived net benefits between a short time use and a long time use. The result from the survey analysis did, however, not support our expectations and in view of the fact that there is an ambiguous view on the Time factor per se this might bear up our previous considerations (see 2.4.3.1) that Time in fact was not a critical success factor for the end-users perceived net benefits. Maybe the Time factor could, and should, be tested using a different approach than a survey. Perhaps can an observation of end-users performance or such better explain the effect Time has on the perceived value of the DSS. Another alternative research method, which is suggested by Staples et al. (2002), is to conduct two surveys at two different occasions on the same population and then compare the findings. We leave this reasoning as an open question and just suggest that the Time factor need more investigation in the future. Thus, Time as a factor is accordingly not seen as a CSF.

6.1.6 Organization Size

According to our literature review (see 2.4.3.2) there have been several historical researches that only tested the impact of Organization Size on implementation success and not on post-implementation success. Through the DSS-experts statements we interpreted that the general opinion was that larger organizations, that presumably have more data and most likely more chaos in their data, consequently also reap greater benefits from a DSS post-implementation. As with Time, we did not consider Organization Size as a critical success factor and the non-significant affect towards end-users perceived net benefits evidently proved this. Hence, the result rejects the expectation that an organization with more than 250 employees have more perceived net benefits from the DSS than an organization with 10 people employed. We believe that we would have achieved a better effect in our investigation concerning the influence of organization sizes on system success post-implementation if a deeper research and more concentrated on different organizations and their dissimilarities had been conducted. Thus, Organization Size is not considered a CSF.

6.2 Limitations and Self-Criticism

There is a selection of limitations in this research that need to be noted in this discussion. First as mentioned in 3.4.3.3 we did not have any direct contact with the respondents (end-users of the DSS) of the survey, instead it was distributed through two contacts at the case organization. Since we hoped for and expected a larger sample size of the population than we acquired, we suppose that this approach unfortunately might have implicated the response rate of the survey since we could not completely control and influence the distribution or the follow-up efforts. Even though this approach might limit the answering frequency, we consider it to have been the best solution at the time, taking into account the time limit and the accuracy of the survey distribution. Second, the decision to use a quantitative approach (a survey), to test our research model, has also limited the understanding of why the absence of significance for the System Quality, Time, and Organization size factor occurred in our thesis. Maybe this is where the quantitative approach lacks in research quality versus the qualitative way. On the other hand, qualitative results are based on anticipations of the researchers own interpretations whilst quantitative results are facts based on calculations of numbers. Thus, a more correct picture of the reality might have been secured if both ways were used to test our model. Thirdly, our literature review was mainly focused on research published in major IS journals which might have influenced that we missed other applicable studies building our tested research model. Fourthly, in view of the fact that we used a case organization and a case application in this thesis, we thought it necessary to reflect upon what incorrectness this might entail vis-à-vis studying several applications. What we want to highlight is the scenario if there is mistrust against the case organization or a flaw in the DSS, or such, which could lead to that a single factor becomes distinctly incorrect. In comparison with investigating several systems where a flaw in one application would not affect a factors contribution, hence it would rather be eliminated by an average opinion. As stated in 3.4.1 we used a case organization that was considered a success out of our predefined criteria's, also stated in 3.4.1, and we think that this was a way to circle the problem of just investigating a single case.

The bias in the responses should also be noted. The interview answers we got from the DSS experts might be biased since both respondents were from the same organization. However, since we used a case DSS in this thesis the best expert opinions would accordingly be provided by the case organization. We were also aware of that the responding part of the end-users might have a diverse insight in the area than users who not completed the survey. Another bias in our survey results might be the effect of that we avoided to use a no-opinion choice in our seven point Likert scale, forcing the respondents to make a choice. However, since we wanted to compare our resulting model (model C) towards the initial model (model A) we constructed our survey in the same shape as Wixom & Watson (2001) did, i.e. without a no-opinion alternative.

6.3 Generalization

Generalization concerns to what degree our results can represent the whole population of users and contexts (Bryman, 2006). Since we could not study the whole population, due to many different limitations, we, as stated in chapter 3, selected a sample population by letting the case organization randomly and by their convenience chose the sample population for us. The user sample population consisted of partly randomly picked organizations, convenient located in Region Skåne. Bryman (2006) argue that it is wrong to generalize the results beyond the population investigated, meaning that our results only would refer to users in organizations operating in the public sector of Region of Skåne. Seale (1999), however, argue that it is up to the reader to make a “relevant judgment” to how a single case can be generalized to other contexts. According to the case organization are the public organizations in Skåne or any other region in Sweden, presumably, not different from each other in the context of how they use the DSS application. Moreover, since the users were partly randomly chosen it also enhanced the spreading of the different types of users from executives to floor managers. Thus, users of Region Skåne were both representative from a diversified user-base and from a geographic point of view. The DSS investigated were as we already mentioned in 2.1.2 partly a *pervasive DSS*, which mean that it is useful and applicable to everyone who needs information to make a better decision and therefore was it suggested that our findings might be appropriate to embody DSS-users outside the public sector as well. Yin (2003) states that a multi case (investigating more than one type of DSS) would be more representative for the whole population than a single case. To circumvent this, we therefore saw it as a necessary to theoretically define and categorize our case DSS (see 2.1.2) into a category that other similar DSS applications can relate to. This consequently made it possible to transfer our findings into other decision support systems.

In this chapter we summarize and highlight the most essential findings and conclusions made in our research. We present our acquired contributions and implications both to the realm of research and to the field of practice. Finally, we give information and guidelines for further research together with some recommendations that can facilitate coming research procedures.

7. Conclusions

7.1 General conclusions

Which critical factors significantly affect perceived net benefits out of an end-user and post implementation perspective?

The above question was our overall research question, which we strived to seek and give an answer to through and across this thesis by being as self-critical as feasible to avoid any biases. By shoulder a multi-method approach, including data collections and analyses from both interviews and a survey, we now stand at the finish line with the result in our hands. Critical success factors for decision support systems that significantly affect end-users perceived net benefits out of a post-implementation point of view are:

- *Data Quality affects Perceived Net Benefits*
- *Support Quality affects Perceived Net Benefits*
- *Problem Match affects Perceived Net Benefits*

The result suggests that one of the original factors found in Wixom & Watson (2001), Data Quality, also affects the success of a DSS. Most interest and attention in our resulting research model (see figure 5.1) would we like to devote to our significant found associations for Support Quality and Problem Match which was not included in the initial model by Wixom & Watson (2001) and are less tested in the field of research that we have focused on. Moreover is that the former CSF, System Quality, which was discovered important already in 1949 (DeLone & McLean, 1992) was not found in significant relationship with end-users perceived net benefits. Two other factors investigated, Time and Organization Size, was also identified to be non-critical within this research field and suggested to need more research and possibly with an alternative research method than we used. Our research method has nevertheless been an especially interesting approach, not only for the reason that it was new to us as researchers but also because a quantitative approach with complex statistical measures is not part of the ordinary at our Department of Informatics. As a wish of consequence we would like to propose that more future students at the Department of Informatics apply a similar interesting quantitative approach to complement that of the qualitative.

7.2 Contributions and Implication

7.2.1 For research

How does our result implicate the present research? The literature and research that was taken into consideration when developing our model was lacking in the sense that there were not sufficient research done that took an end-user, post implementation perspective. Filling this gap was a purpose of this thesis. Thus, we would like to contribute to this field of research with primarily two things: *Support Quality* and *Problem Match*. These factors were according to the literature the least tested and proven in this thesis to have a significant relationship to the dependent variable Perceived Net Benefits. Additionally, we showed that *Data Quality* also affected perceived net benefits in the DSS context, which was in line with our hypothesis. We would further want to highlight the importance of building sound research models that are tested via a statistical manner. Though, a strict qualitative way of conducting research would be more enlightening when diving into and trying to explain one phenomenon, the statistical approach is more preferable when building general models. Furthermore, we want to cover the aspect that this study elaborated on a field that according to Arnott & Perven (2005) was lacking research, namely by investigating single cases (applications) that were centred on the end-users.

7.2.2 For practice

The findings previously discussed might have an impact not only on the research community as mentioned above. It could also have implications on the DSS practice as such. Managers could more easily, via the proposed resulting research model C (figure 5.1), determine which part of a post-implementation they should focus on in order to obtain higher end-user perceived net benefits. E.g. it would be wise for a manager and the DSS-vendor or any other person with system authorities to focus on Support Quality after that a DSS is implemented since it was proven that this factor actually affected the end-user perceived net benefits.

It was also proven that Data Quality was of importance for the end-user which indicates that system administrators should continuously work with this factors underlying variables (summarized in tables 2.4) to obtain a reliable stream of data feeding the DSS, without sound data quality the end-user will have a hardship making the most accurate decision.

Accordingly system managers should also work with the system so that Problem Match via its underlying variables is achieved. The trend of building customized software from scratch has accordingly to Wixom & Todd (2005) changed into a mere customization of already existing “of the shelf” solutions. Although these solutions also bring implications in that additional support might be needed after the system has been implemented. The support could for instance be required when further customizations are needed to encounter new business requirements. This continuously support is something that our research model acknowledges and pushes for.

7.3 Further research

An interesting finding that derived from the interviews, which we have not devoted any additional focus and research to, was the underlying variable to System Quality that we referred to as *associative thinking*. In a future research this variable could be further studied in IS applications but also explored in a literature review to possibly strengthen its importance to System Quality, since our literature review never identified or targeted it.

If a desire is to continue on the cumulative knowledge we strived to establish and further build on our research model, we suggest, as was written under 6.1, that new possible CSF's might be found if one studies the cultural diversities and the different contexts where the DSS is used. Recommended is to review and reflect over McBride's (1997) article where this topic is mentioned.

Additional, the findings or rather relationships that we established is only pointing in one direction, namely from the independent factors to one dependent variable (perceived net benefits). It would most certainly be interesting to investigate if there were a relationship among the factors themselves. For instance, how does Support Quality affect System Quality and so forth?

Since it was stated in the literature that System Quality should have a significant relationship with the dependent variable Perceived Net Benefits and this was not proven in our context. It would be preferable if additional research were done in order to explain this "non-relationship". Additional research that compares the result derived from this study with other seemingly similar studies would be preferable, and would give a deeper understanding to why specific aspects affect certain types of DSS applications.

7.4 Recommendations

When starting this research we were novel researchers of the quantitative approach, and we have therefore realized and experienced several key phases or procedures that also should be noted here in the end of this thesis. Additional to further research, some recommendations to future researchers who would like to conduct a similar research, or parts of it, as ours is given in some sequent order here:

- Dependent on the time limit, one should always start writing as soon as possible but maybe more importantly is that the interview respondents, case organizations, etc, is targeted and contacted in the very first days. This since practitioners or experts of some field often is busy and difficult to schedule a meeting with.
- Be well prepared in how to construct the survey relating to how the questions should be asked and how different constructs should be linked to each other. For instance, only one question about a single variable is not enough. At least two questions per variable are needed to carry out a complete PLS.

- If a web survey is being conducted, chose the online survey tool wisely and assure that it can save and extract the collected data for further analysis using SPSS, SmartPLS, etc. It is worth paying for a smarter tool than computing all the different data by hand. Also, always estimate the survey to be “out there” a week longer to make it certain that the respondents have time enough to participate. Especially since it is a good idea to send out follow-up e-mails to increase the response rate significantly.
- We can recommend using the easier SmartPLS if one wants to carry out a partial least square and/or a regression analysis towards using SPSS, which is far more advanced.

Appendixes

Appendix 1A – Interview Guide

This guide is presented in Swedish since the interviews were conducted in Swedish.

Inledande frågor

1. Vilken professionell bakgrund har ni?
2. Vad har ni för position i företaget?
3. Vad har ni för arbetsuppgifter?
4. Hur länge har ni arbetat på företaget?

Frågor gällande undersökningen

5. Vad tycker ni är viktigt för att slutanvändaren ska bli nöjd med systemet?
6. Är det några speciella faktorer eller liknande som ni trycker extra hårt på för att slutanvändaren ska bli nöjd?
7. Utifrån ett slutanvändarperspektiv, vad är det som gör ert system så bra?
8. Vad är dina åsikter om flexibilitet i systemet? Tror ni att det påverkar slutanvändaren?
9. Vad är dina åsikter om systemets möjlighet att integrera data från olika källor? Tror ni att det påverkar det slutanvändaren?
10. Vad är dina åsikter om noggrann/exakt data, som systemet tillhandahåller? Tror ni att det påverkar det slutanvändaren?
11. Vad är dina åsikter om allsidig/omfattande data, som systemet tillhandahåller? Tror ni att det påverkar det slutanvändaren?
12. Vad är dina åsikter om konsekvent data, som systemet tillhandahåller? Tror ni att det påverkar det slutanvändaren?
13. Vad är dina åsikter om komplett data, som systemet tillhandahåller? Tror ni att det påverkar det slutanvändaren?
14. Efter att användaren fått systemet implementerat, följer ni upp detta? (Support?)
15. Arbetar ni med att få användaren att förstå och kunna använda systemet?
- 15.b. Tränas användaren upp efter implementeringen?
16. Tror ni användaren skulle bli nöjd utan träning? Varför?
17. Hur tror ni att användarens förväntningar på systemet påverkar användarens upplevda nytta av systemet? Varför?
18. Efter hur lång tid tror ni att användaren får ut max (upplever störst nytta) av systemet?
19. Har ni märkt någon skillnad i hur nöjd slutanvändaren är, om man jämför stora och små organisationer som använder ert system?

I teorin och tidigare forskning har vi funnit att kvaliteten på systemet i sig (System Quality) och på de data det skapar (Data Quality) är väsentligt för att slutanvändaren ska känna nytta/värde med systemet. Vi har även funnit bevis på att någon form av support och/eller träning påverkar slutanvändarens upplevda nytta/värde med systemet. Tid och organisationens storlek har även de nämnts som påverkande faktorer.

20. Utöver dessa (ovanstående), finns det några andra konkreta faktorer som ni vet/tycker påverkar hur nöjd slutanvändaren är, eller slutanvändarens upplevda nytta/värde med systemet? Eller bidrar med fördelar till användaren?

21. Hur skapar ni mervärde för användaren?

Avslutande frågor

(Sammanfattar vad vi har förstått)

22. Tycker ni att vi förstått er korrekt?

23. Finns det något mer som vi missat tycker ni?

Appendix 1B – Thematic and translated interview questions

<i>Questions</i>	<i>Theme</i>	<i>Definition (why? how?)</i>
1. What is your professional background?	Introduction	This question is asked partly to get a picture of the participant but also because the participant shall feel satisfied in the interview situation, adapting what Kvale (1996) describes as “dynamical”.
2. What position do you have in the organization?	Introduction	This question is asked partly to get a picture of the participant but also because the participant shall feel satisfied in the interview situation.
3. Which are your work tasks?	Introduction	This question is asked partly to get a picture of the participant but also because the participant shall feel satisfied in the interview situation.
4. How long time have you been working for the organization?	Introduction	This question is asked partly to get a picture of the participant but also because the participant shall feel satisfied in the interview situation.
5. What do you reckon is important to ensure that the end-user is satisfied with the system?	General, system and data quality	Here starts the actual research with a very open question, which tries to clasp as much information as possible from the participant about their view on the topic.
6. Are there any specific factors, or such, which you focus extra hard on to please the end-user?	General, system and data quality	This question tries to narrow the answer from the first question more, to find factors or similar which can be linked to the theory.
7. From an end-user perspective, what makes your system so good?	General, system and data quality	By using this question, answers regarding system and data quality are anticipated to arise and hopefully will the participants bring new variables to existence.
8. What is your opinion on the flexibility of the system, how do you think it affects the end-user?	System quality, flexibility	This question is posed to get information about the flexibility variable in the system quality factor.
9. What is your opinion on the systems ability to integrate data from various sources, how do you think it affects the end-user?	System quality, integration	This question is posed to get information about the integration variable in the system quality factor.
10. What is your opinion about the accuracy in the data which the system provides? How do you think it affect the end-users?	Data quality, accuracy	This question is posed to get information about the accuracy variable in the data quality factor.
11. What is your opinion about the comprehensiveness of the data which the system provides? How do you think it affect the end-users?	Data quality, comprehensiveness	This question is posed to get information about the comprehensiveness variable in the data quality factor.
12. What is your thought about the consistency of the data that the system produces? How do you think it affects the end-users?	Data quality, consistency	This question is posed to get information about the consistency variable in the data quality factor.
13. What is your thoughts, opinions on the completeness of the data that the system	Data quality, completeness	This question is posed to get information about the completeness variable in the data quality factor.

presents? How do you think it affects the end-users?		
14. When the system is implemented, do you continue to support the end-user? (If yes, how?)	Support	This question is asked to get information about the <i>support quality</i> factor and how they contribute to extend and maintain the end-users perceived net benefits.
15. Do you work with getting the end-user to being able to use and understand the system? (If yes, how?)	Support	This is a more narrow question on the support factor, which tries to fish for any underlying variables to the <i>support quality</i> factor.
15.b. Do you support the end-user with training after the implementation of the system?	Support	A subquestion to the previous question. If training or such is not brought up in question 9 this will grasp it.
16. Do you believe that the user would be satisfied without any training? Why?	Support	This question is asked to get an understanding of how important the training variable is and why.
17. Do you believe that the expectations (from the user) on the system, impact the perceived net benefits of the user? (If yes, How and Why?)	Problem match	An open question, which tries to grasp the participants view on the <i>problem match</i> factor.
18. After how long time do you reckon that the end-user get the most (perceive net benefits) out of the system?	Time	This question is related to the time factor. It is not a critical success factor but nevertheless an interesting comparable factor.
19. Have you found any differences in how pleased the end-users are, between small and large organizations that use your system?	Organization size	Same as the above definition. Not a critical success factor but still a comparable and interesting factor.
20. Except the above, are there any more particular factors which you know/believe impacts the perceived net benefits of the end-user? Or contributes with any other advantages?	New factors	This question is generally asked to catch any other factors, except the ones already found in the literature, which can be seen critical from a vendor perspective.
21. How do you create additional value for the user, after the system is implemented?	New factors	This is a very open question with the sole purpose of summarizing and exploring new potential factors that were missed in the previous question.
22. Do you feel that we have understood you correctly?	Ending Q	The first of two ending questions, which tries to validate our understandings of the interview.
23. Is there anything else that we have missed out?	Ending Q	To the final question can the participant freely add anything he or she think have been out missed during the interview.

Appendix 2A – Interview Transcript 1

Björn Gustafsson =	B	SQ	General for system quality
Johannes Johansson =	J	DQ	General for data quality
Respondent =	R	SQ-F	System quality and flexibility
Category: + (relevant), - (non-relevant)		SQ-I	System quality and integration
		DQ-A	Data quality and accuracy
		DQ-COMP	Data quality and comprehensiveness
		DQ-CONS	Data quality and consistency
		DQ-NESS	Data quality and completeness
		SU	Support
		PM	Problem match
		TI	Time
		OS	Organisation size
		NF	New findings

Appendix 2A, Interview 1, Location: Lund Date: 17-04-2009				
Line	Person	Conversation	Category	Code
1	R	Ja det är XX	-	
2	J	Ja, hejsan det var Johannes Johansson och Björn här igen	-	
3	R	Ja	-	
4	J	Då ska vi se, är du färdig och redo	-	
5	R	Ja då, japp, ja det är jag	-	
6	B	Du fick ett mail igår med frågor, och så vidare eller?	-	
7	R	Ja, ja det fick jag och har tittat som hastigast på dem och tittar nu på dem nu igen	-	
8	B	Tycker du att det verkar kännas okej eller är det något som är oklart med dem, liksom?	-	
9	R	Nää, det är väl vad ni menar med både allsidig, konsekvent och komplett	-	
10	B	Japp, vi kommer ner till dem frågorna sedan så kan vi förklara vidare vad vi menar med dem	-	
11	R	Ja precis	-	
12	B	Toppen	-	
13	J	Ha, men då kan vi börja här då med dem här inledande frågorna lite grann, eee, så kan du få börja med att berätta vilken professionell bakgrund som du har.	-	
14	R	Som jag har, Ja (pause) jag är ju inte universitetsutbildad, det är jag inte, jag har inte systemer eller något annat, jag har arbetat inom olika positioner inom landstinget och kommuner och på TietoEnator i sju år, var där som konsult och har jobbat med personalsystem [otydligt] mot kommunal och offentliga organisationer., eeee, så jag är egentligen autodidakt, jag är självlärd vad gäller detta då.	-	
15	J	AAA	-	
16	B	Vad har ni för position inom företaget?		
17	R	Jag är anställd som Pre-sales konsult eller tekniskt affärsstöd kan vi väl översätta det med, nere i Lund och dessutom är jag då konsult ansvarig i södra Sverige.	-	
18	J	Okej, och vad är det för arbetsuppgifter, vad innebär det?	-	
19	R	Det innebär ju att vi jobbar ju så att vi jobbar i olika team med både säljare och pre-sales då, egentligen har som huvudsaklig uppgift att sälja beslutstödet XY till våra kunder, och varje team för sig jobbar mot olika	-	

		segment och det teamet jag tillhör jobbar mot kommuner och offentliga myndigheter och verk i Sverige.		
20	J	Mmm, mmm	-	
21	R	Så vi kompanjerar rätt mycket ihop med våra säljare ute och gör förstabesök, eee andrabesök, tredjebesök och så vidare och vi har också vår huvudsakliga uppgift är att genomföra proof of concept eller sibbar som vi kallar dom,..seeing is believing där vi åker ut till en kund,,till en kommande kund förhoppningsvis då, och låter dem testa XY på egen data,,	-	
22	B,J	Mmmm, mmmm	-	
23	R	Och tillsammans med kunden sätter upp en applikation på 3 dagar och sen så supportrar vi den i en månad och dem får låna x antal licenser utav oss för att testa detta	-	SU
24	B	Ajjjaa	-	
25	R	Är detta bra är detta dåligt? Så det är våra huvudsakliga uppgifter som konsulter på XX , vi är ju inte konsulter så att vi ska implementera nästa steg inte, utan där har vi ju vår partner till detta	-	
26	B,J	Okej, Okej	-	
27	J	Eeee, och hur länge har ni arbetat på XX ?	-	
28	R	Jag har varit på XX i augusti i 2005 e då började jag	-	
29	J	Okej, mmm	-	
39	R	Drygt två och ett halvt år	-	
40	B,J	A det är ju Toppen, toppen	-	
41	B	Eeee, vi tänkte vi går vidare lite grann,, EEE vad tycker ni är viktigt för att slutanvändaren ska bli nöjda med systemet?, Eller vad tror ni är viktigt?	-	
42	R	(Pause) Det allra viktigaste för en slutanvändare är ju upplevelsen utav att det är enkelt för mig att ta fram den information jag behöver för att fatta mina beslut	+	SQ
43	B	Mmm	-	
44	R	Det är enkelheten och (pause) snabbheten i detta så att säga, att jag kan, jag kan, upplevelsen av XY , är ju mycket om man har tittat på den några gånger så är det ju att det är väldigt snabbt det är väldigt flexibelt, jag kan ställa frågor väldigt fritt,,	+	SQ-F SQ
45	J	Mmm, okej	-	
51	R	Och det tror jag är det absolut viktigaste för slutanvändare,japp	-	
52	B	Finns det några speciella faktorer, eem som ni trycker extra hårt på för att slutanvändaren ska bli nöjd? Alltså är det något som ni verkligen vill implementera när ni sitter och utvecklar denna mjukvaran, det har är viktigt för att slutanvändaren ska bli nöjd?	-	
53	R	EE,ja i vår säljprocess, eller det vi hela tiden försöker leverera är ju nyttan, inte bara att det är flashigt och att det går snabbt utan där ska ju även vara en nytta jö, det gäller ju att hitta, när vi är ute på våra sibbar och vi gör våra testinstallationer så är det väldigt viktigt för oss och vi tror även för kunden att vi hittar dem här problemområdena dom har där det är extra jobbigt, eller där dem upplever att dem inte har tillräckligt mycket information för att dra dem slutsatser dem behöver, så att hitta dem verkliga problemområdena,,	+	PM
54	B	Okej okej	-	
55	R	Så det försöker vi hela tiden trycka på, att hitta needsen ute hos kunderna,	+	PM
56	B	Ja	-	

57	R	Och lösa det till dem	-	
58	B	Eeeemm, mm, Vad, om man ser som en användare då, som slutanvändare av själva systemet, vad tror du då dem uppskattar med ert system, vad är det som gör det så bra?	-	
59	R	Enkelheten	+	SQ
60	B	Enkelheten?	-	
61	R	A, jjaa för att det, det, det är så enkelt att ställa så komplexa frågor som vi egentligen gör när vi klickar runt	+	SQ
62	B,J	MM,MM	-	
62,5	R	Men just enkelheten är det att användargränssnittet äää e ju också sådant att (pause) det är ett associativt tänkande, man hela tiden, alltså, jag börjar titta på information men hela tiden när jag tittar på den så dyker det upp en mängd nya frågor i mitt huvud, hur va det nu där och hur var det där, och om man nu ställer den frågan istället vad får jag för resultat och det är ju det som XY verkligen kan stödja den, de sättet att analysera på.	+	SQ NF
63	B	Man får upp en massa information när man söker, när man gör en sökning så få man upp information som ligger runtomkring den informationen också, eller hur är det, det fungerar?	-	
64	R	Ja, allt som är knutet till den informationen, och jag kan direkt när jag ser den informationen så får jag ju en mängd nya frågor hos mig, som gör att jag kan väldigt enkelt med de, den teknik vi använder där användargränssnittet vi har ställa en ny fråga genom att klicka på den	+	SQ
65	B	Så är det ja	-	
66	J	Just det just det	-	
67	J	Eemm, vi går vidare här, ee, vad är dina åsikter om flexibiliteten i XY och hur tror ni det påverkar slutanvändaren?	-	
68	R	(Pause) Eee, (pause) det är en stor flexibilitet i XY , påverkan på slutanvändaren kan ju faktiskt vara lite dubbelt, när vi säger slutanvändare så är det den som ska konsumera informationen?	+	SQ-F
69	B, J	Ja, precis..Ja, precis	-	
70	R	Ibland kan flexibiliteten ställa till det	+	
71	B, J	Okej?, okej?	-	
72	R	Att vi har så pass många möjligheter, helt plötsligt och det kan ju innebära att en flexibilitet kan bli en komplexitet istället ju	+	SQ-F
73	B	A, det klart	-	
74	R	De, man får ju lite tveeget det här med flexibilitet, ibland är det så måste så att säga ee, anpassa våra applikationer så att där inte är så mycket flexibilitet i dem från början, men eftersom XY har den här flexibiliteten inbyggd är det väldigt lätt att sedan utöka det och släppa på mer och mer information för mer avancerade grejer	+	SQ-F
75	J	A just det	-	
76	R	Och skulle vi visa allting från början för en slutanvändare som konsumerar, skulle det kunna vara, upplevas som jobbigt.	+	SQ-F
77	B	Hur släpper ni på den här stegvisa informationen är det ju längre de sitter med systemet, eller hur fungerar det?	-	
78	R	AA, oftast är det så att man har någon form av	+	SQ-F

		rollbaserad behörighet, att man kan ändra sin roll då, att nu får du se mer information eftersom du har efterfrågat, eller att man helt enkelt kan det ju vara så att användaren ringer in och har önskemål om att –jag vill se det här också, då kan man både som utvecklare göra det i det dokumentet som har publicerat eller kan man instruera användaren, du kan faktiskt göra detta själv, kom här ska jag lära dig visa dig hur du gör en ny tabell		SU
79	B	Aha	-	
80	R	Och då öka på detta då	-	
81	J	Ja just det	-	
82	R	Dom har ju den möjligheten nu att man kan skapa sina egna objekt även som en slutanvändare i XY	+	SQ-F
83	J B	-Aha, -okej	-	
84	J	A vi återkommer ju senare här till, aa hur nu lär upp dem och så vidare, men vi kan ta nästa här. Vad är dina åsikter om systemets möjlighet att integrera data från olika källor, eeee, och hur tror ni då att detta påverkar slutanvändaren?	-	
85	R	De e ju, Jag har ju jobbat med kommuner sedan i kommunala, landstingsvärden sedan början på 90-talet , med sådana här frågor, där man hela tiden har efterfrågat att vi vill kunna koppla alla våra system och det har aldrig lyckats riktigt, det blir gigantiska projekt utav det och XY är ju för många av våra kunder lösningen på just detta problem, att koppla personal, ekonomi, verksamhetsdata och annan information. Så dom är stora dom möjligheterna att integrera data från olika källor, och det påverkar absolut slutanvändaren, för att, jag kommer idag nu från (stad x kommun) som öö, tittar då på ett beslutstödssystem linjecheferna ute, som i dagsläget flera olika system som de måste lära sig, sitt ekonomisystem, sitt personalsystem sitt verksamhetssystem och där XY istället blir paraply programmet som håller ihop all den information som finns där, det är ett verktyg där vi kopplat ihopa det, så här ser du din personal, här ser du din ekonomi och dina verksamhetsdata	+	SQ-I SQ-I
86	B	Jag har en lite följdfråga på den, ee, fungerar det så att de fortfarande har sina system i grunden och sen att ni fungerar som skalet som binder samman dem eller hur fungerar det?	-	
87	R	De, de e så, tittar man på ett personalsystem är där ju en mängd olika rutiner för att hantera sin personal å hantera lön, vi tar ju egentligen bara resultatet utifrån lönekörningarna i lönesystem	+	SQ-I
88	B	Okej okej	-	
89	R	Och läser in det i XY , tar man ett ekonomisystem, så hanterar ju den all den ekonomiska transaktioner och annat, vi vill ju bara, intresserade av. Okej vad är nu utfallet blivit här då, hur kan vi följa utfallet mot en budget eller	+	SQ-I
90	B	Mmmm	-	
91	R	Tittar på leverantörsfakturer, så ekonomisystemet lever ju kvar på dem som är, håller på med det och lika så med ett verksamhetssystem, för dem har ju sina uppgifter i varje organisation för att man ska kunna göra det man ska göra i organisationen det vill säga, så vi är ju ett e vi	+	SQ-I

		är ju ett skal		
92	B J	- MM okej - mmm	-	
93	R	För att samla ihop all information som finns i de här olika	+	SQ-I
94	B	A, men det är ju toppen, för att kunna kategorisera ää XY då så måste man veta lite hur den tekniska bakgrunden ser ut lite gran, och vi fick lite information från (Respondent B) också, men det är ju bra med så mycket information man kan få för då kan vi specificera mer vilken typ av DSS det är och så vidare liksom, så att det är bara jättebra, eee, vi kan gå vidare lite gran. Till fråga 10 här och det är då, vad är dina åsikter om noggrannhet/ exakthet som systemet tillhandahåller, hur tror ni det påverkar slutanvändaren?	-	
95	R	Hur menar ni där?	-	
96	B	Om data är, hur ska man säga, om data alltid är lika exakt, till exempel hur den presenteras, om den är, om den knyter samman från alla de här olika systemen som ligger till grund. Är den alltid lika exakt alltså finns där en konsekvens i data liksom	-	
97	R	Ja, alltså konsekvensen bygger ju på hur du har kopplat ihop detta ju och vi blir ju lika exakta som på det som de har matat in i sitt frontsystem	+	SQ-I DQ-CONS DQ-A
98	J B	Mmm Mmm	-	
99	R	Så där är ingen förvanskning på vägen, däremot vi kan ju få förädla, vi kan ju tvätta data, allting är ju beroende på hur man matar in det i början	+	SQ
100	B	Okej så man förlorar ingen information genom att använda denna typ av system	-	
101	R	Näää, där e vi också lite, vi vänder ju på, om man tittar på beslutsstödssystem genom historierna har ju OLAP teknologin så har man ju många gånger där tvingad att summera aggregera sin information i olika kuber för att kunna hantera den, för att det ska vara möjligt att hantera. XY med den tekniken vi har kan vi ju hantera ner på lägsta nivå, vi vill ju inte aggregera den innan vi tar in den i XY vi låter XY aggregera när användaren klickar och använder sina objekt	+	DQ-A SQ,
102	B	Okej okej	-	
103	R	Så vi vill inte förlora informationen, för börjar man aggregera och skapa kuber så tar man bort en väldigt massa information	+	DQ-COMP
104	B	Mm, aa det gör man	-	
105	R	Så vi e, eftersträvar alltid att försöka, vi vill ha in lägsta möjliga transaktionsnivå in i XY	+	SQ DQ
106	B	Vad, om man ska försöka återkoppla till noggrannheten i informationen som kommer, vad var det jag tänkte säga, äää vi kan återkomma till det senare, jag tappade tanken här faktiskt Vi kan gå in till allsidigheten i den data som systemet tillhandahåller, omfattningen på den ska man kanske säga, finns där några, tror du att, ur en kunds perspektiv eller slutanvändarens perspektiv, finns det några sidor av allsidighet omfattning av data som är bra respektive negativ? Om det är bra att den är allsidig och omfattande eller kan det vara för mycket ibland?	-	
107	R	A, jag förstår vad du menar, alltså (PAUSE) om vi går	+	

		tillbaka till min roll så att säga när man bygger applikationer och annat jag vill ju alltid ta in så mycket som möjligt i dokumentet, väljer visa det som är viktigt för stunden		DQ-NESS
108	B J	- Mm okje - mmm	-	
109	R	Vi försöker ju ha en allsidighet i dokumentet och i koden men det är inget som slutanvändaren behöver se, förrän den dagen de börjar efterfråga, som det här med, annars blir det för, kan det bli för mycket flexibilitet i det. Vi har ingen, om man åter igen refererar till kuber så brukar det vara, du kan bara säga att man kan bara ha en tio tjugo dimensioner sen blir det för stort helt enkelt, vi har ju inga begränsningar i vår dimensionallitet på äää på den informationen som vi ska läsa in, utan man tar in det som finns helt enkelt	+	DQ-COMP SQ-F SQ
110	J	Mmm, jaa och väljer och visa	-	
111	R	Sen hur XY hanterar det, det är en annan fråga men den klarar av detta ju.	+	
112	B	Jaapp, och va vi inne, nu ska vi se om jag var inne på den konsekvensen i den data som presenterats, men vi nämnde något om det eller hur var det? Om det alltid är samma data som skickas upp mot slutanvändaren som, eller om den är konsekvent liksom?	-	
113	R	Ja absolut, alltså den eeee, den blir ju så konsekvent som du berättar för XY att hur vi vill hantera den	+	DQ-CONS
114	B	Okej okej, så det är lite upp till användaren själv att visa konsekvens där?	-	
115	R	Jaa, eller till den som eee, som bygger applikationen, den som sitter och utvecklar XY dokument, hur den då hanterar informationen, det här är (pause) om vi tar en sådan sak som att, nu ska vi summera personalkostnaderna, ja hur får vi fatt på personalkostnaderna då måste man ju veta, vilka slag eller konto ligger dem på i ett ekonomisystem, och det är ju inget användaren i sig ska behöva bry sig om utan det gör ju utvecklaren då, han har grupperat ihop eller så att du lätt kan få tag på den informationen.	-	
116	B	Okej, aa men det var ju bra, då har vi fått lite mer info om det där. Eee ska vi gå vidare här?	-	
117	J	Jaa, fråga tretton va? Vad är dina åsikter om komplett data som systemet tillhandahåller? Eee alltså, jag vet inte riktigt hur vi ska,	-	
118	B	Jag tror faktiskt vi kan hoppa över den för jag tror vi har integrerat den i dem andra frågorna. Så att det känns bara som en repetition.	-	
119	R	A det är ju lite grann som allsidighet och	-	
120	B J B	- Ja precis lite åt det hållet - Aaa - dem här frågorna är ju lite gran ställda så att ibland så svarar de lite på sig själva om man har svarat på en tidigare fråga men det är ju bara för att kunna belysa ett problem från många olika håll liksom så det är lite därför vi ställer cirkelfrågor	-	
121	J	Vi kan gå vidare här till fråga fjorton, eee, efter att användaren har fått sitt system implementerat eee hur följer ni upp detta? Du nämnde innan att ni försöker lära upp användaren lite grann, få dem att förstå att de verkligen kan göra det här själva och sådär.	-	

122	R	Där finns ju olika roller då i en organisation, vi har ju alltid att vi utbildar dem som ska vara en XY -utvecklare i en organisation	+	SU
123	B, J	Aha? Jaa?	-	
124	R	Där är ju alltid någon som då är ansvarig, den som är utvecklare sen brukar det vara några också i en organisation som är super users eller lite mittemellan, som också kan då gå en utbildning i hur man bygger eller skapar objekt i ett XY dokument som där redan finns data i, hur gör jag tabeller hur gör jag grafer hur gör jag för att analysera den informationen jag har, så det är ju en form av, vi har ju utbildningar rulland utbildningar på alla våra kontor här i Sverige då som man kan anmäla sig till, och vi säljer alltid med en utbildning när vi säljer till en organisation, sen då slutanvändaren eller den som ska konsumera det som då är gjort där i en organisation den utbildas ju ofta internt i organisationen själva utav de här super userna som varit med och byggt upp dokumentet eller till och med själva har gjort det. Då kan ju de utbilda dem, ööö (pause) det är ju den, vi har ju utbildningar sen har vi ju givetvis en supportorganisation som inom XX ju.	+	SU SU SU SU
125	B	Hur utnyttjas den och hur ser den ut kontra funktioner och annat som finns i XY ? (Pause)	-	
126	R	EEEj,,njea asså supporten är ju för supporten på programvaran XY , det är ju egentligen inte en support på att, hur löser jag ett specifikt problem	+	SU
127	B	Okej	-	
128	J	Okej, så ni tillhandahåller så att de kan ringa ett nummer liksom och få support på det sättet?	-	
129	R	Full support på programvaran XY , sen är det ju hela tiden så att vi kan supporta så att, vi behöver ju hjälp med att lösa ett specifikt problem och då kan vi antingen själva tillhandahålla den hjälpen eller att vi har våra partner som är då [otydligt], våra partner då kan ju gå in o hjälpa och supporta våra kunder också jö	+	SU
130	B	Okej	-	
131	R	Sen kan jag ju bara nämna att vi har ju lite communities också då som precis nu nyligen startat upp och då har vi ju lokala användare communities där vi då bland annat har startat upp ett för kommuner i Sverige. XY användare i som jobbar inom kommuner i Sverige ska ha sin community och kunna ställa frågor, hjälpa varandra och vi kan gå in och svara på frågor där också	+	SU
132	B	A det var ju väldigt smart	-	
133	R	Mmm, det känns bra, det har precis startat, startade igår	-	
134	B	Jaha hahaha okej	-	
135	R	Aa så jag har ju fått möjligheten att bygga upp det här då, där har varit ett intresse från våra kunder att kunna ha den, där har ju funnits en XY community internationellt innan men det är nog bättre att försöka skala ner det till olika segment, så de kan ställa de frågorna som rör det segmentet så att säga,	+	SU
136	J	Då kan vi väl egentligen direkt hoppa till fråga 16 här, vad tror ni, eller hur tror ni att användaren, skulle den kunna bli nöjd utan att få någon träning eller hur fungerar det,	-	

137	B	Alltså learning by doing, skulle det fungerar på er	-	
138	R	Njaaa, det fungerar på vissa, där finns människor som, ja absolut, learning by doing, ee vi träffar ju på e ibland i när man då visar XY och sen berättar man att du kan ladda hem XY själv och testa på XY du har femton dagar på dig att testa det och dom kommer tillbaka och har gjort jättemycket grejer, så att där finns dom människorna, sen så kan jag berätta att från och med vår nästa version så kommer XY för personligt bruk helt fritt	+	SU
139	B J	Aha okej Okej	-	
140	R	Så att det är bara att ladda hem XY och jobba med det själv, så vi tror ju på att visst kan användaren lära sig själva och vi kommer försöka stödja den, eller få till det så att det är ett allmänt spritt verktyg	-	
141	B	Och hur får personer, till exempel om jag skulle vara intresserad av att ladda ner det från er hemsida hur får jag, hur kan jag få information om hur man utvecklar vidare, finns det en sådan typ av community också eller?	-	
142	R	Det finns det, det finns en community för utvecklare på svenska och engelska. Alltså utvecklar communities som vi tror kommer öka på väldigt mycket nu när vi släpper den versionen. Och vi kommer också ge möjlighet att man får lov att publicera sina gjorda applikationer på en server hos oss.	+	SU
143	J	Okej	-	
144	R	Så man kan sprida sina grafer så att säga. Så visst, som svar på frågan om det finns användare som blir nöjda utan träning? Ja!	+	
145	B	Ja [...] mmm ska vi gå vidare kanske?	-	
146	R	Mmm	-	
147	B	Hur tror ni att användares förväntningar på systemet kan påverka deras upplevda nytta av systemet? Det vill säga att den förväntningen som de har innan de får det här systemet implementerat kontra när de väl har fått det.	-	
148	R	Mmm	-	
149	B	Tror ni att det kan påverka?	-	
150	R	Absolut, det är ju mycket sånt här företags bullshit som kommer...	+	
151	B	Det är ingen fara det..	-	
152	R	För vi har ju som ambition att vi ska ju alltid överträffa förväntningarna de har alltså när vi gör vår SIB. Att vi kan ju prata om hur ska vi göra detta och diskutera med dem om vad vill ni att vi gör och sånt där. Sen försöker vi alltid få till en extra grej så att säga.	+	PM
153	B	Förlåt att jag avbryter, men vad betyder SIB för nånting?	-	
154	R	SIB ja, SIB det är egentligen samma sak som proof of concept.	-	
155	B	Ok	-	
156	R	SIB står för seeing is believing.	-	
157	B	Så var det ja. [skratt]	-	
158	R	[skratt]	-	
159	B	Nä men det kan vara bra att ha koll på specifika termer.	-	
160	R	[skratt]	-	
161	B	Ja	-	
162	R	Ne men som svar på det att visst användarnas förväntningar på systemet påverkar ju deras upplevda nytta.	+	PM
163	J	Mmm	-	

164	R	Absolut	-	
165	J	Och ni försöker förädla den nyttan genom att ge dem ytterligare lite till liksom.	-	
166	R	Ja ytterligare lite till, nånting extra som de verkligen ser att XX kan leverera mer än vad man kan förvänta sig.	+	PM
167	J	Ja	-	
168	B	Okej	-	
169	B	Ehh.. Hur lång, efter hur lång tid tror ni att användaren får ut max? eller upplever dens törsta nytta av systemet?	-	
170	R	[...] Ja det är ju svårt att svara på.	+	
171	B	Ja	-	
172	R	[...] Det finns ju de som har använt XX i många många år och de har inte fått ut max ännu. Tror jag. För hela tiden så förändras ju frågeställningar och förändras omvärlden och då kan man ju använda XX till andra uppgifter så att säga, för att lösa andra problem.	+	TI
173	B	Mmm	-	
174	R	Så ser man det isolerat på att det, om man ser att nu ska vi använda XX bara för att följa vår ekonomi kontar utfallet mot budgeten.	+	
175	B	Mmm	-	
176	R	Så kan man ju få ut max nytta efter en dag.	+	TI
177	J	Mmm	-	
178	R	Men det kanske inte är det man ska använda XX bara till utan det är ju ett allsidigt program för all informationshantering och [...] så [...]	+	DQ-COMP
179	B	Jaaaa	-	
180	R	Ja	-	
181	B	Men, vad [...] nu ska vi se om man kan ställa om den här frågan lite grann. Ehhmm. Om man ser från deras sida, om man ser en ny användare till exempel.	-	
182	R	Mmm	-	
183	B	Ska börja använda XX för ehh en specifik tjänst, är det såhär att den här personen förstår hela erat system med en gång eller krävs det att personen engagerar sig i träning och så vidare för att få ut den här nyttan som han behöver eller är det ska få börja liksom?	-	
184	R	Ehh, det ska gå och det gör det också. Kommun X håller på nu att föra ut ehh till X antal användare i kommunen. XX som ett uppföljningsverktyg som har då byggt en applikation som tillhandahåller ekonomi, personal och verksamhetsdata till linjecheferna ute. Ehh de har ju då gått en utbildning på en halvdag tillsammans med de cheferna då, och efter den halvdagen så förväntas då de att få ut nyttan av detta ju.	+	SU
185	J	Okej	-	
186	R	Så de ska lära sig det. Så då har dom lärt sig hur dom ska analysera den här informationen som finns i detta dokumentet men de har dock inte lärt sig hur kan jag fortsätta och utveckla mina egna grejor i XX.	+	SU TI
187	J	Nä nä just det	-	
188	R	För då har de inte lärt sig det fulla utvecklingsverktyget ju. Men de har lärt sig att konsumera informationen som är skapad för dem. Det finns ju olika roller i en organisation och var man är någonstans så [...] ehh hur långt man går in i XX.	+	SU TI
189	B	Haaa	-	
190	J	Ehh, ja då går vi vidare här och kollar lite på om eller	-	

		frågar lite om du tror att det är någon skillnad på hur nöjd slutanvändaren är, eller blir med tanke på om det är en [...] om han eller hon jobbar i en stor organisation eller en liten organisation eller har det någon betydelse? Eller hur?		
191	R	Det ska inte behöva ha någon betydelse ne.	+	
192	J	Ne	-	
193	R	Nu jobbar jag ju egentligen bara emot kommuner eller den typen av organisationer och de är ju per definition ganska stora om man ska jämföra med inom företagsvärlden och den privata sfären ju.	+	
194	J	Mmm	-	
195	R	Men ehh det finns ju en skillnad mellan stora och små kommuner också hur [...] ehh vilken ambition man har och hur man tar till sig såna här typer av redskap.	+	PM
196	J	Ahh	-	
197	R	Det finns det ju.	-	
198	J	Men ehh om man säger ehh små organisationer eller små kommuner får de alltid också en sån här superuser som liksom kan hjälpa de andra vanliga användarna också eller?	-	
199	R	Jaaa, det kan ju bli svårare ju mindre en organisation bli att hitta den här ehh champion eller superusern inom organisationen.	+	OS
200	J	Mmm	-	
201	R	Och är man väldigt liten och inte har den då.. då får man förlita sig på att köpa den tjänsten istället från oss eller från en partner till oss ju.	+	OS SU
202	J	Ah just det.	-	
203	R	Så det eh, vi vill ju helst att hemskt gärna att vi ska hitta den i varje organisation för att det blir bättre. Alltid bättre om man har nån sån som håller i det, förstår det och kan utveckla det vidare.	+	OS SU
204	J	Ja	-	
205	B	Okej, okej, jag har en liten fråga om de här licenserna som ni tillhandahåller och så vidare. När vi pratade med XY innan så sa han att region Skåne hade någonting runt 30 000 användare eller nånting och att de hade nånting som kallades för fri licens.	-	
206	R	Ja	-	
207	B	Ehh, ah, eh, att, innebär det att det faktiskt är 30 000 personer som sitter och använder det? Asså dagligen och betyder det att det finns 30 000 personer som har tillgång till att använda det, eller hur funkar det?	-	
208	R	Ja, det är en sajtlicens som region Skåne har och de har möjlighet att distribuera XX till alla sina anställda då.	-	
209	B	Okej.	-	
210	R	Lite drygt 30 000 är de väl.	-	
211	B	Ja	-	
212	R	Men det faktum hur många som använder XX då det vet jag inte på region Skåne. Men de har, de behöver aldrig tänka på att eh okej nu behöver vi ha, jag vill också använda XX jag vill kunna titta på det här eller se den applikationen. Utan här har du dina licenser.	-	
213	B	Okej	-	
214	R	Så det är ett fritt nyttjande av XX.	-	
215	B	Eh ja. Vi tänkte ju göra en liten eh en eh enkätundersökning just mot region Skåne senare i våran uppsats här.	-	

216	R	Mmm	-	
217	B	För att kolla på deras upplevda nytta och så vidare liksom.	-	
218	R	Ja	-	
219	B	Och hur vi, vi har en liten fråga hur man ska definiera populationen som vi ska undersöka för vi hade ju då de här 30 000 personerna som ingår i organisationen då som ett riktmål då eftersom alla kan använda det, fast sen så samtidigt så förstår vi att det inte kanske är 30 000 personer som faktiskt sitter och använder det. Men har du nått förslag på hur man skulle kunna angripa ah, hur man faktiskt skulle kunna definiera en population som använder XX? Finns det nått sätt att göra det?	-	
220	R	Ah, asså rent generellt så finns det ju eh vi kan ju ta en kommun där det finns eh 30 000 invånare i kommunen.	-	
221	B	Mmm	-	
222	R	Då brukar det va ungeför 3000 anställda då utav kommunen.	-	
223	B	Ja	-	
224	R	Utav de 30 000. Utav de 3000 anställda så brukar man säga att 10% utav dem är på nått sätt en chef men arbetsledande egenskap eller befattning eller ekonomiskt ansvar. Och när vi går in till en kommun och säger att vilka det är som ska, som vi ser har ett behov utav en XX licens brukar vi ta den regeln. 30, 3000 och 300 då, licenser.	-	
225	B	Mmm	-	
226	R	Som det kan finnas ett behov utav som är, har en sådan position att de måste följa sin personal eller sitt ekonomiska utfall.	-	
227	B	Okej	-	
228	R	Och ska man jämföra det på region Skåne så är de 30 000 anställda, 3000 chefer och sen har du då lite kringpersonal så det eh skulle gissa på en population på nånstans som de facto har, kommer att kunna använda XX i region Skåne är nånstans mellan 3 till 10 000	-	
229	B	Runt 3	-	
230	R	Som är då, sen så kan det ju givetvis då.. det är ju internt, sen kan det ju även gå externt ju	-	
231	B	Mmm	-	
232	J	Okej	-	
233	R	Och då finns det ju då region Skåne som ska serva alla som bor i region Skåne med en mängd information.	-	
234	B	Jaa	-	
235	R	Och då finns det ju en potential på, då är vi ju uppe på några miljoner kanske eller hur många bor det i Skåne?	-	
236	B	[skratt]	-	
237	R	En miljon i alla fall.	-	
238	B	Ja 1,5 nånting tror jag	-	
239	R	Och av dem så vill vi ju sälja en licens till en utav var och en av dem ju.	-	
240	B	Ja	-	
241	J	Mmm	-	
242	R	Nää [skratt]	-	
243	B	[skratt]	-	
	J	[skratt]	-	
244	B	Ja man ska ju ha ambitioner liksom. [skratt]	-	
245	R	[skratt]	-	
246	B	Nä men det hjälper oss väldigt mycket för vi ska ju	-	

		kunna definiera lite grann utav den här populationen liksom så vi har haft lite problem med att sätta ett nummer på hur många det är som kanske använder det liksom.		
247	R	Ja precis. Sen är det ju just som en region som region Skåne finns det ju många andra organisationer än bara de som har arbetsledare eller ekonomiskt ansvar som kan ha behov utan XX ju	-	
248	B	Mmm	-	
249	R	Med allt ifrån labbpersonal till nånting annat så finns det ju information som dom behöver ta tag i och analysera kanske.	-	
250	J	Jaa	-	
251	R	Så det kan ju finnas betydligt fler, men jag tror att det är nånstans mellan 3 och 10 000.	-	
252	J	Okej.	-	
253	B	Nä men toppen.	-	
254	J	Ehh då kan vi väl säga som så här att eh vi har ju då läst på då lite i teori och tidigare forskning som har gjorts inom eh beslutsötssystem och så vidare.	-	
255	R	Ja	-	
256	J	Och då har vi, kan man väl säga att vi har funnit då att kvalitet på det som systemet kan ge i kvalitet eh, och den data som systemet skapar, och den kvaliteten på det tillsammans med ehh någon form av support och även då tid och organisationens storlek som vi har frågat om lite här. Och att det då kanske, ah, påverkar ehh slutanvändarens upplevda nytta då.	-	
257	R	Mmm	-	
258	J	Och utöver det här som vi har frågat om här nu innan är det nått annat som du känner att ehh är liksom speciellt påverkar?	-	
259	B	Som vi har missat att fråga om.	-	
260	J	Ja som vi har missat att fråga om, eller sådär. Du nämnde ju innan att enkelheten och snabbheten är två viktiga grejer. Är det nånting annat liksom som?	-	
261	R	Ja tycker ju att vi har ju en ehh, givetvis så har ju vi som alla andra företag en leadingstar eller nått sånt där motto som vi ska leva efter och vi har ju simplified decisions for everyone. Ehh och börjar man tänka på det och vad det är vi säger egentligen att ofta när man pratar om beslutstödsprogram och annat så är det ju from top-to-down, ju att någon där uppe har möjlighet att analysera informationen och ta beslut. Vår ambition är ju att få ner den här möjligheten att fatta beslut till dem som fattar många och många små beslut.	+	SQ-NF
262	B	Mmm	-	
263	R	För det är ju summan av alla de små besluten som påverkar hela organisationen, hur den mår och hur den fungerar och vilket resultat den ger. Så att just det här att vi [...] har den det mottot och att XX kan va det redskapet och verkligen kunna leverera information som du dagligen kan fatta beslut på. Och göra det snabbt. Och eftersom XX är då snabbt och det är flexibelt och det är ganska enkelt också för slutanvändaren så har vi ju faktiskt eller en organisation har möjligheten att göra detta.	+	SQ SQ-F
264	B	Okej	-	
265	R	Även om det är en floskel så tror jag faktisk på den att	-	

		det är sant.		
266	B	Ja men det är ju..	-	
267	R	Kan man fatta många mer beslut är nog viktigare än att en economichef drar en slutsats av det ekonomiska utfallet för då är det ju försent.	+	
268	B	Mmm	-	
269	J	Mmm	-	
270	B	Men som slutanvändarna som sitter framför systemet, vad tror du påverkar denna personen i säger, vad istället för att säga att åh detta är så jobbigt nu måste jag sitta med det här systemet tills att han säger att det är så kul att sitta med det här systemet. Vad tror du det är som bidrar till att XX förhoppningsvis är det här systemet?	-	
271	R	Att man kan leverera en nytta, alltså kan jag leverera en applikation någonting som den användaren ser att det här spar mig såhär mycket tid eller det här ger mig så pass mycket information så jag vill verkligen efterfråga det så man måste vända på det på det sättet så att man ska kunna leverera nytta i det du skapar. Är det bara en uppföljning för att du måste göra det då kan man, då spelar det ingen roll att man har XX eller något annat system. Utan det måste finnas en nytta i det som slutanvändaren ser.	+	PM
272	J	Och den här nyttan kan du beskriva kort hur ni skapar den?	-	
273	R	Ja nytta [...] se om man kan dra nått bra exempel [...] ehh kommuner gör räkenskapsammandrag i som man levererar in till SEP en gång per år. Ekonomerna sitter då och eh tar det ekonomiska utfallet för föregående år och fördelar dem på en mängd olika slag och verksamheter och allt vad de håller på med. Och i mantid kan det då röra sig om mellan 2-4 veckor, att göra detta. Med excel med mallar och allting. Kan man göra en applikation då i XX som vi har gjort då till XY så att man kan göra detta på några timmar så ser jag fördelarna med XX.	+	SQ (EFFEK TIVITET)
274	J	Ja absolut	-	
275	B	Det är klart	-	
276	R	Det är en nytta på en ganska hög nivå men det gäller ju att hitta sådana här nytto effekter på även en verksamhetschef att nu ska jag göra min eh ekonomiska uppföljning för denna månaden å jag måste redovisa detta till min chef uppåt och kan jag då i XX lätt och enkelt ta fram detta och också förstå vad det är som har påverkat det, då är det ju också en nyttoeffekt.	+	
277	J	Ja	-	
278	B	Så det är alltså enkelheten i att plocka fram datan i stort sett liksom, att de är enkelt att presentera att det går snabbt som eh, som eh ledsagor litegrann i XX.	-	
279	R	Ja, och att du kan eh [...] inte bara presentera det utan även kunna analysera den på ett väldigt bra sätt.	+	SQ
280	B	Okej	-	
281	R	Du är ju aldrig låst till ett att nu kan jag bara välja den här månaden och sen gå ner och titta där utan komma ner längst ner på en transaktionsnivå så kan jag byta dimensionaliteten direkt i XX	+	SQ-F
282	J	Ahh	-	
283	B	Ahh	-	
284	R	Då kan jag titta på ett föregående år istället.	-	

285	B	Okej	-	
286	R	Då är det ett klick borta och så har jag den informationen. Och det är just det här associativa sättet som vi själva fungerar på som man försöker få in i XX också.	+	NF?
287	B	Mmm	-	
288	J	Mmm	-	
289	R	Till skillnad mot traditionella verktyg.	-	
290	B	Ehmm, ja ohh vi har ju kollat lite grann på eran applikation eh hur den ser ut med grafer också vidare. Nu e jag ju inte jättemfamiljär med andra system hur de ser ut, men vet du om erat skiljer sig när det kommer till den rent grafiska presentationen gentemot andra eller är det..	-	
291	R	Nää	-	
292	B	Ganska mycket samma sak på alla system.	-	
293	R	Det är nog same same ungefär.	-	
294	B	Det är det ja.	-	
295	R	Det tror jag, ja. Asså YY har ju också grafer i sina presentationer o men vad som skiljer oss då ifrån andra är ju det att våra presentationer är ju aldrig rapporter utan det är ju på skärmen, och du kan ju alltid förändra dem med ett klick.	+	SQ-F
296	B	Mmm okej ja.	-	
297	R	Ehh tar man YX exempelvis så är det ju väldigt mycket att det är en rapport som du producerar som är statiska.	-	
298	B	Mmm	-	
299	R	Och vill du välja något annat så får du göra om det och skapa en ny rapport som tittar på den.	-	
300	B	Så det är lite grann dynamiken i det då eller?	-	
301	R	Ja det är ju dynamiken i det att du kan ju titta på det på skärmen, använder vi det så är det något annat.	+	SQ-F
302	B	Mmm	-	
303	R	Och då kan du ju direkt, du kan ju klicka i grafen ju för att göra ett val ju.	-	
304	J	Mmm	-	
305	R	Exempelvis	-	
306	B	Mmm [...] det var ju bra ju, det där med dynamiken var ju någonting som vi inte riktigt har utvärderat tidigare kanske direkt.	-	
307	R	Nää	-	
308	B	Ehh toppen, eh finns det någonting mer?	-	
309	J	Njaa det, vi har väl egentligen försökt summera här ohhh du har väl försökt svara på det som vi trodde vi hade missat.	-	
310	R	Ja	-	
311	J	.. faktiskt. Ehh så då är vi väl i stort sätt färdiga.	-	
312	B	Så gott som klara ja, eh nä det är vi, vi är faktiskt klara [skratt]. Finns det, och eh vi har ju som sagt frågat om det finns någonting som vi har missat och det tycker jag vi har fångat upp bra. Ehh åh så vi vill väl egentligen bara tacka för oss och eh hoppas att det går bra för er i framtiden med XX och XY.	-	
313	R	Jadå, det ska det nog göra.	-	
314	B	Toppen toppen, vi kommer göra som så att vi kommer nu eh vi kommer att transkribera det här eh intervjun som vi har haft med dig.	-	
315	R	Mmm.	-	
316	B	Och eh sen kommer vi om du vill, så kommer vi kunna	-	

		skicka dig ett eh ett utdrag på den här transkriberingen.		
317	R	Ja	-	
318	B	Och eh så du får läsa igenom den och se så att vi har uppfattat allting. Och den kommer även vara, jag vet inte om vi kommer att skicka kodningsmallen, för vi kodar ju den här transkriberingen med avsikt för att hitta de här olika faktorerna som vi letar efter.	-	
319	R	Ja	-	
320	B	Eh men vi skickar gärna den här transkriberingen till dig..	-	
321	R	Ja absolut	-	
322	B	.. så får du gärna godkänna den bara.	-	
323	R	Jadå	-	
324	B	Eh [...] för det ökar eh uppsatsens trovärdighet om du tar del utav den och bara säger ett ja på den liksom.	-	
325	R	Ja det är lugnt.	-	
326	B	Jätte jättesnällt. Annars tack så jätte jätte mycket för din tid å ha en fortsatt trevlig helg och dag.	-	
327	J	Mmm	-	
328	R	Ja detsamma	-	
329	B	Ha det bra	-	
330	J	Tack så mycket, hej hej	-	
331	R	Hej	-	

Appendix 2B – Interview Transcript 2

Björn Gustafsson = B
Johannes Johansson = J
Respondent = R
Category: + (relevant), - (non-relevant)

SQ General for system quality
DQ General for data quality
SQ-F System quality and flexibility
SQ-I System quality and integration
DQ-A Data quality and accuracy
DQ-COMP Data quality and comprehensiveness
DQ-CONS Data quality and consistency
DQ-NESS Data quality and completeness
SU Support
PM Problem match
TI Time
OS Organisation size
NF New findings

Appendix 2B, Interview 2, Location: Lund Date: 20-04-2009				
Line	Person	Conversation	Category	Code
1	R	Erfarenheten har ju kommit från kunder och marknad väldigt mycket	-	
2	B	Vilken marknadserfarenhet har du, alltså vilken?	-	
3	R	Det tidigare jag jobbade med, innan jag började på XX , så jobbade jag på generell industri kan man säga, jag jobbade med inte något med IT kan man väl säga, eee, utan det handlade om att lösa andra problem inom industrin, jag fick en ganska så bred insikt i hur industrin fungerade, bilindustrin, grafisk industri och el industri också så vidare	-	
4	B	Okej	-	
5	R	Så det är väl min bakgrund då kan man ju säga	-	
6	B J	Japp Jap	-	
7	B	Vilken, eller vad har ni för position i företaget? Jag är regionchef för södra Sverige när det gäller privata företag och sen är jag regionchef för,,,eeeee,,för offentliga organisationer jag har ett team som jobbar med det i hela Sverige så jag har alltså två team som jag jobbar med.	-	
8	J B	Okej Okej	-	
9	B	Eee, och vad är era primära uppgifter, arbetsuppgifter	-	
10	R	Mina arbetsuppgifter är att eee nå målen, [skratt]	-	
11	B J	[skratt] [skratt]	-	
12	R	Men det handlar om att ee se till så att gruppen fungerar, anställa folk, se till så att vi gör rätt saker, se till så att eee, ifrågasätta i vissa fall det vi håller på med, kanske, men också, aaa, ligga på lite och sådär, dra i vissa kunder också som jag känner att jag vill jobba med jag vill inte tappa den biten helt utan jag har några kunder som jag jobbar med, men det är egentligen bara för att det är roligt men också bara för att jag inte ska tappa den biten	-	
13	B	Okej, japp, eee, vi kan gå vidare, vi kan gå hit ner	-	
14	J	Okej då kan vi börja med den övergripande generell fråga här, eee, vilka faktorer tror ni påverkar användarens upplevda nytta av XY ? [pause]	-	
15	R	Vilka faktorer?	-	
16	B	Mmm, vilka faktorer eller egenskaper?	-	
17	R	Mm, det kan man ju säga att användaren förstås! Att det	+	

		man sätter i sjön är något som användaren vill ha, det tror jag är väldigt viktigt		PM
18	B	Mmm	-	
19	R	Ee, där finns många exempel på där man sjösatt system som användaren inte egentligen har hjälpt till med kanske, eller de har inte fått, det har inte fått ut, det blir ingen hjälp helt enkelt och det där är nog oerhört viktigt ärligt talat, att man får någon slags kraft från användaren när man ska sätta sådana här saker i sjön, annars kan man kanske få användaren emot sig, till viss del.	+	PM
20	B	Mmm	-	
21	R	Det är ju bara att titta på hur det ser ut när vi kommer ut på arbetsplatser ibland så pratar man med folk om hur de upplever sina system och så ser man att dem system inte är så speciellt bra, och det beror ju i vissa fall på hur man egentligen har förankrat dem, faktiskt	+	PM
22	B J	Okej Okej	-	
23	R	Så att system kanske är väldigt bra men man har inte förankrat dem, i annat fall kan man ju göra system som är rent ut sagt skitdåliga, men det är ju en annan sak, då har man ju egentligen heller inte gått ut och hämtat en spec, vad det är man behöver ha	+	PM
24	B	Alltså någon form av kravspecifikation då eller?	-	
25	R	Ja precis precis, det är ju verksamheten som sitter med problemen, det är inte IT	-	
26	B	Okej	-	
27	R	Ofta så kan, om man tittar på andra system så för man ju in system på kanske en it-avdelning eller liknande, och det är ju faktiskt inte dem som sitter med problemen utan det är dem som ska drifva dem	-	
28	J	Mmm	-	
29	R	Så problemet finns ju i att du har en verksamhet som behöver ha systemen, sen har du en IT-avdelning som drifva dem och titta bara på hur det ser ut generellt i organisationen så är det IT-avdelningar som får sitta på, ta besluten, och det är ju därför i vissa fall det har fallerat	-	
39	B	Okje, men om man kollar från, när användaren väl sitter där i ert system på en daglig basis, vad är det då i själva systemet som gör att dem blir nöjda, att dem får nytta	-	
40	R	Jag skulle vilja säga såhär, dem får svar på alla sina frågor	+	SQ, PM
41	B	Okej	-	
42	R	Så man kan ju alltså, man styrs inte, eee, att du måste fråga på ett speciellt sätt för att få vissa svar utan du kan fritt gör som du vill och det där är en oerhörd styrka det vill säga vi sätter i händer på dem är en möjlighet till att vara flexibla	+	NF SQ-F
43	B	Okej	-	
44	R	Eee, och den är intressant för dem, ärligt talat det finns inte, mmmm, det är en sak definitivt att man sätter kraften ute hos användarna och lite på användarna faktiskt kan hantera det	-	
45	B	Mmm, japp eemmm [pause]	-	
51	J	Ja ska vi hoppa hit eller? Det är väl nästan taget va?	-	
52	B	Ja, alltså finns där några mer tekniska aspekter med ert system som gör att slutanvändaren blir nöjd eller få någon nytta av, om man går lite mer in på system kvalitet eller data kvaliteten som det här systemet levererar?	-	
53	R	Framförallt så tror jag att teknik biten i botten är ju såhär att, det är ju ett oerhört tekniskt program, det är ju bara att	+	

		erkänna, man kan ju göra väldigt väldigt avancerade saker där, det finns ju olika typer av användare, så du har ju statistiker i vissa fall som då kräver och har en väldigt stor kunskap i botten, som då kräver en hel del avancerade analyser, det kan man göra med XY så du kan göra oerhört avancerade analyser med XY och egentligen göra analyser som ingen annan kan göra beroende på att du har tillgång till databasen, hela databasen ända längst ner på transaktionsnivå, och det där är ju en oerhörd stor fördel för användaren, så det är en kategori av användare, sen har du en annan kategori av användare som då kanske, som då inte är lika avancerade men i det här fallet upplever man systemet som väldigt användarvänligt och väldigt enkelt, så att man kan säga i botten är det ett väldigt tekniskt system men användaren alltså slutanvändaren upplever det som väldigt lätt system och man kan säga som så att det där är oerhört stor styrka med XY för att man kan föra ut det här till väldigt många typer av användare, användare som i vissa fall inte har någon utbildning på a som kanske inte har någon utbildning på programmet.		SQ SQ-F DQ- COMP SQ SQ-F
54	B	Okej, så det är kanske enkelheten i användare- eller det grafiska gränssnittet och tekniken som verkar i kombination där	-	
55	R	Aa, aa precis, plus att analysmöjligheterna fantastiska egentligen och då tillfredställer annan typ av användare	+	SQ
56	B J	MM Mmm	-	
57	B J	Hmm den där har vi ju tagit med nu - mmm -	-	
58	B	Kan, humm nu ska vi ser här, vad är dina åsikter om systemets möjlighet att integrera data från olika källor, tror ni att det påverkar slutanvändaren? Hur ni integrerar, om ni har massa olika system, erat system fungerar väl som så att ni hämtar väl data från olika delar, hur pass viktigt är det att den gör det att den inte bara hämtar från en databas?	-	
59	R	A det är ju jätteviktigt, det beror på lite vad det är för bransch, kan jag ju säga, om du tar, om vi tar tex. Ett privatföretag så har man oftast ett stort affärssystem, vi kan ta SAP,,ee det är ju stort i sig, om man nu benämner det som en källa i detta fallet då, tex. Så kan man säga såhär att det är stort i sig någonstans sådär kanske det inte finns såhär stort intresse av att lyfta in källa nummer två då det mest finns ju nu i källa nummer ett. Men om man tar en annan väldigt stort segment så är det offentliga och där har man istället många system, man har ett ekonomisystem ett personalsystem du har alla dina verksamhetssystem det kan röra sig om 25 30 35 st som är väldigt stora och väldigt viktiga, så kan man tex. Inom sjukvården ett vårdflöde och man ska titta på var någonstans det stoppar upp inom sjukvården då kan man bara inte gå in i journalsystem man kan inte bara gå in i patientsystemet man måste gå in i labbsystemet man måste gå in i röntkensystemet och så vidare och hämta data, man hämtar data antagligen från en sju åtta system för att egentligen få en bild över hur det ser ut på våra processer och var någonstans det stoppar upp.	+	SQ-I SQ-I
60	B	Okej	-	
61	R	I dem lösningarna är det oerhört viktigt att vi vill koppla ihop systemen,.	+	
62	B	Vem är det som sitter av ren kuriosanyfikenhet, vem är det	-	

		som sitter och hämtar in information från alla dessa system, är det en läkare eller?		
	R	Näää det är det inte, det är, inom sjukvården, så har man ju egentligen, så har du ju då ofta en grupp som hanterar det här med ”data”	-	
63	B	Okej	-	
64	R	Och den brukar oftast sitta på IT-avdelningen, men sen har du ju då, du måste ju ha in verksamhetskunskap i lösningarna och då finns det, i vissa fall så har vissa landsting någon slags utsedd läkare eller någon annan professionell person som då är med i detta och som kanske då också har gått någon utbildning i vissa fall och så vidare så att man kan få in den kunskapen	+	
65	B	Okej, eee, och om vi går till den data kvalitet som ert system levererar, hur handskas det, ni hämtar in information från olika ställen och den ser kanske inte alltid likadan ut? Men när den presenteras för användaren så antager jag att den gör det, hur hanterar man det? Blandas information och sen presenteras den eller hur går det till?	-	
66	R	Njeaa asså vi kan ju, vi kopplar ju ihop olika källor och alla källor innehåller skit rent ut sagt, det är ju så	+	SQ-I
67	B J	Mmm Mmm	-	
68	R	Det finns smuts i systemen den här smutsen måste man ta omhand om på något vis „,eeee, och egentligen kan man säga som såhär att i vissa fall så är smutsen av den karaktär att man eventuellt kan göra det på ett sådan sätt att man faktiskt läser ihop saker och ting i någon form av excel, att man tvättar den på det viset, man gör en extra tabell som man skapar saker och ting,,,eee, har man tillåtit att mata in saker och ting i ett fält på olika sätt, numeriska värden eller något annat som inte borde vara där	+	SQ DQ-A
69	B	Datum och så vidare?!	-	
70	R	Jaa tex, det finns dåliga system som har tillåtit att för in information på olika sätt, den är ju väldigt svår att tvätta det kan ju inte vi göra något åt i ärligt talat, faktiskt, så att, men vi kan ju säga såhär, XY kan koppla ihop och vi, man kan säga såhär det vi går in och tassar på väldigt mycket i så fall är att göra ett datalager, ett datalager är ju, oftast så brukar ett datalager ha, eller skälet till att man vill ha ett datalager är att man vill föra ihop källor och tvätta data det brukar vara de två stora argumenten för att ha ett datalager	+	SQ-I DQ-A
71	B	Mmmm	-	
72	R	Okej, men det gör ju vi också, men vi säger inte att vi är ett datalager, det är väldigt viktigt att poängtera det, men vi löser den pucken ofta, men om vi säger att vi alltid ska lösa den pucken så är vi ute o kanske på djupt vatten	+	DQ-A
73	B	Okej	-	
74	R	I vissa fall så finns det ett behov av att skapa någon slags lager utanför, ponera att man ska som sagt föra ihop tio källor och den innehåller mycket skräp den här, då bör man kanske gå in o titta på källorna och göra vissa korrigeringar, och göra det och lägga det någonstans och därefter kopplar man på XY hade man gjort det där i XY så kanske varje applikation hade tagit tre fyra veckor extra att bygga, då är det en dålig lösning att göra, då är man inte snabb då är man inte vass så att säga det handlar egentligen bara om sådana saker	+	SQ-I DQ-A DQ-CONS
75	B	Okej okej, då har vi fått lite mer kött på benen där	-	

76	J	Hur var det med den där allsidigheten?	-	
77	B	Ja vi har identifierat en faktor i litteraturen som kallas ”comprehensivness” av data som vi inte riktigt har fått en bra definition på så kan kanske hoppa över den nu, på svenska heter den allsidighet i data men det säger inte mig så väldigt mycket och jag vet inte om du har hört det tidigare, om det är något du känner igen? Att data är allsidig i sitt sätt att presenteras.	-	
78	J	Kanske skulle vara hur omfattanden den skulle vara kanske eller?	-	
79	R	Njea det kan det ju vara, sen kan det kanske vara typ av [pause]	-	
80	B	Tycker det är ett klurigt ord att sätta på datakvalitet	-	
81	R	Mmm, aa precis, jag vet inte, i vissa fall kan man säga såhär, det vi skapar i vissa fall är ju en möjlighet att gräva ner sig i text också det är också ett sätt att gräva ner sig, om de har en text, en skriven text som läses in i XY så kan du göra en fritextsökning utefter den texten, det är ett sätt att söka ut information, om du tittat på egentligen hur man på ett normalt sätt brukar se på saker och ting så brukar det inte vara de man tittar på, utan man tittar på siffror	+	SQ
82	B	Mmm	-	
83	R	Oftast, med någon slags textfält	-	
84	J	Mmm	-	
85	R	Det är någon slags två tabell struktur, men i det här fallet så har vi också lyft in möjligheten att hämta data som nog kanske är, a vi kan ta en journalsystem som en läkare skriver, det är ju en journal om en patient, sen journal efter journal, om man nu vill göra utsökningar på journaler då då, hur gör du då? Det är inte så lätt att söka ut men det går ju alldeles ypperligt i XY någonstans och vi vill ju koppla den här någonstans du söker på patienter som är, som lider av någon,,aa någon hjärtinfarkt söker du ut den ”schoop pang klart”, alla med hjärtinfarkt har du skrivit in i fritexten, får ut dem, i en tabell där det kopplas ihop med allt det andra	+	SQ SQ-F
86	B	Mmm, okej	-	
87	R	Jag vet inte om det är det där är allsidighet i data	-	
88	B	Det kan det faktiskt vara	-	
89	R	Jag vet inte om det har med det att göra, möjligheten att söka ut ifrån på olika håll och kanter vad det är för typ av data	+	SQ-F
90	B	Är detta vad ni kallar associativ tänkande? Eller det är kanske inte samma grej riktigt?	-	
91	R	Nej associativt är väl att man associerar till saker, låt säga att du tänker på ett land du tänker på Italien och så helt plötsligt så associerar det, i och med att du varit där förra sommaren så var det så fint väder och då var det sol ute, och då associerar du det med god mat, det är en association som du gör	-	
92	B	Okej så det är någon form av kognitivt tänkande	-	
93	R	Med god mat och så helt plötsligt associerar jag med ett gott rött vin som du drack när du var där nere, och sen var du ju faktiskt där och kollade på fotboll också, tillexempel, det är ju associationer som vi människor egentligen gör, om man nu tänker sig hur vi söker ut data generellt ur en databas så sker inte den genom att man associerar, utan att det är, det är att man hierarkiskt går ner, då man börjar längst upp någonstans och ställer en fråga till sig själv och	+	SQ-NF SQ-NF

		så går man ner, men så gör man ju inte, utan det egentligen människor gör är att de associerar och så fungerar XY , så söker du utifrån Italien tillexempel och du ska ha en databas om Italien, så klickar du på Italien så skulle du associera den med viss mat vissa viner vissa fotbollslag och så vidare, och så går man in på fotbollslagen och tittar på dem, och det är dem här och vilka spelar där och var kommer dem ifrån och så vidare		
94	B	Det är någon form av EQ grej kanske, alltså istället för IQ så är det EQ, högra hjärnhalvan associerar alltid olika grejer, om det är det ni har tagit fasta på	-	
95	R	Mmmm ja jo, ja efter som människan faktiskt fungerar så så fungerar XY även så, så någonstans är det väldigt viktigt då att man kan säga att ha ett program som faktiskt eeeee, går i linje med hur människan är	+	SQ-NF
96	B	MMmm	-	
97	R	För att det är ingen människa som söker ut hierarkiskt själv,	-	
98	B	Näää	-	
99	R	Så fungerar inte vår hjärna, men så fungerar då dataprogram, ni har kanske hört det här med, det kanske jag drog förra gången, det här med ving resorna	-	
100	B	Ja precis jo	-	
101	R	Det är ett hierarkisk sätt att söka på, till något som inte leder till någonting	+	SQ-NF
102	B	Nää jag är med på det där	-	
103	R	AAa just det	-	
104	R	Men istället då klicka in tex Italien vecka 27 jag kan bo i rom jag kan bo på Sardinien, där jag hamnar om jag vill åka, då kan man ju visa alla dessa.	-	
105	B	Är detta ett vanligt sätt att jobba i beslutstödssystem?	-	
106	R	Nej, och det är det som är så jävla intressant	-	
107	B	Okej	-	
108	R	Att vi associerar och dem andra gör inte det	+	SQ-NF
109	J	Nää okej	-	
110	R	Och det är ju det som gör det så enkelt också, du får en hel databas, så du kan ju tänka här, ekonomi personal, har jag visat er någon applikation förresten?	+	SQ-
111	B	Naa jag var inne på er hemsida och kollade efter det att vi hade haft förra mötet, så va jag inne och klickade runt på er ajax klient	-	
112	R	Jag kan visa en applikation sen om ni vill?	-	
113	B J	Jaa Jaaa	-	
114	R	Det är mycket bättre att förklara genom att visa	-	
115	B	Ja men absolut	-	
116	R	Så får ni se vad vi menar med associativt information och dess teknik	-	
117	B	Ja självklart	-	
118	R	Det är mycket bättre för då ser ni tekniken och "aha" det är det det handlar om, det är ju så	-	
119	B	Okej, väldigt gärna	-	
120	R	Jag kan berätta när vi har sådana här visningar för studenter, så visar man att man kan göra såhär och såhär och så associerar man så gör man såhär då sitter inte folk och tappar hakan, för folk tror att det ska vara så	-	
121	B J	Mmm Mmm	-	

122	R	Men när man kommer ut och ska arbeta med den teknik som då är föråldrad som då all annan teknik, där man går över till att söka hierarkiskt så börjar man inse snart att va fan är detta för något?	-	
123	B	Aa det måste ju vara jobbigt att jobba så kanske, Men det kollar vi gärna på. Vi kan, nu ska vi se.	-	
124	J	Konsekvent data då, hur tänker du vad är dina åsikter om konsekvensen i data, och hur påverkar den slutanvändaren?	-	
125	R	Ja det påverkar slutanvändaren en hel del, ärligt talat, alltså konsekvensen i datan kan ju ha att göra med tid, organisationsförändringar. Alla byter organisationer stup i ett, där har ni ett problem, så ska du då jämföra dig, att titta på siffror som säger, nu har vi gjort 100 miljoner är det bra eller är det dåligt ? då burkar det första vara att man jämför med hur det varit historiskt	+	DQ-CONS
126	B	MMm	-	
127	R	Det är ju så	-	
128	J	Mm	-	
129	R	Aa, men vad är då 100 miljoner för den här avdelningen? Om man tittar på avdelningen och går tillbaka tio månader så var det faktiskt på det viset att man gjorde en organisationsförändring, så det gäller ju faktiskt att få till så att de här organisationsförändringarna följer med i ut-data	+	DQ-CONS
130	B	Okej	-	
131	R	Och då är det viktigt att man också tar ett beslut om hur man vill se på data, konsekvensen i datan är väldigt viktig att man fattar beslut om också, hur är det vi räknar nu då? Hur tänker vi? Idag så har vi, avdelning A och B hopslaget förra året så var det A och C och B låg vid sidan om, då är det viktigt att man plockar bort C historiskt annars ger ju den här fel information	+	DQ-CONS DQ-A
132	B J	Ajjaja AA just det	-	
133	R	Hänger ni med på den?	-	
134	B J	Ja absolut Japp	-	
135	R	Och då kan man säga såhär för att uppnå det måste man ta vissa beslut, där man fallerar lite ibland känner jag hos kunden att kunden har inte sett hur svårt det här kan vara i vissa fall. Vi kan presentera data som visar upp så så och så men då måste man också knyta den historiska datan på ett speciellt sätt	+	DQ-CONS
136	B	Man måste gå igenom tidigare organisationsförändringar	-	
137	R	Man måste ju i vissa fall kanske, om jag tänker mig att jag har säljare A-F. så här har vi ett antal säljare. Och de finns på avdelningarna 1234, hur får man ihop det här? Alltså hänger ni med?	-	
138	B J	Ja Mm	-	
139	R	Vi visar ju säljare ett idag och detta är igår [rit på tavla] så måste man tala om att de där [rit på tavla] det där är okej va?! Och det där är okej men det där är jobbigt	-	
140	B	Japp	-	
141	R	Eller hur? Där tillkommer en avdelning där måste, om man ska kunna mäta avdelning ett som hade faktiskt en två tre fyra st som jobbade på avdelning ett igår, men idag så är det faktiskt bara två hur gör man då? Alltså på något vis så är det viktigt att även om man gör rätt så kan det bli fel, det här är ju något som kan påverka resultaten och det påverkar	-	

		att något går åt ett visst håll		
142	B J	Mmm MMM	-	
143	R	Därför kan det upplevas som att här här sålde vi då för 100 miljoner och här säljer vi bara för 50 miljoner [visar på tavlan] och här finns ju skäl för det, så det finns ju sådan saker som XY inte kan ta hand om, man slår ihop avdelningar man delar på avdelningar och liknande, man köper upp företag, och var ska de gå in någonstans? Så att sådana här saker tillkommer och då kan man säga så här att i ett datalager i ett traditionellt datalager så burkar man lösa sådana här saker, det är ju sådana här saker man sitter med (tidsaspekten) det kan vi göra alldeles ypperligt i XY också.	+	DQ-CONS DQ
144	B	Detta är faktiskt något vi har tänkt på, så detta är något ni har i åtanke när ni utvecklar ert program? Att ni betraktar gammal data	-	
145	R	Mot kunden måste man betänka detta JA, om vi kan gå in och göra en lösning väldigt snabbt så krävs det något av motparten och en av sakerna som krävs är just den här biten, för nästa år igen så har de bytt organisation igen så man måste ju ha någon form av policy hur man tänker	+	DQ-CONS
146	B	Mmm, men jag tror det kan vara en väldigt bra förklaring på vår fråga,	-	
147	R	Jag vet inte	-	
148	B	Nää men det är absolut, vi hade ju inte så väldigt stor, vi har ju ett humm om det men vi har ju inte varit ute och fått det besvarat i industrin så att det här kan ju vara ett bra sätt att lösa problemet på	-	
149	R	Det här kan jag känna är ett generellt problem	-	
150	B	Okej?	-	
151	R	Alltså här, problem o problem, i vissa fall så är det inte problem för oss men det är hos kunden att man har inte tänkt på den här riktigt	+	DQ-CONS
152	J	Nää nää precis	-	
153	R	Det är ju så	-	
154	B	Jaa, eem, jo jag vet inte om detta är rätt term men ,,.....	-	
155	B	Jo, jag vet inte om detta är rätt term men smutsig data.	-	
156	R	Ja	-	
157	B	Finns ju i de flesta systemen. Eh och i de fall som ni vill hämta information från olika subsystem där ni kanske, ah men nu ska vi hämta information om deras årsbudget eller liknande och där saknas kanske poster där det är ofullständig data.	-	
158	R	Jaa	-	
159	B	Hur löser man den biten? Åh hur tror ni slutanvändaren påverkas utav den?	-	
160	R	Ah, vi kan ju inte trolla med knäna.	-	
161	B	Ne	-	
162	R	Det som inte finns det finns inte. Däremot kan vi ju snart inse att det som är otillräckligt måste läggas på.	+	DQ-NESS
163	B, J	Mmm	-	
164	R	Ehhh. Och då påtalas detta.	-	
165	B	Okej	-	
166	R	Eh, och det som är bra då med XX är ju att vi ser det här väldigt snabbt.	+	SQ
167	J	Mmm	-	
168	R	Att det saknas information.	-	
169	B	Den kastar nått error i gränssnittet eller nått liknande?	-	

170	R	Ja, ingen error, men man kan väl säga att resultatet är ofullständigt.	+	DQ-NESS
171	B	Okej	-	
172	R	Vi jämför inte riktigt bra, utan vi kan då bygga upp den här lösningen kanske på några dagar så ser vi ju snart att det här haltar ju.	+	SQ
173	J, B	Mmm	-	
174	R	Vad är det som haltar? Det är ju att de har lagt in fel data där borta eller att det är på det viset att (pause) att man la in data förra året men i år har man inte lagt in det.	+	DQ-NESS
175	B	Okej	-	
176	R	Och då har man det här problemet.	-	
177	J	A just det.	-	
178	R	Till exempel. Så att du får upp den på banan och helt plötsligt så att man ser vad fan har jag lagt in i detta. Och eftersom man inte har sett det där förut så har man inte kunnat göra någonting åt det. Helt plötsligt så ser man vad man lagt in för data och helt plötsligt är det intressant med utdata och helt plötsligt så gör man faktiskt någonting åt det.	+	SQ DQ-NESS
179	B	Okej, så ni tar in det och behandlar ändå problematiken i det?	-	
180	R	Definitivt ja.	-	
181	B	Okej, great great. Ehh.	-	
182	J	Och efter att användaren/kunden har fått det implementerat, hur följer ni upp det med eh support och	-	
183	B	Följer ni upp det eller?	-	
184	R	Ja vi följer upp det	+	SU
185	B	Okej	-	
186	R	Vi har ju en organisation, eller en försäljningsorganisation som bygger på det och att leverera en lösning, ehh (paus) och sen så eftersom vi har varit där ett antal gånger innan då så har ju kunden lärt känna oss. Vi har bevisat oss och vi har ju sjösatt det här systemet tillsammans med kunden. Eh men så är det ju alltid följdfrågor som kommer upp, och eh vi är intresserade av hur det går och så vidare. Men jag kan väl känna att det är, vi följer upp det men vi har nog inte haft den tiden att följa upp det kanske ett år efteråt.	+	SU
187	B	Ne	-	
188	R	Det kan jag inte säga. Så bra, det beror på vad det är för kund.	-	
189	B	Okej	-	
190	R	Men om vi tar en större kund så har man ju också mer kontroll på dem, har vi en mindre kund så har vi mindre kontroll på det. Det är bara att erkänna. Så är det, så det finns säkert ett eh (paus) hel o ren faktorer där att förbättra.	-	
191	J, B	Mmm	-	
192	R	Det tror jag, men det har ju även mycket att göra med vi växer ju som "hågen" (oklart)	-	
193	B	Ja	-	
194	R	Och vårt mål har ju vart att ta in nya kunder, eh och därmed inte sagt att vi inte ska underhålla de vi har, men det är ändå så att fokus har legat där. Det är bara så faktiskt.	+	SU
195	B	Men eh	-	
196	R	På gott och ont	-	
197	J	Men hur rent konkret arbetar ni med åh..	-	
198	B	När han sitter med systemet, och i vilken utsträckning precis, handlar det om att låta honom eller henne att förstå systemet.	-	

199	R	Mmm, asså det vi gör rätt ofta är att vi skapar ju en person hos kunden.	+	SU
200	B	Mmm	-	
201	R	Som blir någon slags XX-fantast. Som har, som har ett väldigt stort hjärta för XX. Och de driver ju det där så vi skapar ju också en organisation hos kunden som också driver det internt. Och det är viktigt att påpeka.	+	SU
202	J	Mmm	-	
203	R	Så vi försöker ju att få kunden att bli självgående. Vi tycker ju det, och det tycker ju också kunden är bra.	+	SU
204	J	Mmm	-	
205	R	För de driver det internt själva, utbildar sin personal själva. Kan vara så att vi kommer in ibland och hjälper till med vissa saker, men eh vi e inte ute och utbildar kundens eh slutanvändare, utan det tar de hand om själva.	+	SU
206	J	Okej	-	
207	R	Och i vissa fall så har de inte ens utbildning på XX utan de egentligen bara skicakr ut den. Åh eh här är informationen och så vidare också börjar man använda det och det fungerar.	+	SU
208	J	Mmm	-	
209	R	Men eh, jag tror att det finns en hel del och göra i efterarbetet och så. Alltså att följa upp saker och ting.	-	
210	J	Mmm	-	
211	R	Att en del tar inte till sig nya systemet beroende på att alla förändringar som ni vet inte är av godo.	-	
212	B	Nää	-	
213	R	För man tycker det är jobbigt med förändringar.	-	
214	J	Mmm	-	
215	R	Ehh (paus) faktiskt så det är ett stort vägande skäl till varför det kan va.. även om XX är så fantastiskt bra så tycker man ändå att det är svårt att ta till sig det.	-	
216	B	Ah men så är det väl med alla förändringar av alla slag.	-	
217	R	Visst är det så, och därför känner jag att eh det är, vi har inte haft den tiden eller möjligheten att faktiskt va hos kunden vecka där o vecka där.	-	
218	B	Nä	-	
219	R	Det är ju i så fall om man skulle gå till YY till exempel och följa upp alla användare i hela YX. Det har vi inte tid med.	-	
220	B, J	Nää	-	
221	R	Får jag ju erkänna	-	
222	B	Det är klart	-	
223	R	Men vi försöker skapa en bra applikation som man upplever som lätt och som man faktiskt vill använda. Så att eh vi följer upp då de här utvecklarna hos kunden kan man säga och vi följer upp då de här närmsta, ofta så skapar man nån slags referensgrupp hos kunden.	+	SQ SU
224	B	Okej	-	
225	R	Så man har ju utvecklarna i mitten hos kunden, och så har man runt omkring utvecklarna så har man ett antal personer kopplat till olika verksamhetsområden så man kanske har nån som sitter på ekonomisidan som blir någon XX verksamhetsperson	+	SU
226	B,J	Mmm	-	
227	R	Och den som sitter på personalsidan, och sen har du nån som sitter, om det är hos YY så har du nån som sitter på eh XY kanske eller vad det nu är kanske.	+	SU
228	B	Okej	-	
229	R	Så har du då ett gäng runt dig, så ska du bygga en ny	-	

		applikation för att föra ut saker och ting så har du med dig folket längre ut.		
230	B	Så får man in kraven	-	
231	R	Så får man in kraven så följer man upp den vägen. Så att säga va, men vi e inte ute hos slutanvändarna allihop. Absolut inte. Men det här är ett sätt att börja på som vi gör då. Och de (paus) jag tycker det fungerar relativt bra men jag tror definitivt att vi kan förbättra oss.	-	
232	B, J	Okej, mmm	-	
233	R	Det tror jag nog.	-	
234	B	Men finns det.. Så formell träning till de här, den här lilla gruppen som utvecklar de får formell träning	-	
235	R	Där finns det utbildningar ja.	+	SU
236	B	Okej	-	
237	R	Ja och det finns skriptutbildningar, eh avancerade sådana också och det finns, sen finns det också att göra det på plats hos dem där de sitter med sina specifika system. Eh och om man då har gjort den här skriptutbildningen och avancerade också så har man fått lära sig hur man knyter tabeller, kan man säga. Men sen när man då ska ta sig an sin miljö är det då viktigt att man jobbar med sina problem och då kan det vara så att vi är där några dagar extra, och hjälper dem på plats för att knyta sina källor.	+	SU
238	B	Okej	-	
239	R	Så att det blir ofta en väldigt bra utbildning.	+	SU
240	B	Finns där nån, eh när en slutanvändare sitter med systemet och de hamnar i trubbel eller det funkar inte som det ska liksom. Hur ser den supporten ut från er sida då?	-	
241	R	Mmm just det, då kan vi säga så här. Vi har en supportdel på XX som då supporterar XX. Och XX i det här fallet har en egen organisation med detta, det ska man känna till, som då har egentligen öppet jämt som man kan kontakt mitt i natten om det skulle vara så. Eh men den supporterar XX, den supporterar inte en specifik applikation om det uppstår problem så att säga och det är väldigt viktigt att poängtera för vi säljer inte heller lösningar utan vad vi levererar förnånting till en kund, om vi bygger den, så levererar vi det här med ett öppet skript.	+	SU
242	B	Okej	-	
243	R	Det innebär att det här är kundens applikation och vi har gjort den åt honom eller henne.	-	
244	B	Mmm	-	
245	J	Mmm	-	
246	R	Hänger ni med i skillnaden?	-	
247	B, J	Mmm, absolut.	-	
248	R	Om vi tar våra konkurrenter så levererar de en lösning som de nästan går i god för att den ska fungera.	-	
249	B, J	Mmm	-	
250	R	Okej, och diskussionen här är att de ansvariga, i vårt fall så är det så att kunden får en applikation tillsammans med oss och den är testad och klar och den fungerar. Men vi sätter inte något krav på oss själva och gentemot kunden att vi ska vidareutveckla den.	+	SQ
251	B	Okej	-	
252	R	Okej, för vi kan inte ta hand om alla de här 1000tals applikationerna. Då hade det blivit jobbigt alltså.	-	
253	J, B	Mmm	-	
254	R	Så vi har ju en support sida och de tar hand om XX, okej? Men kunden vet ju inte i vissa fall om det är XX eller om	+	SU

		det är applikationen som suger.		
255	B	Nä	-	
256	R	Utan då får man nästan ha kontakt med kanske den här säljaren eller så som har varit där eller så, så det kanske är två kontakter.	+	SU
257	B	Mmm, okej okej	-	
258	R	Ehh, sen har vi också så att eftersom vi inte har en konsultorganisation så har vi då partners som vi knyter till oss. Och partners sitter då ofta med kanske eh hjälper till med i vissa till med leveransen exempelvis.	+	SU
259	J	Mmm	-	
260	R	Och blir då en kugge i spelet också mot kunden. Och då kan det va så att partnern tar vissa saker. Så att eh, det där är väl väldigt klart och låter kanske som att man inte vet vem man ska gå till, men det är väldigt klart och utstuderat i alla fall.	-	
261	B	Okej	-	
262	R	Det är den här säljaren på XX och sen vad det blir av den är det antingen support eller något annat.	+	SU
263	B, J	Okej	-	
264	B	Ehh	-	
265	J	Den har vi nästan fått svar på också	-	
266	B	Hur tror ni att användarens förväntningar på systemet påverkar användarnas upplevda nytta utav systemet?	-	
267	R	Ja det är väl, ja det är ju återigen det här med förändringar.	-	
268	B	Mmm	-	
269	R	Eh, om man nu har en organisation eller en person som är emot förändringar, det ju ofta så att det finns personer som tycker att jag har det bra som jag har det.	-	
270	J	Mmm	-	
271	R	Eller va fan varför ska vi göra det här för. Eller och så vidare och så vidare. Så förväntningar kan ju i vissa fall vara sådär, kan man väl säga. Ehh för dom påverkar ju väldigt mkt. Men det är ju viktigt då för oss är ju faktiskt att, och det är väl vår försäljningsmodell och det är väl därför som den är så bra, eh vårt sätt att sälja på, det är ju att vi går ju faktiskt ut och gör ett litet test hos kunden.	-	
272	B	Mmm	-	
273	R	Så vi applicerar alltså XX på deras egen data hos kunden och sen så skickar vi ut det till alla för att testa och ser om det här är bra eller dåligt.	+	SQ-F SQ-I
274	J	Okej	-	
275	R	Och vad du gör då är att du faktiskt tar bort frågetecknen. Eller så är det nya som tillkommer men då har man en diskussion om det innan man köper, så på nått viss är det att man provkör en bil innan man har köpt den och ser om det är bra eller dåligt. Och vad är det som inte är bra då? Vad vill du ha mer av?	-	
276	B	Mmm mmm	-	
277	R	Och så vidare. På nått sätt så får du bort en hel del frågetecken så den landar rätt, eller mer rätt.	-	
278	B	Men det kanske inte är så mkt förväntningar utan kanske mer..	-	
279	R	Jo, men förväntningar blir det ju ändå för idag så finns det ju många som vet vad XX är och de har ju hört talas om det o det o det. Och de har det med sig så det kan ju va såna förväntningar också. Eh så att förväntningar av det problemet finns men modellen vi har för att ta hand om det är väldigt bra och ärlig på det viset, det är till och med så att	+	PM

		vi har 30 dagars money-back-guarantee, så skulle det va så att de handlar så har de 30 dar på sig att ångra. Och det är inte nån som har gjort det än.		
280	B	Det är ju generöst	-	
281	R	Och på nått sätt kan man ju säga så att om du får testa den innan du har handlat, och köper den och får pengarna tillbaka om det inte är bra. Så har man på nått sätt säkerhetsställt att de här som sitter som frågetecken eller så som inte gillar detta kan faktiskt få sin röst hörd och göra nånting åt det.	+	PM
282	J	Mmm	-	
283	R	Men det är inte nån än som har gått tillbaka än och sagt att jag vill inte ha den här skiten, och då vet jag inte om det är svar på den frågan ni ställde men på nått vis så försöker vi ta hand om det på det viset. Att förväntningarna nånstans ställs rätt och vi försöker få de att inse vad XX är. Och det gör man ju sen inte på 3 dar.	-	
284	B	Nä men man ger ju en bild utav det.	-	
285	R	Men vi börjar ju ofta med när vi säljer XX att vi ser vad de har idag plus lite till.	+	PM
286	J	Mmm	-	
287	R	Man utgår ju egentligen ifrån kunden, det här jobbar vi med idag och nu ska ni få nånting som ni inte har idag. Det är ju det va.	+	SQ PM
288	J	Mmm	-	
289	R	Man ska ju överträffa det där de är.	-	
290	B	Mmm just det okej ja	-	
291	R	Det är viktigt. Om man nu överträffar det dom är så har man förhoppningsvis också fått de att inse att det här är rätt bra kanske. Så förväntningarna är nånstans att det här ska vi slå, och slår vi förväntningarna så vinner vi.	-	
292	B	Precis, mmm ja. Ehh	-	
293	J	Mmm, efter hur lång tid tror ni att användaren får ut max av XX?	-	
294	R	Då kan man säga som så att vad är max? hmm det är svårt att säga va.	-	
295	B	När det fått ut så stor nytta utav systemet som möjligt.	-	
296	R	Exakt, man kan väl säga som så här. Ehh vi kan börja så här, problemet vi har idag är att vi inte har någon som vill investera. Det är ju nummer 1 va.	-	
297	J	Mmm	-	
298	R	Ingen vill handla nånting, varöfr då? Det kostar pengar och vi har inga pengar.	-	
299	B	Mmm	-	
300	R	Vi håller på att varsla folk. Det är vårt problem. Men om jag istället säger såhär. Du vill spara kostnader då antar jag? Jag det vill jag. Men om jag kan få dig att hitta pengar, är det intressant?	-	
301	B	Mmm	-	
302	R	Ja det är intressant. Var någonstans då då? Ja det kan vara att vi hittar lagervärmarna, att vi hittar de sämsta säljarna, eller produkterna med sämst täckningsbidrag.	-	
303	B	Ja	-	
304	R	Eller att vi får in pengarna snabbare ifrån våra kunder. Bara för att nämna några exempel.	-	
305	J	Mmm	-	
306	R	Ehh är det intressant? Ja det är intressant. Ehh vad var frågan?	-	
307	J	Det var angående tid här, efter hur lång tid.	-	

308	R	Ja så var det. Då kan man säga som så här. Om jag kan visa på det här, och hitta de här pengarna på en månad så är vissa grupper vissa grupper böjda efter en månad, controllers. Eller hur?	-	
309	B	Jo, business controllers.	-	
310	R	Hur får man ut max av XX? Ja eh det jag vill komma till är att man kan komma till XX och sitta som controller och ha sina intressen där och kanske snabbt få nått snabbt ja va bra. Man kan sitta där borta och sitta som försäljare och ha kontroll på sina kunder och sina produkter och vara nöjd med det. Hur får man ut max då egentligen? Det vi egentligen vill åt är att försöka få dem att förstå vad XX egentligen är. Då får man ut max av XX. Det är ett så fantastiskt rörligt sätt att hantera data på som ingen annan klarar av.	+	SQ SQ-F
311	B	Men ser ni att det är en tidsaspekt där eller?	-	
312	R	Ja det är inte alla som köper det eller det är inte alla som fattar det här. Om man fattar det att man får ut sina rapporter och sin information och nånstans så tycker man att det är skitbra med XX men man har fortfarande inte begripit 100% XX.	-	
313	B	Okej	-	
314	R	Så man har fortfarande inte sett att man kan köra inte långsidan här borta för att se.. ja så kan man det. Det här tar ett tag. Är man dessutom förstörd, att man suttit och jobbat med SQL frågor i 30 år, ja det är ju jättekul med SQL men nånstans så vet man ju själv va att det är ju fyrkantigt i vissa fall och left join, right join osv. nånstans så bygger jag nån slags struktur för att gå vidare och ta alla dessa frågorna, men så gör inte vi utan detta är ett annat sätt att arbeta med data på som är oerhört snabbt och effektivt och faktiskt mkt bättre.	+	TI SQ
315	B	Ja	-	
316	R	Och den, är inte alla som begriper men vi hittar ett gäng därute ändå som faktiskt lyser och de har förstått vad XX egentligen är och de är de vi vill åt.	-	
317	B	Okej	-	
318	R	Och det kan ta allt ifrån nån månad eller några veckor eller ett år eller flera år. Det beror på vad det är för typ av organisation, hur mogna man är med data.	+	TI
319	B, J	Jaha	-	
320	B	Mmm, sista frågan. Ehh har ni sett någon skillnad i hur nöjda slutanvändaren är och blir beroende på organisationsstorlek? Är det så att en stor organisation lättare anammar dom här kunskaperna med XX och..	-	
321	R	Ja man kan väl ta ytterligheterna då va. Om de har en stor organisation så har de mkt data och flera källor, och mera kaos.	+	OS
322	B, J	Ja	-	
323	R	Och ju mer kaos, ehh ju mindre möjligheter att styra och egentligen veta vad som händer.	+	OS
324	B	Mmm	-	
325	R	När man tittar på det. Har du femtusen artiklar eller om du har tio, har du hundra dotterbolag eller om du har ett, det är så va. Kan man styra detta så att alla inköpen som görs över hela koncernen osv så är det ju mkt svårare. Och kan man lösa den pucken för större så är det givetvis, det är ju ett större problem va. Eh sen kan man väl säga såhär att om man tar ett litet bolag så har man ändå rätt stor nytta utav	+	OS

		XX.		
326	B	Mmm	-	
327	R	För vad som har hänt de sista tio åren är ju att datamängden har ju exploderat. Så även på små bolag så har man mkt data idag. Man lagrar data kanske, så egentligen kan man väl säga att det har blivit en komplexare situation även för mindre bolag. Men tillbaka, ju mer data ju mer kaos, ju mindre data ju mindre kaos. Och går man till en egenföretagare med tio anställda så sitter antagligen den här VD:n eller liknande och har allting i huvudet. Om man generaliserer.	+	OS
328	B, J	Mmm	-	
329	R	Det är nog så va. Och har man behov av XX då? Ja det har man säkert men den här som sitter och har allting i huvudet då? Ja han är ju rätt så viktig och ehh han löser nog en hel del goa problem ändå.	+	OS
330	J, B	Mmm okej	-	
331	R	Så det beror lite på	-	
332	B	Så det kan finnas en aspekt där större problem ger en större nytta.	+	OS
333	R	Definitivt	-	
334	J	Mmm	-	
335	B	Okej	-	
336	R	Och dessutom är det ju så mkt mer pengar i det.	-	
337	B	Ja det är väl det som allting handlar om.	-	
338	J	Ehh vi kan väl avsluta lite, vi har ju som sagt, de här frågorna som vi har ställt de har vi ju egentligen grundat i teori och litteratur som vi har hittat. Eh utöver dem är det något annat som du tycker är..	-	
339	B	Något som vi har missat ur slutanvändar perspektiv.	-	
340	J	Som påverkar hur nöjd man blir när man sitter med XX?	-	
341	R	Jag kan väl säga att man, på markanden finns det väldigt mkt att man driver ut det här centralt från IT-sidan och ofta har det vart så att marknaden eller de som gör det här, användarna har haft väldigt lite att säga till om.	-	
342	B	Mmm	-	
343	R	Och vi går faktiskt ut och ser till så att det nästan blir det omvända. Att vi driver in det här ifrån användarna så att användarna är de vi sätter fokus på. Och vi kan ju göra det eftersom vi kan applicera det väldigt snabbt och vi kan ju forma om XX väldigt snabbt så att användaren får större makt och mer att säga till om kan man väl säga,	+	SQ SQ-F
344	B	Får sina krav uppfyllda.	-	
345	R	Får sina krav tillgodosedda, plus att XX inte är en rapport utan det kan ju vara 1000 rapporter i en applikation och helt plötsligt har du möjligheten att föra ut mer kraft hos användarna och jag säger till användarna att jag litar på dig. Ska vi nå det målet där upp så vill jag att du och du som sitter längst ner ska känna till detta. Var vi är nånstans och om man då tänker i de termerna som faktiskt inte har varit så, det brukar vara någon PDF rapport och ingen rapport överhuvudtaget längst ner så när man skicakr ut XX är det så enkelt att man kan använda det och ger människor den möjligheten att se information så stärker man den gruppen och det är ju faktiskt så att det är nån typ av power users, att man sätter kraften där ute. För det är ju där ute som man tar alla de tusentals besluten varje dag.	+	SQ
346	B	Mmm	-	
347	R	Det gör man ju inte centralt och kan man få alla människor	-	

		att bli lite bättre i en organisation som är väldigt stor till exempel. Vilken kraft det är i det. Det är lite det som vi är ute och missionerar.		
348	B	Distribuerat beslutstöd.	-	
349	R	Ja, och det går ju lite i stick o stäv med hur våra konkurrenter jobbar. Och det är väl egentligen lite vad man glömt där ute.	-	
350	B	Nä för man har väl bara koncentrerat sig på chefer och	-	
351	R	Information är makt, och är det nånting som vi faktiskt har problem med när vi kommer ut i en organisation så är det det att information är makt. Det innebär att vi får en hel del emot oss. Och det är för att de har byggt upp sina kungadömen på information och helt plötsligt så talar vi om för dem att nu ska vi sprida informationen, och då får vi dem emot oss på en gång. Så det stora problemet är att det är politik i en organisation.	-	
352	B	Mmm	-	
353	R	Och då går vi ut med ett sätt där vi ska sprida information och då får vi folk emot oss.	-	
354	J	Okej	-	
355	B	Vi får väl hoppas att det inte är så i all framtid	-	
356	J	Jättebra	-	
357	B	Det här var nog allt faktiskt, eh vi har nog inte nått mer utan vi har nog fått svar på alla våra frågor.	-	

Appendix 3A – The Survey: Introduction letter

This is just a representation of the actual online-survey.

This is presented in Swedish since the survey were conducted in Swedish.



Enkätundersökning

Att färdigställas av:

Alla användare av dataverktyget QlikView

Enkätundersökningen borde max ta 10 minuter att färdigställa, och ska vara oss tillhanda den 4 maj 2009.

Tack för att ni ställer upp i denna undersökning angående beslutstödssystemet QlikView. Undersökningen är ett samarbete mellan Lunds universitet och QlikTech Nordic AB. Alla deltagare kommer att kunna få ta del av resultatet efter att en analys av undersökningen är slutförd. Resultaten kommer att handla om vilka faktorer som påverkar användarens upplevda nytta med QlikView.

All insamlad data kommer att behållas i strikt förtroende av oss. Inga kopplingar till någon specifik individ eller organisation kommer att behandlas i undersökningen eller i en slutlig rapport. Den enda informationen rapporterad kommer vara i en sammanfattad statistisk form över hela undersökningspopulationen.

För mer information eller frågor, kontakta oss på telefon:

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Björn Gustafsson – 073XXXXXXX

Eller via e-post till:

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Vi är väldigt tacksamma för er hjälp! Vi ser fram emot ert deltagande.

Vänliga hälsningar,

Johannes Johansson & Björn Gustafsson
Lunds universitet, Institutionen för Informatik

För att delta i undersökningen gå in på följande länk:

<http://www.questionpro.com/akira/TakeSurvey?id=1218034>

och följ anvisningarna för att hjälpa oss med undersökningen

Appendix 3B – The Survey: The questions

This is just a representation of the actual online-survey.

This is presented in Swedish since the survey were conducted in Swedish.

Bakgrundsinformation

1. Vilken organisation arbetar ni inom? _____
2. Vilken är er position inom organisationen? _____
3. Hur många anställda arbetar inom din organisation? (OS) _____
4. Ungefär hur länge har ni använt QlikView? (TI)
 - 0-3 månader
 - 3-6 månader
 - 6-12 månader
 - mer än ett år
5. Ungefär hur mycket använder ni QlikView?
 - färre än 1 gång per vecka
 - ca 1 gång i veckan
 - flera gånger i veckan
 - ofta/alltid

Vänligen uppskatta varje av följande påståenden angående hur QlikView har påverkat er i ert arbete. Bredvid varje påstående, markera den siffra som stämmer bäst in på dig, från håller inte med alls (1) till håller starkt med (7).

		Håller inte med alls					Håller med starkt	
		1	2	3	4	5	6	7
6.	Jag har mer exakt eller noggrann data idag från QlikView än innan QlikView fanns installerat.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
DQ								
7.	QlikView förser mig med mer omfattande och innehållsrik data än innan QlikView fanns installerat	[1]	[2]	[3]	[4]	[5]	[6]	[7]
DQ								
8.	QlikView förser mig med mer korrekt data än innan QlikView fanns installerat.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
DQ								
9.	QlikView har medfört att jag får data mer konsekvent än innan QlikView fanns installerat..	[1]	[2]	[3]	[4]	[5]	[6]	[7]
DQ								
10.	QlikView kan flexibelt anpassas gentemot nya krav och villkor.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
SQ								
11.	QlikView integrerar effektivt data från olika (arbetsområden)/ användningsområden.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
SQ								
13.	QlikView är mångsidigt då det kan adressera nya databehov när de uppstår	[1]	[2]	[3]	[4]	[5]	[6]	[7]
SQ								
14.	QlikView integrerar effektivt data från många olika datakällor inom organisationen	[1]	[2]	[3]	[4]	[5]	[6]	[7]
SQ								
15.	QlikView ger mig möjligheten att hitta relaterad/närliggande data?	[1]	[2]	[3]	[4]	[5]	[6]	[7]
SQ								

16 SU	Som användare av QlikView har jag fått viktig träning i att använda systemet..	[1]	[2]	[3]	[4]	[5]	[6]	[7]
17 SU	Som användare av QlikView har jag fått viktig träning i att förstå informationen som det möjliggör.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
18 SU	Träning i att använda QlikView har påverkat hur nöjd jag är som användare.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
19 SU	Som användare kan jag alltid få hjälp (support) av supportkontakt med frågor angående att använda QlikView.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
20 PN B	Support och hjälp från supportkontakt har påverkat hur nöjd jag är som användare.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
21 PN B	QlikView har ändrat/påverkat mitt jobb markant	[1]	[2]	[3]	[4]	[5]	[6]	[7]
22 PN B	QlikView har reducerat tiden det tar att ta ett beslut för mig som användare	[1]	[2]	[3]	[4]	[5]	[6]	[7]
23 PN B	QlikView har gjort det enklare att ta ett beslut för mig som användare	[1]	[2]	[3]	[4]	[5]	[6]	[7]
24 PN B	QlikView har påverkat verksamhetsprocesserna	[1]	[2]	[3]	[4]	[5]	[6]	[7]
25 PM	QlikView har uppfyllt syftet och kraven vi hade på systemet	[1]	[2]	[3]	[4]	[5]	[6]	[7]
26 PN B	QlikView gör min organisation bättre	[1]	[2]	[3]	[4]	[5]	[6]	[7]
27 PN B	Som användare av QlikView är jag nöjd	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Övriga synpunkter (frivilligt):

detta är för QlikTech's skull

För att hjälpa QlikView att bli bättre, har ni några övriga synpunkter på QlikView? (frivilligt)

För att hjälpa QlikTech Nordic AB att bli bättre, har ni några övriga synpunkter på hur de kan förbättra sig? (frivilligt)

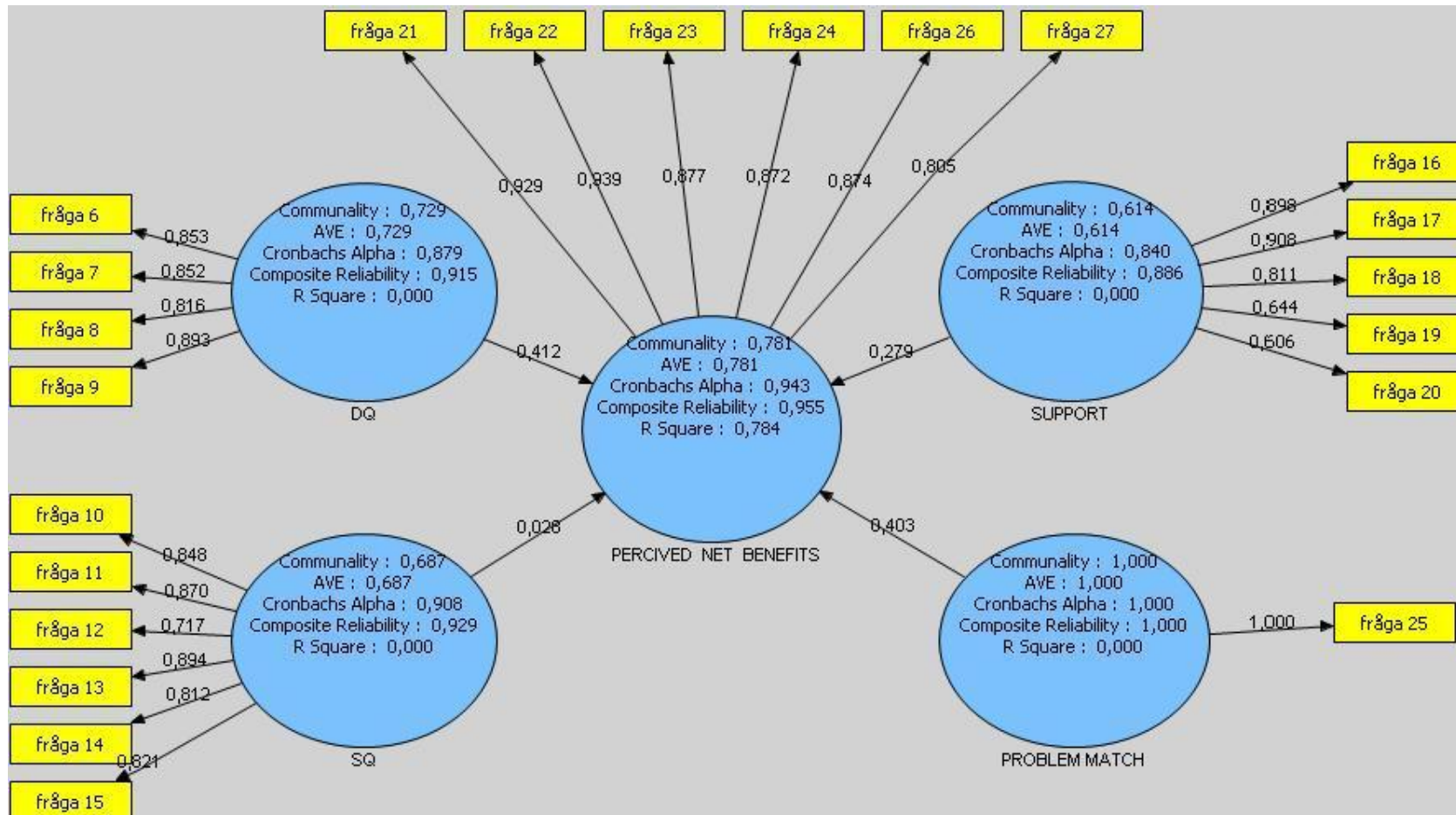
Vänligen fyll i er e-post om ni vill ha en kopia av resultaten. (frivilligt)

Vänligen fyll i er e-post om ni vill ha en kopia av resultaten. (frivilligt)

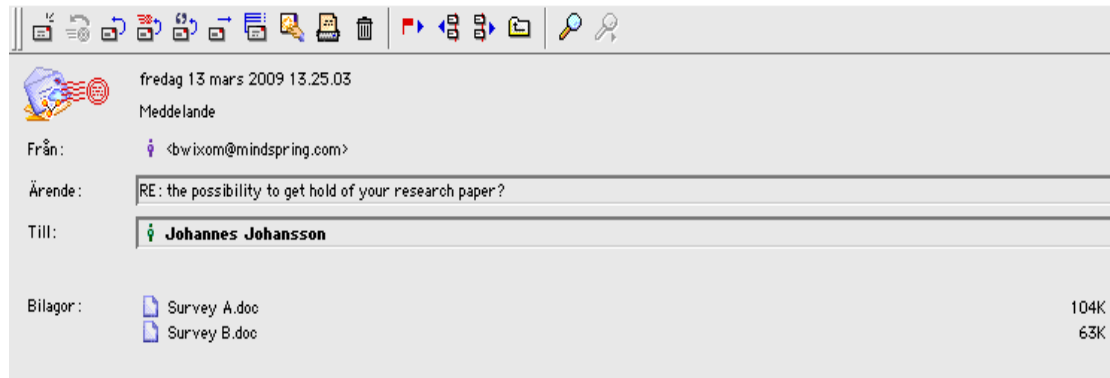
E-post _____

Återigen ett stort Tack!

Appendix 4 – Survey data calculations and measures



Appendix 5 – Mail from Barbara Wixom



Attached are the surveys. I do not have information on the dissertation document itself - I am very sorry that I cannot help.

Significant theoretical advancements have been made since this survey. For example, see Wixom and Todd, Information Systems Research March 2005. So, I personally would make significant adjustments to surveys from the 90's...

Best, Barb

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