Misfits in ERP System Implementation

A Case Study of Dutch SMEs

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MISFITS IN ERP SYSTEM IMPLEMENTATIONS
Thesis Master Information Management

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MANAGEMENT SUMMARY

An ERP system is a configurable real-time software package that supports management and administration with the deployment of resources from one single database. This software package is a standardized system which is not developed primarily for a specific organization. By implementing an ERP system, SMEs want flexible and adaptable software, process improvement, and a short implementation time.

In case an organization implements a standardized ERP system, misfits occur. An actual misfit is a mismatch between the structures embedded in the ERP system and the structures embedded in an organization utilizing the system (as reflected by its strategy, procedures, rules and norms), leading to inefficiency or missing important functionality on organizational level. Not all misfits are actual misfits. Current literature fails to make a distinction whether a misfit is actual or not. There are four drivers of actual misfits: data misfits (deep structure), process misfits (deep structure), output misfits (surface structure), and environmental misfits (latent structure). This all has led to an analytical framework for actual misfits.

An organization has to select the best fitting ERP system. The remaining actual misfits can be solved by customizing the ERP system, adapting the organization to the ERP system, creating a workaround, or accepting a misfit.

Based on the pilot case study, evidence was found that not every identified misfit, during an ERP implementation, is an actual misfit. Current literature fails to make a clear distinction between actual and perceived misfits. A perceived misfit is not an actual misfit, but is perceived as a misfit by the user of the ERP system. So, a perceived misfit is not a legitimate issue in contrast to an actual misfit. Based on the pilot case study and literature, three different types of perceived misfits are identified: resistance to change, ignorance, and wishes. Ignorance and wishes could also lead to resistance to change. This has led to six propositions which are tested in the empirical part of this research. The other three case studies in this research also show evidence that there are both actual and perceived misfits during an ERP implementation.

In all four cases perceived misfits are caused by resistance to change, ignorance, and wishes, but the mutual relationships between those drivers are not clear. Approximately two third of perceived misfits are not solved or accepted. One third of the perceived misfits are solved by customizing the ERP system or creating a workaround to satisfy the users. As the user is the problem in case of a perceived misfit (not the ERP system), no solution or accepting the misfit is required for perceived misfits and therefore money and complexities can be saved. The difference between no solution and accepting a misfit is consciousness.

Two important causes of actual misfits were found in the investigated SMEs. The most prevalent cause of actual misfits is a difference between the deep structure elements of the organization and the ERP system. Deep structure misfits are mainly solved by customizing the ERP system. In case this is too expensive, deep structure misfits are solved by creating a workaround. The second cause of actual misfits is a difference between the surface structure elements of the organization and the ERP system. These surface structure misfits are solved by accepting the misfit or customizing the ERP system.

PREFACE

This master thesis is the final phase of the study 'Master Information Management' at Tilburg University. In order to complete this last phase, I performed a research for the last six months, commissioned by BDO, on the misfits that occur during ERP implementations at small and medium sized enterprises.

Hereby, I thank some people who helped or supported me during my research. First of all, I thank BDO for giving me the opportunity to write my thesis at their organization and providing valuable resources to conduct my research. I thank all my colleagues, who helped me during the last six months, for introducing me at case organizations, thinking along, providing feedback, being available for discussions, and everything else they have done for me. In particular I thank my supervisor of BDO, Wilco Brouwers. During my time at BDO, Wilco was very dedicated and was always there to help me. I have experienced his supervision as very pleasant and valuable.

I thank all four case organizations for their time and resources to participate in my research. All case companies were very open in providing valuable information. Because of their willingness to participate, I was able to gather the data needed.

I also thank my supervisor of Tilburg University, Willem van Groenendaal. Whenever I needed, he was available to provide feedback and think along on how to continue my research. His help was important in achieving the end result of this thesis.

Finally I thank all of my friends and family who provided support during the writing of my master thesis. In particular I thank my beloved girlfriend for always being there for me. Both her support and caring were a major contribution for me to finish this program.

Joost van Beijsterveld
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1 INTRODUCTION

1.1 PROBLEM INDICATION

According to Yen, Idrus, and Yusof (2011) an Enterprise Resource Planning (ERP) system is a configurable software package that provides integrated transaction processing between various functional areas of an organization. The integration of the information system allows for real-time data flows between functional applications (Motiwalla & Thompson, 2012, Chapter 1). The core of an ERP system is a single comprehensive database, that collects and feeds data real time into modular applications supporting virtually all activities of the organization. Such an ERP system streamlines the data flows within an organization and provides management with direct access to a wealth of real-time operating information (Davenport, 1998). Because of this real-time information, ERP eliminates counter-productive processes and problems with cross-functional coordination that hinder the integration of the organization (Yen & Sheu, 2004). In the end, the main objective of an ERP system is to obtain a competitive advantage by controlling the information within the whole enterprise (Botta-Genoulaz, Millet, & Grabot, 2005). During the last two decades, ERP systems have become the standard for most organizations (Alizai & Burgess, 2010; Mabert, Soni, & Venkataramanan, 2000).

Since the late 1980s there are pre-packaged ERP systems which are developed by ERP-vendors like SAP, Oracle and Baan (Rashid, Hossain, & Patrick, 2002). These ERP systems were developed from the Material Requirements Planning (MRP) systems which were born in the late 1960s (Jacobs & Weston, 2007). Over the years the development of an ERP system has moved more and more from in-house developed ERP systems toward packaged systems not developed for a specific organization. Seven percent of the ERP installed base in the Netherlands has an in-house developed ERP system (Van der Lint, 2011). This means that about 93 percent of the ERP installed base in the Netherlands has an 'off-the-shelf' solution, acquired from ERP vendors. These 'off-the-shelf' solutions are called best practices (Gattiker & Goodhue, 2002). According to Ekman and Erixon (2009) and Holsapple, Wang, and Wu (2005) a best practice is a vendor's description of how a specific business process is to be performed in an optimal way. They also mention that these are the best practices of a vendor, and not some general standard for how to run your business. The best practices of a vendor are formed by working with prevailing customers. This is the reason why some ERP vendors have 'better' solutions in a particular industry than others (Ekman & Erixon, 2009). For example, an ERP vendor with a lot of customers in the utilities industry has a better view, how organizations in this industry run their business, than an ERP vendor that has a few customers in the utilities industry. However, this is not a guarantee that this way of doing business is better.

Implementing a standard solution has several advantages: quick delivery, incorporation of best practices, professionally produced technical solutions, broad testing, and few errors (Holsapple et al., 2005). However, because of these best practices there is almost never an exact fit between ERP packages and existing processes of the implementing organization. In case an organization selects a standardized ERP system, misfits occur between the ERP system and the specific business practices of an organization (Holsapple et al., 2005). Misfits have been a common problem in the history of ERP adoption (Soh, Kien, & Tay-Yap, 2000). Yen et al. (2011) state that more than half of the ERP system implementations have been judged as unsuccessful. Hong and Kim (2002) show evidence that there is a positive relationship between organizational fit of ERP and the ERP implementation success. According to the research of Hong and Kim, 24 percent of implementation success is explained by the organizational fit of ERP. So, it is important to have an as good as possible fit.

Nowadays ERP systems become more and more flexible. Almeida and Azevedo (2011) state that organizations need to change the ERP system on short-term to face new market needs. This trend requires flexible information systems. Currently there are several ERP vendors who are developing ERP solutions that are more flexible, such as SAP, Microsoft, JD Edwards and others (Almeida & Azevedo, 2011). Scherrer-Rathje and Boyle (2008) state that the flexibility of an ERP system consists of various dimensions. For instance, an ERP system will be more flexible when it is easy to connect technical components or when it is easy to add more functionality to the system. A more flexible ERP system leads to fewer misfits, because of the multiple possibilities during implementation. According to Scherrer-Rathje and Boyle (2008) an ERP system should not be too flexible, because this could lead to problems like poor data quality and the over-use of non-standard practices.

Literature is clear about resolving occurring misfits in order to achieve a fit. This can be achieved by either customizing the ERP system or by adapting the processes of the organization to fit the requirements of the ERP system (Davenport, 1998; Hong & Kim, 2002). Many studies (on large organizations) advocate that an ERP system should not be customized, because it is risky, costly, and leads to limited maintainability (Zach & Munkvold, 2011). However, Fosser, Moe, Leister, and Newman (2008) state that solving misfits by modifying the business processes should not lead to losing uniqueness or (in other words) competitive advantage. According to Quiescenti, Bruccoleri, La Commare, La Diega, and Perrone (2006) the strength of Small and Medium Sized Enterprises (SMEs) is having unique business processes, so adapting those unique business processes to the standardized ERP system could be fatal for SMEs.

Haddara and Zach (2011) state that little attention has been given to research on ERP systems in SMEs. The majority of the ERP studies are based on findings at large organizations. According to Buonanno, Faverio, Pigni, Ravarini, Sciuto, and Tagliavini (2005) and Mabert, Soni, and Venkataramanan (2003) findings from large organizations on ERP implementations cannot be applied to SMEs. Buonanno et al. (2005) state some important differences between SMEs and LEs: SMEs have a scarce amount of resources compared to LEs, SMEs have limited expertise in IT, and SMEs provide their strength from being unique. Current literature is not clear on the causes of misfits within SMEs, the consequences of those misfits, and how SMEs handle those misfits. Do they adapt their processes or do they customize the ERP package and why have they chosen this solution? According to Soh and Sia (2004), not being aware of misfits leads to undermining the expected benefits of an ERP system and in extreme cases it could lead to project and/or organizational failure.

1.2 PROBLEM STATEMENT

The organizational fit of an ERP system is important for implementation success. When organizations select an ERP system, there will always be misfits between the business processes of the organization and the standardized processes of the ERP system. An organization can deal with these misfits in two ways: Adapting the business processes to the ERP system, or customizing the ERP system to fit the business. Little research has been done on the causes of misfits within SMEs and why and how these misfits are solved by SMEs. By not having an understanding of the cause of misfits, it is difficult to choose the right resolution strategy. By answering these questions, insight is provided into the resolution strategy an SME chooses for a specific type of misfit and whether this solution corresponds with the solutions provided by literature for a specific type of misfit.

The results of this research allow SMEs to be better prepared for implementing an ERP system, because SMEs are more aware of the possible causes of ERP misfits and how these misfits are solved within SMEs. According to Soh, Sia, Boh, and Tang (2003) it is important to understand the causes of misfits, because they can have significant implications for an organization. By understanding the cause of a misfit, an implementer can discover these misfits earlier. It also allows change management to plan for changes in business processes or ERP system (Soh et al., 2003). Also knowing the cause of a misfit, allows managers to make an informed decision about how to solve the occurring misfits. From a vendor point of view, this research provides valuable information on what causes misfits and how they are solved.

1.3 RESEARCH QUESTIONS

The issue to be solved in this research is to map the drivers/causes of misfits between business and ERP systems within SMEs, and to understand how and why SMEs handle these misfits in a particular way. To identify the drivers of misfits between business and ERP system (within SMEs), first 'misfit' needs to be defined, which types of misfits exist, and how these misfits can be measured. It is also important to give an answer to the question which drivers exist in general, according to current literature. The next inquiry is how each type of misfit can be solved and if general resolution strategies exist in the literature. After determining what current literature states about these topics, this theory can be applied to SMEs. According to Buonanno et al. (2005) and Mabert et al. (2003) SMEs differ fundamentally from LEs. It is therefore important to know what the differences are between SMEs and LEs when implementing an ERP system. By conducting a multiple case study, the drivers of misfits within SMEs will manifest. Next, an answer is needed on the question on how SMEs solve the misfits they encounter, and why this solution was chosen.

1.4 SCOPE

This research focuses on misfits between business processes and the ERP system within SMEs in the Netherlands. The so called 'ERP 2' systems (which go beyond the borders of an enterprise) are out of scope in this research. The definition of an SME as used in this research is the definition given by the European Commission (EC, 2005), which is shown in Table 1. This is a first indication of the size of an SME. However, ultimately the number of active users in the ERP system is more important than the number of employees. A user is active when he or she uses the system on a daily basis. The relative number of ERP users compared to the organizational size differs per organization. In consultation with BDO is decided that the number of active users in the ERP system should not fall beneath 10.

Table 1: Definition SME

Enterprise category	Headcount	Turnover	Balance sheet total
Medium-sized	< 250	≤ € 50 million	≤ € 43 million
Small	< 50	≤ € 10 million	≤ € 10 million

Source: European Commission (EC, 2005)

This research only discusses the misfits between pre-packaged ERP systems and business processes. So, misfits between custom made ERP systems and business processes are out of scope for this research. Additionally, only misfits that are recognized by an organization are part of this research. Misfits that an organization has not recognized, cannot be measured and are not part of this research. The case study only focuses on organizations with the Microsoft Dynamics NAV ERP

system. BDO has requested to focus only on this ERP system, because in this way the results of this research are not biased by the brand of the ERP system. Finally, the ERP system implementation should not be longer than five years ago. However, the shorter the time between research and implementation, the better.

1.5 RESEARCH METHOD

This research consists of two parts, a theoretical part and an empirical part. In order to answer the main research question, first a literature review will be conducted. The theory resulting from the literature review will be tested by conducting a multiple case study (empirical part).

Yin (2003) names three conditions for conducting a case study. First, a case study is a preferred research method for "how" and "why" questions and could also be used for exploratory "what" questions. The question to be answered in this research is what the drivers of misfits are within SMEs, how SMEs handle these misfits and why they handle it that way. Second, a case study is preferred when contemporary events are examined. For this study, recent ERP implementations are examined. Third, a case study is preferred when the investigator has no possibility to control events. Because all implementations of this research are finished, no behaviour can be controlled or affected.

According to Yin (2003) a multiple case study has several advantages over a single case study. Most important is that the evidence from multiple case studies is often more compelling, leading to a more robust study. A replication logic should be followed (Eisenhardt, 1989; Yin, 2003). This replication logic implies that the theoretical framework found in literature should be enriched by studying various cases. So, each case is an individual "experiment" which confirms or disconfirms the theory (Eisenhardt, 1989). This framework later becomes "the vehicle for generalizing to new cases" (Yin, 2003, p. 48). On the down side, conducting a multiple case study requires more time and resources.

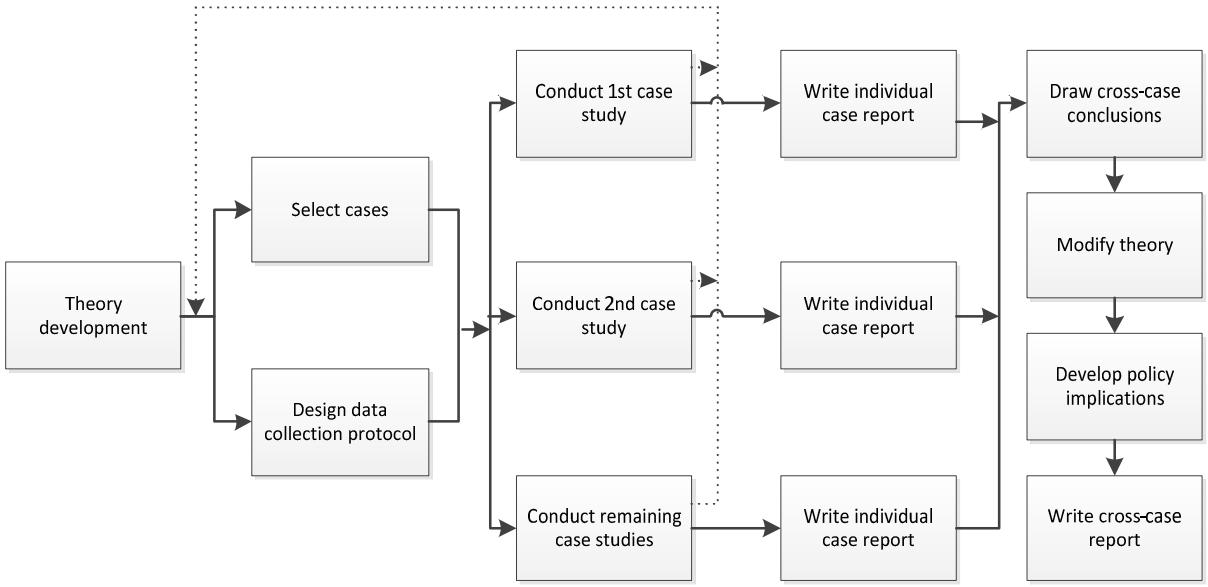

Figure 1: Research method. Source: Yin (2003).

Figure 1 shows the multiple case study research method as proposed by Yin (2003). After the theory development, the cases will be selected and the case study protocol will be designed. The first case study of this research will be a pilot case study. The purpose of this pilot case study is to find a list of misfits and determine the usability of the framework found in current literature, and to refine the

case study protocol. Based on the results of the pilot case study, the framework can be adjusted and propositions can be developed. This framework can be used by conducting the other case studies. For each case the misfits should be mapped and placed into the adjusted framework. Also whether a proposition is demonstrated or not should be reported for each case. Based on this within-case analysis, cross-case conclusions can be drawn. If any important discoveries are made during the case study, the original design should be modified (in Figure 1 this is represented by the dotted line). By conducting this multiple case study, it has to become clear what the drivers of misfits are within SMEs, how they solve the misfit problem, and why they have chosen this solution.

1.5.1 Theory development

Based on current literature, this research describes what a misfit is, which types of misfits there are, how a misfit can be measured, what the drivers of misfits are in general, and which misfit resolution strategies are given in the literature. Current literature discusses all these issues mostly for large enterprises and not for SMEs. However, SMEs differ in some fundamental ways as already introduced in section 1.1.

The data for the literature review will be collected by searching for scholars on all available resources of Tilburg University and scientific search engines like Google Scholar. This data is all secondary. To perform a targeted research, a list will be made with relevant keywords to search on.

1.5.2 Data collection

The case study data will be collected by reading documentation and conducting semi-structured interviews. The case companies to be selected, should have experienced some degree of misfits, because the goal of this research is to investigate what the drivers of these misfits are, and how and why they were solved. All companies that will be selected should have implemented Microsoft Dynamics NAV during the last five years, with a minimum of ten active daily users of the ERP system.

Validity and reliability

For each case, data triangulation will be applied. Data triangulation refers to the use of different sources of data/information, to increase validity (Guion, 2002; Yin, 2003). This research will use data from both documentation and interviews. For each case the ERP vendor, consultant, and implementing organization will be interviewed. From the implementing organization, at least the controller and another user will be interviewed. Each interviewee gets a list of topics and questions sent upfront. Based on the course of the interview, additional questions could be asked, so the interview is semi-structured. For each interview a report will be made about the content of the interview. This report will be sent to the interviewee afterwards in order to avoid misinterpretation and possibly receive feedback.

When all data is collected, the misfits found should be placed in the framework. Because this categorization is subjective, multiple raters (experts) should do the categorization independently, in order to increase the reliability (Green, 1993). By using Fleiss' Kappa, the degree of agreement between multiple raters can be determined (with 0 is no agreement at all, and 1 is complete agreement). This method corrects for chance. The higher the degree of agreement between the raters, the more reliable the results are. Because Fleiss' Kappa only says something about the agreement in total, the categorization of each individual misfit should be compared. In case the various categorizations diverge for an individual misfit, a discussion with the raters is required. For the categorization, it is important that each rater is qualified and has the same understanding of

each category and definition. Therefore, the raters will be selected based on expertise and a manual will be written (appendix F).

In order to increase the reliability of this study, a case study database will be made and a chain of evidence will be maintained. The case study database consists of a physical and a digital part. The physical part consists of all notes taken during interviews, a report of each interview and the documentation. The digital part consists of the voice memos recorded during interviews. By maintaining a chain of evidence the steps taken during the research could be traced back.

In order to increase the validity of this study, this thesis will be reviewed by several colleagues of BDO (experts) and the supervisor of Tilburg University. After the reviews, corrections will be made, leading to an increasing accuracy of the case study (Yin, 2003).

By doing a multiple case study, the framework is tested in other organizations, which increases the external validity. Therefore a case study protocol should be made, in order to increase the external validity and reliability (Yin, 2003). With this protocol, other researchers should end up with the same results under the same conditions.

1.6 SCIENTIFIC AND SOCIETAL BENEFITS OF THE RESEARCH

The results of this paper allow SMEs to be better prepared in implementing ERP systems, because they are more aware of the possible causes of ERP misfits and how these misfits are solved within SMEs. Also knowing the cause of a misfit, allows managers to make an informed decision about how to solve the occurring misfits. According to Hong and Kim (2002) 24 percent of the implementation success is explained by the organizational fit of ERP, so making informed decisions to solve misfits is important to get an as good as possible fit, which increases the chance of a successful implementation. On the opposite, a badly informed decision increases the chance of ERP implementation failure with all its consequences. From a vendor point of view, this research provides valuable information on what causes misfits and how they are solved.

1.7 THESIS OUTLINE

This research starts with a review of current literature. First, chapter 2 gives a definition of an ERP system, describes the lifecycle of an ERP system, the parties involved when implementing an ERP system, and the differences between LEs and SMEs when implementing an ERP system. Chapter 3 provides a definition of an actual misfit, followed by the drivers, types, and consequences of misfits, leading to an analytical framework that is used in the empirical part of this research. Next, chapter 4 discusses how alignment between ERP system and organization can be achieved according to current literature. After the literature on ERP systems, misfits, and resolution strategies is studied, this research continues with an empirical part. The empirical part starts in chapter 5 with a description of the research design and the way data was collected and analyzed in order to achieve as high as possible validity and reliability. Next, chapter 6 contains the results of the pilot case study and six propositions are formulated based on these results, leading to an extension of the analytical framework of chapter 3. This chapter is followed by a summary of the results of all individual four cases in chapter 7. Based on these results, a cross case analyses has been conducted in chapter 8. Finally, chapter 9 gives an interpretation of the results in chapter 8. This chapter also contains a description of the limitations, recommendations, and conclusions giving answer on the main research question of this research.

2 ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS

Misfits occur between the organization and the ERP system. Therefore it is important to know more about ERP systems in general and ERP systems for SMEs in particular. This chapter defines an ERP system from various perspectives, resulting in a definition that will be used in this research (section 2.1). Next the drivers of adopting an ERP system are discussed in section 2.2. This is followed by a discussion about the various phases in the life-cycle of an ERP system in section 2.3. Next, the several parties involved in an ERP implementation are discussed in section 2.4 and the role of ERP systems in SMEs is discussed in section 2.5. Finally, section 2.6 contains a short conclusion of this chapter.

2.1 ERP SYSTEM: A DEFINITION

There are various definitions of an ERP system in literature. Akkermans, Bogerd, Yücesan, and Wassenhove (2003) state that there are three different perspectives on defining an ERP system:

- Business perspective: an ERP system is a combination of business processes and information technology. The ERP system controls a broad range of activities and is an instrument that enables enterprises to manage and streamline business processes through cross-functional or cross-organizational integration (Akkermans et al., 2003; Xu, Rahmati, & Lee, 2008).
- Technical perspective: an ERP system is a configurable, real-time interactive software package. This software package consists of several modules to support the various functions of an organization, and has a single database and a uniform operating platform (Xu et al., 2008).
- Functional perspective: an ERP system is the kind of system that supports management and administration with the deployment of resources like materials, production capacity, money, and human labor. Therefore an ERP system provides three types of functionality: transaction processing, work flow management, and decision support functions.

Xu et al. (2008) added a fourth perspective, the communication perspective. From a communication perspective, an ERP system is an enterprise-wide information system that integrates all information flows and is based on real-time information. However, the communication perspective could be interpreted as part of the business perspective.

In this research ERP will be viewed from a technical/functional perspective. Functional, because misfits are about missing or imposing functionality. Technical, because the standard ERP system can be partially configured to the wishes of the organization. Based on these perspectives, an ERP system is a configurable software package that provides integrated transaction processing between various functional areas of an organization. The integration of the information system allows real-time data flows between functional applications (Motiwalla & Thompson, 2012, Chapter 1). The core of an ERP system is a single comprehensive database. The database collects and feeds data real time and seamlessly into modular applications, supporting practically all activities of the organization. Such an ERP system streamlines the data flows within an organization and provides management with direct access to a wealth of real-time operating information (Davenport, 1998). According to Mabert, Soni, and Venkataramanan (2001), an ERP system can be put together in several ways. The extremes are on one end a single-vendor package, on the other end a collection of modules from different vendors. This research only focuses on single-vendor packages. This includes standardized ERP systems with standardized add-ons.

Configurable software package

As mentioned above, an ERP system is a configurable software package. This can be split into software package and configurable.

Software package implies that the ERP system is predefined. Despite the fact that it is possible to develop your own ERP system, a trend of moving away from home-grown ERP systems towards pre-packaged ERP systems is visible since the 1990's (Gattiker & Goodhue, 2002). SAP has started this trend in the early 1970s by producing the first standard MRP software, which was the predecessor of ERP (Jacobs & Weston, 2007). The pre-packaged ERP systems are standardized systems with standardized business processes and functionalities not primarily developed for a single organization. These standardized ERP systems are called best practices (Gattiker & Goodhue, 2002). According to Ekman and Erixon (2009) a best practice is a vendor's description of how a specific business process is performed in an optimal way. Ekman and Erixon also mention that these are the best practices of a vendor, and not some general standard of how to run your business. Holsapple et al. (2005) state that the best practices are based on the vendor's assumption about management philosophy and business practices. The best practices of a vendor are formed based on working with prevailing customers, their knowledge, their resources, and their norms (Soh & Sia, 2004). This is why some ERP vendors have 'better' solutions in a particular industry than others (Ekman & Erixon, 2009). By choosing an ERP system with its accompanying best practices there is still some degree of flexibility. A best practice can be tailored to the needs of an organization by configuring this ERP system.

This all indicates that the ERP system of a vendor, calling their solution a best practice, is the best way of doing business according to this vendor and not the best way of doing business in general. So, the term best practices is somewhat misleading and the term 'common used practices' should be more suitable. Because the best practice of the vendor is based on their experience with prevailing customers, the best practice is always based on existing practices. However, designing new practices such as Dell did is not a best practice according to the vendors of ERP systems, but Dell was the most successful organization in its industry with its own developed business practices (Magretta, 2002). Therefore, it is important to know whether an organization is the best in industry and exactly knows what they are doing or not. Gattiker and Goodhue (2002) state that whether a process is best, not only depends on the process itself, but also on the strategy of the organization. This all proves that 'common used practices' is more in place than 'best practices'. When the term best practice is used in this research, it is from the viewpoint of the vendor and does not mean it is really the best way of doing business.

Configurable implies that the implementing organization can set parameters to tailor the pre-packaged software to their needs. By setting parameters, an organization fits its business processes to the ERP system. So configuring an ERP system is about choosing pre-packaged processes within the software which best fit your organization. The degree of configurability depends on the flexibility of the system and places certain limits on the design of business processes, which is represented in Figure 2 (Gattiker & Goodhue, 2002). According to this figure, an organization is restricted in the way of doing business by the ERP system, because it is simply not possible for an ERP system to support all ways of doing business. This is represented by the circle in the middle. Next, the way the ERP system is configured determines which options of conducting business remains, this is the inner circle. The space between the middle and inner circle is the flexibility of the ERP system. Soh et al. (2003) state that the price of flexibility is complexity. The more flexible the system, the more options

are available, the more difficult it is for a user to complete a transaction. However, it is almost impossible to configure an ERP system to the precise needs of an organization (Yen et al., 2011).

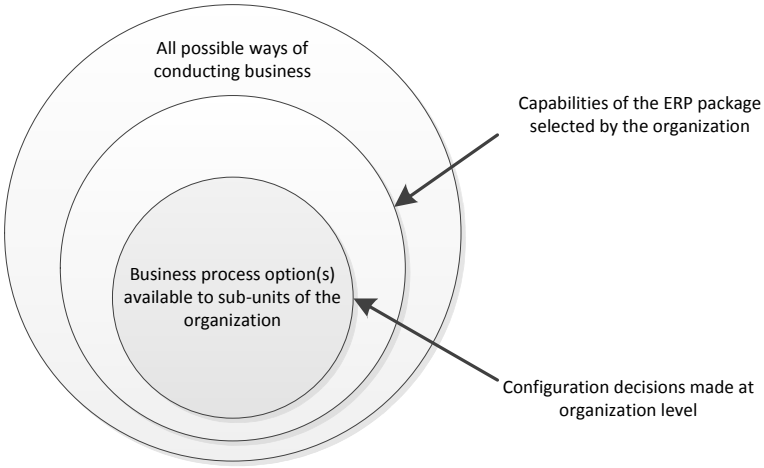

Figure 2: Restrictions of ERP on business process. Source: Gattiker and Goodhue (2002)

2.2 DRIVERS OF ADOPTION

Organizations implement ERP systems for tangible and intangible benefits and for strategic reasons (Rashid et al., 2002). Raymond and Uwizeyemungu (2007) state that there are three different reason categories for organizations to adopt an ERP system:

- The need to improve the performance of on-going operations (cost reduction, strategic decision making, and adaptability to client requirements). By the adoption of an ERP system, it is possible to acquire new capabilities which make it possible to generate improved results;
- The need to integrate data and systems. Replace different legacy systems by one integrated enterprise-wide ERP system;
- The need to avoid competitive disadvantage by not adopting a set of 'best practices'.

Yen et al. (2011) formulate the third category as a cost of entry for highly competitive industries and eventually gain competitive advantage. According to Mabert et al. (2001) the most dominant reason for organizations to adopt an ERP system is to simplify and standardize IT systems. The second most common reason is to have access to accurate information to improve customer and supplier interaction and communication. The third most common reason is to have a higher quality and availability of data. Laukkanen, Sarpola, and Hallikainen (2007) support this statement and conclude that reasons for adoption are mainly the same for LEs and SMEs. Mabert et al. (2001) remark that the goal of an ERP implementation is never to solve an IT problem like Y2K, but to improve the productivity of business processes.

2.3 THE ERP SYSTEM LIFE-CYCLE

Current literature shows a number of ERP life-cycle models. Somers and Nelson (2004) have identified the stages initiation, adoption, adaptation, acceptance, routinization, and infusion, based on the work of Rajagopal (2002). Haddara and Zach (2011) argue that a good life-cycle model should make a clear distinction between ERP adoption and ERP acquisition, and it should make a clear distinction between ERP system evolution and ERP system retirement. Therefore the ERP life-cycle model of Esteves and Pastor (1999) will be used in this research, which contains six stages:

1. Adoption decision phase: During this phase, managers must question whether the organization needs a new ERP system. During this phase requirements and goals are set, but

also the impact of the adoption is analyzed. According to Haddara and Zach (2011), most literature merges this phase with the acquisition phase.

2. Acquisition phase: During this phase an ERP system is selected that best fits the requirements set during the adoption decision phase. The aim is to minimize customization, "because ERP customizations can have substantial long-term cost implications" (Haines, 2009, p. 183). In this phase a consulting company is often selected and factors like price, training, and maintenance are analyzed. Also the contractual agreement is defined.
3. Implementation phase: According to Esteves and Pastor (1999) this phase consists of configuring the ERP system and (possible) ERP customization. Adaptation of business processes is not mentioned. According to Dixit and Prakash (2011), change management is part of the implementation phase. They state that proper change management affects the implementation success positively. This implementation phase should not be confused with an implementation project. An implementation project is broader than the actual implementation. Within the implementation project context, an implementation of an ERP system does not end with the system going live (Metaxiotis, 2011).
4. Use and maintenance phase: During this phase the product is live and in use. The expected benefits are returned. During the usage of an ERP system, it should also be maintained. Maintenance exists of malfunction corrections, meeting special optimization requests (requests for change), upgrading, and making general system improvements.
5. Evolution phase: During this phase, more capabilities are integrated into the ERP system, providing new benefits. For instance customer relationship management (CRM) or supply chain management (SCM).
6. Retirement phase: During this stage new technologies appear and the current ERP system is probably inadequate. This could lead to a decision to replace the ERP system by another information system that better meets the requirements of the organization at that moment.

Another wide-used ERP life-cycle model is the model of Markus, Axline, Petrie, and Tanis (2000), which consists of four phases in the ERP life-cycle: the chartering phase, the project phase, the shakedown phase, and the onward and upward phase. The chartering phase is similar to the adoption and acquisition phase of the ERP life-cycle model of Esteves and Pastor (1999) combined. The project phase is similar to the implementation phase, the shakedown phase is similar to the use and maintenance phase, and the onward and upward matches the evolution and retirement phase.

This research focuses only on the first five stages of the ERP life-cycle model of Esteves and Pastor (1999). The retirement phase falls outside the scope of this research, because in this phase a new ERP system is implemented and phase one starts again.

2.4 PARTIES INVOLVED IN AN ERP IMPLEMENTATION

According to Haines and Goodhue (2003) an ERP system implementation usually involves three main parties: The vendor, the implementer or implementing organization, and the consultant(s). Figure 3 contains an overview of the parties involved in an ERP implementation and the knowledge and skills that are transferred during this project. Nelson and Somers (2004) also point out these main parties, but are more specific. They divide the implementing organization into top management, steering committee, project champion, and users. The three main parties, as mentioned by Haines and Goodhue, are discussed below.

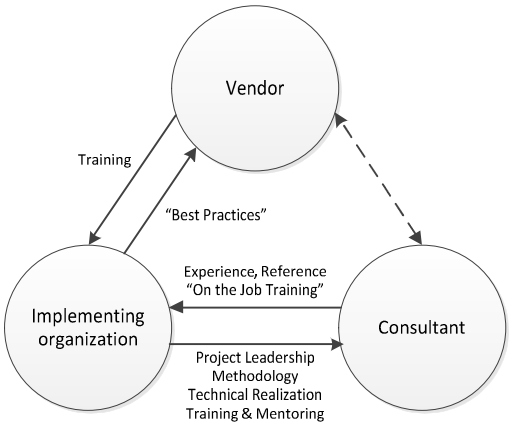

Figure 3: Parties involved in ERP system implementation and knowledge and skills transfer. Source: Haines and Goodhue (2003).

Vendor

According to Haines and Goodhue (2003) the vendor is the developer of the ERP system and sells the ERP system. Additionally they offer training programs related to their products. A vendor is also able to implement the ERP system and therefore could have both the role of ERP vendor and consultant (Haines & Goodhue, 2003). "ERP vendors invest in trying to find, embed, and transfer exemplary practices as a way of leveraging their past experiences and transferring their knowledge into a product that is saleable to the widest number of clients within an industry segment" (Wagner, Scott, & Galliers, 2006, p. 252). So in creating the ERP system, the vendor determines which best practices to include. According to Somers and Nelson (2004), the partnership between the vendor and the implementing organization is highly important throughout the life-cycle up to the use and maintenance phase (see section 2.3). From this phase on, the support of the vendor becomes important.

In case of Microsoft, Microsoft develops the standard Dynamics NAV, but they are not the vendor of the software. When a customer wants to implement Dynamics NAV, Microsoft proposes some vendors. However, most vendors develop additional solutions which Microsoft certifies, like for instance an industry specific solution. So the statement of Haines and Goodhue (2003) that the vendor develops the ERP system is not true for Microsoft Dynamics NAV. The vendor possibly only develops additional software. Besides, as stated by Haines and Goodhue (2003) the vendor could also be the consultant who implements the ERP system. Therefore it can be concluded that the model of Figure 3 is somewhat simplistic.

Implementing organization

The implementer or implementing organization is the organization where the ERP system is to be implemented. The implementer has knowledge about the processes, structure, and the competitive situation of the organization. A certain amount of consulting is needed, depending on the present knowledge about the ERP system and the implementation within the implementing organization (Haines & Goodhue, 2003). According to Somers and Nelson (2004) the implementer is important during each phase of the ERP implementation.

Consultant

The consulting party provides support by helping to implement the ERP system and could consist of multiple consultants. A consultant provides additional skills, knowledge, or simply manpower. The consultant has detailed knowledge about the ERP system and implementation process. A consultant

is able to configure the software and/or cope with organizational change as well. According to Haines and Goodhue (2003), the key for desirable behavior of the consultant is the degree of knowledge possessed by the implementing organization. In case the knowledge level of an implementer is sufficient, the implementer is able to evaluate the consultant's behavior, and determine the degree of involvement (number of consultants and duration of their involvement). However, Haines and Goodhue (2003) point out that hardly any organization has all the required knowledge in-house, so a consulting party is always necessary (exceptions aside). According to Somers and Nelson (2004), the consulting party is most important throughout the life-cycle up to the use and maintenance phase.

In this study all three parties are involved to get a good point of view of the implementation process.

2.5 ERP SYSTEMS IN SMEs

Vendors of ERP systems are focusing more on SMEs because ERP adoptions in LEs are close-to-saturation. Everdingen, Hillegersberg, and Waarts (2000) mention that the demand of ERP systems for SMEs has increased enormously around Y2K. More and more SMEs are adopting ERP systems because of huge information flows across and within SMEs, globalization, partnerships, and value networks. SMEs differ fundamentally from LEs (Buonanno et al., 2005; Zach & Munkvold, 2011). According to Zach and Munkvold (2011) and Buonanno et al. (2005), SMEs have some inherent characteristics like ownership type, structure, culture, market, etc. compared to LEs. They also state that SMEs are constrained by their limited amount of resources, limited knowledge on information systems (IS), and lack of information technology (IT) expertise. Quiescenti et al. (2006) adds that SMEs obtain their strength from having unique business processes and being flexible. Below the phases of the ERP life-cycle are discussed with respect to SMEs.

Adoption

Laukkanen et al. (2007) researched the differences of objectives and constraints of ERP adoption between SMEs and LEs. According to their research, there is a significant difference between SMEs and LEs regarding the objectives and constraints of ERP system adoption. They state that the adoption decision for SMEs is a relatively greater resource commitment and risk compared to LEs, which constrains SMEs in the ERP system adoption. Buonanno et al. (2005) and Alizai and Burgess (2010) agree and state that financial constraints are the main reason for SMEs not to adopt an ERP system. According to Buonanno et al. (2005) the major reasons for SMEs to adopt an ERP system are from organizational and structural nature. They also mention that the decision for SMEs to adopt an ERP system is affected by "the opportunity of the moment" (p. 384), rather than by business related factors. According to Raymond and Uwizeyemungu (2007) ERP systems should only be adopted by SMEs (and LEs) when aligned with the competitive environment, the strategic objectives, and the structure of the organization. Within the SME segment there is a difference between small enterprises and medium-sized enterprises. Small organizations are less outward oriented than medium-sized organizations when adopting an ERP system (Laukkanen et al. 2007). Mabert, Soni, and Venkataramanan (2003b) researched the motivational factors for adopting an ERP system and came to the results in Table 2. The main reasons for SMEs to adopt an ERP system are replacing legacy systems, simplify and standardize systems, improve interactions and communications with suppliers, and gain strategic advantage, as can be derived from Table 2.

Seethamraju and Seethamraju (2008) state that both internal and external factors influence the adoption decision of SMEs. The factors mentioned in Table 2 are all internal factors. However, also

external factors exist which could influence the adoption decision of an SME. The following external factors for SMEs are stated: uncertainty about the environment, competition, external pressure, and changing requirements of various stakeholders.

Table 2: Motivational factors ERP adoption.

Motivation factors	All firms (%)	Small firms (%)	Medium firms (%)	Large firms (%)	Statistical significance (p-value)
Replace legacy systems	85.9	86.8	78.9	89.5	No difference
Solve the Y2K problem	56.5	63.1	63.6	42.3	0.04
Ease of upgrading systems	44.5	35.3	45.2	54.3	0.09
Simplify and standardize systems	83.3	72.4	82.9	94.7	0.001
Pressure to keep up with competitors	49.2	41.7	45.2	59.6	No difference
Improve interactions and communication with suppliers and customers	75.2	70.6	81.3	76.1	No difference
Restructure company organization	32.0	32.8	27	34.6	No difference
Gain strategic advantage	79.6	70.0	75.8	91.8	0.03
Link to global activities	55.5	35.6	61.8	73.6	0.0001

Source: Mabert et al. (2003b)

Acquisition (selection)

After the adoption decision is made, a suitable ERP system should be selected. Bernroider and Koch (2001) state that SMEs have different requirements and a different selection process compared to LEs. According to their research, the most important selection criterion for SMEs are the adaptability and flexibility of the software (94,7% of the SMEs investigated indicate this to be important or very important), short implementation time (94,7%), and process improvement (78,9%). Bernroider and Koch (2001) do not mention the fit of the ERP system as an important selection criterion. Everdingen et al. (2000) mention this as the most important selection criterion which is the result of their research on European SMEs. However, this selection criterion is important for both SMEs and LEs. Also SMEs have a more centralized form of decision making, and fewer people are involved by making this decision (mean of 4,82 people with a standard deviation of 2,27 and a maximum of 10) compared to large organizations.

Implementation

After the ERP system is selected, the next phase is to implement the chosen ERP system. The size of the organization determines the way an organization approaches the ERP implementation (Mabert et al., 2003b). Based on the research of Mabert et al. it can be said that most SMEs (71%) implement the ERP system as a whole or in subsets of modules, instead of implementing a single module. These implementation strategies are respectively called the Big-Bang approach and Mini Big-Bang approach. LEs mostly (69%) implement the ERP system per module or site.

According to Mabert et al. (2003b) almost every organization goes through some form of modification of the ERP system during implementation. However, the degree of customization varies across the size of an organization. SMEs have significantly more (but mostly minor) customizations of the ERP system compared to LEs, which is shown in Table 3 (Mabert et al., 2003b).

Conclusion

SMEs are constrained by their limited amount of resources, knowledge, and expertise on IS and IT. SMEs obtain their strength from having unique business processes and being flexible. The decision to

adopt an ERP system for SMEs depends on both internal and external factors. The main internal factors are replacing legacy systems, simplifying and standardizing systems, improve interactions and communications with suppliers and gaining strategic advantage. External factors that could influence the ERP adoption decision are: uncertainty about the environment, competition, external pressure, and changing requirements of various stakeholders. Once the choice is made to adopt an ERP system, the requirements for the new ERP system vary between LEs and SMEs. SMEs want flexible and adaptable software, process improvement, and a short implementation time. Once an ERP system is selected, an implementation strategy should be chosen. Most SMEs choose for the big bang/mini big bang approach, which consists of an implementation of a complete standard package or a subset of modules. For SMEs, most customizations to the implemented system are minor as can be derived from Table 3.

Table 3: Degree of customization.

Overall Customization	All firms (%)	Small firms (%)	Medium firms (%)	Large firms (%)
Minor	61.11	72.86	62.00	46.67
Significant	29.44	22.86	24.00	41.67
Major	7.78	2.86	12.00	10.00
Other	1.67	1.43	2.00	1.67

Source: Mabert et al. (2003b)

2.6 CONCLUSION

An ERP system is a configurable real-time software package that supports management and administration with the deployment of resources from one single database. This software package is a standardized system which is not primarily developed for a specific organization.

An organization has three reasons to implement an ERP system: improving performance, integrate data and systems, and avoiding competitive disadvantage. The ERP system of an organization goes through six phases: the decision to adopt a new ERP system, selection of a suitable ERP system, implementing this system, going live and maintaining the system, integrating more capabilities, and the retirement of the ERP system. An ERP system implementation usually involves three parties: the vendor, the consultant, and the implementing organization. In case of Microsoft Dynamics NAV, Microsoft only develops the standard software, which is delivered and possibly implemented by the vendor.

SMEs and LEs differ when implementing an ERP system. SMEs are constrained by their limited amount of resources, knowledge, and expertise on IS and IT. SMEs obtain their strength from having unique business processes and being flexible. The main internal factors for SMEs to adopt an ERP system are replacing legacy systems, simplifying and standardizing systems, improve interactions and communications with suppliers and gaining strategic advantage. External factors that could influence the ERP adoption decision of an SME are: uncertainty about the environment, competition, external pressure, and changing requirements of various stakeholders. SMEs want flexible and adaptable software, process improvement, and a short implementation time. Once an ERP system is selected, an implementation strategy should be chosen. Most SMEs choose for implementing a standard package or a subset of modules. For SMEs, most customizations to the implemented system are minor.

3 MISFITS

This chapter focuses on what a misfit is in an ERP implementation and what definition will be used in this research. Section 3.1 discusses the various definitions of a misfit in current literature and gives a definition of a misfit used for this research. A distinction can be made between actual and non-actual misfits. Section 3.2 discusses the two main misfit typologies and categories, and how they are related. In section 3.3 the sources of misfits are discussed. Next, section 3.4 discusses the impact of misfits. This all leads to an analytical framework which can be used to classify misfits and will be used in the empirical part of this study (section 3.5).

3.1 ERP MISFIT: A DEFINITION

According to Pries-heje (2006) there is no common understanding of a misfit in ERP implementations. In general a misfit is a one to one mismatch of two or more distinct components (Maurer, Berente, & Goodhue, 2012). For an ERP related misfit, "a misfit manifest differences between two worlds. One world reflects the organization's needs. The other reflects the package's capabilities" (Rosemann, Vessey, & Weber, 2004, p. 440). Current literature contains various definitions of an 'ERP related misfit' (from now on referred to as misfit). According to Soh et al. (2003), Soh and Sia (2004) and Sia and Soh (2007) a misfit or misalignment is a gap between the requirements of an organization and the features of an ERP package. According to Yen et al. (2011) the overall corporate business strategy determines how processes are shaped. Yen et al. describe business processes and business practices as the lowest level of the business strategy hierarchy. Therefore Yen et al. define a misfit as a poor fitness between ERP system strategy and businesses strategy, while Wang, Klein, and, Jiang (2006) and Maurer et al. (2012) define a misfit as a mismatch between best practice and the organization. Liang and Xue (2004) speak of a misfit when there is a gap between the values brought in by the best practices of an ERP system and the existing values of an organization. Based on these definitions it can be concluded that there is no clear definition of a misfit in current literature. However, a clear definition is needed to understand what a misfit is.

There are some differences between above definitions. All definitions speak about a misfit, misalignment or mismatch (all synonyms) between the ERP system and the business. But what is exactly meant with the 'ERP system' part and what is meant with the 'business' part? Some define a misfit as a gap between the organization 'as it is' and the 'to be' implemented ERP system, while others define a misfit as a gap between what the organization wants and the possibilities of the ERP system. One of the reasons to implement an ERP system is to obtain new functionality which the organization needs to better meet customer demands, for instance. Therefore *the 'business' part* is broader than the organization 'as it is', which is called 'structures embedded in the organization' by Soh et al. (2003). Soh et al. define 'structures embedded in the organization' as the assumptions, norms, and values of the organization. In this research, additional requirements to the new ERP system are also part of 'the embedded structures of an organization'. For instance, when an organization wants e-invoicing functionality in the new ERP system (which it does not have in the legacy system) to meet customer demands, this requirement is also part of the embedded structure of the organization. *The 'ERP system'* is defined as the structures embedded in the ERP system in the research of Soh et al. (2003). Soh et al. define structures embedded in the ERP system as the assumptions, norms, and rules built into the technology by the developer. For instance, when an order is created the ERP system automatically assigns a number.

The key idea of a misfit is that an exact match between the embedded structures of an ERP system and the embedded structures of an organization is missing, ranging from minor inconveniences to critical deficiencies in functionality (Maurer et al., 2012). A common used definition of a misfit in current literature about ERP misfits is (see Figure 4):

"A mismatch between the structures embedded in the ERP system and the structures embedded in an organization utilizing the system (as reflected by its strategy, procedures, rules and norms)."

Figure 4: Graphical representation of a misfit.

According to this definition a misfit occurs when there is even a small difference between the embedded structures of an ERP system and the embedded structures of an organization. For instance when a user first has to enter an address before entering the name of the customer, while it was the other way around in the old ERP system, this is a misfit according to above definition. Some users will complain about this difference, but others will not and perhaps see it as an improvement. So, according to above definition whether it is a misfit or not, depends on the user who complains about it or not. This is not a workable definition, because it does not distinguish between actual and perceived misfits. Current literature does not address this difference. Only some researchers state that some misfits are no real misfits, but they do not expand further on this point. For instance, Gattiker and Goodhue (2005) state that "many complaints can be attributed simply to resistance to change, some reflect legitimate issues" (Gattiker & Goodhue, 2005, p. 7). This indicates that not all misfits are actual misfits. However, it is important to know whether something qualifies as an actual misfit or is only perceived as a misfit by the end-user of the ERP system. Current literature fails to make a clear distinction between those two.

Actual misfit

An actual misfit can be viewed from two perspectives. The first perspective is from the ERP system point of view. The ERP system can impose the organization to work in a certain way which can be inefficient, leading to a negative impact on organization performance. Strong and Volkoff (2010) call this perspective an imposition. Extra features of the ERP system that are present but not problematic are not misfits. The other perspective is from the organization's point of view. The organization requires some functionality that the standard ERP system does not offer. Strong and Volkoff (2010) call this missing functionality a deficiency. So when functionality, which is really needed, is missing (deficiency) or when the ERP system imposes an inefficient way of working (imposition), it is a legitimate issue and thus an actual misfit. To determine whether a misfit is a legitimate issue, it is important to know whether a functionality is really needed or not.

The unit of analysis of an actual misfit is the organization and not the individual user (Seddon, Calvert, & Yang, 2010; Maurer et al., 2012). For example, when a specific user has two minutes more work doing a specific task within the new ERP system, leading to all other users having one minute less work doing their task. On organizational level this change leads to more efficiency (no misfit), but

the individual who needs two more minutes to complete its task, could perceive this change as a misfit. Therefore, previous misfit definition can be made more specific for actual misfits:

"A mismatch between the structures embedded in the ERP system and the structures embedded in an organization utilizing the system (as reflected by its strategy, procedures, rules and norms), leading to inefficiency or missing important functionality on organizational level."

A distinction can be made between the existence and the identification of an actual misfit. Only when a misfit is noticed, it becomes actionable (Maurer et al. 2012). The misfits not identified are out of scope in this research.

3.2 TYPOLOGIES AND CATEGORIES OF MISFITS

Current literature contains misfit typologies and misfit categories which determine the drivers of misfits. This section discusses both misfit typologies and misfit categories and how they are related.

3.2.1 Misfit Typologies

According to Maurer et al. (2012), current literature mainly consists of two different misfit typologies. Sia and Soh (2007) have integrated ontological structures and institutional theory into a misfit typology consisting of four different types of misfits. Strong and Volkoff (2010) used a grounded theory approach and came up with a misfit typology based on a study at an industrial equipment manufacturer. Both typologies are discussed below, followed by a comparison between both typologies.

Ontological structures and institutional theory (Sia and Soh, 2007)

Sia and Soh (2007) have made a typology, based on institutional theory and system ontology:

- First, Sia and Soh used institutional theory to differentiate between 'imposed structures' and 'voluntary structures'.
    - 'Imposed structures' are structures of an organization based on external demands made on the organization by authoritative sources. Country-specific and industry-specific misfits are examples of an imposed structure misfit. For instance, an ERP system which does not have the functionality to meet tax compliance requirements of a country.
    - 'Voluntary structures' are structures where the organization has a choice in creating their structure. An organization could develop its structure based on history, experience, strategy, and management preferences. An example of a voluntary structure misfit is when an organization has lower risk tolerance than the risk tolerance embedded in the ERP system.
- Second, Sia and Soh used the systems ontology of Wand and Weber (1995) to make a difference between 'deep structures' and 'surface structures'.
    - The deep structural elements are considered core and the absence of such elements in an ERP system leads to major deficiencies. A deep structure misfit occurs when "real-world things, properties, states, and transformations are missing or incorrectly represented in the system" (p. 572). Examples of deep structure elements are: inventory items, order number, inventory replenishment options etc.
    - A surface structure "is concerned with how real-world meanings are conveyed through the interface between the information system and its users" (p. 572). A

surface structure misfit occurs when the interface of the ERP system differs from the way users access, view and input data. Those surface structure misfits are relatively of good nature, because it is related to such issues as convenience. Examples of surface structure elements are: format of documents, screen flow etc. Compared to deep structure misfits, with surface structure misfits it becomes vaguer when an issue is an actual misfit or not.

According to Sia and Soh (2007) the institutional and ontological perspective can be combined, leading to four types of misfits (see Figure 5): imposed-deep misfits, imposed-surface misfits, voluntary-deep misfits, and voluntary-surface misfits. This typology suggested by Sia and Soh aims at making a distinction between the severity of misfits. From left to right in Figure 5, the severity of the misfits decreases. Rosemann et al. (2004) state that in this way the more critical misfits can be identified.

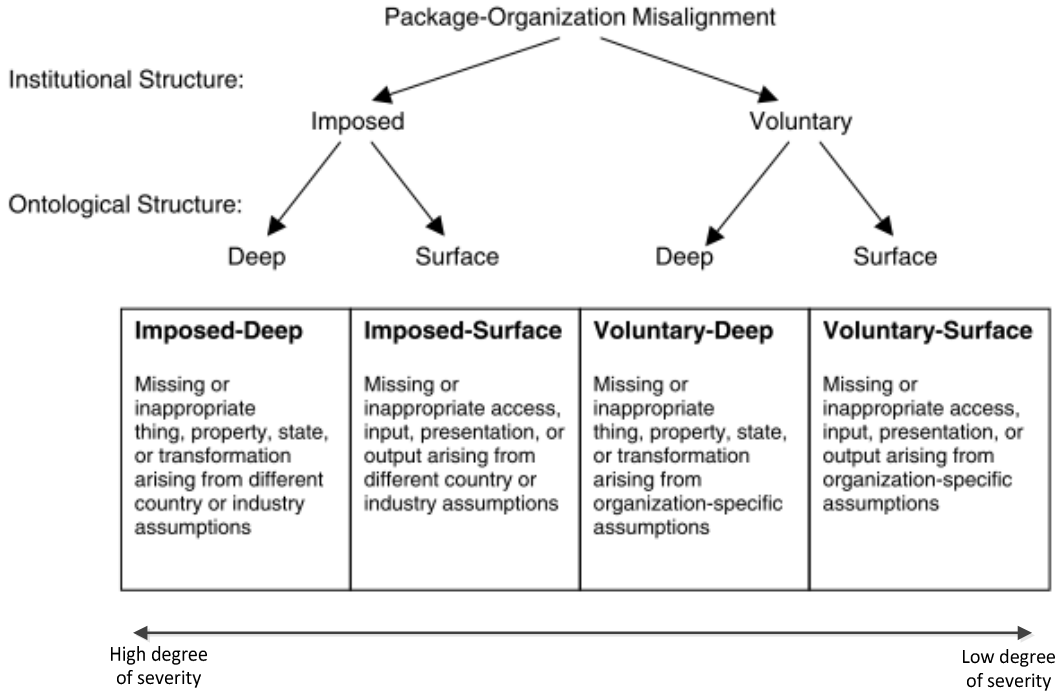

Figure 5: Misfit typology. Source: Sia and Soh (2007).

Grounded theory approach (Strong & Volkoff, 2010)

Strong and Volkoff (2010) have created a misfit typology, where they make a distinction between system deficiencies and impositions.

- *System deficiency* is defined as a problem arising from the features of an ERP system that are missing but needed. According to Rosemann et al. (2004) there are two possibilities for a deficiency. First, the organizational requirement is not meaningful (perceived misfit). Second, the requirement is meaningful, but the system cannot support the requirement (actual misfit).
- *System imposition* is defined as a problem arising from the inherent characteristics of an ERP system such as integration and standardization. These characteristics could offer benefits, but also lead to misfits. In other words, an imposition misfit is when the ERP system requires a way of working which is contrary to organizational norms and practices.

Comparing the two typologies

According to Strong and Volkoff (2010), imposition misfits are generally more serious because these misfits are imposed by the system and cannot be ignored, whereas deficiency misfits can be solved by adding functionality (either by the vendor or via bolt-ons). Sia and Soh (2003) make a similar distinction of deficiencies and excesses. They mean the same with deficiency, but there is a difference between an imposition and an excess. Sia and Soh see an excess as extra functionality which does not impose anything. The additional functionality can be used, but it is optional. Therefore, Sia and Soh focus mainly on deficiencies. They argue that the focus is mostly on deficiency misfits, because implementation participants compare the ERP system with the way things are done within the organization. The 'new' functionality (excesses) becomes more attractive when the organization is used to the new ERP system and has worked with the ERP system. Rosemann et al. (2004) also made the distinction between deficiencies and excesses and have presented this graphically as can be seen in Figure 6. The functionalities needed that are present in the ERP system (green dots) determine the completeness of the ERP system. The functionality needed in the organization (red dots) that are not present in the ERP system are deficiencies, and the functionality of the ERP system (red dots) that is not needed by the organization are system excesses.

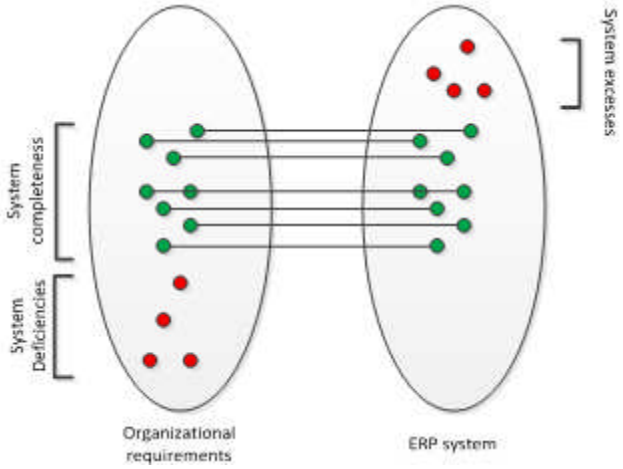

Figure 6: Deficiencies and excesses. Source: Rosemann et al. (2004).

3.2.2 Misfit categorizations

Besides the misfit typologies discussed above, current literature contains two different misfit categorizations, which are discussed in this subsection. This subsection ends with comparing and merging both categorizations into one complete categorization, based on current literature.

Categorization of Soh et al. (2000)

Soh et al. (2000) have introduced a categorization of misfits based on a traditional software application perspective: data, process, and output. They observed the most common misfits and have clustered these misfits into these three categories. Sia and Soh (2003) call these categories the nature of misfits. This categorization is widely used by other researchers in the field of misfits (Hong & Kim, 2002; Sia & Soh, 2007; Wang et al., 2006; Wu et al., 2007; Yen et al., 2011).

Data misfit

A data misfit or input misfit occurs when there are incompatibilities between the requirements of an ERP system and the organization in terms of data format or the relationships among entities as represented in the underlying data model (Soh et al., 2000). Yen et al. (2011) describe a data misfit as

the incompatibility of the ERP system to capture various object attributes or documents into the database of the ERP system. According to the misfit typologies of section 3.2.1, a data misfit is a deep structure misfit and could either be a deficiency or an imposition.

Process misfit
A process misfit or functional misfit occurs when there are incompatibilities between the organizational and ERP system requirements in terms of processing procedures (Soh et al., 2000). An example of a process misfit is the incapability of an ERP system to model the workflow of the organization. According to the misfit typologies of section 3.2.1, a process misfit is a deep structure misfit and could either be a deficiency or an imposition.

Output misfit
An output misfit occurs when there is an incompatibility between the organizational and ERP system requirements in terms of the data presentation and information content of the output. Yen et al. (2011) also call this an interface misfit, and define it as problems with the output of the ERP system, such as reports, interfaces, and the view of the system. According to the misfit typologies of section 3.2.1, an output misfit is a surface structure misfit and could either be a deficiency or an imposition.

Categorization of Strong and Volkoff (2010)
Strong and Volkoff (2010) have conducted a case study. Based on the application of axial coding, they came to six categories of misfits which all can be a deficiency or an imposition:

- A *functional misfit* occurs when usage of the implemented ERP system leads to reduced efficiency or effectiveness, compared with the pre-ERP stage;
- A *data misfit* occurs when data or data characteristics of the ERP system leads to data quality issues (inaccuracy, lack of timeliness etc.);
- A *usability misfit* occurs when the user has to take extra steps to complete a task which does not add any value, or makes the task more difficult to complete;
- A *role misfit* occurs when the roles in the ERP system are inconsistent with the skills available, create imbalances in the workload (leads to idle time and bottle necks), or leads to mismatches between responsibility and authority;
- A *control misfit* occurs when the embedded controls of the ERP system gives too much or too little control, which leads to inability to assess or monitor performance appropriately;
- An *organizational culture misfit* occurs when the ERP system requires the organization to operate in a way that contravenes the organizational norms.

Comparing both categorizations
Strong and Volkoff (2010) compare their categorization with the categorization given by Soh et al. (2000), and conclude that the categories 'functional misfit', 'data misfit', and 'usability misfit' match the categorization of Soh et al. (process misfit, data misfit, and output misfit respectively). The process and data misfits are part of the deep structure, and the output misfits are part of the surface structure (the definitions deep and surface structure are already introduced in subsection 3.2.1). The 'role misfit', 'control misfit', and 'organizational culture misfit' given by Strong and Volkoff, are part of the latent structure of Wand and Weber (1995) (Strong & Volkoff, 2010). They use the term latent, because the latent structure is a second order structure which arises from the physical, deep, and surface structures. For instance, functionality is programmed in the ERP system, which leads to certain roles, control structures and organizational culture. They do not take material form, but are

also part of an ERP system (Strong & Volkoff, 2010). This latent structure is complementing the categorization of Soh et al. (2000). Figure 7 represents the complemented misfit typology of Strong and Volkoff as described here.

In literature, various concrete misfits can be found. Yen et al. (2011) have collected and reviewed these misfits. Based on their review, they have filtered this list of misfits and placed them into the categories data, process, and output misfits (see Figure 8) as introduced by Soh et al. (2000). However, Yen et al. (2011) have added a fourth category: system environment misfits. The system environment category involves misfits regarding system usability and IT infrastructure compatibility. This category of misfits involves issues as the quality of the ERP system in the information system context, the flexibility and reliability of the ERP system, and the backup capability of the ERP system (Yen et al., 2011). The system environment category is a valuable addition on the well-used categorization of Soh et al. (2000), because it is believed to have a substantial impact on the ERP system implementation success/failure. The system environment misfit category contains misfits which belong to the latent structure as introduced by Strong and Volkoff (2010).

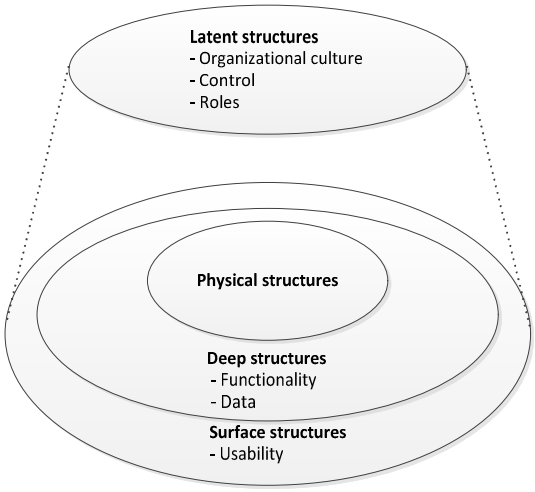

Figure 7: Misfit categorization of Strong and Volkoff (2010).

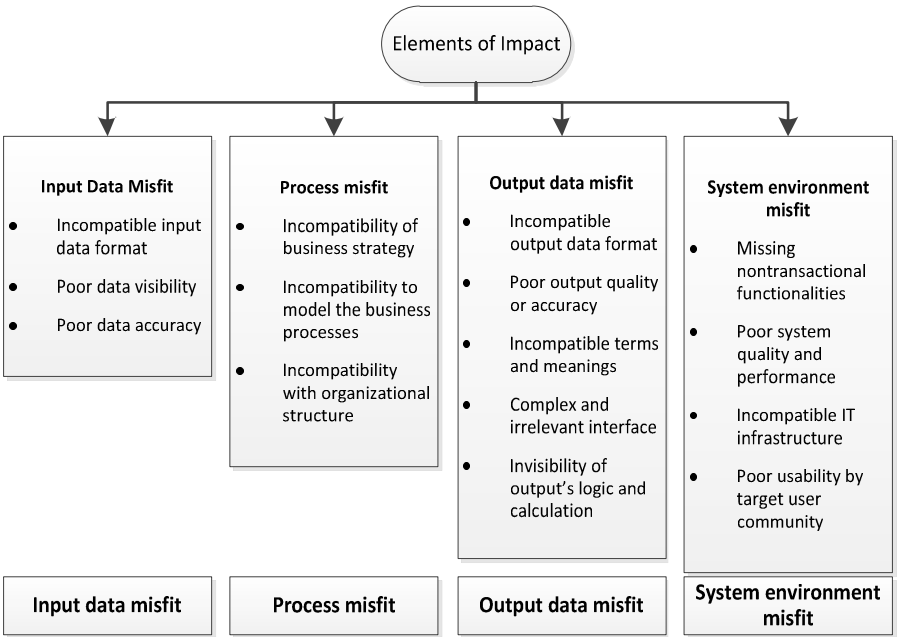

Figure 8: Misfit categorization. Source: Yen et al. (2011).

3.2.3 Conclusion

To summarize, there are two different misfit typologies in literature. According to Sia and Soh (2007), a misfit can occur because of voluntary or imposed obtained structures, and a distinction can be made between surface and deep structure misfits. Strong and Volkoff (2010) have added a latent structure on top of this. According to their research, every misfit is either a deficiency or an imposition. Besides these typologies, misfits have also been categorized in current literature. Soh et al. (2000) have categorized misfits into input, process, and output. Yen et al. (2011) have added a fourth category called system environment misfits. Within this system environment category, Strong and Volkoff (2010) have added the subcategories roles, control, and organizational culture. This leads to the misfit categorization of Figure 8.

3.3 SOURCES OF MISFITS

Despite that an ERP system contains best practices of the vendor, and the number of configurable parameters is increasing, many organizations find that there are important needs that are not fulfilled by these ERP packages (Sia & Soh, 2007). According to Sia and Soh misfits are inevitable, because developers of ERP systems base their solution on proven practices of prevailing customers in general. Besides, it is difficult for developers to tweak their ERP systems continually to keep pace with changing requirements. However, the origin of misfits could differ. According to Soh et al. (2003) it is important to know the source of a misfit, because this source of misfit can have significant implications for the organization. They argue that knowing the sources of misfits enables ERP implementers to recognize misfits at an earlier stage and plan for possible change management issues in order to achieve alignment (Soh & Sia, 2004; Soh et al., 2003).

Soh et al. (2000) and Soh and Sia (2004) mention three different sources of misalignments between the embedded structures of an ERP system and the embedded structures of an organization. Exogenous sources are country-specific and industry-specific requirements that do not match the capabilities of the ERP system. Endogenous sources are the company-specific requirements that do not match the capabilities of the ERP system. The sources of misfits are depicted in Figure 9. As can be seen in Figure 9, the original context differs from the local context, because there are differences between the original ERP system and the ERP system as it should be implemented. These differences occur because of the various misfit sources in the middle.

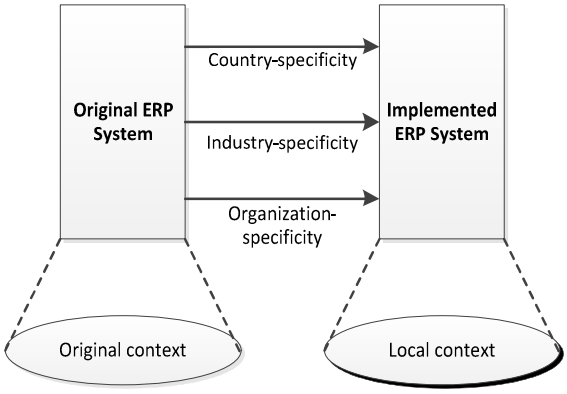

Figure 9: The sources of misfits. Source: Sia and Soh (2003).

Company-specific misfits

Company-specific misfits are differences between organizational structure and the structure embedded in the ERP package. Over time, organizations acquire different structures, which

differentiate organizations from each other. Organizations have to make strategic choices to obtain a favorable position within their environment. Based on the chosen strategy, organizations will develop distinctive routines and structures. Those organizational structures are more or less voluntarily acquired, because an organization has relatively much choice (Sia & Soh, 2003; Soh & Sia, 2004). According to the misfit typology given by Sia and Soh (2007) as discussed in section 3.2.1, a company-specific misfit is often the result of voluntarily acquired structures of the organization.

Industry-specific misfits

Industry specific misfits arise from incompatibilities between the standardized practices of an ERP system and the unique practices specific to an industry (Sia & Soh, 2003). An industry specific misfit arises when professional and/or industry institutions exert normative authority on organizations through guidelines on professional conduct, industry accreditation, or recognition. To keep a good standing, organizations have to adopt forms and procedures. In case the packaged ERP system does not support those forms and procedures, there is an industry-specific misfit. According to the misfit typology of Sia and Soh (2007) as discussed in subsection 3.2.1, an industry-specific misfit is often the result of imposed acquired structures of the organization (they have to). Only when the industry requirement is not applicable to other organizations in the same industry, the requirement could be voluntarily acquired. So an industry specific misfit could be the result of either imposed or voluntary acquired structures. An example of an industry specific requirement is: “Hotels that wish to obtain and maintain a certain level of rating from their industry association would need to adopt prescribed practices pertaining to staff training, customer service, quality of hotel amenities and so on” (Soh & Sia, 2004, p. 380)

Country-specific misfits

Country-specific misfits arise in organizations within countries that have unique regulatory, social and/or cultural practices, that are not supported by the ERP system (Sia & Soh, 2003; Soh & Sia, 2004). Organizations in different countries will evolve different structures over time. Country-specific misfits could be identified in case the organization which is implementing an ERP system originates from a different country than the developer of this ERP system (Yen et al., 2011). Wang et al. (2006) have demonstrated that ERP systems from the same country as the implementing organization leads to less misfit problems, because the ERP system is developed in the same cultural/social context, with the same practices, assumptions, values, and rules. Only when the country requirement is not applicable to other organizations in the same country, the requirement could be voluntarily acquired. An example of a country specific misfit is an ERP system that does not support unique national identification numbers (Sia & Soh, 2007).

3.4 CONSEQUENCES OF MISFITS

This section discusses the impact misfits can have. Hong and Kim (2002) have demonstrated that 24 percent of implementation success is explained by the organizational fit of the ERP system. So not having a good fit lowers the chance of having a successful ERP implementation with all its consequences. Morton and Hu (2008) and Wang et al. (2006) support this statement. Seddon et al. (2010) have found evidence that the greater the fit between organization and ERP system, the greater the organizational benefits from the ERP system. Such organizational benefits can be reduction in staff and productivity improvement (Somers and Nelson 2003). So, the lower the fit, the lower the organizational benefits. According to Maurer et al. (2012), actual misfits have various

negative effects, ranging from lack of integration, limited visibility, loss of control, to decreased productivity and increased costs.

Table 4: ERP misfits and consequences.

ERP misfit types	Consequences	Direct consequences for which level?
Poor usability by target community.	• Generating incorrect data; • Lose in trust of the ERP system by end-users.	Operational.
Complexity and poor visibility of ERP calculation logic.	• Decision making with questionable output; • Lack of control about data output; • Lose in trust of the ERP system by end-users.	Operational.
Incompatible input data.	• Creating wrong input; • Creating complex reports; • Creating incorrect data; • Wrong use of input data.	Operational.
Incompatible terms and meanings.	• Lose in trust of the ERP system by end-users; • Creating wrong input; • Wrong use of input data.	Operational.
Missing non-transactional functionalities.	• Missing validation function; • Generating incorrect data; • No control over unauthorized people; • Higher risk of fraud.	Operational.
Poor system quality and performance.	• Lose in trust of the ERP system by end-users.	Operational.
Incompatible IT-infrastructure.	• Lose in trust of the ERP system by end-users; • Need for change in the IT-infrastructure.	Tactical.
Poor output quality or accuracy.	• Wrong decision making due to poor quality/ accuracy of data.	Tactical.
Complexity of reports and interface.	• Wrong decision making due to complex data.	Tactical.
Poor data visibility.	• Uncompleted data reports; • Use of extra inventory.	Tactical.
Poor data accuracy.	• Incorrect information processing; • Incorrect reports.	Tactical.
Inappropriate data presentation and output format.	• Incorrect reports; • Inflexible reports.	Tactical.
Conflict with management philosophy and organization structure.	• Need for change in the business processes; • Need for change in the organizational structure.	Strategic.
Incompatible to model the business model.	• Need for change in the business processes; • Need for change in the organizational structure.	Strategic.
Incompatibility of business strategy.	• Need for change in the business processes; • Need for change in the organizational structure.	Strategic.

Based on Yen et al. (2011) and Wu et al. (2005)

According to Henderson and Venkatraman's (1993) strategic alignment model, there should be alignment between the business and IT/IS domain. When a misfit occurs, there is lack of alignment between the business and IT/IS domain. This misalignment could occur at the external (strategic) level and at the internal (infrastructure and processes) level. Because the processes and infrastructure of the business and the IT/IS domain reflect the strategy of the business and IT/IS domain respectively, a misfit on internal level, could lead to a misfit on external level. Somers and

Nelson (2003) and Yen et al. (2011) agree that an ERP system should be aligned to the organization's strategy. Therefore a potential consequence of a misfit is the competitive advantage being at risk.

Misfits could have various consequences at three organizational levels (strategic, tactical, and operational level). The consequence of a misfit depends on the type of misfit that occurs. For instance, a consequence of an incompatible input data format misfit leads to an employee not working properly and/or generating incorrect data, possibly leading to making incorrect decisions on a higher organizational level (Yen et al., 2011). This could lead to ordering unneeded materials, warranty charges to fix products, freight costs for shipping and returning products etc. Wei, Wang, and Ju (2005) call this the cascading effect of misfits. Current literature shows that misfits have negative effects on all three organizational levels. At the operational level, incorrect data is generated, and at the tactical and strategic level, this data is used for reports. Based on these reports, managers will make decisions. So, poor information leads to poor decisions (Yen et al., 2011). Yen et al. and Wu et al. (2005) did a literature review on consequences of misfits. Table 4 contains an overview of their findings. This overview distinguishes between the three different levels of an organization and provides possible consequences. However, according to Table 4, on strategic level the consequence of a misfit is the need to change business processes or organizational structure. So, they are assuming that only the organization can be adjusted to the ERP system and not the other way around. However, in some situations the ERP system has to be adjusted to maintain the competitive advantage for instance.

3.5 ANALYTICAL FRAMEWORK

This chapter has made a distinction between the sources, typologies, categories and consequences of misfits. Based on these topics, an analytical framework can be composed, which can be used to categorize misfits. Based on current literature, it has become clear that it is possible to look at misfits from various perspectives. According to Sia and Soh (2007) a misfit could occur because of voluntary and imposed acquired structures. A misfit can also occur because of deep, surface, and latent structures (Sia & Soh, 2007; Strong & Volkoff, 2010). This typology can be applied to the misfit categories input, process, output, and environmental misfits. Figure 10 contains the misfit framework of Yen et al. (2011) combined with the typologies of Sia and Soh (2007) and Strong and Volkoff (2010). Yen et al. have proved that their framework is applicable, but the framework of Figure 10 is more complete than the framework of Yen et al. and contains some valuable additions based on current literature. This framework is important to identify and classify misfits in order to provide a foundation to identify, analyze, manage, and formulate solutions to solve misfits (Yen et al., 2011).

Table 5: ERP misfit combinations.

		Source		
		Country-specific	**Industry-specific**	**Company-specific**
Category	**Deep structure**	Imposition/deficiency	Imposed/deficiency	Imposed/deficiency
	Surface structure	Imposed/deficiency	Imposed/deficiency	Imposed/deficiency
	Latent structure	Imposed/deficiency	Imposed/deficiency	Imposed/deficiency

Based on Yen et al. (2011); Strong & Volkoff (2010); Soh et al. (2000)

Based on the framework of Figure 10, a misfit between the embedded structures of an ERP system and the organization has a source and belongs to a category. This classification of misfits is

important, because different action is required for different sources and categories. Therefore, nine different combinations of misfits are possible, which are represented in Table 5. Within each misfit category, a distinction should be made between imposed misfits and deficiencies as proposed by Strong and Volkoff (2010) and Sia and Soh (2003).

3.6 CONCLUSION

An actual misfit is a mismatch between the structures embedded in the ERP system and the structures embedded in an organization utilizing the system (as reflected by its strategy, procedures, rules and norms), leading to inefficiency or missing important functionality on organizational level. Not all misfits are actual misfits. However, it is important to know whether a misfit is a legitimate issue or not (and thus only perceived as a misfit by the end-user of the ERP system). Current literature fails to make a distinction between what an actual misfit is and what is not. Only some researchers mention this difference, but they do not expand further on this point.

The result of this chapter is the analytical framework of Figure 10. This framework is important to identify and classify misfits in order to identify, analyze, manage, and formulate solutions to solve misfits. This framework will be used and tested in the empirical part of this study.

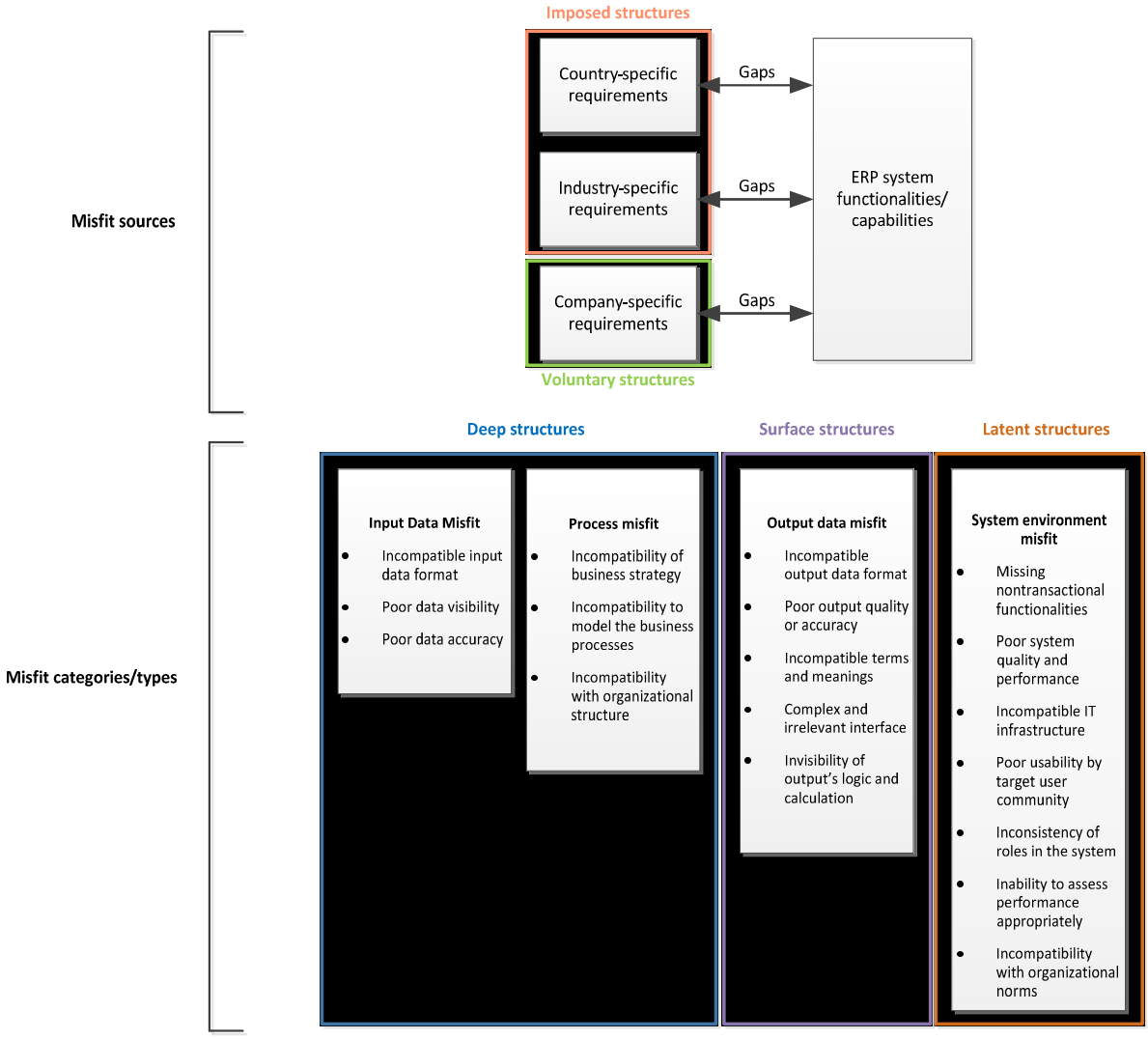

Figure 10: Misfit analytical framework (Based on: Yen et al. 2011).

4 ACHIEVING ALIGNMENT

When misfits occur in an ERP system implementation, there is lack of alignment. By solving misfits, alignment is achieved. Section 4.1 discusses the selection of the ERP system. The best fitting ERP system should be selected, to keep the amount of misfits as low as possible. Next, section 4.2 discusses how the remaining misfits can be solved. The four different resolution strategies are all discussed briefly. Finally, section 4.3 discusses when to choose a specific resolution strategy.

4.1 SELECTION OF THE ERP SYSTEM

Morton and Hu (2008) state that an organization has to choose an ERP system that best fits its organizational structure in order to decrease the amount of organizational resistance and thus decrease the chance of unsuccessful implementation. So, by choosing the best fitting ERP system, the risk of failure is minimized. Hong and Kim (2002) support this statement and have found evidence that each adaptation of both the ERP system and/or the organization processes, changes from positive to negative as the level of adaptation increases. Therefore the degree of adaptation should be limited by selecting the best fitting ERP system after a thorough misfit analysis and the making of a resolution plan (Hong & Kim, 2002). Everdingen et al. (2000) and Somers and Nelson (2003) agree with this and state that the most important selection criterion for an ERP system is to choose the ERP package that best fits with the current business processes. Rosemann et al. (2004) call this the completeness of the ERP system and state that the ERP system with the best one-to-one mapping between the organizational requirements and ERP system capabilities should be selected.

Wu, Shin, and Heng (2007) have developed an ERP selection method to measure the degree of fit between ERP system candidates and the implementing organization. This method makes a distinction between misfits at the enterprise level (goal misfits), at the scenario level (functional misfits), and at the activity level (data/output misfits). On every level misfits can occur and should be identified. Based on the misfits between the organization and various ERP packages, the ERP system with the smallest degree of misfits should be selected. Of course this is only true in case there are no significant differences in price. By using this method, the best fitting ERP system can be selected. Holsapple et al. (2005) state that an ERP system seldom completely meets the requirements of the implementing organization, so even when selecting the best fitting ERP system, misfits will occur. As described in section 3.2.1, Strong and Volkoff (2010) state that this remaining misfit is either a deficiency or an imposition.

4.2 SOLVING ACTUAL MISFITS

After selection of the most suitable ERP system, most of the remaining misfits are known. According to Sia and Soh (2007) misfits need to be identified early on, to choose the best possible solution to achieve alignment. Once a misfit has been identified during implementation, it should be solved to achieve alignment. According to Soh et al. (2003) a decision needs to be made regarding misfits that affect how the ERP system will affect the organization. Sia and Soh (2007) state that there are two major ways of solving misfits. An organization can choose to restructure the embedded structures of the ERP system and an organization can choose to change its own organizational structures and adapt to the structures of the ERP system (Brehm, Heinz, & Markus, 2001; Davenport, 1998; Soh et al., 2003). Soh et al. (2000) mention two types of resolution strategies between those two extremes. Besides adapting to the ERP system and customizing the ERP system, an organization can choose to accept a shortfall in ERP functionality, or create a workaround to provide the needed functionality, without touching the script of the ERP system. The resolution strategies given by Soh et al. (2000) are

shown in Figure 11. Every single misfit can have its own resolution strategy, so it is possible to have a mixture of resolution strategies for an ERP implementation. The four options as mentioned by Soh et al. (2000) will be discussed in this section.

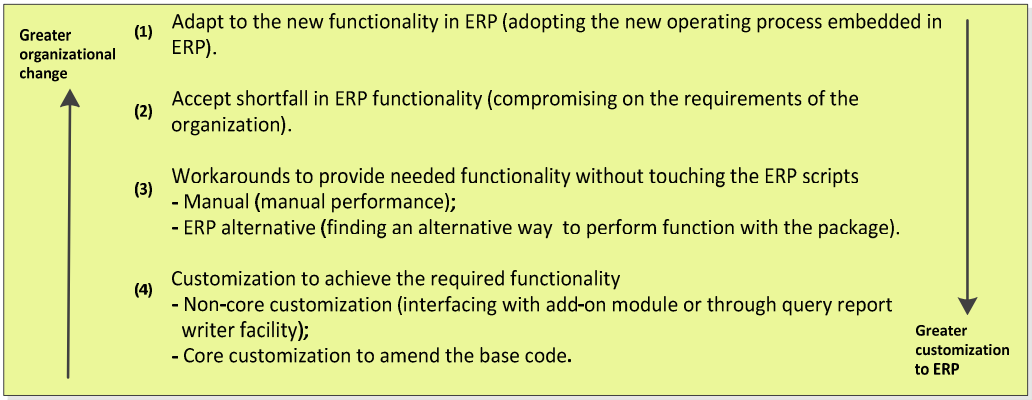

Figure 11: Misfit resolution strategies. Source: Soh et al. (2000).

4.2.1 Change embedded structures of the ERP system

The first option to achieve alignment is by adapting the system to the organization, also known as technical customization (Luo & Strong, 2004). According to Wang et al. (2006) customizing an ERP package is an attempt to reverse the choices made by the vendor, leading to a different set of beliefs of how things should be done. Luo and Strong (2004) state that the primary goal of ERP system customization is to achieve alignment between the functionalities of the ERP system and requirements set by the organization. Mabert et al. (2003b) define customization as modifying the package through code re-writes, changes, or additions. According to Brehm et al. (2001), customization or tailoring as they call it, contains two extremes:

- *Configuration* is supported by the vendor and refers to setting parameters. The configuration options of an ERP system comes with the package and determine the flexibility of the ERP system.
- *Modification* refers to changing the code of the ERP package. Modifications are not supported by the vendor.

Including those two extremes, Brehm et al. (2001) suggest nine different forms of customization as can be seen in Table 6. In this research, part of the definition of an actual misfit is when there is a gap between the embedded structures of the ERP system and the embedded structures of the organization leading to becoming inefficient or missing important functionality. Therefore, configuration and bolt-ons from the customization typology (Table 6) of Brehm et al. (2001) are not considered customizations in this research. This is because configuration is setting parameters and comes with the ERP package and thus is part of the embedded structure of the ERP system. A bolt-on is also a standardized piece of software on top of the ERP system. The ERP system and the bolt-on together can be seen as a standardized solution, so it is also part of the embedded structure of the ERP system. Both configurations and bolt-ons do not lead to any code changes or other more invasive alterations (Haines, 2009). Therefore the definition of customization used in this research is:

"Customization is a code change put into place because the ERP business process does not mirror the 'desired' business processes" (Davis 2005, p. 250).

Table 6 shows that the impact of the various tailoring options increases from top to bottom. However, the degree of impact for these types of customizations is not written in stone. For instance, a screen mask could have a larger impact than extended reporting, so it is a very rough estimation of the impact. According to Brehm et al. (2001) there are other factors than just the tailoring type that determine the impact. For instance the number of customization options applied, and the extent to which a particular customization option is applied.

Table 6: Customization options

Tailoring type	Description	Examples	Layer involved
Configuration	Setting of parameters (or tables), in order to choose between different executions of processes and functions in the software package.	Define organizational units; create standard reports; formulate available-to-promise logic; use of a standard interface to an archive system.	All layers.
Bolt-ons	Implementation of third-party package designed to work with ERP system and provide industry-specific functionality.	Provide ability to track inventory by product dimensions (e.g. 2 500m. lengths of cable do not equal 1 1000 m. length).	All layers.
Screen masks	Creating of new screen masks for input and output (soft copy) of data.	Integrate three screens into one.	Communication layer.
Extended reporting	Programming of extended data output and reporting options.	Design new report with sales revenues for specific criteria.	Application layer and/or database layer.
Workflow programming	Creating of non-standard workflows.	Set up automated engineering change order approval process.	Application layer and/or database layer.
User exits	Programming of additional software code in an open interface.	Develop a statistical function for calculating particular metrics.	Application layer and/or database layer.
ERP programming	Programming of additional applications, without changing the source code (using the computer language of the vendor).	Create a program that calculates the phases of the moon for use in production scheduling.	All layers.
Interface development	Programming of interfaces to legacy systems or 3rd party products.	Interface with custom-build shop-floor-system or with a CRM package.	Application layer and/or database layer.
Package code modification	Changing the source-codes ranging from small change to change whole modules.	Change error message in warning; modify production planning.	Can involve all layers.

Source: Brehm et al. (2001)

Despite the growing awareness that ERP customizations are difficult and have cost implications, most organizations perform at least some customizations (Haines, 2009). According to Haines, Goodhue, and, Gattiker (2006) an organization should only invest in customizations that are strategically important. This is the case when the business function to which the ERP system relates is strategically important and when the ERP system plays an important role in that business function. Zach and Munkvold (2011) indicate that this is the main reason for organizations to customize.

Drawbacks

ERP system customization has several downsides. According to Somers and Nelson (2004) it leads to longer implementation time and problems with upgrades and vendor software maintenance. Davis (2005) states that a customization often has minor bugs, because a customization is part of a development effort, leading to delays. Haines et al. (2006) and Soh et al. (2003) agree with these drawbacks and state that they all lead to increasing costs. These increasing costs could lead to budget overruns, delays and even project failure (Haines, 2009). These disadvantages are often

mentioned in current literature (Luo & Strong, 2004; Soh et al., 2000). Haines (2009) agrees with these disadvantages and states that it also leads to an increasing amount of complexity, because all processes are interconnected (Wang et al., 2006).

Advantages

Customization does not always have to be a bad thing. An advantage is that the way of working does not change and therefore the uniqueness of the organization can be retained (Buonanno et al., 2005; Haines, 2009). Some processes of an organization are of strategic importance. Because of these processes, an organization can distinguish itself from competitors. However, the standardized ERP system provides every organization the same business processes, leading to losing uniqueness. By customizing the ERP system, the competitive edge can be retained (Fosser et al., 2008).

When following the standardized processes of an ERP system leads to inefficiencies or a greater possibility of errors (for instance workarounds), customization is a good way to solve these problems (Haines et al., 2006).

4.2.2 Workarounds

According to Soh et al. (2000) there are two different types of workarounds. The first type is working by hand rather than using a computer system, which they call manual performance. For instance using Excel sheets or printing a list manually. The second type is using the ERP system in a different way as it was intended to still perform the functionality with the ERP system (Boudreau, 2003). For instance using the field 'statistical code' to capture other data or to navigate through multiple screens instead of one. The type of workaround discussed here is a solution chosen by the organization to solve an actual misfit and should not be confused with a workaround initiated by a user because of resistance to change (Ferneley & Sobreperez, 2006).

"Workarounds usually have negative impacts on productivity and organizational controls and undermine potential benefits from integration" (Soh et al., 2003, p. 82). Haines (2006) states that workarounds slow down processes and increase the possibility of errors made. However, these workarounds lead to achieving the required functionality without touching the ERP system and the business processes (Soh et al. 2003).

4.2.3 Accept misfit

Accepting a misfit is in fact compromising on the requirements of the organization (Soh et al., 2000). This leads to missing the required functionality, but not making adjustments to the ERP system or business processes or creating workarounds.

4.2.4 Change embedded structures of the organization

According to Gattiker and Goodhue (2002) an ERP system can demand an organization to change their business processes or not. Sia and Soh (2007) state that changing the embedded structures of an organization requires changes in the business processes of the organization, policies, structures, and/or roles. An organizational adaptation can vary from minor adaptations to large (significant) adaptations (Luo & Strong, 2004; Sia & Soh, 2007). An example of a significant adaptation is: "The organization may need to change its departmental structure to accommodate the more cross-functional structure of the package" (Sia & Soh, 2007, p. 572).

According to Gattiker and Goodhue (2002) there are two reasons for organizations to change their existing business processes. First, the ERP system is incapable of modeling certain business practices

that are being used by the organization. Second, the implementing organization thinks the processes embedded in the ERP system are superior to the existing business processes, leading to improved business processes of the organization. Grabot, Mayère, and Bazet (2008) call this second reason 'the chance of an ERP implementation'.

Gattiker and Goodhue (2002) make a distinction between strategic and nonstrategic business processes. They argue that it is important for a strategic business process to be strategically aligned. In case the business process has been changed due to the ERP implementation, leading to a better alignment between business process and business strategy, this has a positive impact on the ERP implementation. On the opposite, a decreasing alignment between business processes and business strategy has a negative impact on the ERP implementation. In case a business process is not strategic, adapting the business process to the ERP system could lead to resistance, but will not affect the impact of the ERP system either positively or negatively.

Drawbacks

Somers and Nelson (2003) state that adapting the processes to the ERP system increases the level of complexity, risks, and costs. Soh et al. (2003) state that adapting the business processes leads to a disruption in these processes, leading to risks. In case a particular business process is strategically important, adapting the business processes leads to a negative impact of the ERP system as discussed by Gattiker and Goodhue (2002) and Buonanno et al. (2005).

Advantages

According to Somers and Nelson (2003) adapting the processes to the ERP package promises the highest return on investment, compared to customizations. Haines (2009) agrees with this and states that adapting the business processes is less costly than customizing the ERP system. Strong and Volkoff (2010) state that adapting the processes of the organization to the ERP system could also offer benefits which could not be achieved from legacy systems (i.e. improved business processes).

4.3 WHICH SOLUTION TO CHOOSE?

According to Soh et al. (2003) the choice to customize, adapt business processes, or work around them is important, because this choice has a large impact on the organization. All resolution strategies have their pros and cons. Soh et al. state that customizing the system leads to a good fit, but involves costs and implications as discussed in section 4.2.1. Creating a workaround leads to obtaining the required functionality, but usually has a negative impact as discussed in section 4.2.2. Accepting a misfit involves no changes to either the ERP system or the organization, but leads to missing the required functionality as discussed in section 4.2.3. Adapting the business processes could lead to improvements in efficiency of the business processes, but could also lead to legitimate organization needs not being met as discussed in section 4.2.4.

Strategic importance

In current literature different criteria are provided about which resolution strategy to choose. Gattiker and Goodhue (2005) state that it is important to know whether a process is strategic or nonstrategic. According to Gattiker and Goodhue a process should not be adapted to the ERP system when this leads to a decreasing ability of the organization to execute its strategy. Haines et al. (2006) state that the strategic importance of a process determines the amount of customization to the part of the ERP system that supports the specific business process, under the condition that the information system plays an important role in that business process. The matrix in Figure 12 shows

four quadrants. The best outcomes whether to specialize or not are the quadrants 1 and 3. In case a business function has low strategic importance and low specialization is required, little customization is needed. In case a business function is of high strategic importance and a high degree of specialization is needed, customizations are required. Haines et al. came up with three steps which have to be followed in deciding how much to customize: (Haines et al., 2006, p. 44)

1. "Determine the strategic importance of each relevant ERP module;
2. For modules with high-strategic importance, consider each increment of customization independently;
3. Consider trends in the evolution of the standard solutions and the costs of customizing. For low-strategic importance modules, a future update could be the solution. For high-strategic importance modules, rapid action is required to stay ahead of competitors who can buy standard software."

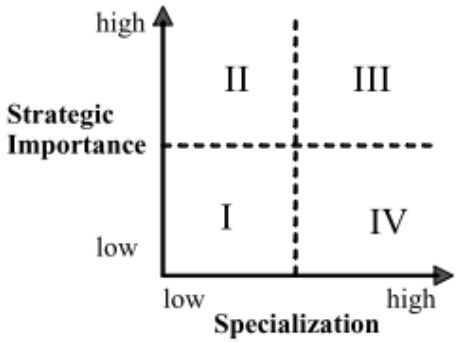

Figure 12: Strategy/specialization matrix. Source: Haines et al. (2006).

Misfit typology

Sia and Soh (2007) look at whether a misfit occurs from a deep structure (input and process misfit) or surface structure (output misfit) and whether it occurs from an imposed structure (country and industry specific misfits) or voluntary structure (company specific misfit). This typology has already been discussed in section 3.2.1. Sia and Soh (2007) and Soh and Sia (2004) conclude that an organization is most likely to customize the ERP system for *imposed-deep* misfits and most likely to adapt the business processes for *voluntary-surface* misfits. According to their research, imposed misfits are more severe than surface structure misfits, and therefore a customization is easier to justify for imposed structure misfits than for voluntary structure misfits. Their research shows that organizations often have to choose customizations for imposed misfits, because they have to obey the imposed structures like for instance regulations of a country. For voluntarily acquired structures, an organization has more freedom to change the requirements. For *imposed-surface misfits*, an organization cannot ignore the imposed structure and therefore has to customize or create a workaround. The choice of the solution depends on whether the benefits of a customization outweigh the workaround efforts needed to fulfill the imposed requirement. For *voluntary-deep misfits*, organizations have the option to adapt to the ERP system. To adapt to the ERP system or not should depend on whether the strategy of an organization is at risk or not. In case it decreases the ability of an organization to execute its strategy, it should choose customization. Yen et al. (2011) conclude the same and state that the business processes can be adapted, as long as the competitive advantage or strategic position of the organization is not at risk. So, whether a process is strategic or not (as discussed by Gattiker and Goodhue [2005] and Haines et al. [2006]) only plays a role for this kind of misfits, where an organization has a choice. This all is summarized in Table 7.

Table 7: When to choose which resolution strategy

	Imposed structure	Voluntary structure
Deep structure	Customization	Adaptation or customization
Surface structure	Workaround or customization	Adaptation

Based on: Sia and Soh (2007)

Yen et al. (2011) agree with the typology of Sia and Soh (2007) and state that each misfit has two properties (imposed/voluntary and deep/surface) which influence the way an organization resolves a misfit. According to Yen et al., solving misfits in the deep structure by customizing the ERP system has larger implications than customizations in the surface structure and latent structure. "This involves higher costs, greater risk, and complex processes, because these misfits occur at the core level of the system architecture, such as the data, application, and business logic levels" (Yen et al., 2011, p. 70). Therefore an organization has to avert customizations in the deep structure as much as possible. Only when the benefits of the customization are greater than the costs and difficulties associated with the customization in the deep structure, and when an organization has to obey to an imposed structure, customizing the ERP system can be justified. For surface structures a customization involves less risks, lower costs, and less complexity.

According to Strong and Volkoff (2010) a rule of thumb is that at least 80 percent of the standard ERP system needs to fit the organization and only 20 percent should be customized. Dixit (2011) argues that the maximum of customizations is 30 percent. However, it is hard to determine what one percent of customization is, because not every customization has the same impact. Only few ERP implementations can be implemented without customizations. Solving misfits requires a combination of various resolution strategies (Luo & Strong, 2004; Wu et al., 2005; Wu & Wang, 2006).

4.4 CONCLUSION

So first of all, an organization that wants to implement an ERP system needs to select the best fitting ERP system. Next, the remaining misfits need to be solved in order to achieve alignment. Literature shows four resolution strategies for solving single misfits. Those resolution strategies are: customization, creating a workaround, accepting a misfit, and changing the embedded structures of an organization.

All resolution strategies have their pros and cons. Which resolution strategy to choose for a specific misfit depends on whether the misfit occurs from an imposed/voluntary structure or deep/surface structure. For *'imposed-deep misfits'* an organization is most likely to customize the ERP system and the most likely to adapt the business processes for *'voluntary-surface misfits'*. For *'imposed-surface misfits'* the organization has to customize or create a workaround and for *'voluntary-deep misfits'* organizations have the option to adapt to the ERP system (depending on whether the process is strategic or not). However, solving misfits in the deep structure by customizing the ERP system has larger implications than customizations in the surface structure and latent structure. Therefore an organization has to avert customizations in the deep structure as much as possible. Only when the benefits of the customization are greater than the costs and difficulties associated with the customization in the deep structure, and when an organization has to obey to an imposed structure, customizing the ERP system can be justified.

5 RESEARCH DESIGN

As discussed in section 1.5, this research contains a theoretical part and an empirical part. Based on the literature review of Chapters 2, 3, and 4, it became clear what an ERP system is and what the differences are between SMEs and LEs when implementing an ERP system (chapter 2). Between this ERP system and an organization, misfits could occur. Chapter 3 discussed what a misfit is, which types, categories, sources, and consequences of misfits there are, leading to an analytical framework (Figure 10). Next, chapter 4 discussed how the occurring misfits can be solved and when to choose a specific solution according to literature. All these theories will be tested for SMEs by conducting a multiple case study, which is the empirical part of this research. The multiple case study should give an answer to the questions what the drivers of misfits are for SMEs and whether the analytical framework of Figure 10 is applicable. Besides, the empirical part of this research should give an answer on the question how SMEs solve different types of misfits and why they choose a particular solution.

This chapter describes the design of the empirical part. Section 5.1 discusses the selection and purpose of the pilot case study, followed by a discussion of the other cases. Section 5.2 discusses how data was collected to increase the reliability and validity of this research. In section 5.3 the data analysis will be discussed. Also the way of analyzing is important in order to increase the validity and reliability of this study.

5.1 DESIGN OF THE CASE STUDY

Yin (2003) mentions three conditions for the research strategy of a case study. First, a case study is a preferred research method for “how” and “why” questions and could also be used for exploratory “what” questions. The question to be answered in this research is what the drivers of misfits are within SMEs, how SMEs handle these misfits and why they handle it that way. Second, a case study is preferred when contemporary events are examined. For this study, recent ERP implementations are examined. Third, a case study is preferred when the investigator could not control events. All implementations of this research are finished, so no behaviour can be controlled or affected.

According to Yin (2003) a multiple case study has several advantages over a single case study. Most important is that the evidence from multiple case studies is often more compelling, leading to a more robust study. A replication logic should be followed (Eisenhardt, 1989; Yin, 2003). This replication logic implies that the theoretical framework found in literature should be enriched by studying various cases. So, each case is an individual “experiment” which confirms or disconfirms the theory (Eisenhardt, 1989). This framework later becomes “the vehicle for generalizing to new cases” (Yen, 2003, p. 48). On the down side, conducting a multiple case study requires more time and resources.

5.1.1 Pilot case study

The empirical part starts with a pilot case study. The purpose of this pilot case study is to determine the usability of the framework of Figure 10 and to refine the case study protocol (appendix A). Based on the results of the pilot case study, the framework can be adjusted and propositions can be developed (Yin, 2003). This framework can be used and tested by doing the subsequent case studies.

The choice for case study company A is made because A suited the profile set at the beginning of the research (see case study protocol). A has implemented Microsoft Dynamics NAV and went live on January 1st of 2012. They also met the requirement of having at least ten daily users of the ERP

system. Because current literature (Gattiker & Goodhue, 2005; Soh & Sia, 2007) argues that every organization faces at least some misfits during ERP system implementation, it is plausible that no additional criteria are needed for the selection of the pilot case study. Because company A had some major customizations according to a consultant of BDO and this implementation was guided by BDO, this case was chosen for the pilot case study.

5.1.2 Other cases

Based on the refined case study protocol (appendix A) other case studies were selected and conducted. Case company B and C fitted the requirements of the profile set at the beginning of the research. Organizations B and C have respectively 170 and 210 employees, of which 26 and 55 daily ERP system users. Both organizations have finished the implementation less than two years ago. Case company D fitted the requirements set as well, but they have 330 employees. This is more than the definition of a midsized organization according to the European committee as discussed in section 1.4. However, case company D is a waste processing organization with relatively many employees 'in the field' and has 60 daily ERP system users. From this point of view, case company C has almost the same amount of daily ERP system users. Therefore it is decided to also use organization D as a case.

Besides the pilot case study, BDO was only involved at the ERP System selection phase of case company B. Case companies C and D are customers of BDO, but BDO had nothing to do with the selection or implementation of Dynamics NAV at those two companies.

5.2 DATA COLLECTION

The data for the case study was collected by reading documentation and conducting semi-structured interviews at the selected organizations.

For each case, data triangulation is applied. Data triangulation refers to the use of different sources of data/information, to increase the validity (Guion, 2002; Yin, 2003). This research uses data from documentation and interviews. For each case the ERP vendor, consultant, and implementing organization are interviewed. From the implementing organization, at least the controller and another user are interviewed. Each interviewee received a list of topics and related questions sent upfront. Based on the course of the interview, additional questions were asked, so the interview was semi-structured. For each interview a report was created about the content of the interview. This report was sent to the interviewee afterwards in order to avoid misinterpretation and possibly receive feedback.

A case study protocol has been made, in order to increase the external validity and reliability of this research (Yin, 2003). With this protocol, other researchers should end up with the same results under the same conditions. In order to increase the reliability of the study, a case study database is also created and a chain of evidence has been maintained. The case study database consists of a physical and a digital part. The physical part consists of all notes taken during interviews, a report of each interview and the documentation. The digital part includes the voice memos recorded during interviews. By maintaining a chain of evidence the steps taken during the research could be traced back. Because all evidence is confidential, it can only be looked into via the author of this research.

5.3 DATA ANALYSIS

When all data was collected, the misfits found were placed in the analytical framework of Figure 10 for each separate case. Because this categorization is subjective and it is hard to determine whether

something is an actual misfit or not (Pries-Heje, 2006), multiple raters (experts) did the categorization independently in order to increase the reliability (Green, 1993). Segregation of duties has been applied between the role of rater and data collector/elaborator. So the researcher did not take part in rating the misfits.

It is important that each rater is qualified and has the same understanding of each category and definition. Therefore, the raters were selected on expertise. Five BDO consultants with at least five years of experience with Microsoft Dynamics NAV were selected. Also, a manual has been written and a short oral explanation was given to each rater (appendix F). The purpose of the manual was to clarify what was expected from the rater, to explain every category and definition, and to give background information about each case. Of the five consultants, four consultants finished all cases and one consultant finished case A and B. All these results are included in the data analysis.

The kappa statistic of Fleiss is a widely used method for nominal scale agreement among multiple raters (Sim & Wright, 2005). By using Fleiss' kappa, the degree of nominal scale agreement among multiple independent raters can be determined. Fleiss' kappa is an extension of Cohen's kappa, which is only useful for two raters. The benefit of using Fleiss' kappa is that it corrects for chance and every disagreement is considered equally serious (Fleiss, 1971). Fleiss' kappa is a number between 0 and 1 beyond chance. Landis and Koch (1977) created a table for interpreting the value of the kappa as can be seen in Table 8. This table is not universally accepted, but it is a good indication of the amount of agreement above chance. The formulas of Fleiss' kappa can be found in appendix G and the kappa calculations made in Excel for each case can be found in appendix H. The Excel sheets can be accessed via the author.

Table 8: Interpreting kappa values.

K	Interpretation
<0	Poor agreement
0.01-0.20	Slight agreement
0.21-0.40	Fair agreement
0.41-0.60	Moderate agreement
0.61-0.80	Substantial agreement
0.81-1.00	Almost perfect agreement

Based on Landis and Koch (1977)

The higher the degree of agreement between raters, the more reliable the outcome. Because Fleiss' kappa only says something about the agreement in total, the categorization of each individual misfit per rater should be compared. When all raters agree that a misfit belongs to a certain category, it is obvious that this misfit has been categorized correctly. In case the various categorizations diverge too much for an individual misfit, a discussion with the raters was required.

Table 9 shows when a misfit was assigned to a category directly (bold) and when a discussion between the raters was required. For instance, when five raters had a choice between two categories and four raters chose category A and one rater chose category B, the misfit was assigned to category A. However, it is also possible that the raters did not reach 'enough' agreement. An example of this is when two raters chose category A, and three raters chose category B. In such cases a discussion between the raters was needed. Based on this discussion, it became obvious what the reason was for the diversion and to which category the misfit belongs after discussion.

The raters were first asked to indicate whether a misfit is perceived or actual (two categories), followed by the subcategory of the misfit (three categories). In case a rater diverged from the other raters whether a misfit was perceived or actual, his rated subcategory was not taken into account to determine the subcategory of the misfit. For instance when four raters have categorized a misfit as an actual misfit and one as a perceived misfit, the rater who has chosen the perceived category, automatically has chosen a subcategory belonging to perceived misfits.

For each case the misfits should be mapped and placed into the adjusted framework. Also whether a proposition is demonstrated or not is reported for each case. Based on this within-case analysis, cross-case conclusions are drawn.

Table 9: Assigning a category to a misfit.

5 raters					
2 categories	**5-0**	**4-1**	3-2		
3 categories	**5-0-0**	**4-1-0**	**3-1-1**	3-2-0	2-2-1
4 raters					
2 categories	**4-0**	**3-1**	2-2		
3 categories	**4-0-0**	**3-1-0**	2-1-1		
3 raters					
2 categories	**3-0**	2-1			
3 categories	**3-0-0**	2-1-0	1-1-1		

Validity and reliability

The data collection and data analysis are designed in a way to guarantee the validity and reliability of this research. However, in order to increase the validity of the study, the report was reviewed by several colleagues of BDO. After the reviews, corrections were made, leading to an increasing accuracy of the case study (Yin, 2003).

5.4 CONCLUSION

The literature discussed in chapters 2, 3, and 4 is tested for SMEs by conducting a multiple case study. This multiple case study started with a pilot case study, followed by three other cases. Based on a case study protocol, data was collected by conducting interviews and studying documentation. Next, the misfits identified during data collection were analyzed by placing them into the analytical framework of Figure 10. This categorization was done independently by five experts of BDO.

6 PILOT CASE STUDY

The pilot case study starts with a short description of the organization (section 6.1), followed by all misfits identified during data collection in section 6.2. Because not all identified misfits fit into the categories of the framework, the framework had to be adjusted. For each adjustment a proposition has been created and discussed together with literature in section 6.3. The adjusted framework can be found in section 6.4. Section 6.5 shows how misfits can be analysed using the extended framework. Finally, section 6.6 contains the results of the pilot case study. A complete elaboration of the pilot case study, together with a summary of each interview can be found in appendix B.

6.1 DESCRIPTION CASE A

The pilot case study was conducted at company A. By studying documentation and conducting interviews, information was obtained about the ERP implementation and the organization. Table 10 contains the company profile and an overview of the interviews conducted and documentation used for case company A.

Table 10: Company profile and interviews case company A.

Company profile – Company A		
Type of organization	Manufacturer	
Number of employees	50	
ERP system users	20	
Time after implementation	7 months	
Interviews and documentation		
Code	**Function**	**Date**
Interviews		
1.1	External project leader	10-4-2012
1.2	ERP vendor	12-4-2012
1.3	Consultant	1-5-2012
1.4	Head IT of A	4-5-2012
1.5	Financial controller of A	4-5-2012
1.6	Managing director of A	8-5-2012
Documentation		
A1	Report: project leader consult	12-7-2010
A2	Report: discussion Functional Requirements Document	4-3-2010
A3	Functional requirements document	26-2-2010
A4	Report: preparation for testing	22-4-2010
A5	Report: Discussion open points	17-1-2011
A6	Highlight report 7	9-12-2010
A7	Visit report ERP vendor	12-4-2011

Company A is a manufacturer and trader of flexible conduits and hoses for various applications. These partially are a standardized product, but on customer specification, hoses and conduits can be customized. A distinguishes itself from competitors by being flexible (quickly switching and producing small batches), offer a great variety of solutions (whatever the customer wants), and quickly respond to the market. A has long enduring relations with its customers (common in the industry). Therefore it is very hard to gain new customers.

Adoption

A had a custom made ERP system that has been used and adjusted for about 25 years. An IT-employee had developed this system and he maintained the system. A completely depended on the

system developer and needed a new ERP system which could be maintained by other people. Besides this main reason, other reasons were mentioned to adopt a new ERP system. The old ERP system was outdated and by implementing a new ERP system, multiple legacy systems should be replaced.

Implementation

The organization has implemented Microsoft Dynamics NAV, complemented with an industry specific solution. This industry specific solution is developed by the vendor and is certified by Microsoft. The ERP system went live in January 2012. The system is used by approximately 20 (local) active users. The implementation was delayed and there was a considerable budget overrun. According to the interviewees, the main reason for this was customizing the ERP system.

6.2 MISFITS

Based on the interviews and documentation, various misfits came up. Below is a list of the identified misfits of the Microsoft Dynamics NAV implementation at company A:

A1. **Calculation:** The biggest misfit, according to all interviewees, is the calculation functionality, which is a deficiency in the standard ERP solution. Despite the fact that the industry specific standard (which has calculation functionality) was implemented, A missed important functionalities. According to the consultant and the vendor most of the requirements set by A were justified. When A makes a calculation, it wants to have an overview which shows the connections between calculation, selling order, and production order. They also want to elaborate every detail (machine hour /man hour/ materials/ planning/ scrap percentages etc.) in the calculation so they can easily convert it to a production order. According to all interviewees, this functionality was not part of the standardized software.

A2. **Complex calculation**: According to the Head IT, the people of the engineering department still use the old system for complex calculations; the engineers argue that this is faster to work with.

A3. **Overview:** The consultant indicates that the users went too far in getting the system to do what they want. For instance, they want to insert some information in a specific screen. In Dynamics NAV the user has to insert this information in another screen.

A4. **Time registration:** A manufactured product consists of various parts. Dynamics NAV demands the user to enter the operation time for every part. However, A does not keep track of the operation time for each part, but only for the complete product. It is not possible in Dynamics NAV to enter the operation time for a complete product, because Dynamics NAV calculates this based on all operation times for the parts.

A5. **Invoicing:** According to the interviewees of A (see Table 10) it is very hard to make corrections in the system. It often occurs that afterwards transportation costs, amounts, products, etc. should be added/corrected. This was easier in the old situation and increased the time spent on invoicing from two hour a day to 6-8 hours a day. The Head IT provided an example; it is very hard with Dynamics NAV to send goods to Russia, but the invoice to China. The consultant of the vendor indicates that Dynamics NAV forces the organization to enter data correctly at the start of the process (invoice and order), leading to less work for invoicing. However, the users of the invoicing department of A keep on working the same way as before the ERP implementation, which involves a lot of checking

and correcting. During interviews it became obvious that the users do not know how to easily correct data on the invoice. This checking and correcting is time expensive.

A6. **Order statistics:** Dynamics NAV does not allow to create statistical information for incoming orders, as they have always done. For instance, to calculate the amount of transportation costs at the end of the year and including these costs in the selling prices of the products in the new year.

A7. **Declaration by agents:** In the agent administration it is not possible to insert declarations.

A8. **Tender:** According to the Head IT, the employees of A making tenders for manufacturing goods, do not use the functionality of Dynamics NAV anymore, but make tenders the old way: in Word. They do this because they argue that it is too difficult to change data on a tender, which leads to spending too much time on entering a tender.

A9. **VAT posting groups:** Dynamics NAV imposes employees of the administration department to use all VAT posting groups. Those posting groups are not needed, but not using them leads to errors.

A10. **Budget list:** According to the CFO, it is not possible to obtain a budget list directly from the system. This budget list is needed to obtain an overview of the remaining budgets for each running project.

A11. **Building reports:** A is missing a tool that makes it possible to build or change reports themselves. The Head IT has completed a training report building to use the report building functionality of Dynamics NAV, but according to him this is way too complex. The consultant agrees with this and states that it is only possible for experienced consultants to build reports with Dynamics NAV 2009. He also mentions that it is pure programming to define or change a report. In case A wants to build or change a report they have to hire a consultant. However, the requirement of A was to do this themselves.

A12. **Credit note:** When a credit note is created for returned goods, the goods are automatically added back in stock by the system. No distinction can be made between returned goods and those that are broken.

A13. **Negative stock:** It is possible to have negative stock in the current configuration of Dynamics NAV at A, which A does not want. Because of this, they manually have to check for every order whether there is enough in stock.

A14. **Stock per country:** Within Dynamics NAV it is not possible to show the stocks per country.

A15. **PDF-files:** A wanted to have the possibility to send invoices, orders, tenders etc. as a pdf-file with the new ERP system. This functionality was not possible with the old ERP system. The CEO of A indicates that this was one of multiple drivers to adopt Microsoft Dynamics NAV, because Dynamics NAV should have this functionality. However, this functionality is not standard in the basic version of Dynamics NAV. A later decided not to buy this functionality, because the additional module for the pdf-file functionality was too expensive.

6.3 PROPOSITIONS

During the pilot case study it became obvious that not all misfits mentioned above are actual misfits leading to missing important functionalities and/or becoming inefficient. Sometimes the users perceive something as a misfit, but it is not an actual misfit. An example; the users of A went too far in getting the system to do what they wanted. For instance, they want to insert some information in a specific screen. In Dynamics NAV the user has to insert this information in another screen (misfit

A3). The users indicated this as a misfit, but changing the screens requires customizations and does not lead to acquiring missing functionalities or becoming significantly more efficient, so this is not an actual misfit. Another example is misfit A5. The users of A complain that invoicing takes much more time than before, because it is harder to make corrections on an invoice. However, the users do not know how to easily correct data on the invoice in Dynamics NAV, so this is not an actual misfit.

This indicates that there actually is a difference between actual misfits and misfits perceived by users of the ERP system as already introduced in section 3.1. It is important to know whether something qualifies as an actual misfit or not, and thus is only perceived as a misfit by the end-user of the ERP system. Current literature fails to make a clear distinction between those two. By looking at literature, only some researchers mention this difference. Gattiker and Goodhue (2005) state that it is important to make a distinction between those two but do not expand further on this point. The legitimate issues are real/actual misfits and will occur in every identical organization, while perceived misfits depend on the experience and perception of people within the organization and may not be real misfits. Some people will experience a process adjustment as a misfit, while others do not.

A perceived misfit can be an actual misfit, but this does not have to be the case. There is a perceived misfit in case the users of the implemented ERP system perceive some change in process or system due to the ERP implementation as a misfit, but it may not be an actual misfit. So, users always perceive misfits, of which some are legitimate issues (the actual misfits) and others are not (residual). This is represented in Figure 13. From now on, the 'residual perceived misfit' is called 'perceived misfit' in this research. The following definition of a perceived misfit is used in this research:

"A perceived misfit is not an actual misfit, but it is perceived as an actual misfit by the user of the ERP system"

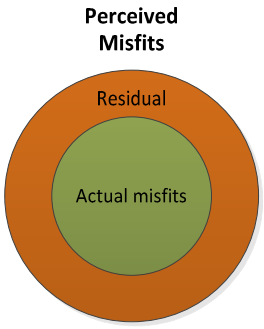

Figure 13: Perceived misfits.

This indicates that the current framework, which is applicable for actual misfits, is not sufficient and needs to be adjusted. The framework derived from current literature (see Figure 10) is only applicable to actual misfits, so a category for perceived misfits has to be added, leading to the following proposition:

Proposition 1: Perceived misfits occur during ERP implementations.

The pilot case study has shown several sources of perceived misfits. The sources of perceived misfits found are:

- Resistance to change (A2);
- Ignorance (A5 and A10);
- Wishes (A3).

Those three sources of perceived misfits are discussed below. For each source of a perceived misfit a description has been given based on the pilot case study, complemented with a literature review for each perceived misfit source.

6.3.1 Resistance to change

Because of resistance to change, employees (for various reasons) want to do their work the same way as before the ERP implementation, regardless of whether the new way of working leads to benefits. During the pilot case study, the external interviewees indicated that some users have showed a high degree of resistance to change. However, the new ERP system is never exactly the same as the old ERP system, so things will change. When processes change and employees do not want to work differently, they often complain that the new ERP system is missing functionality, while the functionality is present in the new ERP system. Take for instance the complex calculation misfit of case A (misfit A2). The users argue that the old system is faster for complex calculations and therefore start using the old system again. According to the external interviewees and even the Head IT of A, the employees of the calculation department did not want to change their way of working even a little bit, leading to customizations.

Some studies mention the difference between actual misfits and perceived misfits, and all address this to resistance to change (Gattiker & Goodhue, 2005; Haines, 2009; Pries-Heje, 2006). “What some interpret as a misfit others may define as resistance to change” (Pries-Heje, 2006, p. 6). However, this topic has not been widely discussed in current literature. Some users will complain about the new ERP system and experience a high degree of perceived misfits, while others will not complain about the same changes and experience a low degree of perceived misfits. Haines (2009) has found evidence that a relationship exists between change management and the amount of perceived misfits caused by resistance to change. Haines concludes that not addressing organizational resistance leads to more perceived misfits, so in this case the orange part of Figure 13 is bigger compared to no resistance to change at all. Perceived misfit are sometimes solved by customizing the ERP system or working around the ERP system, while this may actually not be needed.

“Resistance to change stems from change in job content and uncertainty of the new ERP system” (Hong & Kim, 2002, p. 29). Because ERP system implementations are disruptive changes, every ERP system implementation will face a certain degree of organizational resistance which leads to additional perceived misfits. According to Kotter and Schlesinger (2008) there are various forms of resistance to change:

- The desire not to lose something of value;
- Misunderstanding the change;
- Lack of trust;
- Believing that the change does not make sense;
- Fear of not being able to develop the new skills and behavior required.

Change management

Umble, Haft, and Umble (2003), Somers and Nelson (2003), and Haines (2009) state that proper change or project management can prepare an organization to reduce the organizational resistance to the new ERP system. Seddon et al. (2010) call this the overcoming of organizational inertia. According to Finney and Corbett (2007), change management is the most cited critical success factor (CSF) in ERP implementations literature. “One key task is to build user acceptance of the project and

a positive employee attitude" (Finney & Corbett, 2007, p. 336). Pries-Heje (2008) agrees with this and states that user participation and involvement leads to a better fit between business and ERP system. So to summarize, based on current literature the degree of perceived misfits is determined by the degree of organizational resistance, which depends on the applied change management approach.

Muntslag (2001) states that change management can be seen as a risk management approach. An ERP implementation comes with considerable changes within an organization and associated risks. No matter how good the technical ERP system performs, people have to be motivated to use the ERP system and they should have the knowledge to work effectively with the ERP system (Seddon et al., 2010). During implementation, potential risks should be monitored and where possible measures should be taken in order to control these risks. Muntslag (2001) appoints six CSF's for change management. Insufficient attention for these CSF's during an ERP implementation could lead to a risk of user resistance against the change. So, proper change management is necessary in order to decrease the degree of organizational resistance and thus the amount of perceived misfits. Therefore, the following CSF's are required (Muntslag, 2001):

- Convincing business case: To achieve commitment of the users, they need to be convinced about the consequences in case there will be no changes. This can be done by analyzing the current situation and developing an appealing future vision.
- Sponsorship for changes: Top management should support the change process by making resources available. Also middle management should have the right attitude towards the future vision.
- Change focused communication: Users have to be informed about the impact and timing of the intended changes early on.
- Ability of the organization to change: The organization should be ready to change. By involving users and process owners of different departments with developing the future vision and the implementation, users are more confident that they can change. Another advantage of commitment of employees during all stages of the change process is that they learn the new competencies required in the new situation.
- Human resource management (HRM) processes: Some HRM processes are important to reduce the amount of resistance. People should be trained and educated in order to develop the right competencies, good behavior should be stimulated, and the right external competencies should be attracted.
- Integrated change: The ERP implementation process is not only a technical change, but also a change of processes, people, and organization. All these aspects should be treated well.

In order to achieve above CSF's, several actions are required. According to Seddon et al. (2010) employees of an organization should be motivated to learn, use, and accept the new system. User participation and user involvement are important for the success of the implementation. However, involving users without giving them influence on the implementation process, does not result in involvement, but in 'pseudo participation' (Pries-Heje, 2008). Change management activities to achieve the CSF's are highly important during the adoption, adaptation and acceptance phase of an ERP implementation (Somers & Nelson, 2004). Finney and Corbett (2007) performed a literature review on the activities required for proper change management to overcome organizational inertia. The most cited activities are:

- User training and education;

- Achieve commitment of users;
- Users have to be informed;
- Users should understand the benefits and drawbacks;
- Involve users in the system design;
- Support users;
- Build management commitment;
- Create a culture with shared values and common goals.

These actions for proper change management are not new:

> The lesson of the 60's is that no system is going to succeed without the active and willing participation of users. Users have to be made aware of how the system will work and how they will make use of it. They have to be sold on the system. Their expertise in the business area must be made a key ingredient to system development. They must be kept aware of progress, and channels must be kept open for them to correct and tune system goals during development (DeMarco, 1979, p. 6).

Table 11: Methods for dealing with resistance to change.

Approach	Commonly used in situations	Advantages	Drawbacks
Education + communication	Where there is lack of information or inaccurate information and analysis.	Once persuaded, people will often help with the implementation of the change.	Can be very time consuming if lots of people are involved
Participation + involvement	Where the initiators do not have all the information they need to design the change, and where others have considerable powers to resist	People who participate will be committed to implementing change, and any relevant information they have will be integrated into the change plan.	Can be very time consuming if participators design an inappropriate change.
Facilitation + support	Where people are resisting because of adjustment problems.	No other approach works as well with adjustment problems.	Can be time consuming, expensive, and still fail.
Negotiation + agreement	Where someone or some group will clearly lose out in a change, and where that group has considerable power to resist.	Sometimes it is a relatively easy way to avoid major resistance.	Can be too expensive in many cases if it alerts others to negotiate for compliance.
Manipulation + co-optation	Where other tactics will not work or are too expensive.	It can be a relatively quick and inexpensive solution to resistance problems.	Can lead to future problems if people feel manipulated.
Explicit + implicit coercion	Where speed is essential, and the change initiators possess considerable power.	It is speedy and can overcome any kind of resistance.	Can be risky if it leaves people mad at the initiators.

Source: Kotter and Schlesinger (2008).

Kotter and Schlesinger (2008) state that it is important to address the type of organizational resistance in order to choose the right manner to overcome resistance. Kotter and Schlesinger have come up with various approaches for dealing with different types of resistance to change as can be seen in Table 11. According to their research, proper change management is characterized by a skillful mix of these approaches, depending on the situation. Various change management strategies are possible. A change management strategy exists of a certain speed of change and the application of a mix of methods to overcome the resistance to change. The two extremes are rapid implementation (clear plan and little involvement of others) and a slow implementation (less clear plan and involvement of many others). From top to bottom, Table 11 shows slow to fast ERP implementation. For instance, the coercion approach should be used when the ERP system should be

implemented very fast. So the change strategy depends on both the speed of implementation and the type of resistance. In order to say something about the applied change management approach of an ERP implementation, the applied change management approach should be compared with the best suiting change management approach according to the model of Kotter and Schlesinger. However, the change management approach could differ per person or group of persons.

In summary, the amount of perceived misfits depends on the degree of organizational resistance which is determined by the change management approach. According to current literature, proper change management should address the above eight activities in order to fulfill the CSF's of change management. The change management approach depends on the type of resistance to change. So, when analyzing an ERP implementation it is important to analyze the type of resistance, methods to deal with the resistance, and the optimal speed of change. This leads to the following proposition:

Proposition 1a: Resistance to change leads to perceived misfits in ERP implementations.

6.3.2 Ignorance

During the pilot case study, all interviewees indicated that there was a lack of knowledge about the possibilities Microsoft Dynamics NAV offers. This lack of knowledge may lead to users missing functionalities that actually are in the system. During interviews, the interviewees of A all indicated that some functionality was missing, but they could not say whether the functionality was really absent in Dynamics NAV or not. For instance, in the new situation users of A are arguing that they need at least three times as much time for invoicing. During interviews it became obvious that the users do not know how to make easy corrections to the invoices (misfit A5). All interviewees agree that a lot of problems occur because of the lack of knowledge about Dynamics NAV within A. They state that having more knowledge about the possibilities of Dynamics NAV would lead to a more efficient use of the ERP system and less problems. The CEO said: *"It will all improve, because all functionalities are in the system of course, but you have to make use of it".*

Pries-Heje (2008) conducted a case study, also addressing users having lack of knowledge about the implemented ERP system. According to Xu and Ma (2008) and Pries-Heje (2008) a successful ERP implementation involves knowledge of both the business processes and the ERP system. The key users possess detailed knowledge about the business processes and the consultant possesses experience in the ERP system. According to Pries-Heje, consultants and users should work as a team. Xu and Ma indicate that knowledge from both sides needs to be integrated in order to implement the ERP system successfully. So, proper knowledge sharing between consultant and key users could decrease the amount of perceived misfits caused by ignorance. According to the research of Xu and Ma, key determinants of the knowledge transfer are the willingness of the source to transfer knowledge, the absorptive capacity of the recipient, and the communication capability of both parties. The knowledge transfer could be in the form of a training (Haines & Goodhue, 2003). Pries-Heje adds that users have to be deeply involved in the ERP implementation to prevent a lack of knowledge about the possibilities of the new ERP system. So, ignorance can be prevented by deeply involving the ERP system users and having a proper knowledge transfer (training) between consultants and the end-users of the ERP system.

Not having sufficient knowledge about the ERP system leads to users not being able to develop and evaluate design suggestions during the implementation. After the system is live, lack of knowledge

leads to users not knowing how to use the ERP system correctly, and users not knowing what the benefits of the new ERP system are (Pries-Heje, 2008). This leads to the following proposition:

> **Proposition 1b:** Ignorance leads to perceived misfits in ERP implementations.

Pries-Heje (2008) and Wu and Wang (2006) state that the knowledge level of ERP system users influences the attitude and the satisfaction of users, possibly leading to resistance to change. Having more experience and knowledge about the new ERP system is likely to cause more positive attitudes of the users towards the implemented ERP system (Abdinnour-Helm, Lengnick-Hall, & Lengnick-Hall, 2003). This indicates that there is a link between misfits caused by resistance to change and misfits caused by ignorance. Misfit A8 is an example of this. The users of A who make tenders for manufacturing goods, do not use the functionality of Dynamics NAV anymore, but make tenders the old way: in Word. They do this because they argue that it is too difficult to change things on a tender, which leads to spending too much time on entering a tender. This leads to the following proposition:

> **Proposition 1c:** Ignorance causes resistance to change, leading to perceived misfits in ERP implementations.

6.3.3 Wishes

Because of the wishes of employees, the new ERP system does not fulfill the exact needs of the users, leading to a user indicating something as a misfit, which is not an actual misfit. For instance the user believes some functionality will be more convenient or the user has an overkill of wishes for the new ERP system. However, this wish for functionality does not increase efficiency (significantly) or, not having this functionality, does not lead to missing important functionality. In the case of A, this type of misfit occurred when the users got somewhat spoiled. The functionality for the calculation department was missing, and the decision was made to customize the ERP system. According to the consultant and the interviewees of the implementing organization, the users went too far by wanting everything customized, because it was a misfit according to the users. For instance the overview misfit (A3). Dynamics NAV allows users to insert information in a specific screen. The users wanted to insert this information in another screen, requiring customization. However, not every screen should or can be custom made only because the users think it is more convenient.

This type of perceived misfit can be partially attributed to resistance to change, when a user wants the new ERP system to function exactly as the legacy ERP system. However, this type of misfit does not have to be attributed to resistance to change, because it is also possible the user wishes for some functionality because he thinks it is more convenient. For instance something simple as wanting a print button on the left hand side of the screen instead of the right hand side.

Current literature does not address this type of perceived misfits because of wishes explicitly. By looking at requirements engineering theory, it becomes obvious that the users of the implementing organization need to understand what the implications are of customizations. Also the requirements of the users need to be critically analyzed. By documenting the rationale for the requirements, unnecessary requirements can be eliminated. The question ‘why it is needed’ is important here (Daneva, 2004). The five experts of BDO who were used in this research were asked how this type of misfit could be solved and came up with being clear to the users about what is possible and what is not, and critically analyze the RFC’s and reject them for these type of misfits as mentioned by Daneva (2004). This leads to the following propositions:

Proposition 1d: Wishes for new functionalities lead to perceived misfits in ERP implementations.

Proposition 1e: Wishes cause resistance to change, leading to perceived misfits.

Figure 14 shows an overview of the propositions formulated in this section. The perceived misfit is the dependent variable. Ignorance, resistance to change, and wishes are independent variables in this model (arrows 1a, 1b, and 1d). Resistance to change is a moderating variable in case ignorance or wishes lead to resistance to change leading to perceived misfits (arrows 1c and 1e).

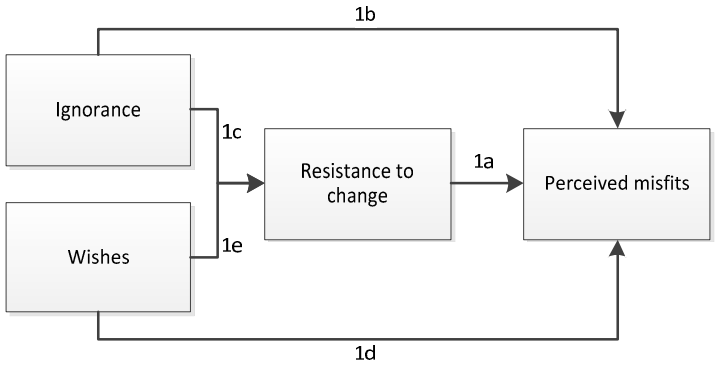

Figure 14: Propositions.

6.4 EXTENDED ANALYTICAL FRAMEWORK

Based on above propositions the analytical framework of Figure 10 in section 3.5 can be extended with the types of perceived misfits mentioned above, leading to the extended framework of Figure 15. This extended framework is applicable for both actual and perceived misfits. Because this extension is based on just one case, further testing of the new framework is needed to increase the validity. The framework needs to be tested for each case separately and could lead to further adjustments of the framework.

6.5 ANALYZING MISFITS

Before assigning misfits to a specific category in the analytical framework, it should be decided whether a misfit is actual or perceived. Based on the definitions of an actual and a perceived misfit this distinction could be made. Figure 16 shows a flowchart that helps to determine whether a misfit is a legitimate issue or not. Next, the misfit can be assigned to a certain category in the analytical framework. That is deep structure, surface structure or latent structure for actual misfits and resistance to change, ignorance, and wishes for perceived misfits. The flowchart is made for the experts of BDO to help them decide whether a misfit is actual or perceived and which category it belongs to. This flowchart only guides the experts. Their knowledge is important, because it should be determined whether something is inefficient or not for instance. In the end, not the flowchart but the expert assigns a misfit to a certain category.

6.6 CONCLUSION

Based on the pilot case study, evidence was found that not every misfit identified during an ERP implementation is an actual misfit. Current literature fails to make a clear distinction between actual and perceived misfits. Based on the pilot case study and literature, three different types of perceived misfits are identified: resistance to change, ignorance, and wishes. Ignorance and wishes could also lead to resistance to change. This all leads to five propositions (see Figure 14) and the extended analytical framework of Figure 15. The propositions require further testing to increase the validity.

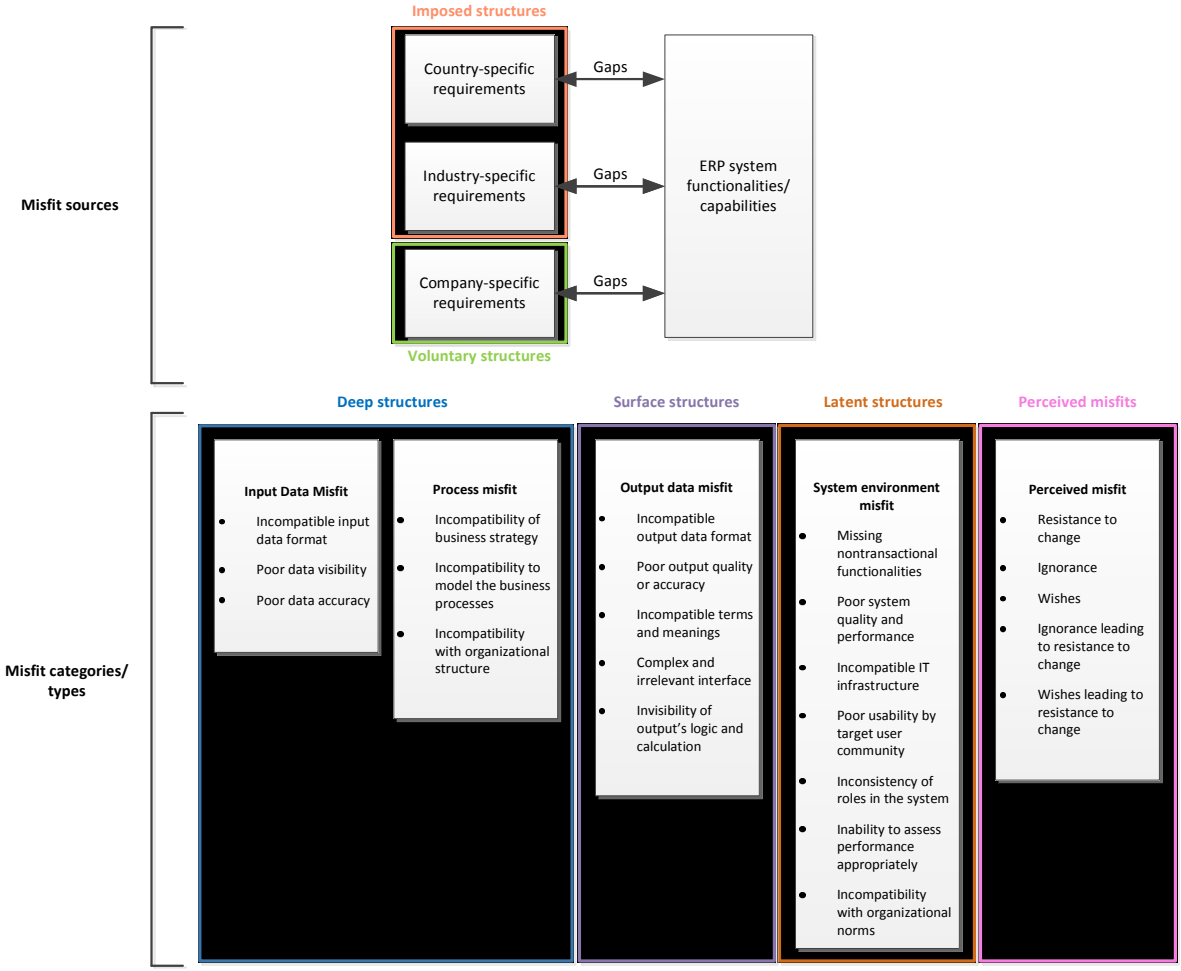

Figure 15: Extended analytical framework.

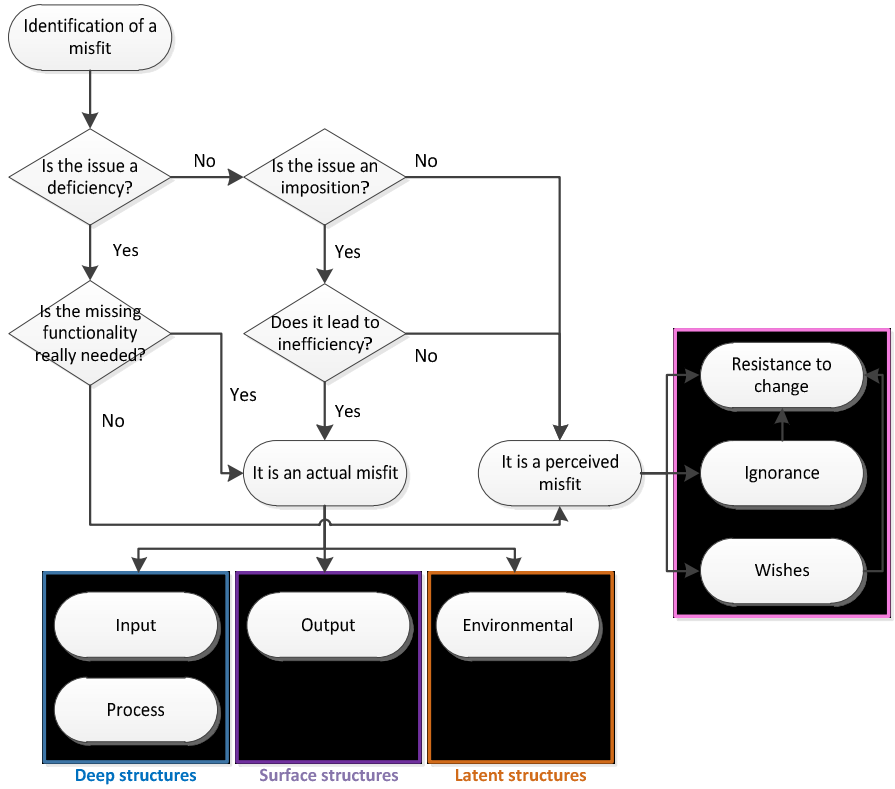

Figure 16: Flowchart perceived/actual misfit.

7 SINGLE CASE ANALYSIS

This chapter contains the results of each individual case (including the pilot case study). Section 7.1, 7.2, 7.3, and 7.4 show respectively the results of case A, B, C, and D. Every section/case in this chapter is divided into the same subsections. Every case starts with a table containing an overview of the case company and implementation, the interviews conducted, and documentation used. Next, the first subsection gives a description of the organization and the ERP implementation at the case company. Because the cross case results are given in chapter 8, the second subsection of each section contains only a conclusion of the results of the case. The detailed results for each case can be found in appendix I on which the conclusion in each section is based. For case A (pilot case study) the table and the first subsection are already described in section 6.1. The assigned category and subcategory of a misfit are based on the categorization done by the BDO experts.

In case an organization has implemented an industry specific solution, the name of this solution is not mentioned, because the name of the ERP vendor can be derived from the name of this solution.

7.1 CASE A

A description of case company A and the implementation of Dynamics NAV at case company A can be found in section 6.1 together with a company profile and an overview of the interviews conducted and documentation used for case A in Table 10.

7.1.1 Sources

After discussion with the experts, it became clear that it is hard to determine whether the source of a n actual misfit is company-specific or industry-specific based on the information available. The aim of the misfit source is to determine whether a misfit arises because of voluntary or imposed acquired structures as discussed in section 3.2. Besides, the source of the misfit does not say whether a misfit is caused by voluntary or imposed acquired structures. Take for instance misfit A4. The raters agree that this is an industry-specific misfit. However, this misfit is not caused by imposed acquired structures. Missing this functionality is not catastrophic and could be solved easily via a workaround. So, knowing whether the source of a misfit is company-specific or industry-specific does not say anything whether the misfit arises from voluntary or imposed acquired structures. Therefore, the source of a misfit stays out of scope in the remaining case studies, because the aim of the source of an actual misfit was to make a distinction between imposed and voluntary acquired structures.

7.1.2 Conclusion Case A

Based on the value of Fleiss' kappa in Table 12 it can be concluded that the raters have little difficulties in general to determine whether a misfit is actual or perceived for the Dynamics NAV implementation at company A. Also assigning a category to the actual misfits does not lead to difficulties in general. When assigning a category to the perceived misfits, the kappa of 0.2785 indicates that the raters have more problems reaching an agreement about the category of a perceived misfit. For calculations see appendix H.

Table 12: Kappa values of case A.

Categorization	Kappa value	Type of agreement (Landis & Koch, 1977)
Actual/Perceived	0.5671	Moderate agreement
Actual misfit categories	0.5778	Moderate agreement
Perceived misfit categories	0.2785	Fair agreement

Both perceived and actual misfits were found at company A. Of the fifteen misfits identified, five (33%) are perceived misfits and ten (67%) are actual misfits. Therefore evidence is found that proposition 1 is true for case A. See appendix B for details of every misfit and appendix I for the assigned category of every misfit.

Actual misfits

Drivers

Of ten actual misfits, six misfits (60%) were caused in the deep structure elements, and four (40%) were caused in the surface structure elements. No misfits were caused or found in the latent structure elements.

Solutions

Of the actual misfits, two misfits were solved by customizing the ERP system. The argument for both customizations was that they could not function without having this functionality. Four misfits were solved via workarounds. The reason for this solution was that the workarounds led to an acceptable solution, so customization or process adaptation could be prevented (possibly saving money). Two misfits were accepted, because buying or customizing this functionality was too expensive.

Perceived misfits

Drivers

Based on the categorization of the BDO experts, of the five identified perceived misfits, one was caused by resistance to change, two were caused by ignorance, one was caused by wishes, and one was caused by ignorance leading to resistance to change. No misfits were caused by wishes leading to resistance to change. So, evidence is found in this case for propositions 1a, 1b, 1c, and 1d and no evidence is found that supports proposition 1e.

Solutions

Of five perceived misfits, only one was solved via a workaround. For the other four perceived misfits, no solution was chosen, but they were leading to users working outside the system, or spending too much time doing their job.

7.2 CASE B

Table 13 contains a company profile and an overview of the interviews conducted and documentation used for case B. A complete elaboration with each identified misfit of case study B, together with a summary of each interview can be found in appendix C.

7.2.1 Description case B

B is an organization that collects and processes waste for four municipalities in the Netherlands and was established in 1999. Those municipalities are the shareholders of B and the most important clients. Other activities of B are cleaning, gritting, pest control, serving commercial clients, running a thrift shop and managing an environmental park. B has mainly two different processes. A process for the civilians of the four municipalities, and a process for commercial clients. The general strategy of B is customer intimacy. B wants to take over the worries of clients about their waste. B is not the cheapest waste processor, but it wants to take over the care of waste from the four municipalities. B also finds it important to be sustainable and to control costs.

Table 13: Company profile and interviews case company B.

Company profile – Company B		
Type of organization	Waste processor	
Number of employees	170	
ERP system users	26	
Time after implementation	1 year and 7 months	
Interviews and documentation		
Code	**Function**	**Date**
Interviews		
2.1	Financial controller of B	13-6-2012
2.2	Head IT of B	13-6-2012
2.3	Consultant	25-6-2012
2.4	Key-user sales department of B	27-6-2012
2.5	External project leader (ERP Vendor)	27-6-2012
Documentation		
B1	Fit gap analyses	21-9-2010
B2	Report: steering committee	14-2-2011
B3	Process descriptions of company B	-
B4	Notes consultant during decision of new ERP system	27-7-2010
B5	Overview requirements and wishes	14-4-2010
B6	Long list ERP system selection	28-4-2010
B7	Document: Requirements vs. Dynamics NAV	-
B8	Project initiation document	10-9-2010

Adoption

The main reason to replace the legacy ERP system: Exact for Windows, is because this software was outdated and the continuity of this ERP system could not be guaranteed. A second reason for the adoption of a new ERP system was to have a more integrated system, because in the old situation, B had multiple separate systems leading to multiple versions of the truth. Therefore, by implementing a new integrated ERP system, the risk of having multiple separate administrations would be gone.

The purpose of the new ERP system is to use it for financial administration and some additional functionalities which are now fulfilled by the home grown ERP system. With the new situation the civilian process stays in the home grown system, but the commercial process will be in Dynamics NAV.

Implementation

B has implemented standard Microsoft Dynamics NAV, complemented with industry specific software. This industry specific solution is developed by the vendor and is certified by Microsoft. The ERP system went live in January 2011. For the payroll, the application called Mercash was installed. The system is used by approximately 26 (local) active users. The implementation was both on time and within budget. The aim of the implementation was to follow the standard as much as possible. According to all interviewees the amount of customizations was kept to a minimal and only minor customizations were made.

7.2.2 Conclusion case B

Based on the value of Fleiss' kappa in Table 14 it can be concluded that the raters have little difficulties in general to determine whether a misfit is actual or perceived for the Dynamics NAV implementation at company B. Also assigning a category to the actual misfits does not lead to

difficulties in general. When assigning a category to the perceived misfits, the kappa of 0.2202 indicates that the raters have more problems reaching an agreement about the category of a perceived misfit. For calculations see appendix H.

Table 14: Kappa values of case B.

Categorization	Kappa value	Type of agreement (Landis & Koch, 1977)
Actual/Perceived	0.6727	Substantial agreement
Actual misfit categories	0.6126	Substantial agreement
Perceived misfit categories	0.2202	Fair agreement

Both perceived and actual misfits were found at company B. Of the eighteen misfits identified, eight (44%) are perceived misfits and ten (56%) are actual misfits. Therefore evidence is found that proposition 1 is true for case B. See appendix C for details of every misfit and appendix I for the assigned category of every misfit.

Actual misfits

Drivers

Of ten actual misfits, five (50%) were caused in the deep structure elements, four (40%) were caused in the surface structure elements, and one (10%) was caused in the latent structure elements.

Solutions

Of the actual misfits, five misfits were solved by customizing the system. The reasons for customizations mentioned at B are:

- Obey legislation of local authorities;
- Keep working and communicating with the legacy system;
- Complete overviews and lay-outs.

Five misfits were solved via workarounds. Various reasons were mentioned to choose a workaround:

- Saving money: Because the functionality is only needed sometimes, it is too expensive to buy or customize this functionality;
- The functionality is sufficient, so no customization is needed;
- They are looking for a better solution meanwhile, so the workaround is temporary;
- Evading complexity.

Perceived misfits

Drivers

Of eight identified perceived misfits, six were caused by resistance to change, one was caused by ignorance, and one was caused by wishes. No perceived misfit was caused by ignorance leading to resistance to change and wishes leading to resistance to change. So, evidence is found for propositions 1a, 1b, and 1d and no evidence is found that supports proposition 1c and 1e.

Solutions

Of eight perceived misfits, only one was solved via a customization. For the other seven perceived misfits, either no solution was chosen, the misfit was accepted, or the business processes were adapted. The only customization was made so the users did not have to adapt.

7.3 CASE C

Table 15 contains a company profile and an overview of the interviews conducted and documentation used for case C. A complete elaboration of case study C, together with a summary of each interview can be found in appendix D.

Table 15: Company profile and interviews case company C.

Company profile – Company C		
Type of organization	Valuation firm	
Number of employees	210	
ERP system users	55	
Time after implementation	1 year and 10 months	
Interviews and documentation		
Code	**Function**	**Date**
Interviews		
3.1	Head IT of C	15-6-2012
3.2	Financial controller of C	15-6-2012
3.3	User planning and control department C.	27-6-2012
3.4	Consultant (ERP vendor)	22-6-2012
Documentation		
C1	Functional requirement document	15-1-2009
C2	Example functional design	June 2009
C3	Company information	15-6-2012
C4	Budget letter improvement Dynamics NAV project	13-2-2012
C5	Plan of action improvement Dynamics NAV project	8-7-2011
C6	Excel file with all issues and status during implementation and live phase.	June 2012

7.3.1 Description case C.

C is one of the leading valuation firms in the Netherlands and the world. C does valuations for two purposes:

- Insurance purposes;
- Economic valuation purposes.

Those two are the main businesses of company C (also in the ERP system). The two valuation purposes have different accounting principles. Insurance valuations concern the costs of an object when it has to be replaced. Economic valuations concern value of assets like buildings, machine parks, goodwill etc. Besides, C also has a department that is specialized in counter-expertise for the insured party. C has about 210 employees of which 55 active daily ERP system users. The strategy of C is to give an as good and independent valuation as possible for movable and immovable properties. C is not the cheapest valuation firm in the market, but they are known for their reliability and expertise. C mainly has large clients.

Adoption

C was using Exact for the counter-expertise part and had built its own system for the valuation part (both insurance and economic valuations). However, C executed the entire financial administration in Exact (also for the valuation part). The custom made system was started as a standardized ERP system fifteen years ago. During time this system was built more and more to C's specification.

According to the head IT, this system was outdated and too many customizations were made. The consultant states that C became too dependent on this custom made ERP system.

Implementation

The standard Dynamics NAV together with an industry-specific solution was implemented. This industry-specific solution is developed by the vendor and certified by Microsoft. The industry specific solution is developed for organizations working in projects for business services. According to the financial controller, the aim of the ERP system implementation was to make the ERP system leading and to have as less customizations as possible. The implementation took more than two years. Both deadline and budget were not met. The main reason for this was the development of customizations.

7.3.2 Conclusion case C

Based on the value of Fleiss' kappa in Table 16 it can be concluded that the raters have little difficulties in general to determine whether a misfit is actual or perceived for the Dynamics NAV implementation at company C. Also assigning a category to the actual misfits does not lead to difficulties in general. When assigning a category to the perceived misfits, the kappa of 0.2795 indicates that the raters have more problems reaching an agreement about the category of a perceived misfit. For calculations see appendix H.

Table 16: Kappa values of case C.

Categorization	Kappa value	Type of agreement (Landis & Koch, 1977)
Actual/Perceived	0.6415	Substantial agreement
Actual misfit categories	0.6790	Substantial agreement
Perceived misfit categories	0.2795	Fair agreement

Both perceived and actual misfits were found at company C. Of thirty two misfits identified, nineteen (59%) are perceived misfits and thirteen (41%) are actual misfits. Therefore evidence is found that proposition 1 is true for case C. See appendix D for details of every misfit and appendix I for the assigned category of every misfit.

Actual misfits

Drivers

Of thirteen actual misfits, eight (62%) were caused in the deep structure elements, four (31%) were caused in the surface structure elements, and one (8%) was caused in the latent structure elements.

Solutions

Of the actual misfits, eight misfits were solved by customizing the system. The main reason to customize was because functionality was missing in the industry specific standard. Three misfits were solved by accepting the misfit. The reasons for this was because customization is too expensive, customization is impossible (too expensive), and one unknown reason. Also two misfits were solved by buying other software. The functionality was present in Dynamics NAV, but because the functionality was poor, they decided to buy other software.

Perceived misfits

Drivers

Of nineteen identified perceived misfits, seven were caused by resistance to change, seven were caused by ignorance, four were caused by wishes, and one was caused by ignorance leading to resistance to change. No misfits were caused by wishes leading to resistance to change. So, evidence

is found in this case for propositions 1a, 1b, 1c, and 1d and no evidence is found that supports proposition 1e.

Solutions

Of nineteen perceived misfits, three were solved with a customization and two via a workaround. For the other fourteen perceived misfits, either no solution was chosen, the misfit was accepted, or the business processes were adapted. The reasons mentioned to customize for those perceived misfits were to keep users satisfied, and to let users work in the same way as before, so the user does not has to get used to a new way of working. However, the real reason behind this is unknown. The reason to create workarounds is to let the user work in the same way as before.

7.4 CASE D

Table 17 contains a company profile and an overview of the interviews conducted and documentation used for case D. A complete elaboration of case study D, together with a summary of each interview can be found in appendix E.

Table 17: Company profile and interviews case company D.

Company profile – Company D		
Type of organization	Waste processor	
Number of employees	330	
ERP system users	60	
Time after implementation	4 year and 7 months	
Interviews and documentation		
Code	**Function**	**Date**
Interviews		
4.1	Head IT of D	7-6-2012
4.2	System developer (A) of D	7-6-2012
4.3	System developer (B) of D (other system developer)	7-6-2012
4.4	Consultant	25-6-2012
Documentation		
D1	Report: IT alignment scan	9-2-2012
D2	Automation/Computerization policy 2010-2014	January 2010
D3	Company information	June 2012
D4	Excel file with all issues and status during implementation and live phase.	June 2012

7.4.1 Description case D

D was established in 1998. D is an organization that collects and processes waste for nine municipalities in the Netherlands. D also manages environmental parks in those municipalities and takes care of street cleaning, transportation, cycle activities, and gritting. Besides serving civilians in the nine municipalities, D helps organizations to manage their waste. The nine municipalities are shareholder of D.

D has about 330 employees, of which 60 active daily users of the ERP system. D uses the ERP system to support their business processes. D has an own software development department, consisting of three employees. This software development department has the knowledge to make customizations into Microsoft Dynamics NAV. The strategy of D is to do everything as cheap as possible. They aim at being as efficient as possible. D has contracts with the municipalities and has to

determine a budget for every municipality each year. The lower the costs, the better they perform. D does not aim to make profit, and wants to serve the citizens as good as possible.

Adoption

The main reason to adopt a new ERP system was because the old ERP system, named 'Clear' was outdated. During the ten years before implementation, the old ERP system was built exactly how the users wanted it. This led to a system with a lot of customizations, not performing efficiently anymore. Another reason was that D had a lot of separate computer systems, and wanted to have a more integrated information system. By implementing a new ERP system, D wanted to achieve consistency (insert data at one location) and efficiency (insert data once). The ERP system will not replace all legacy systems, but it will reduce the amount of systems.

Implementation

Together with standard Dynamics NAV and the industry specific module, a maintenance module was implemented. This industry specific solution is developed by the vendor and is certified by Microsoft. The implementation did not meet budget and time. The actual costs of the implementation were more than twice as high as the initial budget of 485.000 and the implementation was delayed approximately 1,5 years. The issue register of D shows more than 3000 issues requested by users, varying from small adjustments to big customizations.

7.4.2 Conclusion case D

Based on the value of Fleiss' kappa in Table 18 it can be concluded that the raters have little difficulties in general to determine whether a misfit is actual or perceived for the Dynamics NAV implementation at company D. Also assigning a category to the actual misfits does not lead to difficulties in general. When assigning a category to the perceived misfits, the kappa of 0.3165 indicates that the raters have more problems reaching an agreement about the category of a perceived misfit. For calculations see appendix H.

Table 18: Kappa values of case D.

Categorization	Kappa value	Type of agreement (Landis & Koch, 1977)
Actual/Perceived	0.6593	Substantial agreement
Actual misfit categories	0.8109	Almost perfect agreement
Perceived misfit categories	0.3165	Fair agreement

Both perceived and actual misfits were found at company D. Of sixteen misfits identified, six (35%) are perceived misfits and eleven (65%) are actual misfits. Therefore evidence is found that proposition 1 is true for case D. See appendix E for details of every misfit and appendix I for the assigned category of every misfit.

Actual misfits

Drivers

Of eleven actual misfits, seven (64%) were caused in the deep structure elements, three (27%) were caused in the surface structure elements, and one (9%) was caused in the latent structure elements.

Solutions

Of the actual misfits, nine misfits were solved by customizing the system. The reasons to customize the system are:

- Because the local authorities are obliging D to work in a certain way;

- Becoming more efficient;
- Complementing the functionality of the system.

D has its own system development department existing of three FTE's. Two misfits were solved via workarounds, because customizing was not possible.

Perceived misfits

Drivers

Of six identified perceived misfits, one was caused by resistance to change, two by ignorance, and three by wishes. No perceived misfit was caused by ignorance leading to resistance to change or wishes leading to resistance to change. So, evidence is found for proposition 1a, 1b, and 1d and no evidence is found that supports proposition 1c and 1e.

Solutions

Of six perceived misfits, three were solved by customizing the ERP system and one by creating a workaround. For the other two perceived misfits, either the misfit was accepted, or the business processes were adapted. The reasons mentioned to customize for those perceived misfits were because the user wanted it (but does not use it anymore), and to force employees to work in a certain way. The created workaround was initiated by the users.

7.5 CONCLUSION

This chapter showed an overview of the results for each individual case (details can be found in appendix I). Based on the results of each individual case, a cross case analysis is conducted in chapter 8.

8 CROSS CASE ANALYSIS

In this chapter the most noticeable results of each individual case are compared and analysed. Section 8.1 starts with the distribution of misfits between actual and perceived misfits. Section 8.2 focuses on the actual misfits. What are the causes of actual misfits for the four investigated SMEs and how and why were those actual misfits solved in a particular way. Section 8.3 focuses on the perceived misfits. What are the causes of perceived misfits, and how and why was a specific solution chosen. Also the propositions are analysed on whether the four cases provide evidence that supports each proposition or not. Finally, section 8.4 discusses the ease of making a distinction between actual and perceived misfits and assigning a category to actual and perceived misfits, based on the kappa values obtained during single case analysis. This chapter shows only the cross case results. The interpretation can be found in chapter 9, the discussion.

8.1 ACTUAL VS. PERCEIVED

All four cases show both actual and perceived misfits as can be seen in Table 19. Overall, the proportion of actual misfits across the four cases ranges from 41 percent to 67 percent, and the proportion of perceived misfits across the four cases ranges from 33 percent to 59 percent. Based on the four cases at least one out of three identified misfits has been categorized as a perceived misfit and is, according to the definition of this research, not a legitimate issue. In every case evidence has been found that supports proposition 1. So, perceived misfits occur during ERP implementations.

Table 19: Distribution between actual and perceived misfits in all four cases.

Case	Actual misfits	Perceived misfits	Total
Case A.	10 (67%)	5 (33%)	15
Case B.	10 (56%)	8 (44%)	18
Case C.	13 (41%)	19 (59%)	32
Case D.	11 (65%)	6 (35%)	17
Total	**44 (54%)**	**38 (46%)**	**82**

8.2 ACTUAL MISFITS

8.2.1 Actual misfit categories

All four cases show both deep structure misfits and surface structure misfits as can be seen in Table 20. In three out of four cases a latent structure misfit was found. The most prevalent cause of an actual misfit was in the deep structure (50-64%), followed by a misfit in the surface structure (27-40%), and the latent structure (0-10%).

Table 20: Distribution of actual misfit categories in all four cases.

Case	Deep structure	Surface structure	Latent structure	Total
Case A.	6 (60%)	4 (40%)	0	10
Case B.	5 (50%)	4 (40%)	1 (10%)	10
Case C.	8 (62%)	4 (31%)	1 (8%)	13
Case D.	7 (64%)	3 (27%)	1 (9%)	11
Total	**26 (59%)**	**15 (34%)**	**3 (7%)**	**44**

8.2.2 Resolution strategies

Deep structure misfits

When analysing the solutions chosen for deep structure misfits, one can see none of the case companies has chosen to accept an actual misfit for the most severe deep structure misfits (see top

part of Table 21). Overall, the solution of choice is customization (65%), followed by creating a workaround (31%), and process adaptation (4%). When looking at each individual case, the distribution of customization/workaround varies.

Table 21: Resolution strategy chosen for deep, surface and latent structure misfits.

Deep structure misfits					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	1 (17%)	2 (40%)	8 (100%)	6 (86%)	17 (65%)
Workaround	4 (66%)	3 (60%)	-	1 (14%)	8 (31%)
Accept misfit	-	-	-	-	-
Process adaptation	1 (17%)	-	-	-	1 (4%)
Total	**6**	**5**	**8**	**7**	**26**
Surface structure misfits					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	1 (25%)	3 (75%)	-	3 (100%)	7 (46%)
Workaround	-	1 (25%)	-	-	1 (7%)
Accept misfit	3 (75%)	-	3 (75%)	-	6 (40%)
Process adaptation	-	-	-	-	-
Buy other software	-	-	1 (25%)	-	1 (7%)
Total	**4**	**4**	**4**	**3**	**15**
Latent structure misfits					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	-	-	-	-	-
Workaround	-	1 (100%)	-	1 (100%)	2 (67%)
Accept misfit	-	-	-	-	-
Process adaptation	-	-	-	-	-
Buy other software	-	-	1 (100%)	-	1 (33%)
Total	**-**	**1**	**1**	**1**	**3**
Overall resolution strategy					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	2 (20%)	5 (50%)	8 (62%)	9 (82%)	**24 (55%)**
Workaround	4 (40%)	5 (50%)	-	2 (18%)	**11 (25%)**
Accept misfit	3 (30%)	-	3 (23%)	-	**6 (14%)**
Process adaptation	1 (10)	-	-	-	**1 (2%)**
Buy other software	-	-	2 (15%)	-	**2 (4%)**
Total	**10**	**10**	**13**	**11**	**44**

Surface structure misfits

Overall, the solution of choice to solve surface structure misfits is customizing the ERP system (46%), closely followed by accepting the misfit (40%). In only one instance, a workaround was created (7%) or other software was implemented (7%). This last solution was not mentioned by Soh et al. (2000) as a resolution strategy. Again when looking at each individual case, the distribution between the resolution strategies varies. For instance, case company D only solved surface structure misfits by customizing the ERP system, while company C did not choose to customize the ERP system for surface structure misfits at all.

Latent structure misfits

Only three latent structure misfits were found in the four cases. Two were solved via a workaround (67%) and one by implementing other software (33%).

Overall resolution strategy

When adding all resolution strategies of three different actual misfit categories (see bottom part of Table 21), one can see that the overall solution of choice to solve any kind of actual misfit is to customize the ERP system (55%), followed by creating a workaround (25%).

8.2.3 Reasons resolution strategy

In this subsection, the reasons mentioned to choose for customization, workarounds, accepting misfits, and implementing other software across the four cases are listed.

Customization

Table 22 contains an overview of the reasons mentioned in the four cases to solve an actual misfit by customizing the ERP system. Missing functionality is the reason most mentioned (three times), followed by obeying legislation (two times).

Table 22: Reasons mentioned to solve a misfit by customization.

Reason	Times mentioned
Functionality is missing	3
Obey legislation	2
Keep working with legacy system	1
Complete overviews and lay-outs	1
Become more efficient	1

Workaround

Table 23 contains an overview of the reasons mentioned in the four cases to solve a misfit by creating a workaround (manually or an alternative in the ERP system). The reason most mentioned is that the workaround offers an acceptable solution so customization is not needed (two times).

Table 23: Reasons mentioned to solve a misfit by creating a workaround.

Reason	Times mentioned
Acceptable solution, so customization is not needed	2
Saving money (functionality is only sometimes needed)	1
Temporary solution	1
Evading complexity	1
Customization not possible	1

Accept misfit

Two case companies have accepted at least one actual misfit. They both mentioned the same reason: Buying or customizing the functionality is too expensive.

Implement other software

One organization has solved two misfits by implementing other software. The functionality was present in Dynamics NAV, but poor functionality (and therefore missing functionality) was argued, which was solved by implementing other software. This resolution strategy is not mentioned by Soh et al. (2000).

8.3 PERCEIVED MISFITS

8.3.1 Perceived misfit categories

As can be derived from Table 24, perceived misfits are caused by resistance to change, ignorance, and wishes in all four cases. Only in two cases a perceived misfit was caused by ignorance leading to

resistance to change and in no cases perceived misfits were caused by wishes leading to resistance to change. Therefore, this last category is not discussed in the remainder of this chapter. Overall, the most prevalent cause of a perceived misfit is resistance to change (39%), closely followed by ignorance (32%), and wishes (24%). Only in two cases a misfit was found were ignorance led to resistance to change (5%). When looking at each individual case, the distribution between the different perceived misfit categories differs. For instance in company B, 75 percent of the perceived misfits were caused by resistance to change, while in company D only 17 percent of the perceived misfits were caused by resistance to change.

In all cases evidence has been found that supports propositions 1a (resistance to change), 1b (ignorance), and 1d (wishes). Only in two cases, evidence is found that supports proposition 1c (ignorance leading to resistance to change). In both cases one misfit belonging to this category was found. No evidence is found that supports proposition 1e (wishes leading to resistance to change).

Table 24: Distribution of perceived misfit categories in all four cases.

Case	Resistance to change	Ignorance	Wishes	Ignorance to resistance	Total
Case A.	1 (20%)	2 (40%)	1 (20%)	1 (20%)	5
Case B.	6 (75%)	1 (13%)	1 (13%)	-	8
Case C.	7 (37%)	7 (37%)	4 (21%)	1 (5%)	19
Case D.	1 (17%)	2 (33%)	3 (50%)	-	6
Total	**15 (39%)**	**12 (32%)**	**9 (24%)**	**2 (5%)**	**38**

8.3.2 Resolution strategies

For some perceived misfits an organization indicated that a perceived misfit was accepted, leading to the user compromising on his/her requirements. Sometimes no solution was mentioned by the case organizations. The result of both 'solutions' is the same, namely turning down the request of the user. However, the difference between those two resolution strategies is consciousness. A perceived misfit was accepted consciously. In case no solution was chosen this was done unconsciously.

Resistance to change

The top part of Table 25 shows that the overall solution of choice for perceived misfits caused by resistance to change is process adaptation (40%), followed by accepting the misfit (26%), customization (20%), creating a workaround (7%), and choosing no solution (7%). When looking at each individual case, the distribution of the solutions chosen varies.

Ignorance

Overall, the solution of choice to solve perceived misfits caused by ignorance is accepting the misfit (42%), followed by choosing no solution (33%), creating a workaround (17%), and customizing the ERP system (8%). When looking at each individual case, the distribution of the solutions chosen varies. Besides, the amount of misfits in this category also varies from 1-7 between the different cases.

Wishes

Overall, the solution of choice to solve perceived misfits caused by wishes is choosing no solution (45%), followed by customizing the ERP system (33%), creating a workaround (11%) and accepting the misfit (11%). When looking at each individual case, the distribution of the solutions chosen

varies. Besides, the amount of misfits in this category also varies from 1-4 between the different cases.

Ignorance leading to resistance to change

Of two cases where ignorance led to resistance to change, both perceived misfits were solved by choosing no solution.

Table 25: Resolution strategy chosen for resistance to change, ignorance, wishes, and ignorance leading to resistance.

Resistance to change					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	-	-	3 (43%)	-	3 (20%)
Workaround	-	-	1 (14%)	-	1 (7%)
Accept misfit	-	3 (50%)	1 (14%)	-	4 (26%)
Process adaptation	-	3 (50%)	2 (29%)	1 (100%)	6 (40%)
No solution	1 (100%)	-	-	-	1 (7%)
Total	**1**	**6**	**7**	**1**	**15**
Ignorance					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	-	-	-	1 (50%)	1 (8%)
Workaround	1 (50%)	-	-	1 (50%)	2 (17%)
Accept misfit	-	-	5 (71%)	-	5 (42%)
Process adaptation	-	-	-	-	-
No solution	1 (50%)	1 (100%)	2 (29%)	-	4 (33%)
Total	**2**	**1**	**7**	**2**	**12**
Wishes					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	-	1 (100%)	-	2 (67%)	3 (33%)
Workaround	-	-	1 (25%)	-	1 (11%)
Accept misfit	-	-	-	1 (33%)	1 (11%)
Process adaptation	-	-	-	-	-
No solution	1 (100%)	-	3 (75%)	-	4 (45%)
Total	**1**	**1**	**4**	**3**	**9**
Ignorance leading to resistance					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	-	-	-	-	-
Workaround	-	-	-	-	-
Accept misfit	-	-	-	-	-
Process adaptation	-	-	-	-	-
No solution	1 (100%)	-	1 (100%)	-	2 (100%)
Total	**1**	**-**	**1**	**-**	**2**
Overall resolution strategy					
	Case A.	**Case B.**	**Case C.**	**Case D.**	**Total**
Customization	-	1 (13%)	3 (16%)	3 (50%)	**7 (18%)**
Workaround	1 (20%)	-	2 (11%)	1 (17%)	**4 (11%)**
Accept misfit	-	3 (37%)	6 (31%)	1 (17%)	**10 (26%)**
Process adaptation	-	3 (37%)	2 (11%)	1 (17%)	**6 (16%)**
No solution	4 (80%)	1 (13%)	6 (31%)	-	**11 (29%)**
Total	**5**	**8**	**19**	**6**	**38**

Overall resolution strategy

When adding all resolution strategies of the four perceived misfit categories as can be seen in Table 25, one can derive the overall solution of choice to solve any kind of perceived misfit, which is to choose no solution (29%), followed by accepting the misfit (26%), customizing the ERP system (18%), adapting the process (16%), and creating a workaround (11%).

8.3.3 Reasons resolution strategy

In this subsection, the reasons mentioned to choose for customization and workarounds across the four cases are listed.

Customization

Table 26 contains an overview of the reasons mentioned in the four cases to solve a perceived misfit by customizing the ERP system. Customizing so the users do not have to adapt to something new is the reason most mentioned. Three out of four organizations have made at least one customization, of which two have made a customization so the users do not have to adapt to something new.

The underlying reasons behind the reasons mentioned in Table 26 to customize the ERP system, cannot be obtained from the collected data.

Table 26: Reasons mentioned to customize for perceived misfits.

Reason	Times mentioned
The users do not have to adapt to something new	2
To satisfy the users	1
Because the user wants the functionality	1
To force users work in a certain way	1

Workaround

The main reason mentioned to create a workaround in order to solve perceived misfits is letting the users work the same way they did before. One workaround was initiated by the users.

8.4 CATEGORIZATION

For each case three kappas were calculated to get an insight in the inter-rater agreement. As can be seen in Table 27, the Fleiss' kappa across all cases of categorizing a misfit as actual or perceived ranges from 0.5671 to 0.6727, with an average of 0.6352, which is a substantial agreement according to Landis and Koch (1977). The kappa across all cases of categorizing actual misfits into the subcategories ranges from 0.5778 to 0.8109, with an average of 0.6701. Again, there is substantial agreement about categorizing the actual misfits. The kappa across all cases of categorizing perceived misfits into the subcategories ranges from 0.2785 to 0.3165 with an average of 0.2737, which is a fair agreement according to Landis and Koch.

Table 27: Kappa values of all four cases.

	Case A.	Case B.	Case C.	Case D.	Average
Actual/Perceived	0.5671	0.6727	0.6415	0.6593	**0.6352**
Actual misfit category	0.5778	0.6126	0.6790	0.8109	**0.6701**
Perceived misfit category	0.2785	0.2202	0.2795	0.3165	**0.2737**

8.5 CONCLUSION

So to summarize, all four cases showed actual and perceived misfits, so evidence is found in all cases that supports proposition 1: Perceived misfits occur during ERP implementation. Of the actual

misfits, all categories of the framework (deep structure, surface structure, and latent structure) occurred during the implementation of Dynamics NAV at the four case companies. The most prevalent cause of an actual misfit occurred in the deep structure, followed by respectively a misfit in the surface structure, and latent structure. Overall, an actual misfit was solved mostly by customizing the ERP system (55%), followed by creating a workaround (25%).

Of the perceived misfits, the categories resistance to change, ignorance, and wishes, as proposed in section 6.3 (figure 14), occurred at all four cases during the implementation of Dynamics NAV. In all four cases, evidence is found that supports propositions 1a, 1b, and 1d. Only in two cases evidence was found that supports proposition 1c and no evidence was found that supports proposition 1e. Overall, a perceived misfit was solved mostly by choosing no solution (29%), followed by accepting the misfit (26%), customizing the ERP system (18%), adapting the process (16%), and creating a workaround (11%).

Overall, the five experts who categorized the identified misfits, had substantial agreement to determine whether a misfit is actual or perceived, and whether an actual misfit occurred in the deep, surface, or latent structure. The five experts only had fair agreement determining the category of a perceived misfit.

9 DISCUSSION

During the last two decades, ERP systems have become the standard for most organizations (Alizai & Burgess, 2010; Mabert et al., 2000). During the last decade, the development of an ERP system has moved more and more from in-house developed ERP systems towards packaged systems not developed for a specific organization. There is almost never an exact fit between the business processes of the organization and the standardized processes of the ERP system (Holsapple et al., 2005). However, the organizational fit of an ERP system is important for implementation success (Hong & Kim, 2002). Literature shows two main resolution strategies to solve misfits: customizing the ERP system or adapting the processes of the organization to fit the requirements of the ERP system (Davenport, 1998; Hong & Kim, 2002). Many studies (on large organizations) advocate that an ERP system should not be customized, because it is risky, costly, and leads to limited maintainability (Zach & Munkvold, 2011). According to Quiescenti et al. (2006) the strength of Small and Medium Sized Enterprises (SMEs) is having unique business processes, so adapting unique business processes to the standardized ERP system could be fatal for SMEs.

The purpose of this qualitative explorative study was to map the drivers of misfits between business and ERP systems within SMEs, and to understand how and why SMEs handle these misfits in a particular way. Little research has been done on these topics. By not having an understanding of the drivers of misfits, it is difficult to choose the right resolution strategy. This study also provides insight into the resolution strategy an SME chooses for a specific type of misfit and whether this solution corresponds with the solutions provided by literature for a specific type of misfit.

The cross case analysis of chapter 8 showed the results of the four cases together. These results will be interpreted in the discussion of section 9.1. Section 9.2 discusses the limitations of this research and the results found. Next, in section 9.3 recommendations are made for future areas of research, and towards organizations to better deal with misfits in ERP implementations. Finally, this chapter concludes what we have learned from this research and what the implications are (section 9.4).

9.1 DISCUSSION

The results will be discussed in the same order as chapter 8, so first actual vs. perceived misfits will be discussed (subsection 9.1.1). Next, the results of the actual misfits are discussed (9.1.2), followed by the results of perceived misfits (9.1.3). For both subsections the topics: drivers of misfits, resolution strategies, and reasons to choose for a resolution strategy will be discussed.

9.1.1 Actual vs. perceived

With few exceptions (Gattiker & Goodhue, 2005; Haines, 2009; Pries-Heje, 2006), no studies make a real distinction between actual and perceived misfits. The results of this study indicate that this distinction should be made. The five experts had little difficulties (substantial agreement) to determine whether a misfit was perceived or actual. So, evidence has been found that a distinction should and can be made between actual and perceived misfits, supporting proposition 1 (perceived misfits occur during ERP implementation).

An example of a study not making a distinction between actual and perceived misfits is the study of Sia and Soh (2007). They identified every request for change (RFC) as an actual misfit (over four hundred in total). It is not very likely that every RFC they have identified is an actual misfit. So, their results are based on misfits which probably are not all actual misfits.

9.1.2 Actual misfits

Of the identified misfits across the four cases, 41 percent to 67 percent is an actual misfit. Overall, more than half of the identified misfits is an actual misfit. All actual misfit categories of the framework (deep structure, surface structure, and latent structure) occurred during the implementation of Dynamics NAV at the four case companies. Therefore, it can be inferred that the 'actual part' of the extended analytical framework (Figure 15) is applicable for ERP implementations at SMEs, because all actual misfit categories were found in every case (excluding the latent structure misfit that was not found in case A). The five experts, who categorized all misfits, reached substantial agreement about the category of an actual misfit. This indicates that the different drivers of an actual misfit are clear and applicable.

Drivers of actual misfits

The most prevalent cause of an actual misfit was in the deep structure, followed by respectively a misfit in the surface structure, and the latent structure. There are two types of deep structure misfits: data misfits and process misfit. So according to the results, most misfits are the result of Microsoft Dynamics NAV not being able to capture various attributes or documents of the organization into the database (input misfit), or Dynamics NAV not being able to process the organizations procedures. According to Sia and Soh (2007) those deep structure elements are considered core. Not having the ability to insert certain data and process it in a certain way leads to major deficiencies. A possible reason of the occurrence of most misfits in the deep structure at every case organization is that SMEs acquire their strength from distinguishing themselves from competitors (Quiescenti et al., 2006). This requires a set of unique business processes (deep structure) that are not supported by the standard ERP system (and its industry specific standard). Organizations acquire this unique way of doing business in the deep structure elements rather than the surface or latent structure elements. For instance, company A wants to distinguish itself from competitors by being flexible (quickly switching and producing small batches). This can be obtained better by organizing the processes in a way that allows to be flexible, than by having unique invoices for instance.

During data collection, every case organization indicated that the output functionality of Dynamics NAV is very poor. This could explain a large part of the surface structure misfits found at each case organization.

Resolution strategies for actual misfits

Overall, actual misfits were solved mostly by customizing the ERP system (55%), followed by creating a workaround (25%). Both resolution strategies lead to achieving the required functionality, so it can be concluded that for most actual misfits (80%) the case organizations wanted to keep their 'unique' way of doing business. Only for some actual misfits (14%) an organization has chosen to accept a misfit, which means that an organization compromises on the requirements.

Customization

Many studies (on large organizations) advocate that an ERP system should not be customized, because it is risky, costly, and leads to limited maintainability (Zach & Munkvold, 2011). Yet, the case organizations solve most actual misfits by customizing the ERP system. Despite the disadvantages of customizing the ERP system, it seems that the case organization find it more important to obtain the missing functionality by customizing the ERP system and to keep their uniqueness. This corresponds with the reason most mentioned by the case organizations to customize the ERP system: because the

functionality is needed. Another mentioned reason is to obey legislation. So, the SMEs in this case study prefer solving misfits by customizing the ERP system mostly because they have to (obey legislation) or because they miss functionality. However, other factors could also play a role, like an own system development department and the culture of the organization (satisfying users). The market position of an organization could be a third factor. For instance company C is (one of) the leading valuation firm(s) in the Netherlands. In case you really know how to best conduct business, it could lead to customizations. If you are the best, why should you change your way of doing business?

Workarounds

Workarounds were mainly created to solve deep structure misfits. A workaround leads to having the required functionality without changing the business processes or customizing the ERP system. This seems a good solution when the functionality is really needed, but customization is too expensive. However, solving misfits by creating a workaround has some down sides. It seems that the benefits of these workarounds outweigh the disadvantages. The most cited reason to solve an actual misfit by creating a workaround is that it provides an acceptable solution, so customization is not needed. This indicates that a workaround is a cheap alternative for a customization.

Accept misfit

Only for surface structure misfits (output) an organization compromises on the requirements. This sounds plausible, because this functionality is often not crucial. The argument for all case companies to accept a misfit was that customizing or buying the functionality was too expensive. This indicates that this functionality is not core, since the case organizations have chosen to do it without this functionality.

Drivers vs. resolution strategies

The companies chose customization to solve deep structure misfits relatively more often, than for surface structure misfits. As already discussed in this subsection, achieving a competitive advantage happens mainly in the deep structure elements. Therefore, a deep structure misfit is only solved by customizing the ERP system or creating a workaround when a customization is too expensive, leading to not changing the unique business processes. According to Sia and Soh (2007), a deep structure misfit should be solved by customization or process adaptation. The results of this study show something else. 96% of the identified misfits in the deep structure were solved by either customizing the ERP system or creating a workaround. Thus, the conclusion is that this theory of Sia and Soh does not hold for the investigated SMEs.

Yen et al. (2011) state that customizations in the deep structures have larger implications than customizations in the other structures. Therefore it seems that organizations are willing to deal with these implications and that the benefits of the customization outweigh the disadvantages of the customization according to those organizations.

Only for surface structure misfits (output) an organization compromises on the requirements and accepts misfits. When not accepting a surface structure misfit, the case organizations wanted the functionality by customizing the ERP system. Sia and Soh (2007) state that surface structure misfits should be solved by creating a workaround, customization or process adaptation. Therefore, it seems that this theory of Sia and Soh does not hold for the investigated SMEs.

9.1.2 Perceived misfits

The amount of perceived misfits found across the four cases ranges from 33% to 59%, with an average of 46%. However, an interviewee with a lot of complaints about the ERP implementation could increase the percentage of perceived misfits, compared to someone who is supporting the implementation. For instance, the percentage of perceived misfits for case C was much higher than for the other cases. Does this depend on the people interviewed, or are there other reasons?

Drivers of perceived misfits

During the pilot case study three main drivers of misfits were found. All four cases show perceived misfits were caused by these main drivers: resistance to change, ignorance, and wishes, supporting propositions 1a, 1b, and 1d as can be seen in Figure 17. However, the mutual relationships between these perceived causes of misfits are less clear. When looking at these mutual relationships, only two cases showed evidence for proposition 1c (ignorance leads to resistance to change), and none of the cases showed evidence for proposition 1e (wishes leads to resistance to change).

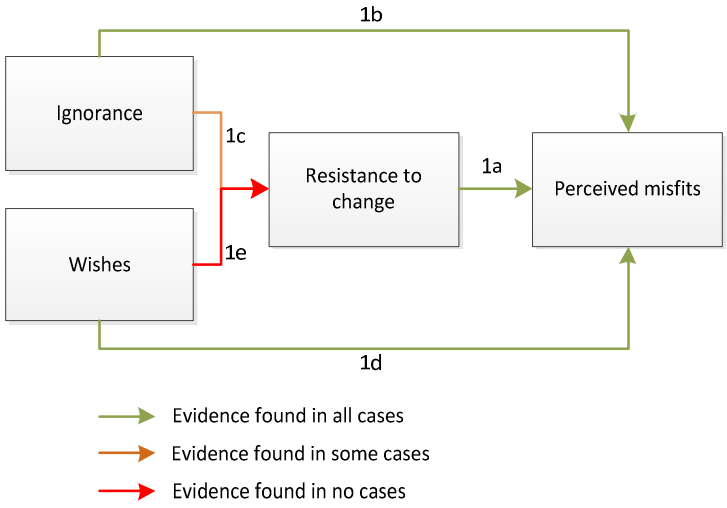

Figure 17: Evidence found for propositions.

The experts had difficulties to determine the category of a perceived misfit. So, it is possible to determine whether a misfit is an actual or a perceived misfit, but it becomes harder to select the perceived misfit category. A possible reason for this is that the mutual relationship between the categories (arrows 1c and 1e) was not clear to the five experts. Almost every perceived misfit is placed into one of the three main categories 'resistance to change', 'ignorance', and 'wishes' (propositions 1a, 1b, and 1d). Only three misfits were placed in a category leading to another category (propositions 1c and 1e). A possible explanation is that the experts only have chosen for the most obvious category. For instance when a perceived misfit has been caused by 'ignorance leading to resistance to change', it is possible that the raters assigned the perceived misfit to only one category (resistance to change or ignorance). Therefore, it cannot be precluded that propositions 1c and 1e are not true. However, this requires further research. So, the extension of the analytical framework with at least the perceived misfit drivers: resistance to change, ignorance, and wishes, seems a valuable extension. For the remaining extensions (propositions 1c and 1e) further research is required.

Overall, the most prevalent cause of a perceived misfit was resistance to change (39%), followed by ignorance (32%), and wishes (24%). However, the cause of a perceived misfit strongly depends on the

case companies. For instance, an organization with an aged workforce who have used the legacy system for a long time (for a young workforce with Dynamics NAV experience, probably the amount of perceived misfits would be much lower) or departments in an organization resisting the new ERP system (most perceived misfits identified caused by resistance to change). So, the amount and type of perceived misfits strongly depends on each individual organization.

The cause of each type of perceived misfit is difficult to determine based on the data collected. For instance, according to current literature, resistance to change can be prevented by having 'proper' change management as discussed in section 6.3. Data was collected about different aspects of the change management approach. In case an organization did meet all requirements of 'proper' change management it is still hard to conclude whether the change management approach was proper or not, because this depends on details like the skills of the trainer who trained the end users etc. So, the theory in section 6.3 just gives directions on how to prevent the different causes of perceived misfits and requires further research.

The fact that resistance to change is the most identified type of a perceived misfit, could be a lead that ignorance and wishes could lead to resistance to change, but the collected data is inconclusive.

Resolution strategies for perceived misfits

Overall, a perceived misfit was solved mostly by choosing no solution (29%), followed by accepting the misfit (26%), customizing the ERP system (18%), adapting the process (16%), and creating a workaround (11%).

According to the definition of a perceived misfit in this research (section 6.3), a perceived misfit is not an actual misfit, but only perceived as a misfit by the end user of the ERP system. So, a perceived misfit is not a legitimate issue leading to inefficiency or missing important functionality. Therefore, a perceived misfit does not require action in the form of customization or creating a workaround. Both these resolution strategies have disadvantages as discussed in section 4.2 and no advantages for perceived misfits, because the issue is a non-issue that does not have to be solved. So, in 29% of the cases a perceived misfit was solved by customizing the ERP system or creating a workaround which is superfluous. In case the studied organizations had identified misfits as perceived, they could have saved time, resources, complexities etc., because the reason of these misfits is the user and not the implemented ERP system. However, the reason most mentioned by the case companies why they have chosen to solve some perceived misfits by customizing the ERP system or creating a workaround, is that users do not have to adapt to something new.

9.2 LIMITATIONS

Although this study resulted in some interesting findings, there were several limitations to this study. First of all, the list of identified misfits is not exhaustive. It can be assumed that most actual misfits were identified, because these are legitimate issues leading to problems, which were mentioned during interviews and/or documented. The identified perceived misfits strongly depend on the interviewee. Besides, not every involved person of the implementation was interviewed. Therefore, not all perceived misfits could be identified, because these perceived misfits strongly depend on the interviewees and are often not documented. Therefore the amount of perceived misfits would be higher when interviewing all users of the ERP system. Both the level of actual misfits and perceived misfits varies. For instance, the calculation misfit (actual) at company A was an overarching misfit that contains multiple smaller misfits. So, the list of identified misfits is not exhaustive, but one can

assume that it gives a representative picture of the different types of misfits occurred at every case organization, because multiple parties and documentation were respectively interviewed and studied.

A second limitation is that the resolution strategy 'process adaptation' is underexposed in this research. During interviews (also in documentation), people mostly remember the other resolution strategies. When asking whether the processes were changed due to the ERP implementation, often the interviewees could only say that processes have changed in general, but could not give a concrete example. Therefore, most identified misfits in this study were solved by either accepting the misfit, creating a workaround or customizing the ERP system.

A third limitation is that the empirical part of this research does not address the impact of a customization. A customization could be very small and have a low impact, but it is also possible a customization is large and has a large impact. Therefore, it is important to keep in mind that not every customization is the same.

The fourth limitation is that the experts, who categorized the identified misfits, had brief information about each misfit. Therefore, categorization of a misfit was difficult sometimes. However, in case of doubt, more information was given and the category of the misfit became clear after discussion with the experts.

The fifth limitation is that it was hard to determine whether a misfit was a country-specific, industry-specific, or company-specific misfit as discussed in section 3.3. The aim of the misfit source is to determine whether a misfit arises because of voluntary or imposed acquired structures. Besides, the source of the misfit does not say whether a misfit is caused by voluntary or imposed acquired structures one on one. Therefore, the source of a misfit was out of scope in this research.

The final limitation of this study is the limited generalizability. Because the results of this study are based on only four cases at SMEs using MS Dynamics NAV, the findings cannot be generalized too all other SMEs. However, the part of perceived misfits was explorative and has given some directions for further research. Based on these results more targeted research can be conducted in the future.

9.3 RECOMMENDATIONS

Based on this research, it can be concluded that ERP implementations at SMEs involve perceived misfits and thus not all misfits are actual misfits. Organizations have to be aware of, and address perceived misfits. The problem of perceived misfits lies with the user (and not the ERP system) and therefore customization or creating a workaround is not needed. Therefore, organizations should accept perceived misfits. This could save the organization complexity issues and money.

As a result of this research, the vendors and developers of the industry specific solutions are recommended to make their solutions more flexible. All organizations studied in this research indicate that the financial part of Dynamics NAV (secondary processes) fit the organization really well, but the fit of the company-specific part was not as good. SMEs do not prefer to adjust their primary processes, so in case misfits occur in the primary processes, these are solved mostly by creating workarounds and customizations. By making the systems more flexible, less customizations and workarounds are required.

Based on this research's findings it becomes clear that the 'actual part' of the framework (Figure 15) is applicable. The 'perceived part' is a valuable extension. The drivers of perceived misfits identified in this research are resistance to change, ignorance, and wishes, but the mutual relationships are not clear yet. Further research is required to clarify the mutual relationships between the various causes of perceived misfits and to make the results of this study more generalizable. To know the cause of perceived misfits precisely, those causes can be combatted to prevent perceived misfits from occurring as much as possible.

Based on current literature (section 6.3), directions can be found on how to prevent perceived misfits. Further research is required to see whether those preventive measures really work or not, and thus what really causes each type of perceived misfits. For instance is there a relationship between the change management approach and the amount of resistance to change? Identifying those relationships is important to understand how perceived misfits can be prevented as much as possible.

9.4 CONCLUSIONS

The purpose of this multiple case study is to map the drivers of misfits between business and ERP systems within SMEs, and to understand how and why SMEs handle these misfits in a particular way.

A first important finding of this study is that not all misfits during ERP implementations are actual misfits. A part of the identified misfits are perceived misfits, where the problem lies with the user (and not the ERP system). Other studies investigating misfits, do not make a distinction between actual and perceived misfits. This study shows that organizations need to make a distinction between actual (legitimate issues) and perceived misfits (not legitimate issues), because different actions are required.

Two important causes of actual misfits were found in this research. The most prevalent cause of actual misfits during ERP implementations within SMEs is a difference between the deep structure elements of the organization and the ERP system. Deep structure misfits are data and process misfits. So, Microsoft Dynamics NAV is not able to capture various attributes or documents of the organization into the database (input misfit) or Dynamics NAV is not able to process the organizations' procedures. This research concludes that SMEs need missing functionalities in the deep structure elements and therefore solve deep structure misfits mostly by customizing the ERP system or creating a workaround. The second cause of actual misfits is a difference between the surface structure elements of the organization and the ERP system. So, Dynamics NAV does not meet the output requirements of the organization. Surface structure misfits are solved by either customizing the ERP system or accepting the misfit. The reason to accept an actual misfit is because customizing the ERP system is too expensive.

Perceived misfits during ERP implementations within SMEs are caused by resistance to change, ignorance, and wishes. However, the mutual relationships between those drivers of perceived misfits are not clear yet. Approximately two third of perceived misfits are not solved or accepted. One third of the perceived misfits are solved by customizing the ERP system or creating a workaround to satisfy the users. Because the problem lies with the user (and not the ERP system), no solution or accepting the misfit is required for perceived misfits, and therefore money and complexities can be saved.

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APPENDICES

- Appendix A – Case study protocol
- Appendix B – Elaboration pilot case study company A.
- Appendix C – Elaboration case study company B.
- Appendix D – Elaboration case study company C.
- Appendix E – Elaboration case study company D.
- Appendix F – Manual categorization
- Appendix G – Fleiss' kappa
- Appendix H – Kappa calculations
- Appendix I – Detailed results single case analysis

APPENDIX A – CASE STUDY PROTOCOL

1 Overview of the case study project

The issue to be solved in this research is to map the drivers of misfits between business and ERP systems within SMEs, how SMEs handle these misfits and why they have chosen this solution. To identify the drivers and impacts of misfits between business and ERP within SMEs, first needs to be discussed what misfits are, which types of misfits exists and how they can be measured. It is also important to give an answer on the question which drivers exist in general according to current literature. The question next is how each type of misfit can be solved and which general resolution strategies exists in literature. After it is clear what current literature says about these topics, this theory can be applied to SMEs. SMEs differ from LEs in some fundamental ways. It is therefore important to know what the differences are between SMEs and LEs for implementing an ERP system. By conducting a multiple case study it has to become clear what the drivers of misfits are within SMEs. Next, an answer is needed on the question on how SMEs solve the misfits they encounter, and why they have chosen this solution.

Theoretical framework

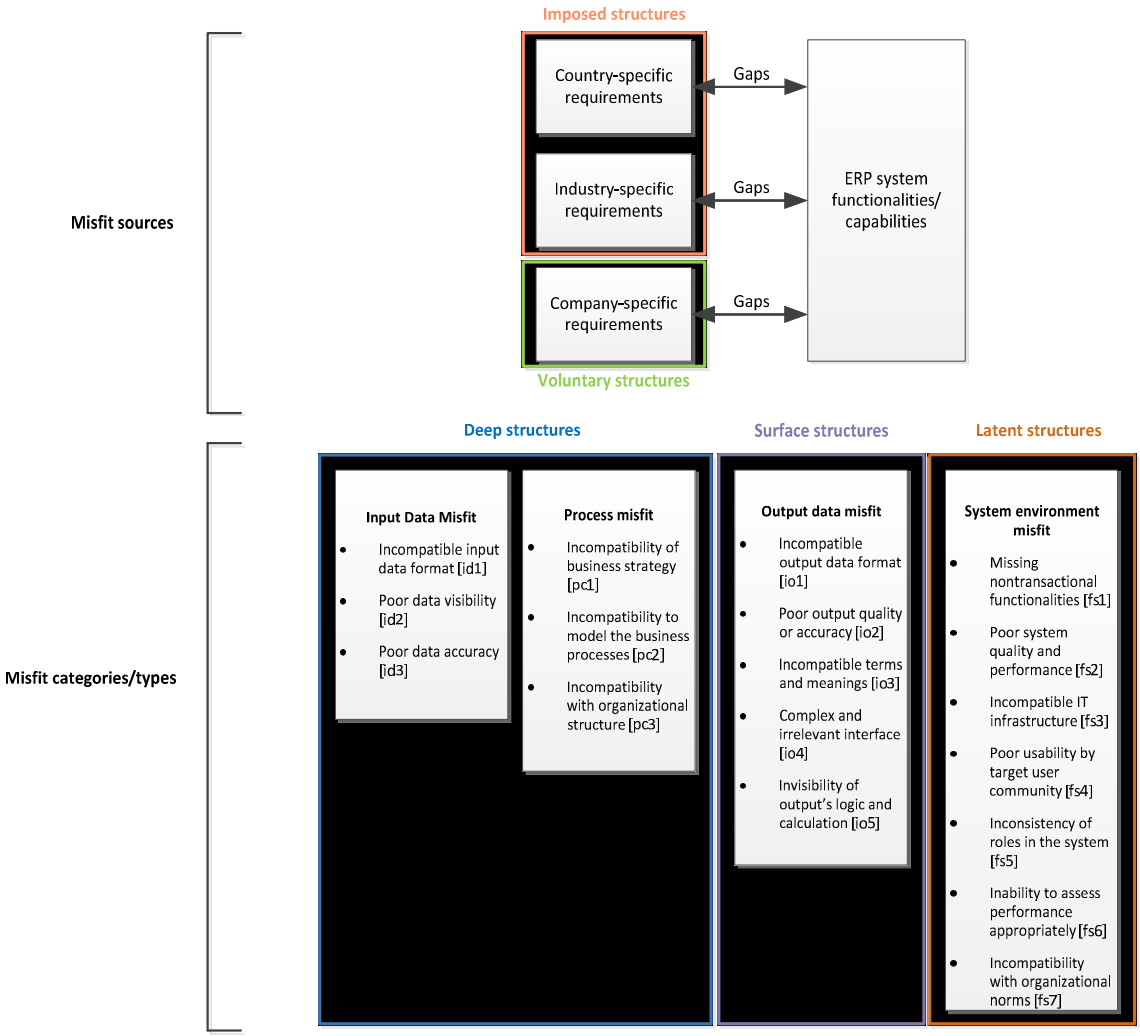


Figure 18: Misfit framework.

2 Field procedures

Selecting case study site

Each case study site should fulfil the following requirements:

- Microsoft Dynamics NAV should be implemented recently (within 5 years);
- The implementation should be finished;
- The organization has to be a Dutch SME with at least ten daily active users of the ERP system;
- The organization should have faced some degree of misfits.

Contact case study site

After the cases are selected, a case study site can be contacted after allowance of the accompanying representative of BDO. The first contact should be made by someone of BDO who has contacts within the organization. This representative could also tell the names of persons who are interesting to speak with.

After the representative of BDO has given allowance, an appointment can be made by calling the interviewees. After the appointment is made, the letter below can be mailed to the interviewees in order to confirm the appointment, inform them again about the subject, and give them a chance to prepare for the interview.

Beste [naam interviewee],

Via [naam accountmanager] heb ik vernomen dat u tijd vrij wilt maken voor een interview. Alvast hartstikke bedankt hiervoor! Hierbij bevestig ik de telefonisch overeengekomen afspraak op [DATUM + TIJD]

Ik zal mezelf even kort voorstellen: Mijn naam is Joost van Beijsterveld en ik studeer Information Management aan de Universiteit van Tilburg. Momenteel ben ik bezig met het schrijven van mijn afstudeerscriptie. Hiervoor doe ik onderzoek naar hoe MKB bedrijven zijn omgegaan tijdens de implementatie met missende functionaliteit, of juist functionaliteit in het systeem die je zaken oplegt die je eigenlijk niet wil (Dit noem ik misfits). Hierbij maak ik onderscheid tussen of iets echt een misfit is, of dat het zo door de gebruiker wordt gezien (door weerstand, gebrek aan kennis e.d.).
Voor dit onderzoek voer ik een casestudy uit door voor verschillende bedrijven in kaart te brengen hoe de implementatie is verlopen en welke misfits men is tegengekomen. [BEDRIJFSNAAM] is één van de cases die ik hiervoor gebruik. Voor [BEDRIJFSNAAM] ben ik uiteindelijk op zoek naar een lijst misfits en hoe iedere misfit is opgelost (Is het ERP systeem aangepast, of juist het bedrijfsproces). Door middel van interviews met verschillende partijen en het bestuderen van documentatie wil ik deze lijst zo compleet mogelijk krijgen.

De onderwerpen die ik tijdens het gesprek wil bespreken zijn:

- Keuze voor nieuw ERP systeem: Waarom is er gekozen voor een nieuw ERP systeem?
- Selectie: Waarom gekozen voor Dynamics NAV?
- Implementatie zelf
- Fit: Heeft het systeem tekortkomingen, of legt het zaken op die je niet zou willen? Hoe is dit opgelost (door maatwerk of door bedrijfsprocessen aan te passen?
- Inefficiëntie: Leidt Dynamics NAV tot inefficiëntie van de bedrijfsprocessen?
- Veranderingen aan bedrijfsprocessen: Wat is er allemaal veranderd aan de bedrijfsprocessen van [BEDRIJFSNAAM] door de implementatie van Dynamics NAV (veel/weinig).
- Maatwerk: Waarvoor is er maatwerk geleverd?

- Voordelen: Tot welke voordelen heeft het systeem geleid? Waren deze voordelen vooraf allemaal voorzien?
- Change management: zijn de gebruikers betrokken bij de implementatie, zijn de gebruikers ondersteund, is er training geweest etc.
- Kennis Dynamics NAV: Wat is het kennisniveau van de gebruikers omtrent Dynamics NAV en worden alle functionaliteiten gebruikt?
- Is er extra gewenste functionaliteit niet genomen?
- Wordt er nog buiten het systeem om gewerkt?

Dit is in hoofdlijnen waar ik het over wil hebben. Ik heb gedetailleerdere vragen voor mezelf opgesteld, welke tijdens het gesprek aan bod zullen komen. Mochten er vooraf nog vragen zijn, dan hoor ik deze graag.

Nogmaals alvast ontzettend bedankt voor jullie tijd.

Met vriendelijke groet,

Joost van Beijsterveld

Resources
The resources needed for each interview are:

- Separate room;
- Notepad;
- Pen;
- Voice recorder.

Verification
After an interview is finished, a report about the interview should be made and sent to the interviewee. The interviewee has to approve the content of the report.

Classification of misfits
Not all misfits can be mapped for each case study. However, the misfits found during the case study have to be classified according to the theoretical framework. Because this categorization fully depends on the research, at least one other colleague of BDO should categorize the misfits found. The percentage of matching categories is an indicator about the precision of the categorization. Differences should be discussed.

Schedule
The report about each interview should be finished within one working day and sent back to the interviewee. After all data is collected, the final case report should be written within five working days.

Data management
Each case has its own number. The first case is '1', the second case '2' etc. Each interview for a case has a sub number. Interview 1 of case 2 is '2.1' etc. For each case, a separate physical and digital folder should be created. The physical folder contains all notes taken during the interviews, the approved reports for each interview, and the accompanying documentation which should be

labelled. The digital folder contains all versions of the reports for each interview, the voice memo's, and all documentation.

Based on the data described above, a final report of each case can be made, after which cross-case conclusions can be drawn.

3 Case study questions

Level 1 questions (asked of specific interviewees)

Organisatie

- Wat voor bedrijf is X?
- Hoe levert X waarde aan de klant?
- Product, maatwerk/standaard?
- Wat is de strategie van X?
- Wat zijn de strategische processen van organisatie X?
- Wat is de omvang van X?
- Aantal gebruikers ERP systeem?
- Waarvoor gebruiken ze het ERP systeem?
- Wie zijn de gebruikers van het ERP systeem?

Algemeen

- Zijn er nog oude procesbeschrijvingen?

Adoption decision

- Welk systeem werd vervangen en waarom?

Acquisition

- Waarom is er gekozen voor Dynamics NAV?
- Hoe hebben jullie het selectie traject doorlopen en hadden jullie daarbij oog voor misfits?

Implementatie

- Wanneer heeft de implementatie plaatsgevonden?
- Wanneer is de implementatie gestart/afgerond (doorlooptijd)?
- Heeft er vertraging plaatsgevonden tijdens de implementatie? Zo ja, waardoor?
- Is het implementatieproject binnen budget gebleven?
- Wat was de scope van de implementatie?
- Wat is er precies geïmplementeerd? Welke modules?
- Wie waren er bij de implementatie betrokken?
- Tegen welke problemen is er aangelopen tijdens de implementatie?

Change management

- In welke mate zijn de gebruikers betrokken bij de implementatie?
- Vanaf wanneer zijn de gebruikers betrokken bij de implementatie?
- In hoeverre hebben gebruikers inspraak gehad bij de inrichting van Dynamics NAV?
- Hebben de gebruikers trainingen gehad?
- Hoe en wanneer zijn de gebruikers geïnformeerd over beslissingen die hebben geleid tot veranderingen?
- Zijn de gebruikers ondersteunt tijdens de implementatie? En hoe (handleidingen bijv.)?
- Hoe was het management betrokken bij de implementatie?

- Zijn de gebruikers op de hoogte gebracht van de voor- en nadelen van de verandering? Hoe en wanneer?
- Zijn de gebruikers op de hoogte gesteld van de functionaliteiten van Dynamics NAV? En hoe?
- Hoe stonden de gebruikers tegenover de verandering?
- Was er veel weerstand onder de gebruikers?
- Hoe is met weerstand omgegaan?
- Is de werkwijze van de gebruiker veel veranderd?
- Zijn er onterechte klachten geweest over het systeem? Hoe zijn deze opgelost?

Kennis Dynamics NAV

- Wat is het kennisniveau van de gebruikers van Dynamics NAV?
- Lopen jullie nog tegen zaken aan die anders zouden kunnen, maar je weet niet hoe het moet met Dynamics NAV?
- In hoeverre zijn jullie nog afhankelijk van een consultant?

Livegang

- Doet het nieuwe systeem hetgene dat vooraf beloofd was?
- Heeft het nieuwe systeem tot onverwachte voordelen geleid?
- Zijn er ook functionaliteiten die jullie extra zijn gaan gebruiken door de implementatie van Dynamics NAV?
- Zijn er na de implementatie nog problemen naar voren gekomen?
- Zijn er nieuwe procesbeschrijvingen gemaakt?

Fit

- Voldeden de processen in Dynamics NAV aan alle eisen van de processen binnen de organisatie?
- Legt het nieuwe systeem de gebruiker extra handelingen op, waardoor bedrijfsprocessen minder efficiënt wordt?
- Biedt het systeem extra functionaliteiten die niet gebruikt worden?
- Had het systeem tekortkomingen in functionaliteit?
- Voldoet de output van Dynamics NAV?
- Zijn er problemen met de invoer van data?

Process adaptation

- Welke processen/stappen zijn veranderd na invoering van het nieuwe systeem?
- Waarom zijn de processen aangepast?
- Heeft het veel tijd en moeite gekost om de bedrijfsprocessen aan te passen aan het ERP systeem?
- Is er extra gewenste functionaliteit niet genomen? En waarom niet? (Bijv. zaken moeten laten vanwege te hoge kosten)
- Werkt de gebruiker nog buiten het systeem om?
- Zijn er workarounds buiten het systeem om?
- Zijn er door de implementatie Excel sheets of oude systemen verdwenen?
- Worden er nog Excelsheets en/of andere systemen gebruikt na de implementatie?
- Zijn er tekortkomingen in functionaliteit gewoon geaccepteerd?

ERP adaptation

- Hoe zijn tekortkomingen in functionaliteit van het systeem opgelost?
- Waarom maatwerk en niet deze functionaliteit in Dynamics NAV gebruikt?
- Is er iets aan de broncode van het systeem aangepast?

- Zijn er zaken aan het systeem gebouwd (bolt ons)?
- Was er wet- en regelgeving, of eisen vanuit een brancheorganisatie die niet door het systeem ondersteund werden? (Was deze wet- en regelgeving ook van toepassing op andere organisaties in het zelfde land/branche)
- Zijn er invoervelden toegevoegd?
- Zijn er standaardrapporten aangepast? Zo ja, is hierbij de broncode veranderd?

Overige oplossingen

- Zijn er workarounds in het systeem of handmatig?
- Zijn er misfits geaccepteerd? En waarom?

Zijn er de volgende documenten?

- RFC
- Issue logs
- Selectiecriteria voor Dynamics NAV
- MoSCoW list?
- Procesbeschrijvingen (voor en na de implementatie)
- Nog meer documentatie?

Level 2 questions (Questions asked of the specific case)

- What kind of organization is it?
- What was the driver to implement a new ERP system?
- Why is Dynamics NAV selected?
- How did the implementation go?
- How was the fit between Dynamics NAV and the business processes?
- Which misfits occurred during implementation and the live phase?
- What were the drivers of the misfits?
- How were the misfits solved?
- What is the knowledge level about Dynamics NAV of the employees?
- Was there resistance to change and how has this been managed?

Level 3 questions (Questions asked of the pattern of findings across multiple cases)

- What were the most common drivers of misfits?
- What were the drivers of the perceived misfits?
- What were the drivers of the actual misfits?
- How was each misfit type solved?
- Why was chosen for this solution?

4 Case study report

- Introduction
- Literature review
    - ERP Sytems
    - Misifts
    - Solutions
- Case study design
- Pilot case study

- Other cases
- Cross case analysis
- Discussion
- Conclusion
    - Limitations
    - Future research

APPENDIX B – ELABORATION PILOT CASE STUDY COMPANY A

Interviewees:

- External project manager;
- ERP Vendor;
- Consultant;
- Head IT of A;
- CFO of A;
- CEO of A.

1 Description company A.

Company A. is a manufacturer and trader of flexible conduits and hoses for various applications. Examples are the metal hoses in phone booths. This all is partially a standardized product, but on customer specification, hoses and conduits can be custom made. The custom made product concerns the combination of various items (i.e. hose with a specific connector), the development of a completely new product, and cutting a hose or conduit to the right size.

A. has about 50 employees, of which 20 users of the ERP system Dynamics NAV. They use this ERP system mainly to automate processes and process data. The CEO uses the ERP system for some overviews. He is interested in the revenues of each product group and country. Based on this information he can make decisions.

Strategy A.

A. distinguishes itself from competitors by being flexible (quickly switching and producing small batches), offer a great variety of solutions (whatever the customer wants), and quickly respond to the market. A. has long enduring relations with its customers (common in the industry). Therefore it is very hard to gain new customers.

There are two types of conduits and hoses. Conduits and hoses for electrical products, and conduits and hoses for fluids and gasses. Because the conduits and hoses for electrical products have a larger margin and brings along less risks, A. focuses more on these types of conduits and hoses. Within this type of conduits and hoses, A. produces both products from its catalogue, and products on customer specification. Producing something on customer specification includes designing, calculation, testing, and offering.

2 Adoption

A. had a custom made ERP system that has been used and adjusted since about 25 years. An IT-employee had developed this system and he maintained the system. Based on the requirements of the system users, the system developer has built the system and added functionality over time. A. completely depended on the system developer, because he was the only one who knows how the system is built, works, and how to maintain the system. Because the system developer retires within a few years, A. needed a new ERP system which could be maintained by other people.

During interviews with the CEO and CFO of A. other reasons to adopt a new ERP system came up. The CFO mentioned that the old system was getting outdated on some aspects. For instance, with the old ERP system every overview had to be printed instead of viewing it on a screen. The CEO also mentioned this reason and said that some additional functionality was required. For instance sending invoices as a pdf-file. He also mentioned that in the old ERP system it was not easy to navigate

through the system. They had to open a separate window for inventory, customers, orders and so on. By adopting a new ERP system, they wanted to have a system which is more a whole.

The CEO has mentioned a third reason, which is to replace multiple legacy systems by one complete ERP system. An example he mentions is integrating the barcode scanning system into Microsoft Dynamics NAV.

3 Acquisition

A. has conducted its own ERP selection. Based on a list of requirements (which is not available anymore), they first made a long list, followed by a short list. The short list consisted of:

- SAP Business One;
- Microsoft Dynamics NAV;
- ISAH 7 in combination with Account-View.

During the interviews, it became obvious that SAP was not the ERP system A. was looking for. Therefore, ISAH 7 and Dynamics NAV where remaining, of which A. has chosen for Dynamics NAV.

Remarkably, all three interviewees of A. indicate that ISAH 7 was the best fitting ERP system. This system is specifically developed for manufacturing companies. However, they have chosen for Dynamics NAV, because ISAH is a Dutch ERP vendor which is much more smaller than Microsoft. In order to not take any risk, they have chosen for Dynamics NAV. All key users were involved in making this decision.

Next, they went to Microsoft to find an implementation partner. Microsoft came up with some vendors and in the end A. has chosen for vendor G. Based on the requirements of A, G. has indicated that Dynamics NAV is a suitable solution for A.

4 Implementation

The implementation started in February 2010. A. had attracted an external project leader for the implementation. A. wanted to avoid customizations, because they do not want any problems with future updates. Therefore, the plan was to implement standard Dynamics NAV. According to the vendor, manufacturing companies face several misfits when implementing Dynamics NAV. Therefore, besides Dynamics NAV they have also implemented an industry specific bolt-on. This bolt-on can also be seen as a standardized piece of software and is certified by Microsoft. Besides this industry specific standard, a bolt-on for hour registration and purchase invoices was implemented

The idea of A. was to put the functionality of the legacy system in Dynamics NAV. This should lead to working the same way in the new ERP system. During the live phase, when the users are familiar with Dynamics NAV, they wanted to add functionality over time. The vendor had the same idea and calls it “het oude ERP system in een Dynamics NAV jasje steken”. During implementation it became clear that this was not possible, because the two systems differ too much. Therefore the new idea was to make Dynamics NAV leading, which has led to some process improvement, which was not intended at first.

Budget overrun and delay

The implementation was delayed and considerably there was a budget overrun. The CEO indicates that the costs of the new ERP implementation were more than twice has high as estimated.

According to the CFO the total direct costs were around €350.000. The consultant indicates that the duration of the implementation project was much longer than for similar organizations. From documentation can be derived that the live phase was postponed a couple of times. In July 2010, the planning was to go live in October 2010. In December 2010, the planning was to go live in January and so on.

According to all parties, the major reason for the delay was the customization of the calculation functionality. The standardized calculation functionality of the industry specific standard was insufficient. During implementation it became clear that customizations were needed. The consultant and the people of the implementing organization indicate that the delay is due to continue improvements that had to be made to the customization of the calculation functionality. The people of the engineering department had specific requirements which programmers of the vendor have built. Based on this deliverable, A. had additional requirements which had to be built again. Because the programmers had filled their calendar meanwhile, they could built the new requirements after a couple of weeks. This went on and on. According to the interviewees of A. and the consultant, the engineering department of A. went at some point to far.

Another often mentioned reason for the delay is that the users moved the testing work aside and did not understand the new ERP system. The aged workforce had difficulties getting used to the new ERP system, and also had not much time to work with the system, because A. had a lot of orders to process.

The consultant indicates a third reason for the delay. He says that all communications were going via the Head IT. Instead of contacting a key-user, the Head IT had to be contacted, which contacted the key-user. This resulted in a bottleneck which made it hard to do multiple things at the same time.

Configuration
The configuration had a duration of about six months and went well.

5 Change management

Change management checklist:

- User training and education: Directly at the beginning of the implementation, the key users have followed a Dynamics NAV training. This training was a basic training of Dynamics NAV for a bicycle manufacturer. According to the CFO the users were not attracted by this example at all. All three interviewees of A. indicate that A. has an aged workforce who have difficulties using software like 'Word' and 'Excel'. This is supported by documentation like meeting minutes. For those people a basic training is not sufficient. Also because it was never clear when the system was going to be live, the training of the users had taken place more than a year before going live. Meanwhile they had forgotten everything about the new system.
- Achieve commitment of users and users should understand the benefits and drawbacks:
    - Together with the key-users, A. had chosen for Dynamics NAV. Some had the preference for ISAH 7, but where convinced by the arguments to choose for Dynamics NAV.

    - Because the years during the implementation project were very busy for A. most users did testing next to their job and did not take it very seriously. This indicates that they were not aware of the importance of the project.
    - According to the interviewees of A. and the consultant, the attitude of people was “we will see what will come” (we zien het wel). They could be more driven.
    - The external project leader came by once a week and had difficulties dealing with the type of people of A. According to the CEO his people need continuous guidance, which cannot be given by being present once a week.
    - According to the external project leader, the benefits of Dynamics NAV were shared but not understood by some employees.
- Users have to be informed: Users were informed in the beginning about the new ERP system. According to the external project leader and the Head IT, clear decisions about which procedures to follow were not made by the management. This led to ambiguities. The Head IT gives an example of the logistic process. For this process the standard process of Dynamics NAV was followed. However, this was not communicated to the employees of the logistics department, resulting in employees who do not know how to do their work in the new situation.
- Involve users in the system design: For the calculation functionality, the users were involved in giving requirements. For the configuration, the key-users were involved.
- Support users: Because the users had difficulties using Dynamics NAV, the consultant had made demo-scripts. These scripts exactly tell a user what to do (every click). Besides these scripts, consultants of the vendor have guided the users one by one.
- Build management commitment:
    - Management was aware of the importance of the implementation of a new ERP system. They were all involved in the selection of Dynamics NAV. However, the CEO tells he was standing on the side line at first. After the external project leader had gone, he became the project leader and interfered. He prepared a separate testing room, where users had to test (which became mandatory) and could not do their work meanwhile. The consultant agrees with this and says that the real management commitment came when the CEO had taken the lead.
    - The consultant mentioned that the logistic manager walked away at the start of the implementation project with the argument that it was “not his thing”. The interviewees of A. did not mention this.

6 Misfits

1. **Calculation:** The biggest misfit according to all interviewees is the calculation functionality, which is a deficiency in the standard ERP solution. Despite that the industry specific standard (which has calculation functionality) was implemented, A. missed important functionality. According to the consultant and the vendor the requirements set by A. were mainly justified. When A. makes a calculation, it wants to have an overview which shows the connections between calculation, selling order, and production order. They also want to elaborate on every detail (machine hour/man hour/materials/planning/ scrap percentages etc.) in the calculation so they can convert it easily to a production order. According to all interviewees, this functionality was not in the standardized software.

2. **Complex calculation**: According to the Head IT, the people of the engineering department still use the old system for complex calculations, because they argue that this is faster.
3. **Overview:** However, the consultant indicates that the users went too far in getting the system to do what they exactly want. For instance, they want to insert some information in a specific screen, where Dynamics NAV let the user insert the same information in another screen.
4. **Time registration:** A manufactured product consists of various parts. Dynamics NAV demands the user to enter the operation time for every part. However, A. does not keep track of the operation time for each part, but only for the complete product. It is not possible in Dynamics NAV to enter the operation time for a complete product, because Dynamics NAV calculates this based on all operation times for the parts.
5. **Invoicing:** According to the interviewees of A, it is very hard to make corrections in the system. It often occurs, that afterwards transportation costs, amounts, products etc. should be added/corrected. This was easier in the old situation and increased the time spent to invoicing from two hour a day to 6-8 hours a day. The Head IT gives an example that it is very hard with Dynamics NAV to send goods to Russia, but the invoice to China. The consultant of the vendor indicates that Dynamics NAV forces the organization to input data correctly at the start of the process (invoice and order), leading to less work for invoicing. However, the users of the invoicing department of A. keep working the same way as before the ERP implementation, which involves a lot of checking and correcting. During interviews it became obvious that the users do not know how to easily correct data on the invoice. This checking and correcting is time expensive.
6. **Order statistics:** With Dynamics NAV it is not possible to make information for incoming orders, as they have always done. For instance, to calculate the amount of transportation costs at the end of the year and including these costs in the selling prices of the products in the new year.
7. **Declarations agents:** In the agent administration it is not possible to insert declarations.
8. **Tender:** According to the Head IT, the employees of A. who make tenders for manufacturing goods, do not use the functionality of Dynamics NAV anymore, but make Tenders the old way: in Word. They do this because they argue that it is too difficult to change things on a Tender, leading to spending too much time on entering a Tender.
9. **VAT posting groups:** Dynamics NAV imposes employees of the administration department to use all VAT posting groups (BTW boekingsgroepen). Those posting groups are not needed, but not using them leads to errors.
10. **Budget list:** According to the CFO it is not possible to obtain a budget list directly from the system. This budget list is needed to obtain an overview of the remaining budgets for each running project.
11. **Building reports:** A is missing a tool which makes it possible to build or change reports themselves. The Head IT has followed a training report building to use the report building functionality of Dynamics NAV, but according to him this is way too complex. The consultant agrees with this and states that it is only possible for experienced consultants to build reports with Dynamics NAV 2009. He also mentions that it is pure programming to do something with a report. In case A wants to build or change a report they have to hire a consultant. However, A wanted to do this themselves.

12. **Credit note:** When a credit note is made for returned goods, the goods are automatically added back in stock by the system. This should not be done for returned goods which are broken.
13. **Negative stock:** It is possible to have negative stock in the current configuration of Dynamics NAV at A, which A. does not want. Because of this, they manually check for every order whether there is enough in stock.
14. **Stock per country:** Within Dynamics NAV it is not possible to show the stocks per country.
15. **PDF-files:** A. wanted to have the possibility to send invoices, orders, tenders etc. as a pdf-file with the new ERP system. This functionality was not possible with the old ERP system. The CEO of A. indicates that this was one of multiple drivers to adopt Microsoft Dynamics NAV, because Dynamics NAV should have this functionality. However, this functionality is not standard in the basic version of Dynamics NAV. A. later decided not to buy this functionality, because the additional module for the pdf-file functionality was too expensive.

All interviewees agree that a lot of problems occur because the lack of knowledge about Dynamics NAV within A. They state that having more knowledge about the possibilities of Dynamics NAV would lead to a more efficient use of the ERP system and less problems.

The CEO said this: *"Het zal allemaal wel beter worden, want het zit er allemaal in natuurlijk, maar je moet het eruit halen".*

7 Solutions

Customization

- Calculation: The calculation module is customized to the requirements of A.
- Stock per country: The consultant has made it possible to show the stocks of Italy and the Netherlands separately.

Workaround

- Declaration agents: They have found another way to register the declarations of the agents.
- Budget list: Via the general ledger it can be accessed.
- Negative stock: They manually check whether a product is in stock.
- Credit note: They check by hand whether the returned goods should be added to the stock and if needed, they correct it.
- Time registration: It is not possible to keep track of the time used on complete product level. A. uses one part of the complete product to enter the total time needed. In the system this leads to making big loss on that part and large gains on the other parts. However, at the end the result is the same.

Accept

- Order statistics: They do not use it anymore.
- Building reports: It is not an option to customize a report builder, so A. has accepted that every time a report needs to be built or changed, it has to order a consultant.
- PDF-functionality: Because this was not in the standard. A. has chosen to not buy this functionality, because it is too expensive.

Business processes

- VAT posting group: They now use all VAT posting groups.
- According to the interviewees of A. the business processes have changed a lot, because mainly the business processes of Dynamics NAV are followed, which differ a lot from the business processes in the old ERP system. This often has led to improvements according to all interviewees. For instance, the stock has been adjusted automatically after each order. In the old system, they had to adjust the stock manually. Another example is that in the old situation all overviews were printed and analyzed. With Dynamics NAV they set a filter and can get an overview of whatever they want. Another example is that they did not have segregation of duties in the old system.

Customization

According to the consultant the only real customization was the customization of the calculation functionality. Besides this customization, some small changes are made to the source code.

8 Timeline

- The implementation phase has started in February 2010
- Users has followed their first training in February 2010
- Users have followed a second training in April 2010 to refresh things
- April 2011: The external project leader left and the CEO took over.
- The system went live on 1-1-2012.

9 Live

Because the users had difficulties and did not spend enough time on getting to know Dynamics NAV, the CEO had decided to go live anyway at 1-1-2012. This should force people to use and learn Dynamics NAV. He says that at that moment the basic functionalities of Dynamics NAV were functioning and that arising problems would be solved.

Because the testing was not done adequately, a lot of problems were not detected during the implementation phase. This has led to frustrations and problems during the live phase.

At the beginning of the implementation, A. has explained the vendor how they work. The vendor came to the conclusion that Dynamics NAV was a suitable solution for A. Looking back, the CEO states that Dynamics NAV does not have all standard functionalities which A. required, and of which the vendor said it has. This can be attributed to the fact that A. did not have any process descriptions on paper. All knowledge is tacit. This makes it harder to understand in every little detail how A. operates.

According to the CEO the standard functions of Dynamics NAV are running at the moment and a lot of improvements needs to be made. The plan is to use the system better and better over time. *"Het pakket biedt zowel voordelen als nadelen. Sommige zaken kosten meer tijd en sommige minder tijd"*

10 Gespreksverslagen

Uitwerking 1.1

Rol: Externe projectleider
Datum: 10-4-2012

A. Europe is een bedrijf dat slangen maakt voor tal van toepassingen. Voorbeelden zijn slangen voor bekabeling in treinen, de metalen slang aan de hoorn in oude telefooncellen etc. Dit is deels maatwerk en deels standaardwerk. Het maatwerk betreft het op maat maken van slangen voor de klant en speciale koppelingen erop zetten. A. komt uit Canada, maar dit is het kantoor van Europa, waar ter plaatste wordt geproduceerd. Verder zitten in Europa nog een aantal verkoopmedewerkers. Het bedrijf bestaat uit ongeveer 50 man en heeft zon 20 gebruikers van het ERP systeem. Ze gebruiken automatisering met name om data te verwerken en nog niet zozeer om beslissingen te nemen. Ze werken beperkt met rapportages.

Implementatie
A. heeft ooit een eigen ERP systeem ontworpen. De ontwikkelaar van dit systeem gaat binnen een aantal jaar met pensioen, waardoor men over wil stappen naar een ander (standaard) ERP systeem. In het verleden zijn de eisen en wensen vanuit de business rechtstreeks door de ontwikkelaar vertaald in het systeem. Na de beslissing om een standaard oplossing te nemen, hebben ze zelf pakketselectie gedaan en zijn gekomen op Microsoft Dynamics NAV. B. is hier ingestapt als externe projectleider om de implementatie te begeleiden. De leverancier heeft de standaard modules geïmplementeerd en heeft zowel een handel als een productieproces.

De implementatie is gestart rond april 2010 en begin 2012 is het systeem live gegaan. Er is veel vertraging opgelopen, omdat het systeem volgens de organisatie niet kon wat het zou moeten kunnen. Ze vertrouwen de werking van een best practice niet.

Maatwerk
Uiteindelijk is er maatwerk ontwikkelt door de leverancier voor het calculeren van nieuwe producten (specifieke klantvraag) en het gebruiken van deze definitie in offertes en productieopdrachten. Indien een klant naar een specifiek nog niet bestaand product vraagt maakt A. daar een calculatie voor. Dit kan zijn een variatie op een bestaand product en dan verander je hier iets aan. Het kan ook een nieuw product met volledig nieuwe componenten zijn. Uiteindelijk gaat zo'n project niet altijd door en wil A. de voorlopige calculatie alleen als calculatie bewaren. Deze calculatie wordt dan niet als productdefinitie opgeslagen. Het maatwerk calculeren dient dus om tijdelijk een product te definiëren en daar offertes op te baseren. Dit kan, indien het doorgaat, definitief worden gemaakt, waarna het definitief in het systeem kan worden ingevoerd, zodat productieopdrachten van de calculatie kunnen worden gemaakt. Het maatwerk calculeren hangt dus als het ware voor de offerte en productieopdracht in Dynamics NAV. Het fungeert als status voor de offerte en productieopdracht en loopt daar logisch in over. Dit soort maatwerk grijpt niet in op bestaande functies van het systeem waardoor release updates van het systeem redelijk eenvoudig door te voeren zijn.

Nog een reden voor het maatwerk is dat je met de calculaties verschillende versies kunt maken. Je maakt een calculatie op T=1, maar doordat de prijs van bijv. koper varieert, is op T=2 de prijs anders. Ook wilden ze bij de calculatie al plannen wanneer het product gemaakt kan worden. Dit kan volgens

de externe projectleider niet in Dynamics NAV. Normaal gesproken is dat een volgende stap. Dus eerst een definitie van het product maken en dan pas plannen en beschikbare middelen (capaciteit en materialen) controleren

Volgens A. ondersteund Dynamics NAV geen voorlopige calculatie. Dit is iets wat ze altijd zo deden. Dus moet uitgevogeld worden of dit in Dynamics NAV zou kunnen?

Waarom het niet in Dynamics NAV wordt gedaan kan beter aan R. worden gevraagd (hoofd bedrijfsbureau / planning calculatie). Er moet dus worden nagegaan bij A, waarom juist deze oplossing is gekozen en of dit proces zich onderscheid van de concurrentie.

Gebruiker
De gemiddelde Dynamics NAV gebruiker van A. is aardig op leeftijd en er was veel weerstand. Ze hebben een cursus gehad een jaar voor de live gang. Een aantal mensen hadden moeite om het nieuwe systeem te gebruiken. Op veel punten heeft de organisatie zich aangepast aan het systeem. Voorbeeld van de kostprijscalculatiemethode, inkoopproces en proces om orders te versturen. Voorheen ging men met de hand na hoeveel men nog op voorraad had en hoeveel men in moest kopen. Dit kan in Dynamics NAV automatisch en dat deed men dan ook. Hetzelfde geldt voor het versturen van orders.

Misfits

- VVP: Vaste verreken prijs voor artikelwaardering. Voorheen bleven ze heel vaak de VVP herberekenen (simuleren gemiddelde inkoopprijs). Dus moest het omgezet worden naar een andere methodiek (gemiddelde inkoopprijs), zodat men niet continu hoeft te herwaarderen. Dat kost in de nieuwe situatie veel minder tijd en moeite.
- Inkoopaanvragen: oude situatie keek men de bestellijsten door en bepaalde wat men nodig had. In de nieuwe situatie koos men ervoor om dit automatisch te doen.
- Transport: oude situatie (Huub) deed veel met handwerk en zelf lijstjes maken. Gaf zelf transportopdrachten. In de nieuwe situatie een overzicht draaien wat klaar is en wat weg kan.
- Ze moesten in veel gevallen hun handwerk vervangen door automatisering (in de toekomst nog meer). Ze hadden een oude manier van werken en door zich aan te passen aan de best practices, kon veel efficiëntie worden gewonnen. Dit zijn allemaal misfits.

Overige

- Volgens de externe projectleider waren de processen vooraf niet goed gemodelleerd. In de nieuwe situatie wel.
- Er is niets in de broncode aangepast, alleen iets aangeplakt.
- Navragen waar men buiten het systeem werkt (Excel)
- Vaak zijn extra velden (beschikbaar in het systeem) gebruikt, waardoor men niets aan de database hoefde aan te passen.
- Autorisaties e.d. zijn nieuw. Dit heeft het systeem de gebruiker opgelegd.
- Volgens de externe projectleider veel naar voren geschoven, waardoor men later efficiëntie heeft.
- Dynamics NAV heeft een databaselaag en daar bovenop een landenlaag.

- Mogelijke industry specifieke misfits met certificering. Producten moeten getest worden en daarbij hoort een certificaat.
- Nog navragen of men iets heeft moeten programmeren (functionaliteit toevoegen) aan de lay-outs.
- Men heeft de lay-outs laten maken door G, omdat men dit te complex vond in Dynamics NAV. Hierbij is wel de vraag of ze gebruik maken van standaard functionaliteit van Dynamics NAV, of echt iets hebben toegevoegd.
- Dynamics NAV biedt nog veel meer mogelijke voordelen, maar hier is niet naar gekeken.
- De gedocumenteerde processen zijn de nieuwe processen in Dynamics NAV.

Uitwerking 1.2

Rol: Leverancier Dynamics NAV
Datum: 12-4-2012

De trigger voor de implementatie was De IT-man die aangaf dat hij met pensioen zou gaan en dat hij de enige is die het systeem kan onderhouden. Hierdoor zou er een systeem moeten komen dat door andere mensen onderhouden kan worden.

A. heeft zelf zijn eisen en wensen opgesteld en op basis hiervan gekeken welk ERP systeem het beste bij hun past. Zij kwamen hierbij uit bij Dynamics NAV en zijn naar Dynamics NAV gestapt. Dynamics NAV heeft vervolgens een aantal implementatiepartners aangewezen die het zouden kunnen implementeren en kwamen zo bij de leverancier. Op basis van de eisen en wensen lijst heeft de leverancier gekeken of ze een oplossing aanbieden op de case A. en dat was zo. Vervolgens hebben ze een demonstratie gegeven door een voorbeeld order door het systeem te draaien.

De leverancier geeft aan dat A. een oud bedrijf is en dat van binnen ook uitstraalt. De hele entourage is de afgelopen decennia weinig veranderd en de medewerkers zijn met name 50+. Men is binnen dit bedrijf niet gewend aan veranderingen en dit werd door de leverancier als grootste risico voor de implementatie aangedragen. Ook stonden de procedures en werkwijzen niet duidelijk op papier, maar deze zaten allemaal in de hoofden van de werknemers (impliciete kennis).

Implementatie
De insteek van De IT-man was om de functionaliteit van het oude systeem in Dynamics NAV te gieten en in een later stadium mogelijk de processen te verbeteren. Dit bleek echter niet mogelijk, omdat de functionaliteit van het oude systeem zoveel verschilde van Dynamics NAV, dat Dynamics NAV leidend werd. Dit leidde tot veel weerstand van De IT-man, die zijn eigen 'best practices' vervangen zag worden door de best practices van Dynamics NAV. Daarnaast kwam er ook veel weerstand van de afdeling WVB/calculatie, die vonden dat de functionaliteit van Dynamics NAV tekortschoot op het gebied van het calculeren van nieuwe producten.

Bij A. is gekozen voor de implementatie van de standaard Dynamics NAV, wat gebruikt wordt voor handel, assemblage en productie. Productie en assemblage volgen dezelfde weg (WVB, calculatie/productieorder etc.), maar handel werkt met handelsartikelen (in- en verkoop/ transport/ factuur etc.). De leverancier vindt dat productiebedrijven standaard een aantal misfits ondervinden en hebben hiervoor een additioneel stuk software geschreven (branche specifieke standaard). Dit is

ook een standaard, maar kan bovenop Dynamics NAV worden geïmplementeerd. Dit is gecertificeerd door MS. Bij A. is dit ook geïmplementeerd.

De eerste insteek van de implementatie was een soepele migratie om van huidig naar nieuw te gaan, dus het oude ERP systeem in het Dynamics NAV jasje te steken. Dit bleek niet mogelijk, aangezien deze systemen erg van elkaar verschilden. Later is gekeken vanuit Dynamics NAV hoe zaken uit het oude systeem hierin konden worden meegenomen. Dus veel processen zijn meteen verbeterd, wat een stap verder is dan aanvankelijk de bedoeling was.

Volgens de leverancier was de grootste uitdaging om de verandering door te voeren en was de uitdaging niet zozeer technisch. Uiteindelijk is het project geslaagd en heeft A. veel waar voor zijn geld: Niet meer afhankelijk van de IT-man, efficiëntie winst. Het gevaar is dat A. stil blijft staan.

Maatwerk

Vooraf werd ingeschat dat er geen maatwerk zou hoeven worden gemaakt. Halverwege is men toch tot de conclusie gekomen dat het onderdeel calculeren niet voldeed. A. wil een losse calculatie kunnen maken zonder het aan een klant te hoeven koppelen, maar gewoon als artikel in het systeem. Dit kan niet in Dynamics NAV. Daarnaast zou dit zonder maatwerk leiden tot vervuiling van het systeem, omdat je steeds per nieuwe aanvraag van een artikel een nieuwe offerte aan moet maken en dit zo meteen aan een klant hangt. Eerst was voorgesteld een workaround te doen, door A. als klant aan te maken en hier de calculatie onder te hangen. Dit vond A. te omslachtig.

Misfits

- Ze wilden op de financiële administratie periodiek alle transacties van journaalposten uitprinten met een matrix printer. Het doel hiervan was alles te bewaren om later zaken terug te kunnen vinden. Deze printer moest hoe dan ook aangesloten worden op Dynamics NAV, wat eigenlijk niet mogelijk was. Dit heeft een hoop ‘gepruts op technisch niveau’ opgeleverd, maar uiteindelijk werkte het wel. Er is door de leverancier aangegeven dat men dit niet nodig heeft, maar ze wilden het toch perse hebben. Later bleek dat ze toch alleen gebruik maakten van de nieuwe functionaliteit, door dingen in het systeem op te zoeken.
- Voorheen geen ‘three way match’ van inkoopfactuur, bestelling en goederenontvangst. Ze moesten bij binnenkomst van een factuur naar het magazijn om te checken of het ook echt klopt. Er was dus geen functiescheiding in het systeem. In Dynamics NAV is dit wel geregeld. Hier wordt ook in Dynamics NAV naar gekeken. Voor details navragen bij Bert van Dongen.
- De leverancier schat dat er veel minder Excel sheets in de nieuwe situatie worden gebruikt, maar nog steeds wel een aantal. Dit moet voor de zekerheid nagevraagd worden.
- Er zijn geen problemen geweest met wet- en regelgeving. Dit komt omdat Dynamics NAV een landenlaag heeft die zelden problemen geeft in Nederland, omdat Nederland relatief weinig wet- en regelgeving heeft. Dynamics NAV heeft slechts 3 blokken van de 600 voor Nederland aangepast.
- Veel bedrijfsprocessen zijn verandert, maar calculatie is hetzelfde gebleven. Financiële verwerking is van handmatig naar automatisch gegaan. Inkoopproces ook. Verkoop moet nog nagegaan worden.
- Er zijn geen database aanpassingen gedaan op het gebied van input en output.
- De templates waren complex om te maken, waardoor de leverancier dit heeft moeten doen. Wel is er hierbij alleen gebruik gemaakt van de functionaliteit van Dynamics NAV, dus van

misfits is geen sprake. De IT-man was op cursus gestuurd om het zelf te kunnen doen, maar kwam hier niet uit, waardoor de leverancier hier ongeveer 20 dagen in heeft moeten steken. De schatting vooraf was dat dit 6 dagen zou kosten (aan ondersteuning), maar omdat De IT-man dit niet lukte, heeft dit meer tijd gekost.

Uitwerking 1.3

Rol: Consultant Logistiek en productie (leverancier)
Datum: 12-4-2012

De consultant is vanaf het begin bij de implementatie betrokken als consultant

Implementatie

- Het systeem is per 1-1-2012 live.
- De implementatie heeft langer geduurd dan gelijksoortige projecten bij andere organisaties. De consultant geeft aan dat dit vrij ongebruikelijk is. Volgens De consultant heeft dit twee oorzaken:
  - Ten eerste door het maken van het maatwerk voor de calculatiemodule. Steeds sprak men af wat het zou moeten kunnen, dan was het af en hadden de gebruikers weer aanvullende eisen wensen. Maar eer dat er weer nieuwe programmeurs ingepland konden worden ging er weer wat tijd overheen.
  - Ten tweede dat dit vooral komt omdat alles via De IT-man liep. In plaats van dat je steeds met een key user contact hebt en zaken afspreekt, moest dit eerst via De IT-man. Nu kon je niets over meerdere mensen 'uitsmeren' en liep er weinig parallel, omdat De IT-man alles wilde weten.

Maatwerk

Volgens de consultant is er niet echt veel maatwerk gedaan, behalve dan het stuk voor calculeren. Daarnaast zijn er ook reports e.d. gebouwd, waarvoor wel enige kennis van programmeren nodig is, maar dit is volgens De consultant geen maatwerk. In het FED wat toentertijd door de leverancier is opgesteld stonden ook de issues korting over korting kunnen geven en teksten verplaatsen, dit is uiteindelijk toch opgelost door de standaard door te voeren. Dit was mogelijk omdat men er later achter kwam dat de functionaliteit van Dynamics NAV ook goed werkte.

In de broncode zijn er alleen kleine dingetjes aangepast, wat door de consultant niet als heel belangrijk wordt bevonden. Wel heeft men hiervoor moeten programmeren, maar dit is op hetzelfde niveau als layouts maken etc. Bijvoorbeeld het toevoegen van een extra voorraadlocatie in een bepaald overzicht. Al deze informatie zat al in het systeem, maar moest nog op een gewenste manier of op de juiste plaats getoond worden. Volgens De consultant zijn al deze zaken wel handig en logisch dat men het wil.

De consultant mailt een lijstje met al deze type aanpassingen die zijn gedaan.

Calculatiemodule

Voor het onderdeel calculeren heeft de leverancier de calculatiemodule (onderdeel van de branche specifieke standaard) ontwikkeld. Deze module is een standaard voor calculeren die de Dynamics NAV werkwijze volgt. Dit sloot niet helemaal aan op de wijze van calculeren van A. Hierdoor moest de calculatiemodule worden aangepast.

De eisen en wensen die A. had wat betreft deze calculatiemodule waren volgens de consultant deels terecht, wat de leverancier zelfs nieuwe inzichten bood en waarop ze hun best practice hebben aangepast, maar soms schoten ze iets te ver door.

Wat echt nodig was zijn de overzichten, zodat je goed kan zien waar een calculatie staat en aan welke verkoop- en productieorder deze calculatie gekoppeld is. Deze informatie is echt nodig. In de module werken ze een calculatie helemaal uit (inclusief WVB) zodat het meteen in een productieorder omgezet kan worden. Dit doet men, omdat de slagingskans erg hoog is en dat ze dan niet opnieuw alles in hoeven te voeren, maar dat het een kwestie is van een paar klikken. Dit ondersteunde de calculatiemodule niet.

Voor de rest vindt De consultant dat de overige gewenste functionaliteit werd geboden door de calculatiemodule, maar dat ze er bij A. op stonden om het exact op hun manier in het systeem te zetten. Alle informatie die ze nodig hebben zit in het systeem en kan in het systeem worden ingevoerd. Er waren alleen wat 'misfits' aan de invoerkant. Zo wilden ze op een aantal schermen perse bepaalde zaken invoeren, terwijl dat in Dynamics NAV op een ander scherm moet.

Wat A. wilde, botste enigszins met de structuur van de tabellen in Dynamics NAV. De leverancier heeft A. niet kunnen overtuigen dat ze dit beter niet konden doen. Dus uiteindelijk hebben ze het zo gemaakt zoals A. het wilde. Op 1 punt is tegen een grens aan gelopen, omdat men 'door bleef draven', waarop een alternatief (workaround) is getoond wat leidde tot dezelfde functionaliteit. Hier zijn ze nog steeds niet happy mee, maar men doet het nu wel zo. Het volgende was aan de hand: Bij een calculatie wilde A. een overzichtsscherm. Hierop staan verschillende regels met producten die gemaakt worden. Onder deze regel hangen materialen en bewerkingen. Die wilden ze in hetzelfde scherm krijgen. Dat is gemaakt, alleen bij switchen van geselecteerd artikel in de calculatie verdwenen er regels en als men dan iets bij wilde werken, dan verdween dit. De oorzaak hiervan hebben ze niet kunnen achterhalen. De workaround is om in het overzichtsscherm via een sneltoets regels in te voeren. Hiermee hebben ze dezelfde functionaliteit, alleen niet op de manier waarop A. het wilde.

Verbeteringen

- Prijzen zijn nu netjes bijgewerkt.
- Calculaties kunnen nu makkelijk worden gekopieerd.
- Voorraden meteen bijgewerkt in het systeem, in plaats van dat dit steeds met de hand moest worden aangepast.
- Voorheen hield men speciale transportkosten in Excel bij en op basis van statistiek keek men wat de transportkosten waren aan het eind van het jaar en verrekende men dit in de prijs van het artikel. Met Dynamics NAV gebeurt dit door de transportkosten in te voeren en toe te wijzen aan bijbehorende artikelen, waarna de prijs automatisch verandert. Het proces is hier dus verandert, maar ook verbetert.

Change management

<u>Betrokkenheid gebruikers</u>

- Engineering is betrokken geweest bij het ontwikkelen van het maatwerk omtrent de calculatie. Volgens De consultant hebben die het goed opgepikt en zijn ze goed kritisch geweest naar de calculatiemodule.

- De IT-man is er bij betrokken geweest als key-user. Dit was vaak het eerste aanspreekpunt en vervolgens riep hij er wat mensen bij.
- De overige functionarissen konden wat gedrevener zijn en hadden vaak zoiets van 'we zien wel wat er op ons afkomt'. Het was niet zozeer onwil.
- De logistiek manager heeft zich vanaf het begin meteen terug getrokken. 'Neuh, is niets voor mij, daar doe ik niet aan mee'. Hier werd voor de rest niets mee gedaan door de directie van A.

Trainingen en ondersteuning

- De gebruikers hebben trainingen gehad, maar er bleef erg weinig hangen. Op een gegeven moment is er gewoon voor gekozen live te gaan en men moest er maar mee leren werken. Na de livegang zijn de gebruikers ondersteund door consultants en hebben ze handleidingen (demoscripts) gekregen, waarin precies stond hoe ze hun werk konden doen. Nu bleef het wel hangen.

Management involvement

- Pas iets voor en na de livegang raakte het management betrokken bij de implementatie. Vanaf ongeveer april 2011 werd de directeur de projectleider, omdat de externe projectleider stopte als projectleider. Zijn afstand tot het project was te groot, omdat hij daar niet continue zat en dat werkte niet in deze situatie bij dit bedrijf. Als je een aantal zaken afsprak, dan was dit een week later niet allemaal afgerond.

Misfits

- Tekortkoming uren registratie. Een product wat gemaakt wordt bestaat uit verschillende onderdelen. Ieder onderdeel wordt in Dynamics NAV gecalculeerd en daar hoor een bepaalde bewerkingstijd bij. Omdat dit niet per onderdeel wordt bijgehouden, hangen ze het aan 1 onderdeel, waardoor er op dat onderdeel verlies wordt gemaakt en op de andere onderdelen teveel winst. Hier dealen ze gewoon mee, omdat het uiteindelijk onder aan de streep niet uitmaakt. In het oude systeem werd dit niet per onderdeel gedaan.
- Vroeger voerde men een verkooporder in met beperkte gegevens en later met de hand de factuur, waar men nog heel veel aan kon passen. In Dynamics NAV is dit allemaal aan elkaar gekoppeld en als een verkooporder eenmaal goed in het systeem staat, heeft men bij de afdeling facturatie in de nieuwe situatie minder werk. Men moest dus alles meteen goed invoeren bij de verkooporder. Ondanks dat zo het werk naar voren werd geschoven in het proces, klaagde men bij de afdeling facturatie dat men juist meer werk had (8u in plaats van 2). Volgens De consultant komt dit met name omdat men heel veel zaken nog nakijken en controleren en zal dit naarmate men met het systeem leert werken minderen.
- Door wet- en regelgeving moest er report-technisch het een en ander worden toegevoegd aan facturen. Voor sommige landen moeten er goederencodenummers en datum levering er goed op staan. Deze informatie zat wel gewoon allemaal in het systeem.
- Hieronder is een lijstje te zien met alle 'misfits' waarvoor enige vorm van maatwerk is gedaan. De consultant heeft hierbij aangegeven of de aanpassing klein, middel of groot is. Voor de rest is alles met de standaard opgelost.

Gebied	Onderwerp	Categorie klein/middel/groot
Logistiek	Aanpassingen report 50002, verkooporders te leveren Groepering en volgorde omzetten/ er uit/ markering wat reeds op mag.verzending staat	Klein
Logistiek	Factbox bij verkoop uitbreiden, 2 lijstschermen aanpassen	klein
Logistiek	Voorraad NL en ITA apart tonen	Klein
Logistiek	Lijst “verkooporders te leveren” aangepast voor beter overzicht wat er wel/niet geleverd kan worden.	middel
Logistiek	Tonen “samengestelde artikelen” in magazijnleveringsscherm en report	middel
Eng.	Veld op artikelkaart, historisch voorraadverloop. Dit is een voortschrijdend voorraadverloop tot – 1 jaar	Klein
Eng.	Factbox artikeldetails op plannings- en inkoopvoorstel zetten	Klein
Eng.	In artikelposten een extra veld waarbij het inkoop en verkoopnummer getoond wordt in geval van inkoopontvangsten en verkoopleveringen	Klein
Eng.	Wijzigen artikelnummer blokkeren	Klein
Eng.	Historisch jaarverbruik	Middel
Eng.	Gegevens kopieren van calculatie naar standaard productiestuklijst.	Middel
Logistiek	Leveranciers/klantnaam op bepaalde scherm naast het deb/cred nummer toevoegen.	Middel
Productie	Aangepast materiaalscherm waarop alle te verbruiken materialen staan over alle deelorders. Werkt voor hen sneller	Klein
Eng.	Calculatiemodule aanpassingen (veel werk, zoals besproken)	Groot
Externe reports	Dit zijn offerte, order, factuur. Meertalig, veel werk geweest. Gedurende de implementatie zijn eisen aangepast.	Groot
Logistiek	Boekingsknop aangepast, waardoor de facturatie is gescheiden van de levering	Klein

Uitwerking 1.4

Rol: IT-man implementerende organisatie
Datum: 4-5-2012

De IT-man was het aanspreekpunt voor A. bij de implementatie en moest bewaken dat de data van het oude systeem juist kwam in het nieuwe systeem en dat de mensen hun werk kunnen doen in het nieuwe systeem.

Adoption
De IT-man heeft via Cobol in een Linux omgeving het oude ERP systeem verder ontwikkeld. De start hiervan is 20 jaar geleden begonnen in Assembler en door ontwikkeld in RM-cobol in een Unix omgeving en is helemaal vanaf de grond opgebouwd. Omdat de IT-man binnen een aantal jaar met pensioen gaat, achtte hij en de directie het nodig dat er een nieuw systeem moest komen, dat niet afhankelijk was van één persoon en zou aansluiten op bestaande software.

Acquisition
Van long list naar shortlist gegaan. Het ging uiteindelijk tussen Dynamics NAV, SAP en ISAH 7 aangevuld met Accountview. SAP viel al snel af, waarna ISAH en Dynamics NAV nog over waren. ISAH 7 is speciaal ontworpen voor assemblage/constructiewerk bedrijven en sloot beter aan op het type bedrijf dat A. is, dan Dynamics NAV. De IT-man vertelt dat de assemblage/ engineering afdeling erg belangrijk is binnen het bedrijf. Toch is voor Dynamics NAV gekozen, omdat het ERP pakket één geheel is t.o.v. ISAH 7 met Accountview eraan geplakt en omdat Dynamics NAV een grotere partij is, waarbij het risico kleiner is dat ze failliet gaan met alle gevolgen van dien.

- Daarnaast hadden ze in de oude situatie geen systeem dat gekoppeld kon worden aan Microsoft producten. Bijvoorbeeld het uitdraaien van facturen als PDF en die vervolgens versturen.
- A. is naar Microsoft gestapt, en die stuurde A. vervolgens door naar de leverancier om het systeem te leveren en te implementeren en te ondersteunen.
- Het eisen en wensen document op basis waarvan de keuze is gemaakt voor Dynamics NAV is niet meer beschikbaar.

Implementation
De inrichting van Dynamics NAV heeft een half jaar geduurd en is goed verlopen. De uitloop is veroorzaakt door het maken van het maatwerk. Het ontwerpen van dit maatwerk is iteratief tot stand gekomen. Na iedere nieuwe oplevering van functionaliteit moesten er zaken worden aangepast, maar de consultants van de leverancier konden pas weer na een paar weken een nieuwe afspraak plannen, omdat hun agenda ondertussen gevuld was. De IT-man geeft aan dat het niet alleen daarom zo lang duurde, maar ook omdat de eisen en wensen met betrekking tot het maatwerk soms te ver werden doorgedreven. Deze uitloop leidde tot een overschrijding van het budget en een hoop indirecte kosten.

Het maken van lay-outs met de reportwriter van Dynamics NAV was volgens de IT-man om te huilen. Na het volgen van een cursus, was het nog steeds niet te doen om de gewenste lay-outs te creëren. De standaard lay-outs waren in ieder geval niet voldoende. Een voorbeeld: Op verkoopfacturen behoord standaard in de EU statistiekcodes voor goederen te staan. In Italië staan daar boetes op als

dat niet gebeurd. Je mag volgens de IT-man van een standaard internationaal pakket verwachten dat dit geregeld is. Uiteindelijk hebben ze een consultant in moeten huren die dit heeft gedaan.

Bovenop de standaard Dynamics NAV, is een standaard voor de urenregistratie en inkoopfacturen genomen (ontwikkeld door 'To-Increase') en een standaard voor het engineering werk (ontwikkeld door de leverancier), welke vervolgens moest worden aangepast naar de eisen en wensen van A. (maatwerk).

Change management

- De projectleiding die door BDO is gedaan, is volgens de IT-man een 'geldweggooier' geweest. De projectleiding zou de kar moeten trekken, maar dit is niet gebeurd. De externe projectleider kwam één keer per week langs en dit was in principe voldoende. Deze zou dan mensen moeten begeleiden bij het testen en rekening moeten houden met de omstandigheden van de gebruikers (leeftijd, drukte etc.).
- Op een gegeven moment heeft men elkaar een aantal maanden aangekeken wie doet wat en daarbij heeft de projectleider niet het voortouw genomen.
- Wat niet meehielp aan het soepel lopen van de implementatie, is dat A. een erg goed en druk jaar had tijdens de implementatie, waardoor de diverse gebruikers weinig tijd hadden om zich in het nieuwe systeem te verdiepen en zaken als testen goed aan te pakken.
- Volgens de IT-man heeft de directie gefaald, omdat er geen beslissingen zijn genomen over hoe de procedures moesten lopen in het nieuwe systeem. Ze waren niet goed bij de implementatie betrokken. Bijvoorbeeld het logistieke proces is door Dynamics NAV flink verandert. Daar is men volledig de standaard gaan volgen. Dat is een andere logistieke stroom geworden, dan dat men aanvankelijk deed. Hierbij zijn de mensen niet aangestuurd op de veranderende procedures en is de directie in gebreke gebleven.
- Een deel van de gebruikers was positief, maar een aantal negatief.
- De gebruikers hebben een basistraining gehad (hoe Dynamics NAV werkt). Niet met de flow van de nieuwe bedrijfsprocessen van A..
- Een aantal gebruikers hadden moeite om met het nieuwe systeem te werken.
- Key-users zijn betrokken bij de implementatie. Per afdeling is besproken hoe men in de nieuwe situatie gaat werken.
- Ook bij de ontwikkeling van het maatwerk is men betrokken.
- Doordat men niet echt heeft getest, zijn er te weinig zaken vooraf ontdekt, waardoor men tijdens de live-gang tegen problemen aanliep, wat heeft geleidt tot frustraties.
- De komst van een nieuw ERP systeem is vooraf aan de gebruiker medegedeeld.

Nadelen

- Dynamics NAV zou moeten leiden tot minder werk, minder papierstromen etc. Op dit moment is men uiteindelijk meer tijd kwijt. Er zijn vier uitzendkrachten bij gekomen, omdat ze het werk er niet doorheen krijgen. Bijvoorbeeld bij het factureren is men veel meer tijd kwijt (van 2 tot 6 à 7 uur per dag). Volgens de IT-man komt dit door het aanbrengen van correcties in de facturen. Bij A. komt het vaak voor dat aantallen, goederen, bijkomende kosten, expeditiekosten achteraf nog toegevoegd/gecorrigeerd moeten worden. Volgens de IT-man was men daar vroeger flexibeler in. Hij noemt een voorbeeldje dat het nu erg lastig is om goederen naar Kuweit te sturen, maar de factuur naar China.

- Als men een fout maakt, bijvoorbeeld factuur met verkeerd adres, dan is het erg lastig om fouten te corrigeren. Als het eenmaal in het systeem staat, dan krijgt men dit niet makkelijk meer aangepast. Dit geld voor heel Dynamics NAV. Dit is volgens de IT-man o.a. mede te danken aan de beperkte kennis op het gebied van Dynamics NAV van de gebruikers.

Live

- Het invoeren van offertes, dat is men op de assemblage afdeling weer op de oude manier gaan doen, omdat men de manier in Dynamics NAV te omslachtig en niet flexibel genoeg vond. Ook hier vond men het weer te moeilijk om zaken aan te passen en vinden de gebruikers het systeem te omslachtig.
- Men gebruikt bij een ingewikkelde calculatie nog steeds het oude systeem. Omdat men zegt dat dit sneller is. Men is niet tevreden over het tot op heden geleverde maatwerk.

Maatwerk

- Het maatwerk moest worden gemaakt, omdat volgens Ed de module calculeren niet voldeed aan de eisen van de industrie. De standaard module kon calculeren, maar daar hield het dan ook mee op. Zo was het bijvoorbeeld o.a. niet nodig om afvalpercentages erbij te registreren. Het had kortweg veel te weinig functionaliteit. Vooraf was gezegd dat dit makkelijk op te lossen was, maar dit bleek achteraf niet.

BP aanpassen

Volgens de IT-man is de werkwijze veel veranderd.

- De verkoop binnendienst geeft nu zelf de orders in. Dit deed vroeger een aparte afdeling. Dit werkt prima voor handelsartikelen.
- Verwerking betalingen. DSM hoofdkantoor betaalt alles voor al hun vestigingen, maar de facturen moeten naar alle vestigingen. In Dynamics NAV doe je dit met een klantkaart en is lastig verwerken in Dynamics NAV. In het oude systeem was men flexibeler. Toch heeft men zich hier aan het systeem aangepast.

Workarounds

- Offertes die buiten het systeem om worden gedaan.
- Of men veel met Excelsheets werkt, kan de IT-man niet zeggen.
- De historie staat nog in het oude systeem, dus soms moet men zaken terug moeten zoeken in het oude systeem. Dit had met maatwerk gemoeten, maar men accepteert deze tekortkoming, want het oude systeem hoeft steeds minder gebruikt te worden en het scheelt een hoop tijd en geld.
- Declaraties vertegenwoordigers.

Misfits

- SEPA betalingen naar het buitenland werkt niet in batches en geeft een foutmelding. Dit is nog steeds niet opgelost, waardoor het met de hand één voor één wordt gedaan.
- Statistieken binnengekomen orders kan men niet meer maken, dit accepteert men. Dit kan nu alleen op salesgebied.

- Achteraf werkt het PDF toevoegen aan email niet. Dit had in eerste instantie wel moeten kunnen, maar later bleek dat hiervoor een extra module nodig is. Omdat deze duur is, heeft men deze tekortkoming voorlopig nog geaccepteerd.
- Met de vertegenwoordigersadministratie is het niet mogelijk om declaraties in te voeren. Dit wordt opgelost met een workaround.

Overige

- Geen problemen met de input

Uitwerking 1.5

Rol: Financieel manager implementerende organisatie
Datum: 4-5-2012

Volgens de financieel manager werkte het oude systeem goed, alleen op sommige zaken raakte het oude systeem verouderd. Een heel groot nadeel volgens Financieel manager was dat alles moest worden geprint, omdat overzichten op een scherm niet mogelijk waren.

Selection

Er was door een aantal mensen eigenlijk gekozen voor ISAH 7 in combinatie met account view. Een aantal managers vonden Dynamics NAV beter omdat dit van Microsoft was en dit een internationaal georiënteerd pakket is, en A. dit ook is. ISAH was een Nederlands pakket dat al een aantal keren van eigenaar was veranderd. Om geen risico's te lopen is uiteindelijk toch gekozen voor Dynamics NAV.

Implementation

Volgens de financieel manager is tijdens de implementatie de communicatie en begeleiding tussen de leverancier en A. niet helemaal soepel verlopen. Hij geeft aan dat dit aan beide partijen te wijten valt. Vanuit A. wil men teveel 1 op 1 over, waardoor men zich hierop ging focussen.

De financieel manager gelooft dat het pakket goed werkt als je volledig de standaard volgt, maar voor A. geeft het wel de nodige problemen vanwege toch wel de nodige aanpassingen. Men heeft zoveel mogelijk de standaard proberen te volgen, omdat dit anders problemen kan geven met updates. Alleen voor het onderdeel calculatie heeft men maatwerk moeten ontwikkelen.

In totaal heeft de implementatie rond de 350.000 gekost aan directe kosten.

Change management

- De financieel manager geeft aan dat A. een verouderd personeelsbestand heeft. Van deze mensen hebben sommigen 25 jaar met hetzelfde systeem gewerkt. Voor deze mensen is een simpele basistraining niet genoeg. Dit leidde tot veel frustraties. Tijdens deze algemene training werd een fietsenfabriek als voorbeeld gebruikt en dit sprak volgens de financieel manager de mensen totaal niet aan, omdat A. niet met een fietsenfabriek te vergelijken valt.
- Voor de implementatie had men ingeschat dit naast de dagelijkse werkzaamheden erbij te doen. Door een druk jaar, nam men de tijd niet om te testen en schoof men dit vaak opzij. Dit had beter begeleid moeten worden.
- Mensen stonden tegenover de implementatie van "we zien het wel".
- Men heeft trainingen gehad in een Dynamics NAV systeem onder volledige licentie van de leverancier waar dus alles meegedaan kon worden. Bij de "live" gang bleken er een aantal

licenties niet in te zitten wat naar boven kwam met het testen. Achteraf alsnog aanvullende licenties moeten aanschaffen zoals de Telebankier module.
- Er zat erg veel tijd tussen training en testen.

Tekortkomingen
- Buitenlandse betalingen werkt niet. Functionaliteit zou er moeten zijn, maar het geeft foutmeldingen. Dit moet nu handmatig één voor één worden gedaan.
- In de betalingsrun mis je zaken. Hier komen bepaalde facturen niet uit (die er wel tussen zouden moeten staan). Men weet ook niet waar dit door komt.
- Budgetlijst wordt via het grootboek verkregen. Dit zou direct moeten kunnen (workaround). Via deze budgetlijst krijgt men inzichtelijk hoeveel budget er nog is per project.
- Het aanbrengen van correcties en toevoegingen bijvoorbeeld in de factuur wordt niet ondersteund. Dit duurt nu vele malen langer. Binnen A. komt het vaak voor dat dit soort zaken zich voor doen. Voorbeeld: Als je er 50 verstuurd in plaats van 100, dan moet je een restorder aanmaken.

Oplegging
- Je moet perse definitief alle vijf de btw boekingsgroepen gebruiken, anders krijg je een foutmelding. Deze boekingsgroepen zijn niet nodig, maar moeten wel gebruikt worden. Hier heeft men dus de procedure op aan moeten passen.

Uitwerking 1.6

Rol: Directeur implementerende organisatie
Datum: 8-5-2012

Strategie
A. onderscheid zich van concurrenten door een specialist te zijn in het leveren van flexibele slangsystemen. A. heeft er voor gekozen om een breed aanbod van producten te hebben i.p.v. enkel voor volume te gaan, omdat dit volgens de directeur makkelijk te kopiëren is.

Ze onderscheiden zich ook door flexibel te zijn, d.m.v. snel schakelen en kleine series te produceren. Ze zijn niet de grootste in de markt, maar hebben wel een grote variëteit aan oplossingen. Zelfs wat buiten de catalogus valt, wordt klant specifiek gemaakt. Hiervoor is kennis en kunde nodig. A. opereert in heel Europa. A. heeft langdurige relaties met klanten en de markt is erg stabiel. Als je een klant wint, dan zit je er vaak lang aan vast.

Ze doen aan handel en aan productie/assemblage. Op het gebied van assemblage/producten wil men een zo breed mogelijk aanbod aan oplossingen hebben. Op het gebied van handel heeft men dit niet.

Er zijn twee typen slangen, voor elektrische producten en voor vloeistoffen en gassen. Omdat de marge beter is op de elektrische slangen en er minder risico's kleven aan deze producten, richt A. zich met name op de elektrische slangen. De slangen voor vloeistoffen doet men met name in Nederland.

Binnen de elektrische slangen zijn er producten die uit de catalogus komen en die op maat worden gemaakt voor de klant. Hiervoor moet men ontwerpen, calculeren, testen, en aanbieden etc.

Dus flexibel, groot aanbod en snel inspelen op de markt.

Adoption
De redenen voor een nieuw ERP systeem is om over te stappen van het eigen ontwikkeld systeem naar een systeem dat door meerdere partijen onderhouden kan worden. Het oude systeem is alleen door De IT-man door te ontwikkelen en te onderhouden, maar die gaat binnen een aantal jaar met pensioen.

Een tweede reden is om één systeem te hebben in plaats van meerdere naast elkaar. Een voorbeeld is het gebruik van barcodes. Hier was een apart systeem voor (nu nog steeds), maar in de toekomst wil men deze functionaliteit in Dynamics NAV gaan gebruiken.

Een derde reden is extra functionaliteit. In het oude systeem moest vaak een nieuw scherm opgeroepen worden en kon je niet makkelijk doorklikken. Ook kwam hierbij een hoop handwerk kijken, zoals het controleren van de voorraad die je vervolgens uit moest printen en in een pak papier handmatig moest doorkijken. Uiteindelijk was hierbij de gedachte om flexibeler te worden. A. krijgt steeds meer artikelen en er wordt vaker een kleine hoeveelheid besteld.

Selection
Men heeft Dynamics NAV verkozen boven ISAH 7, omdat Dynamics NAV een groter bedrijf is. Omdat ISAH een Nederlands pakket is en een stuk kleiner is, is de continuïteit minder in het geding met Dynamics NAV.

Vooraf is uitgelegd hoe A. werkt. Vanuit de leverancier was de inschatting dat dit allemaal goed paste binnen Dynamics NAV. Achteraf bleek dat dit niet zo het geval is.

Achteraf gezien is het volgens de directeur de vraag of Dynamics NAV wel het meest geschikte pakket was. de directeur geeft aan dat het pakket prima werkt voor het handel gedeelte, maar dat de standaard tekort schiet voor productiebedrijven. Vooraf werd gezegd dat dit pakket prima past bij de manier van werken van A.. Gaandeweg bleek dat dit niet zo was en moest er maatwerk gemaakt worden. Het idee was vooraf om geen maatwerk te nemen, omdat dit problemen op kon leveren met onderhoud. De directeur geeft aan dat men tijdens de presentatie van het systeem een ander verwachtingspatroon had, dan dat uiteindelijk werkelijkheid is geworden.

Volgens de directeur is A. helemaal geen bijzonder bedrijf, maar ze hebben wel veel functionaliteit nodig, omdat ze zowel aan handel als aan productie doen, in heel Europa opereren etc. Wellicht dat het pakket hiervoor te licht is.

Implementatie
De eerste gedachte achter de implementatie was één op één over gaan, wat volgens de directeur is dat je in het nieuwe systeem op de oude manier kan werken.

Naarmate de tijd vordert, wil men steeds meer functionaliteit toevoegen. Bijvoorbeeld facturen via pdf mailen.

Live

Veel problemen die zich hebben voorgedaan, zijn volgens de directeur toe te schrijven aan het niet kennen van de mogelijkheden van Dynamics NAV. Als men hier meer kennis van had, zouden er veel minder problemen zijn.

"Het zal allemaal wel beter worden, want het zit er allemaal in natuurlijk, maar je moet het er uit halen"

Maatwerk

- Het gedeelte met calculatie zat volgens de directeur niet in Dynamics NAV en moest specifiek voor A. ontworpen worden. Bij een calculatie wordt rekening gehouden met materialen, machine-uren, mensuren etc. Vervolgens moet het gepland worden.
- Reports moesten door een consultant geprogrammeerd worden. Dit zou A. zelf moeten kunnen met een training, maar dit was volgens de directeur totaal niet mogelijk. Nu het eenmaal staat kan men er mee werken, maar als er een aanpassing moet gebeuren op een report, dan kan men dit niet zelf oplossen. Dit heeft men bij A. wel nodig.

Oplegging

- Als materialen terug worden gestuurd en er wordt een creditnota aangemaakt, dan wordt dit automatisch opgeboekt bij de voorraad, maar dit moet niet als het geretourneerde product een defect bevat. Dit moet met de hand worden gecorrigeerd.
- Negatieve voorraad is mogelijk, daarom heeft men soms problemen als een artikel niet op voorraad is, want het systeem geeft geen melding. Men lost dit momenteel op door zelf steeds in het magazijn te gaan kijken.
- Bij de afdeling facturatie is men nu meer tijd kwijt dan voorheen. Dit komt door het maken van correcties etc.

Process aangepast

- Vroeger had men iemand die speciaal in dienst was om orders in te voeren. Nu moet de verkoop binnendienst dit doen. Deze kunnen simpel een offerte tot order promoveren. Op deze manier zijn ze meer betrokken bij de orders die de klanten plaatsen.

Change management

- Implementatie is moeizaam verlopen, omdat men het druk had.
- Verouderd personeelsbestand, dat ook moeite heeft om met een Word of Excel te werken.
- Men heeft het geforceerd geïmplementeerd, om mensen zo te dwingen met het nieuwe systeem te werken, waardoor het minder vrijblijvend was. De basis van het systeem werkte en de problemen zou men dan wel oplossen.
- Het testen moest naast de (drukke) werkzaamheden en er zat steeds veel tijd tussen.
- Met de key-users is bewust gekozen voor dit systeem. Zij hadden hier een stem in.
- Men kreeg meteen trainingen met Dynamics NAV, maar het duurde nog een kleine twee jaar voor het systeem live ging. Omdat men er tussentijds niet veel mee heeft gedaan, was dit snel weggezakt.
- De rol van de directeur was eerst beperkt. Men had voor een externe projectleider gekozen, om zo meer ervaring in huis te halen. Dit was al vanaf de offerte. Volgens de directeur liep dit niet lekker omdat A. wat 'moeilijke mensen heeft'. Vanaf dat moment werd de rol van de

directeur groter en heeft hij een aparte testruimte ingericht, zodat men verplicht kon worden tot testen los van het werk en is hij er wat korter op gaan zitten.

Verbeteringen

- In het oude systeem had men geen back-orders en moest men opschrijven wat niet verzonden werd, en moest dit handmatig in het systeem worden ingegeven. Als men dit vergat in te voeren, kreeg de klant uiteindelijk niets. In het nieuwe systeem zitten meer controles.
- In het oude systeem moest men allerlei overzichten uitdraaien op papier, bijvoorbeeld de voorraad per artikelgroep. In dit oude systeem kon men alleen informatie bekijken op klant en artikelniveau. Met Dynamics NAV kan alles op het scherm door zelf een filter in te stellen en zo een overzicht te creëren.
- Volgens de directeur is het veel makkelijker om met Dynamics NAV te sturen op basis van overzichten in Dynamics NAV.
- Er valt volgens de directeur heel veel in te stellen wat ook een nadeel is. In de toekomst wil men het systeem nog continu beter gaan gebruiken.

“Het pakket biedt zowel voordelen als nadelen. Sommige zaken kosten meer tijd en sommige minder tijd”

APPENDIX C – ELABORATION CASE STUDY COMPANY B

Interviewees:

- Consultant;
- Head IT of B;
- Controller of B;
- User of the sales department of B.
- External project leader (ERP vendor)

1 Description company B.

B. was established in 1999. B. is an organization that collects and processes waste for four municipalities in the Netherlands. Those municipalities are the shareholders of B. and the most important clients. Other activities of B. are cleaning, gritting, pest control, serving commercial clients, running a thrift shop and managing an environmental park. B. has mainly two different processes. A process for the civilians of the four municipalities, and a process for commercial clients.

B. has about 170 employees, of which 26 users of the ERP system Dynamics NAV. B. uses the ERP system to support their business processes.

Strategy B.

According to the head IT, the general strategy of B. is customer intimacy. B. wants to take over the worries of clients about their waste. B. is not the cheapest waste processor, but it wants to take over the care of waste from the four municipalities. B. finds it also important to be sustainable and to control costs.

2 Adoption

According to the financial controller and the head IT, the reason to replace the old ERP system: Exact for Windows, is because this software was outdated and the continuity of this software package could not be guaranteed. The consultant adds another reason. He says that within B. there were multiple separate systems, leading to multiple versions of the truth. Therefore, by implementing a new integrated ERP system, the risk of having multiple separate administrations would be gone.

The purpose of the new ERP system is to use it for the financial administration and some additional functionalities which are now fulfilled by the home grown system. In the new situation the civilian process stays in the home grown system, but the commercial process will be in Dynamics NAV.

3 Acquisition

The selection of the ERP system is done by a consulting firm. Based on the requirements and wishes of B, a long list resulted in a short list. The short list contained five ERP systems. Five ERP vendors have given a demonstration. The final choice was between SAP W&R and Microsoft Dynamics NAV with an industry specific solution. In the end, Dynamics NAV was chosen. B. has chosen for Dynamics NAV, because it has good references and it was the best suiting ERP system, together with SAP W&R. The consultant states that the financial controller had a preference for Dynamics NAV on forehand.

4 Implementation

B. has implemented standard Microsoft Dynamics NAV, complemented with the industry specific software. For the payroll, the application called Mercash is installed. Besides Dynamics NAV, B. runs its own developed application. This software is used to register containers and the emptying of

containers. After implementation, the own developed application will only be used for the civilian process. The commercial process will be completely handled in Dynamics NAV. The head IT states that it off course will be the best solution when all functionality is in a single system, but such systems do not exist. According to the financial controller and head IT, the own developed application functions perfect and has everything the organization needs. Therefore they do not have an argument to replace this piece of software by Dynamics NAV. According to the Head IT, the own developed application has better and completer overviews, and is therefore faster to work with. When helping a civilian this is needed. The financial controller states that the separation between Dynamics NAV and the own developed application is very clear.

In September 2010 the implementation started. According to all interviewees, the implementation was successful, because both budget and planning were met. The system went live on 1-1-2011 and total costs stayed below 200.000. The standpoint was to keep the amount of customizations as low as possible. The external project leader and the consultant state that there were little customizations during the implementation. The employee of the sales department agrees with this and mentions that following the standard really happened.

In association with the ERP vendor/implementation partner, every module was delivered separately. After delivery, the module was tested by the users, accepted and finally in 'production' (live).

According to documentation of the ERP vendor and the interviewees, the degree of fit between the standard software and company B, was high. By inquiry of the different interviewees, it became clear that the amount of customizations was very minimal. However, according to the financial controller, the fit was better or the financial part, than for the industry specific part.

5 Change management

- User training and education: At the beginning of the implementation, all users followed a basic Dynamics NAV training given by the ERP vendor. The standing point was on the job training. The financial controller indicates that they have trained employees as late as possible before the live-phase. This approach was chosen to ensure that people did not forget how to work with the new ERP system. The external project leader states that the on the job training took place a month before going live.
- Achieve commitment of users and users should understand the benefits and drawbacks: According to the sales department employee, the younger employees did understand the benefits better than the older employees. There was some resistance in the beginning, but once working with the new system, people were seeing the benefits (employee of the sales department). They found the new ERP system more efficient, because it is all in one system.
- Users have to be informed: At the beginning of the implementation, there was a kick-off meeting. During this kick-off meeting, the user was informed about the implementation, the way of implementing Dynamics NAV and the time planning. According to the external project leader, the management of B. had made very clear that B. would follow the standardized software.
- Involve users in the system design: Key-users were appointed for every department. The key-users had a voice in the system configuration and design. The Head IT indicates that the users of a department knows best how the processes should be.

- Support users: According to the employee of the sales department, older users needed more support than the younger ones. However, they have got this support. After going live, the ERP vendor gave support by solving problems and answering questions.
- Build management commitment: According to the financial controller, the management (except for the financial manager) saw the implementation as an IT-project and were not deeply involved. They only wanted to know the status of the project once in a while. However, the external project leader indicates that the financial controller was very deeply involved and was important for the successful implementation.

Resistance to change

According to the financial controller, the head IT, employee of the sales department, and the consultant there was a lot of resistance to change in the beginning at two departments: Sales and the workshop. For instance, the sales department was still using the legacy system to look things up, while Dynamics NAV was already live. The external project leader does not agree with this and state that there was little resistance to change, only by some people. According to the head IT, for a lot of people it was hard to let go the Excel sheets they have always used.

Ignorance

According to the financial controller, the sales department creates orders in both the old system and the new ERP system, because they are afraid the system will 'forget' something or it will malfunction. The employee of the sales department supports this statement. According to the financial controller nine out of ten times ignorance is the problem.

The head IT, indicates that Dynamics NAV is more flexible and open-ended than their previous ERP system. Because not everyone has the right knowledge about Dynamics NAV, it happens that people do not enter complete orders into the ERP system, leading to making mistakes.

6 Misfits

Financial

1. **General ledger:** Dynamics NAV generates a number and shows this as description for an entry in the general ledger. B. wants to see a description of the entry instead of the number, because the number means nothing to the employees of B.
2. **Posting hours and quantities:** B. had the requirement that it could book hours and quantities in the general ledger. This functionality is not supported by Dynamics NAV. However, it is possible to register hours and quantities in Dynamics NAV project administration (not in the general ledger) and use this information for reports.
3. **E-Invoicing:** A requirement of B. was to start using e-invoicing in the new ERP system. By using e-invoicing, it should be possible to generate batches of digital invoices. This functionality is not in the standard Dynamics NAV.
4. **General ledger entry:** B. had a lot of numbers in general ledgers in Exact. Dynamics NAV imposes the user to work with dimensions in a ledger. So the amount of general ledgers will not be the same in the new situation.
5. **Pension fund:** Once a year, the data of the salary administration needs to be delivered to the pension fund. This is not possible with the standard Mercash software.

6. **Invoicing:** With Dynamics NAV, an invoice can only be registered, when a reception of incoming goods has been posted. In the old system (Exact) this was not the case. The users of B. argue that the system imposes them things. For instance the employees of P&O purchase trainings. Those trainings have to be 'received' in the system, before they can pay for the training. The employees do not understand why it has to be "so difficult".

Industry specific processes:

7. **Lay-out:** The possibilities to adjust the standard lay-outs in Dynamics NAV are very poor. The requirements was that they could adjust the lay-out themselves. It is possible to create a lay-out with pre-programmed fields, but when a database field needs to be on a lay-out and it is not in the standard, it is not possible for B. to put such data on the lay-out themselves. It is very normal in the waste industry to put the container capacity on an order for example. However, it is not standard to select such data for lay-outs.
8. **Rides list:** The rides list shows an overview of every route and in what sequence the customers have to be served. The standard rides list of Dynamics NAV is very limited and shows not all information needed by the drivers.
9. **Planning module:** The only functionality of the planning module in Dynamics NAV is to create routes. However, the planners of B. also want to couple resources to a route.
10. **Financial value:** Based on the hours spend and deposited waste, a financial value should be linked to these aspects. This is not possible in Dynamics NAV.
11. **DIFTAR:** Some municipalities are starting with DIFTAR (citizens have to pay for the weight of their waste). The consequence of this, is that B. has to register the weight of the waste per household. This functionality is not supported by the standard ERP system.
12. **Purchase invoice:** B. always used the functionality of purchase invoice registration in Exact (old ERP system). Purchase invoice registration is not possible in standard Dynamics NAV. The external accountant has obligated B. to register purchase invoices.
13. **Discounts:** Before, the sales department had a separate system. The sales employees could do whatever they wanted in this system. For instance with giving discounts. Before, an order had a transportation, rent, and waste component. The sales people could say to a customer that they do not have to pay for transportation for example and enter a line for this discount in the order. In Dynamics NAV the total cost became a subscription, and the sales people had to work with discount percentages on the total price. However, they are not working the new way and instead, they do it as they did it before, by entering an additional line in the order.
14. **Flexibility:** According to the sales people, Dynamics NAV is not flexible enough. It requires too much data entry and it is harder to change orders after they have been entered. However, this better data entry leads to more efficiency over the whole line. For example, when a customer is blocked by the financial department for not paying their bills, no order can be entered by the sales department for this customer. The sales department cannot reverse the blocking. They argue that they need the possibility to unblock a customer, so they still can enter an order.
15. **Too much work:** According to the people of the work shop it takes too long to put everything all the time in the system. Before they always put information about vehicle reparation, materials etc. at the end of the week in the system. Now they have to do it with scanners after each transaction and this takes too much time.

16. **Linking the own developed application -Dynamics NAV:** There was no standard link possible between Dynamics NAV and the own developed application. However, those two systems need to exchange information. For instance, registered hours in the own developed application are needed in the financial administration in Dynamics NAV.
17. **Temporary blocking customers:** Sometimes a customer needs to be blocked temporarily. For instance a primary school is closed during holidays and produces no waste. Therefore, their container does not to be emptied, and the customer does not have to pay during the holiday. B. needs this functionality, but it is not present in the standard software.
18. **Codes:** Dynamics NAV gives everything a code. In the old system, B. was using descriptions. For instance the description 'paper' was used for paper. In Dynamics NAV, paper can be recognized by the code 'P011013'. Therefore, people have to get used working with codes.

7 Solutions

Customizations

Financial

- **General ledger entry:** This has been custom made, so the written description is showed for every entry in the general ledger instead of the automatically generated number.
- **DIFTAR:** This functionality is not ready yet, but they are busy making this customization. They have chosen for customization, because not having this functionality is not an option.

Industry specific

- **Lay-outs:** They have to hire a consultant to get this information on the lay-outs.
- **Rides list:** A customization has been made, that makes it possible to create the rides lists in the own developed application, based on the information in Dynamics NAV.
- **Financial value:** A customization has been made to give a financial value on hours and deposits.
- **Linking the own developed application -Dynamics NAV:** The interface has been customized.

Workarounds

- **E-invoicing:** An additional module should be purchased. The financial controller indicated that this module was too expensive, because the amount of customers demanding a digital invoice is very limited. It is always possible to print a single invoice as a pdf-file and email this to the client. However, when more clients demand a digital invoice, this activity can become very time consuming.
- **Planning module:** B. is thinking about a solution for this problem. At the moment they plan by hand in the old system, but they want a better solution in the future.
- **Purchase invoice registration:** By creating a separate line and sending this to the financial department, they have functionality which is sufficient.
- **Pension fund:** It is too expensive to customize this for something that has to be done once a year. Therefore, employees of B. do this by hand every year.
- **Temporary blocking customers:** According to the sales department employee, the chosen solution is very complicated and user unfriendly. Because the rule was to follow the standard, a workaround was created.

Accept

- **Posting hours and quantities:** They accept that it is not possible to post hours and quantities in the general ledger and they now use the functionality of Dynamics NAV, to register the hours and quantities in the database (not in the general ledger).
- **Flexibility:** According to the financial manager, the sales department has the same functionality as before, only they have to do it a little bit different.
- **Codes:** People have to learn to work with the codes.

Process adaptation

Financial

- **General ledger:** B. started using the dimensions of the general ledger functionality in Dynamics NAV. According to the financial controller, the amount of general ledgers decreased enormously.

Industry specific

- **Discounts:** According to the financial manager, this is not a misfit and the sales department has to work like this.
- **Time consuming:** According to the financial controller they have to change their processes. However, they keep entering data once a week, leading to a lot of frustrations in other departments. For instance, planning wants to know which vehicles are available. When the data is entered once a week, the data in the system is not accurate and timely.

According to the financial controller, there were no big process adjustments.

8 Timeline

- The implementation started in September 2010;
- The system went live in January 2011.

9 Live

Since being live, there were two requests for changes (RfC). According to the financial manager, those RfC's were very minor.

10 Gespreksverslagen

Uitwerking 2.1

Rol: Financial Controller
Datum: 13-6-2012

Implementatie
Hetgeen geïmplementeerd is, is standaard Dynamics NAV, aangevuld met de branche specifieke standaard. Het oude systeem was Exact Globe. Naast Dynamics NAV heeft men een eigen systeem draaien. Voor de salarisadministratie is de standaard Mercash geïmplementeerd.

De vooraf gestelde deadline van 1-1-2011 is gehaald, men is binnen budget gebleven en volgens F. is de implementatie in hoofdlijnen goed verlopen. In september 2010 is gestart met de implementatie. De leverancier was hierbij de implementatiepartner. Samen met de leverancier is een plan van aanpak voor het implementatieproject gemaakt waarin duidelijk beschreven stond wanneer welke mijlpaal opgeleverd moest worden. Daarnaast was er vooraf een fit-gap analyse opgesteld.

Vervolgens is module voor module opgeleverd. De methodiek van testen-acceptatie-productie is gevolgd. Begonnen is met het financiële stuk en vanuit daar is uitgebouwd naar verkoop, branche specifieke module etc. B. heeft in hoofdlijnen twee verschillende processen. Een commercieel proces (verhuur containers etc.) en een huis-aan-huis proces. Het commerciële proces loopt momenteel compleet in Dynamics NAV en de huis aan huis proces loopt via het zelf ontwikkelde systeem en blijft via dit systeem lopen. Dit systeem functioneert prima voor dit proces en F. geeft aan hier niet mee te willen knoeien. Daarnaast is er een duidelijke scheiding tussen wat in Dynamics NAV gebeurt en wat niet. Wel is er een koppeling tussen het zelf ontwikkelde systeem en Dynamics NAV, waardoor de twee systemen met elkaar kunnen functioneren en data uit kunnen wisselen.

Fit
Financieel was de fit goed, waarbij één ding is aangepast (Zie misfit bankrekeningnummers). Wat betreft het branche specifieke stuk was de fit minder, maar nog steeds goed.

Maatwerk

- Bankrekeningnummers: Dynamics NAV zoekt naar bankrekeningnummers om binnengekomen betalingen te matchen. Omdat B. voorheen nooit de bankrekeningnummers van klanten geregistreerd heeft, moesten deze nog in het systeem komen. Bij het boeken van bankafschriften was het niet mogelijk om automatisch de bankrekeningnummers aan te maken in Dynamics NAV. Men heeft gekozen om maatwerk te maken waarmee bankafschriften kunnen worden ingelezen vanuit het bestand van de bank, die automatisch het bankrekeningnummer herkent en aan een klant koppelt. Alternatieve manieren zouden zijn geweest om klanten te bellen en naar hun bankrekeningnummers te vragen of door het uit de historische data te halen, maar bij B. heeft men voor deze oplossing gekozen, omdat dit de meest snelle manier was.
- Boeken van uren en aantallen in grootboek: Dit was een eis vanuit B. en dit werd niet ondersteunt door de standaard. Wel is het met de branche specifieke standaard mogelijk om uren, aantallen etc. te registreren en over te rapporteren, maar dan niet in het grootboek. In het oude systeem deed men dit wel, maar door logisch na te denken bedacht

men zich dat het helemaal niet noodzakelijk was dit in het grootboek bij te houden. De manier waarop het nu ingevuld wordt, volstaat voor B.

- Voorheen deed men veel vanuit het grootboek, maar met Dynamics NAV veel minder. In dit opzicht is het financiële proces dus enigszins aangepast. Doordat Dynamics NAV met dimensies werkt in de grootboeken, is het aantal grootboeken sterk verminderd.
- Lay-out: De standaard lay-outs zijn volgens F. slecht in Dynamics NAV. Het is wel mogelijk om velden op een formulier te verslepen en te selecteren, maar als een bepaald databaseveld niet tot de keuzeopties behoort voor een veld op een lay-out, dan moet er geprogrammeerd worden. Dit heeft men in het geval van B. moeten doen. Zo is het in de afvalbranche normaal dat je bijvoorbeeld de inhoudsmaat van een container op een order zet.
- E-facturatie: Men wilde in het nieuwe systeem gebruik maken van e-facturatie (eis). Uiteindelijk heeft men er toch voor gekozen dit niet te doen, omdat hiervoor een extra module moest worden aangeschaft die duur en complex is. Daarnaast is het aantal klanten dat een digitale factuur wil beperkt en is dit altijd mogelijk dit per factuur te doen. Alleen de functionaliteit van een batch draaien met digitale facturen kan nu dus niet.
- Rittenlijst: De rittenlijst is de route die de auto's rijden. De standaard output hiervan in Dynamics NAV is volgens F. erg matig en schoten tekort. Deze zijn zelf geprogrammeerd. De data wordt nu via het zelf ontwikkelde systeem uit Dynamics NAV gehaald en die maakt er een rittenlijst van die wel volstaat en die voldoet aan wat de chauffeurs willen.
- Begeleidingsformulieren: Deze formulieren moeten met een chauffeur mee en die komen nu nog uit het zelf ontwikkelde systeem, maar deze functionaliteit wil men in Dynamics NAV gaan gebruiken.
- Volgens F. was het grootste probleem het registreren van de uren en gewichten met betrekking tot inzameling. B. wil registreren hoeveel tijd men kwijt is aan routes en hoeveel gewicht er ingezameld is. Momenteel wordt dit met de hand in het zelf ontwikkelde systeem ingevoerd en via een interface in Dynamics NAV ingelezen, waar de factuurafwikkeling wordt gedaan voor het commerciële proces. In de toekomst wil men het hele commerciële proces in Dynamics NAV hebben.
- De planningsmodule van Dynamics NAV kan B. niets mee. Hiermee is het enkel mogelijk om routes te creëren en dan houdt het op. De planners van B. willen ook resources kunnen koppelen aan een route en dat is niet mogelijk in Dynamics NAV. Men is nog zoekende naar een oplossing om dit op te lossen. Men denkt aan boardcomputers met planningssoftware bijgeleverd. Vanwege de kosten denkt men hier goed over na.
- De omschrijving van een post geboekt op de grootboekrekening in Dynamics NAV voldeed niet. Dynamics NAV geeft je een eigen gegenereerd nummer, maar B. wilde daarbij de omschrijving zien. Dit is een stukje maatwerk geworden.
- B. wilde van de Geschreven uren en gestorte gewichten, verplichtingen vastleggen. Hier moet vervolgens een financiële waarde aan gekoppeld worden. Dat was niet mogelijk met Dynamics NAV en is opgelost met Dynamics NAV.
- Doordat een aantal gemeentes DIFTAR in gaan voeren (betalen voor gewicht afval), voldoet de branche specifieke oplossing niet meer en moet dit geprogrammeerd worden.

Procesaanpassing

De processen zijn enigszins aangepast, maar dit zijn volgens F. geen grote aanpassingen geweest. De belangrijkste aanpassingen aan het proces waren:

- De registratie van uren gebeurt niet meer in het financiële gedeelte van het systeem, maar in de branche specifieke software.
- Inkoopfactuurregistratie gebeurde in Exact en daarvoor was een apart gedeelte aanwezig in Exact, maar dit kan niet in de standaard van Dynamics NAV. Nu doen ze dat op een andere manier door een aparte regel aan te maken en deze door te sturen naar facturatie. Deze nieuwe manier van werken volstaat. Deze aanpassing was noodzakelijk, want van de accountant moeten inkopen geregistreerd worden.

Workaround

- De aanlevering van de gegevens van de salarisadministratie aan de pensioenuitvoerder kan niet met Mercash. Daar is geen oplossing voor en het is te duur om maatwerk te laten ontwikkelen voor iets dat slechts 1x per jaar gedaan hoeft te worden. Dit doet men daarom jaarlijks met de hand.

Weerstand

- De meeste weerstand kwam van de afdeling Verkoop binnendienst. Die hadden vooraf een apart pakket, waar ze “in konden rommelen wat ze wilden”. Bijvoorbeeld met het geven van kortingen. Voorheen had een order een transport-, huur- en afvalcomponent. Na de implementatie is dit een abonnementsprijs geworden, waarbij ze alleen nog maar percentages korting kunnen geven op het geheel en niet bijvoorbeeld een container gratis vervoeren. Een ander voorbeeld is dat een slecht betalende klant in de nieuwe situatie geblokkeerd kan worden, zodat er ook geen orders meer in kunnen worden gegeven. Vroeger was dit niet zo. De afdeling verkoop vind dat ze zulke zaken wel moeten kunnen blijven aanpassen en vonden het nieuwe systeem te weinig flexibel. Volgens F. kunnen ze voor de rest nog precies doen wat ze voorheen deden, alleen moet het net wat anders.
- Op de afdeling verkoop maakt men nog steeds losse bonnen aan in het zelf ontwikkelde systeem naast Dynamics NAV, omdat men bang is dat het systeem dit ‘vergeet’ of er iets verkeerd gaat. Volgens F. is 9 van de 10 keer een tekort aan kennis het probleem.
- In de nieuwe situatie kan er alleen nog maar een factuur worden geboekt als er een ontvangst is geboekt op de inkooporder. In de oude situatie kon dit niet. De gebruikers vinden dat hun dingen op worden gelegd die niet nodig zijn. Bijv. op de afdeling P&O koopt men inleidingen in. Vervolgens moet een opleiding ‘ontvangen’ worden voor deze betaald kan worden. Zij zien de toegevoegde waarde niet en doen dit liever niet zo.
- De afdeling werkplaats is erg star en de mensen daar veranderen hun manier van werken niet. Ze hebben scanners gehad om zaken in te scannen , maar ze houden op lijstjes alles bij en voeren alles 1x per week in Dynamics NAV in. Dit leidt tot problemen en frustraties verderop in het systeem bijv. als ze pas aan het eind van de week een voertuig als gerepareerd melden, terwijl het al eerder gebruikt had kunnen worden. De afdeling planning werkt echter wel met deze data. Op deze manier loopt het systeem achter t.o.v. de werkelijkheid. Volgens F. komt het omdat men vindt dat het te lang duurt in de nieuwe situatie.

Change management

- Key users zijn aangesteld en die zijn betrokken bij de inrichting van het systeem.
- Gebruikers zijn last minute getraind, zodat ze meteen met de software konden werken. On the job training was het uitgangspunt.
- Het management zag de implementatie als een IT-project en op de controller na, geloofde de rest van de directie het wel.

Changes
Sinds het moment van live-gang zijn er twee verzoeken tot een change geweest.

Uitwerking 2.2

Rol: Hoofd ICT
Datum: 13-6-2012

De strategie van B. heeft een aantal speerpunten:

- Duurzaamheid
- Opschuiven in de keten (Iets van een bewerkingsslag doen voor het naar de bewerker gaat).
- Kostenbeheersing
- Ontzorgen: B. is niet de goedkoopste die er is, maar ze willen de gemeente werk uit handen nemen.

Uiteindelijk streeft men naar de algemene strategie van customer intimacy.

B. is in handen van een viertal gemeentes welke aandeelhouder zijn.

Software
Het liefste zit alles in Dynamics NAV, maar er zullen een aantal systemen naast blijven bestaan. Zo wordt het zelf ontwikkelde systeem gebruikt voor huisaansluitingen, dit werkt goed en er is daarom geen reden om dit over te zetten. Volgens A. kunnen ze in de toekomst niet zonder één van de twee systemen.

In het zelf ontwikkelde systeem doet men pasregistratie, containerregistratie, containerledigingen, bezoeken op de milieustraat etc. Momenteel zitten er nog opdrachtbonnen in voor de commerciële kant, maar die wil men in de loop der tijd overzetten en het zelf ontwikkelde systeem voor dat gedeelte uitfaseren. Dan gebeurt de hele keten in Dynamics NAV. Nu is dat nog opgesplitst, waardoor je beide systemen nodig hebt.

Volgens A. is het zelf ontwikkelde systeem sneller en overzichtelijker voor huisaansluitingen, omdat dit complete overzichten biedt in tegenstelling tot Dynamics NAV waar steeds geklikt moet worden. Dat werkt niet praktisch als je een klant aan de lijn hebt en probeert te helpen.

Implementatie
Volgens A. is de implementatie goed verlopen en was het standpunt om zoveel mogelijk de standaard te volgen en alleen voor echt nodige zaken maatwerk te maken. Dit is volgens A. erg minimaal geweest. De gedachte achter het volgen van de standaard is om geen problemen te krijgen met software-updates.

Maatwerk

- Er is maatwerk gemaakt voor de koppeling tussen het zelf ontwikkelde systeem en Dynamics NAV. Deze koppeling is nodig voor bijvoorbeeld de uren die geregistreerd staan in het zelf ontwikkelde systeem, welke wel nodig zijn om in Dynamics NAV mee te nemen voor de kostendekking.

Procesaanpassingen

- Voor verkoop is het proces aangepast. De manier waarop de contracten tot stand komen is gewijzigd. Dit gebeurt niet meer op de manier, waarop men dit gewend was. Als zij het goed in het systeem zetten, dan weet men wat men moet uitvoeren en weet de afdeling facturatie wat ze moeten factureren. Voorheen werden er tussendoor steeds vertaalslagen gemaakt. Wat tot meer werk leidde. Nu is het proces in zijn geheel dus meer efficiënt, maar de medewerkers verkoop klaagden er wel over. Hier is weerstand tegen geweest door de verkoopmedewerkers.
- De werkplaats had eerst ook een 'eigen financiële administratie' voor voertuigen repareren etc. Maar volgens A. heeft B. hier gewoon een afdeling voor, waarna dit na de implementatie is verplaatst naar de afdeling facturatie.

Kennis

Het systeem is flexibeler en wat vrijer dan voorheen. Doordat niet iedereen de juiste kennis heeft en even kundig en vaardig is met het systeem, kunnen er zaken niet ingevuld blijven voor een opdracht, met als gevolg dat er een halve opdracht in het systeem staat. In de oude situatie was het systeem strakker en konden er geen halve opdrachten worden ingevoerd, waardoor minder fouten werden gemaakt. Het systeem is nu dus foutgevoeliger.

Overige

- De ICT afdeling heeft nauwelijks verzoeken tot wijzigingen gehad, op wat autorisatiezaken na.
- Er is tijdens de implementatie met key-users gewerkt. Deze hebben een grote inspraak gehad op hoe de processen zijn ingericht. Omdat ze er dagelijks mee werken, hebben zij meer inzicht van de processen dan degenen die het implementeren. Wel is gekeken naar de structuur als geheel en of het daarbinnen past.
- Voor veel mensen is het moeilijk geweest oude zaken los te laten als Excel sheets e.d.

Uitwerking 2.3

Rol: Consultant

Datum: 25-6-2012

Adoption

B. had een zelf ontwikkeld ERP systeem en daarnaast veel andere 'administraties' buiten dit systeem om. Veel medewerkers hielden zelf zaken bij in bijvoorbeeld Excel. Hierdoor waren er "meerdere versies van de waarheid". De nieuwe financial controller wilde deze risico's inperken en een nieuw ERP systeem implementeren. Het zelf ontwikkelde ERP systeem werd gebruikt voor inkoop (afvalverwerking), abonnement registratie, financiële administratie en de werkplaats voor zowel het burger als het commerciële proces.

Acquisition

Binnen B. had men vooraf de voorkeur voor Dynamics NAV (ervaringen controller bij eerdere werkgever). Omdat men toch wilde kijken welk ERP systeem daadwerkelijk het beste zou passen, besloot men een selectietraject op te starten.

Op basis van de aanwezig procesbeschrijvingen, is een programma met eisen en wensen opgesteld. Op basis van dit programma eisen en wensen is een long list tot stand gekomen en na het afvinken van de eisen en wensen per ERP systeem, is men gekomen tot een shortlist met vijf pakketten. De vijf leveranciers van deze pakketten hebben een demo gegeven en vervolgens is de keuze gemaakt voor Dynamics NAV in combinatie met een branche specifieke oplossing.

Implementatie
Men wilde Dynamics NAV en de branche specifieke aanvulling inzetten voor de registratie van abonnementen, financiële administratie, werkplaats, voorraadbeheersing, inkoop en human resources. De logistiek en planning wilde men in het zelf ontwikkelde systeem laten draaien, omdat men hierover tevreden was. Het is mogelijk om dit in de toekomst over te zetten van het zelfontwikkelde systeem naar Dynamics NAV. In die zin wilde men wel een toekomstproof nieuw systeem waarin dit later mogelijk zou zijn.

De insteek van de implementatie was om het zoveel mogelijk standaard te houden, om de voordelen van standaard software te benutten. Volgens de consultant had B. hierbij een heldere visie en een voldoende kritische blik. Daarnaast had de controller van B. iemand ontmoet van de leverancier die al een dergelijke implementatie bij een afvalverwerker had gedaan. B. heeft bedongen dat deze inhoudelijke expert dedicated bij het project betrokken was en zijn kennis/expertise continu in kon zetten.

De implementatie is binnen planning en budget gebleven.

Weerstand
Uiteindelijk kwam er weerstand van voornamelijk twee gebruikersgroepen: werkplaats en verkoop binnendienst.

Fit
De fit tussen B. en de standaard software was over het algemeen goed. Wel waren er een aantal zaken waar het systeem niet helemaal aansloot.

- Werkplaats module: Deze module bood niet genoeg functionaliteit en is naar wens van B. aangepast. Dit was maatwerk.
- Uren en gewichten boeken in de financiële administratie (grootboek): Binnen B. had men de gewoonte om uren en gewichten te boeken zonder hier financiële waardes aan te koppelen in het grootboek. In Dynamics NAV kan dit niet. Uiteindelijk heeft men toch de manier van werken in Dynamics NAV gevolgd, waarbij hoeveelheden niet in het grootboek, maar in de projectadministratie worden geregistreerd. Via een tarieventabel wordt de financiële waarde vervolgens geboekt in het grootboek (in plaats van uren en gewichten).
  In principe was dit een eis die later op een manier kon worden ingevuld waarbij de standaard software kon worden gebruikt.

- Omdat het zelf ontwikkelde systeem nog gebruikt moest worden in de nieuwe situatie, maar de gehele financiële administratie in Dynamics NAV plaats gaat vinden, moet er een koppeling zijn tussen deze twee systemen. Deze interface is zonder verdere problemen op maat gemaakt.

Uitwerking 2.4

Rol: Medewerker verkoop binnendienst
Datum: 27-6-2012

De afdeling verkoop binnendienst doet het contract- en contactbeheer van 2500 commerciële klanten.

Implementatie

- De insteek van de implementatie was om zoveel mogelijk de standaard te volgen. Volgens de medewerker verkoop binnendienst is het hierdoor niet flexibel, omdat er weinig ruimte was voor maatwerk. Voor de afdeling verkoop is geen maatwerk ontwikkeld.
- De implementatie vond men lang duren en dit vergde veel tijd van de gebruiker. “Je doet het niet zo maar tussendoor”.

Change management

- De medewerkers zijn op de hoogte gesteld van de implementatie. Ze hebben vooraf een presentatie gehad waarbij werd uitgelegd en gedemonstreerd wat het systeem kan en hoe het eruit ziet. Vervolgens is men betrokken bij de inrichting van het systeem tot op bepaalde hoogte. Vooraf is duidelijk gemaakt dat de standaard gevolgd zou worden op uitzonderingen na.
- De oudere gebruikers hebben meer moeite om met het nieuwe systeem overweg te kunnen en hebben meer ondersteuning gehad.
- Men zag de voordelen in van de implementatie en dan met name de jongere medewerkers. Men is uiteindelijk ook positief over de implementatie en vindt dat men sneller kan werken met het nieuwe systeem en meer kan doen.
- De key-users hebben een on-the-job training gehad van een consultant. Deze hebben werkinstructies opgesteld welke werden doorgespeeld naar de gebruiker. Dit gebeurde ongeveer een maand voor live-gang.

Weerstand

- Volgens de medewerker verkoop was er weerstand. In het begin na de live-gang was het wennen aan het nieuwe systeem. Wel werd de mogelijkheid gegeven om via het hoofd verkoop binnendienst terug te kijken in het oude systeem.
- Daarnaast was er ook kennisgebrek onder de gebruikers.

Missende functionaliteit

- Wat men mist is een CRM gedeelte in dit systeem. Men is momenteel bezig om deze functionaliteit in het systeem te krijgen.

Opleggingen

Volgens de medewerker verkoop binnendienst waren er geen opleggingen door het systeem. Men is in totaliteit wel efficiënter gaan werken.

Procesverandering

- Men heeft binnen de afdeling verkoop op een andere manier moeten leren werken. Om dezelfde zaken gedaan te krijgen, moeten andere stappen in het systeem doorlopen worden.

Voordelen

- Voorheen werkte men met meerdere systemen om onder andere contracten en contacten bij te houden. Nu werkt men in één systeem wat leidt tot meer efficiëntie.

Misfits

"Er kwamen eisen en wensen tevoorschijn die of niet mogelijk waren of via een hele grote omweg". Voorbeelden hiervan zijn:

- **Ledigingen in vakantie:** Bij bijvoorbeeld basisscholen hoeft er in de vakantie niet geledigd te worden. In het systeem moet deze klant dus tijdelijk geblokkeerd worden en hoeft deze klant ook niet te betalen. In het vorige systeem kon dit met twee klikken. In het nieuwe systeem is dit veel lastiger om in te richten. Deze functionaliteit heeft men nodig. Hier heeft men gekozen voor een workaround (die niet gebruiksvriendelijk is) en niet voor maatwerk.
- **Codes:** Dynamics NAV werkt veel met codes. Voorheen gebruikte men omschrijvingen. Bijvoorbeeld, voorheen gebruikte men de omschrijving 'papier' en nu wordt hiervoor de code P011013 gebruikt. Dit maakt het lastig om te herkennen (met name in het begin). Hier is uiteindelijk niets mee gedaan, maar men had graag dat deze codes vervangen zouden worden door tekstomschrijvingen.
- **Dienst verkopen met korting:** Voorheen kon men gewoon een regel in de order zetten met een kortingsbedrag. Nu zou dat met staffels moeten (percentages). Dit vindt men teveel handelingen en niet logisch, waardoor men deze staffelfunctie niet gebruikt. Men zet alsnog de korting in een losse regel op de order.

Uitwerking 2.5

Rol: Externe projectleider (leverancier)
Datum: 27-6-2012

Wat is geïmplementeerd is standaard Dynamics NAV in aanvulling met een branche specifieke oplossing voor de milieubranche en een werkplaats module. De werkplaats module is in een later stadium opgeleverd.

Implementatie

De standaard sloot volgens de externe projectleider erg goed aan op de bedrijfsprocessen van B. De leverancier heeft een fit gap analyse gedaan en de fit was goed te noemen. Men heeft als uitgangspunt genomen zoveel mogelijk de standaard te volgen en dat is ook gelukt. Er zijn wel een aantal aanpassingen geweest, maar deze waren zeer beperkt en "dit zou eigenlijk geen naam mogen krijgen". Wat lay-outs en schermen zijn aangepast op kleine puntjes. "Er zijn geen grote maatwerkstukken geleverd".

De implementatie is binnen planning en budget gebleven. Kanttekening hierbij is dat vanuit de leverancier 'binnen budget blijven' betekent dat ondertussen het budget in overleg met de klant

aangepast kan zijn. Naast de leverancier heeft de ICT afdeling van B. gedurende de implementatie ook zelf interfaces ontwikkeld, zodat de systemen buiten het ERP systeem konden communiceren met Dynamics NAV.

De externe project leider heeft samen met de berokken consultants gedurende de implementatie één keer per week een projectdag gehad bij de klant. Daarnaast is er regelmatig stuurgroep overleg geweest, waarbij de status wordt besproken en dit verliep elke keer soepel.

Change management

- Vanuit het management van B. is heel duidelijk gesteld dat men de standaard zou volgen en dat het antwoord op maatwerk aanvragen standaard nee zou zijn. Er zijn volgens de externe projectleider, naast de aanpassingen in lay-outs en schermen, in totaliteit een aanvraag of twee geweest. Volgens de externe projectleider filterde de financial controller (die het project intern leidde) veel van zulke verzoeken, waardoor merendeel niet doorkwam tot de leverancier. Intern heeft men hier dus een beter beeld van.
- Er is weinig weerstand geweest vanuit de gebruikers volgens de externe projectleider. De externe projectleider geeft aan dat de financial controller een belangrijke rol heeft gespeeld bij de implementatie. Hij was heel duidelijk en in positieve zin dominant aanwezig tijdens de implementatie.
- De gebruikers zijn betrokken geweest bij de inrichting van het systeem tijdens workshops.
- De gebruikers zijn vooraf op de hoogte gesteld van de implementatie. Tijdens een kick-off wordt naar de gebruiker gecommuniceerd wat de uitgangspunten zijn van de implementatie en wat er geïmplementeerd gaat worden en wat de planning is.
- De gebruikers hebben direct in het begin van de implementatie een knoppentraining gehad, waarbij men leert werken met de basis van Dynamics NAV. Tijdens de realisatie en testfase heeft er training on the job plaatsgevonden. Deze trainingen zijn door de leverancier verzorgd.
- Dicht tegen de live-gang hebben de eindgebruikers een eindgebruikerstraining gehad. Deze trainingen zijn door B. verzorgd.
- Sommige gebruikers pakten het sneller op dan andere. Sommige gebruikers gaven aan dat ze het te druk hadden om te testen e.d. maar dit is niet in het extreme geweest bij B.
- Na live-gang is ondersteuning geboden aan B. Hierbij zijn weinig problemen geweest en men was vrij positief. De enige problemen die men is tegengekomen tijdens de implementatiefase zelf zijn bugs in de software die al tijdens de implementatiefase zijn opgelost met updates (hier valt zelf weinig aan te doen).

APPENDIX D – ELABORATION CASE STUDY COMPANY C

Interviewees:

- Consultant (ERP vendor);
- Controller of C;
- Head IT of C;
- System user planning and control department of C.

1 Description company C.

C. is one of the leading valuation firms in the Netherlands and the world. C. does valuations for two purposes:

- Insurance purposes;
- Economic valuation purposes.

Those two are the main streams of company C (also in the ERP system). The two valuation purposes have different accounting principles. Insurance valuations are about the costs of an object when it has to be replaced. Economic valuations are about value of assets like buildings, machine parks, goodwill etc. Besides, C. also has an department that is specialized in counter-expertise for the insured party. C. has about 210 employees, of which 55 active ERP system users.

Strategy C.

The strategy of C is to give an as good and independent valuation as possible for movable and immovable properties. C. is not the cheapest valuation firm in the market, but they are known for their reliability and expertise. C. has mainly large clients.

2 Adoption

C. was using Exact for the counter-expertise part and had built its own system for the valuation part (both insurance and economic valuations). However, C. did the entire financial administration in Exact (also for the valuation part). The custom made system was started as a standardized ERP system 15 years ago. During time this system was built more and more to customer specification. According to the head IT, this system was outdated and too much customizations were made. The consultant states that C. became too dependent on a custom made ERP system.

3 Acquisition

The scope of the ERP implementation was all locations of C. within the Netherlands. C. has conducted the traditional ERP packet selection method. Based on the requirements of C. a long list and a shortlist were made. The shortlist contained AFAS, Microsoft Dynamics NAV, and Exact. All three parties have given a demonstration. C. came to the conclusion that Dynamics NAV was the best solution and they had the best feeling with this ERP system.

4 Implementation

The standard Dynamics NAV complemented with an industry specific solution was implemented. This industry specific solution is specially developed for organizations working in projects for business services.

According to the financial controller, the aim of the ERP system implementation was to make the ERP system leading, and to have as less customizations as possible. At first, the aim was to do this for all

parts of C. But in the end, Dynamics NAV was only implemented for the insurance valuation part (and the financial administration of the business economic part). The financial controller states that this means that the financial department and human resources need to follow the processes in Dynamics NAV, unless they have very good arguments. The reason for these departments to follow the standard is that C. does not have to distinguish itself compared to competitors on these processes. The consultant agrees with this and states that only minor customizations are made for the financial/HRM part. For the valuation part the balance between customizations and the standard is 20-80 according to the financial controller.

Planning and budget

The implementation lasted more than two years. Both deadline and budget were not met. The financial controller states that the implementation was finished more than a year after planned. The main reason according to the financial controller is the development of customizations. It is hard to say what you really want and read the functional design. It happened several times that what was delivered did not meet the precise requirement of the users. The financial controller says that the ERP vendor has promised more than it could deliver.

Also the implementation went largely over budget. The reason for the delay and extra costs were the development of the customizations. In October 2010 C. went forced live. According to the financial controller “miraculously it went very well”.

Fit

The fit for the financial part was good according to the financial manager and the consultant. However, some users were complaining, that Exact (the legacy system) had more functionalities. The fit for the valuation part was less, because the industry specific solution is made for business services in general and there are some differences between business services in general and the business services of C.

Resistance to change and ignorance

- The sales department does not want to work in the new situation. They think entering every offer is too much work. The employees of the sales department are still arguing to enter offers in a simplistic way.
- The financial department still uses the old system to look up old valuations. They do not trust the new ERP system, or they do not know how they can find data in the new ERP system. According to the financial controller, they do not take the effort to learn the new system.
- According to the head IT, the employee planning and control, and the consultant, the employees of C. are aged and have worked a long time with the old ERP system. According to the head IT, this has led to some resistance to change, because the employees were forced to work in another manner.
- According to the interviewed user, people are still negative about Dynamics NAV, and there has been a lot of resistance to change.
- The head IT states that people do not know enough about Dynamics NAV. They also do not try things and play with the new ERP system. For instance they some employees do not know how to make an export to Excel. The interviewed user agree with this and states that Dynamics NAV has too much possibilities and that they often not know what is possible with the system and what is not.

- According to the head IT, employees have to be higher educated than before, to handle an ERP system. “It is less straightforward”.
- According to the consultant C. has invested in customizations because the user argued the functionality was really needed. However, the user often could not say how much he used the functionality.
- In the beginning of the live-phase, it sometimes happened, that customers had to be called back, because the employees of C. could not find certain information in the system.

5 Change management

- User training and education: In the beginning of the implementation the users had a basic Dynamics NAV training. Just before going live, the users of the new ERP system had an internal on the job training, given by the key-users. During this internal training, the focus was on where to click to do the job. The interviewed user was satisfied with the training.
  Users were given training documentation and instructions.
- Achieve commitment of users and users should understand the benefits and drawbacks: The users had a basic Dynamics NAV training at the beginning of the implementation. According to the consultant, the purpose of this training was to get users familiar with Dynamics NAV, so they could participate in discussions about the ERP system design.
  Learning the new ERP system was difficult for most users. According to the consultant, they often were thinking how they did their job before, and how they could do this the same in the new ERP system.
  The head IT and the consultant state that after one and a half year begin live, the users still do not embrace the new ERP system. They do not see the benefits of the system and think Dynamics NAV contains too much operations. However, the reason for this is that the management of C. wants to make better use of the ERP system, which involves more operations to be performed.
  The user doubts whether the other users saw the benefits of the new ERP system.
- Users have to be informed: According to the financial controller, users were complaining that communication was not good enough towards the users of the ERP system. The financial controller states that the main reason for this was that not all requests of the users were accepted.
- Involve users in the system design: For the implementation, a steering group was established. Under this steering group were several project groups. Those project groups existed of employees (key-users). The key-users were involved in the decisions made about the ERP system design. The financial controller indicates that it is a risk that people want to work in the old way. The interviewed user states that the users were involved, but they did not always listen to the users.
  After a customization had been delivered, the users of this customization had to test this. A pitfall is that people do not take the time to adequately test this customization, leading to problems when the new functionality really had to be used.
- Support users: At the moment of going live, user were not confident about the system and had a lot of questions. After going live, users were supported: Answer was given on questions from users and occurring incidents were solved. According to the consultant, this went well, but users were not very satisfied about the new way of working.

- Build management commitment: The management of C. was present in the steering committee of the implementation project.

6 Misfits

Financial

1. **Invoice method :** C. uses two different invoice methods: fixed price and invoicing a certain percentage of the appraisal value. When invoicing based on a percentage of the appraisal value is chosen, an increase in insured value, does not mean that the amount to be invoiced should increase proportional. Based on a negotiation with the customer the price has to be set. To change a price in Dynamics NAV, several people need to be involved. However, within C. only one employee is changing prices. This leads to one person making a lot of clicks in different roles, to adjust the price.
2. **Posting over periods:** It is not possible to post an invoice over multiple periods. C. did not had this functionality in the old ERP system either and solved this manually with journal entries. However, C. wishes to have this functionality in a new ERP system.

HRM and payroll

3. **HRM and payroll:** C. wanted to have this functionality in Dynamics NAV. According to the head IT, this standard functionality was not what C. was looking for. C. wants employee self-service and management self-service. According to the head IT, the current standard leads to an impairment instead of the planned improvement.

Business specific

4. **Project:** The industry specific bolt-on is mainly designed for business services like lawyers, accountants etc. They start a project for each customer and post hours on these projects. A valuation is also a project, but it also has to be linked to a physical location. Also a project needs to be closed in Dynamics NAV, but for C. a valuation never ends and comes back after three or six years. Within C. a valuation is more a continuous process, than a project. These functionalities were not present in Dynamics NAV.
5. **Retain value for location:** After a valuation, for each location different values should be retained for that specific location. This functionality is missing in the standard.
6. **Historical data:** C. uses historical information for the future. After six years, an valuation report expires for buildings and after three years for inventory. Therefore, a lot of documents were transferred to the new ERP system. This conversion had some problems, which were solved in the end. However, the employees do not trust the information in Dynamics NAV anymore and keeps using the old information system. The users argue that they need a custom made interface to search for historical data.
7. **Centralized data management:** In Dynamics NAV, the information about projects is located at the centralized administration. C. consists of several subsidiaries, with their own Dynamics NAV administration. Those subsidiaries take care of their own financial administration. The centralized administration and the decentralized administrations continuously communicate, but the decentralized organization does the invoicing. However, it is not possible to make adjustments in the decentralized administration. So in case a user wants to make adjustments, it has to switch between the centralized and decentralized administrations.

When switching between databases, a user cannot see in which database it is working leading to problems.

8. **Project number:** From the past, the appraisers of C. think in locations. A valuation is a project in Dynamics NAV, so standard Dynamics NAV shows project numbers. However, it is hard for the appraisers to remember and think in project numbers.
9. **Hours remaining:** The appraisers want to know how many hours are posted on a project and how many hours are remaining. Dynamics NAV does not show this information.
10. **Approving posted hours:** Posted hours need to be approved by several roles in Dynamics NAV. According to the users of C. this process is too bureaucratic and posted hours need only be approved by one manager.
11. **Offer:** The sales department only entered orders in the old ERP system. Dynamics NAV offers the possibility to enter offers correctly and promote this to an order. The advantage is that once an offer is entered correctly, little adjustments are needed later in the process. However, the employees of the sales department are resisting this change. They argue that they have a lot of extra work. When an offer is not accepted, they think that the work was done for nothing. Management argues that they need this information in the system.
12. **Increasing number of operations:** The number of operations in the ERP system has been increased and employees are complaining about it. They have to do more to enter all required information. However, management decided to enter more information in the new ERP system, to make better use of the possibilities of Dynamics NAV and make better decisions. Employees attribute this extra work to the ERP system and argue that the old ERP system was better. For instance, in the old situation, it was only possible to see whether a project was finished or on-going. After the implementation, management wanted to know the exact status of a project when it is on-going. This requires the input of additional data, which the user experiences as unnecessary.
13. **Lay-out:** The standardized lay-outs in Dynamics NAV are very poor. Besides it is not possible for anyone of C. to adjust these basic lay-outs. Therefore, C. has to hire someone to adjust the lay-outs. So, C. is missing the functionality to adjust the lay-outs itself.
14. **Reporting:** The reporting functionality is poor. Only standardized reports are possible and it is not possible to play with and change these reports. Most reports contain too much or wrong information. Reports with correct information is needed for the Key Performance Indicators (KPI's) and making decisions.
15. **Overview:** An overview does not contain all information needed. In Dynamics NAV it often happens that a user needs to navigate between different screens and departments to get the required information. According to users this is not ideal when calling with a customer. In the old ERP system all information was in one screen.
16. **Large projects:** According to the head IT, the system is designed mainly for large projects. Entering a small project costs relatively much time. Currently, C. is looking whether it is possible to build something for smaller projects. However, the head IT indicates that they prefer following the standard.
17. **Assigning appraiser:** In the standard it was not possible to assign an appraiser to a project. This functionality is needed, because every project has an appraiser.
18. **Expiration date:** When a valuation expires, C. wants to receive a notification, because after the expiration date of a valuation, there could be possible new work.

19. **Customer categorization:** The sales department wants to indicate whether a customer is platinum, gold or silver. This functionality is not in standard Dynamics NAV. This functionality was not present in the old ERP system.
20. **Blocking customers:** In Dynamics NAV, a contact exists of multiple customers. It is not possible in the standard system to block single customers (only whole contacts can be blocked). However, sometimes a customer who does not pay needs to be blocked, but not necessarily the whole contact, because other customers of that contact could be good payers.
21. **Blocking resources:** For some customers only a few appraisers can be used (based on expertise). However, it is not possible in the standard software to block resources for a certain project.
22. **Filter:** After setting a filter, the filter is saved in Dynamics NAV. However, when a user uses the system again, it often does not know the filter has been saved, leading to problems.
23. **Interface valuation data system:** C. uses a separate system to capture valuation data like photos, reports etc. According to the consultant this functionality is present in the standard software. However, C. insisted in using the separate system instead of Dynamics NAV for this functionality. Therefore an interface between those two systems had to be made.
24. **Postal code:** Employees of C. are used to search for postal codes based on the street name. This functionality is not present in the standard software. The consultant states that the users could not quantify how often they use this functionality.
25. **Definitions:** A lot of definitions were not the same in the new ERP system. For instance, a project in Dynamics NAV has an end date, but within C. they call this an expiration date.
26. **Excel export:** A project could contain multiple appraisers. When exporting information about a project to Excel, the field of 'appraiser' only contains the name of one appraiser, instead of all appraisers. In export files C. is missing important information.
27. **No error:** When a user forgets to enter some fields in an order, the system gives no error. Later in the process people notice that not all required information was entered, leading to problems. According to the users, Dynamics NAV does not guide users enough.
28. **Quick order:** When an appraisers goes to a customer, the order needs to be entered first. When the order is not entered, the appraiser cannot go. An accelerated procedure is needed when an appraiser needs to go to the customer immediately. According to the employees of C. it should be possible to enter an order in a quick way, but they do not know how to do this.
29. **Number of tabs:** Dynamics NAV has too much tabs according to the users. The number of tabs should be decreased to make the system less complex.
30. **Inserting too much:** According to the employees, Dynamics NAV forces users to insert too much information. "Dynamics NAV is too labor-intensive". The user argues that most time losses are due to not knowing how the systems works and inserting too much information. The user is aware that the system offers also more output.
31. **Emergency order:** The employees of C. were missing functionality to show emergency orders in a list, so everyone knows which order has more priority. The users of C. do not know whether such functionality is in Dynamics NAV or not.
32. **Order sheet:** C. has a lot of customers, of which some are exceptions. The users of C. wants for every exception a different order sheet, because those exceptions need other information on the order sheet.. However, most exceptions occur a few times a year.

7 Solutions

Customization

- Project: Adding a location to a project has been custom made, by expanding the project table.
- Posting over periods: This functionality has been custom made, so it is now possible to post an invoice over multiple periods.
- Retain value for location: By making a customization it is now possible to retain different values for each location.
- Assigning appraiser: This functionality is customized. So it is now possible to assign an appraiser to a valuation.
- Expiration date: The table project revaluation has been made, which shows valuations which have to be revaluated within a specific amount of time.
- Customer categorization: The functionality to categorize a customer has been custom made.
- Blocking customers: By making a customization it is now possible to block single customers.
- Blocking resources: By making a customization it is now possible to block resources for a valuation.
- Interface valuation data system: The interface has been made, so it is possible for the two systems to communicate.
- Postal code: According to the consultant, management wanted this functionality, because otherwise the users would not accept the new ERP system.
- Definitions: Those definitions has been changed to the definitions they wanted, by adjusting the names in the tables.
- Reporting: The required reports are customized.

According to the financial controller, 20% is custom made by the ERP vendor. A number of customization request were not accepted, because this went sometimes too far. For instance, users were asking for buttons and field in various screens, because the user thought this to be convenient. According to the head IT, C. has to be critical for every request, because many request are not critical.

The consultant states that some customizations could be avoided. The reason for this superfluous customizations were not having optimised and clear business processes.

Workaround

- Project number: By entering the project location in the description field, the appraisers can see the location of a valuation. They have chosen this solution, because a customization became too expensive.
- Emergency order: The users have created an Excel file on a central server. When an order is an emergency order, they enter this order in the Excel file. Based on this file, other users know what orders have high priority.
- Reporting: They have bought JetReports for this functionality.
- HRM and payroll: They have bought the HRM and payroll module of AFAS to have this functionality. The vendor of Dynamics NAV is also working on a solution for this, but this solution is finished at the end of the year.

Accept misfit

- Invoice method: It is less efficient, but the system imposes to work like this, so it has to be accepted.
- Historical data: According to the financial controller this is a perceived misfit.
- Centralized data management: They have accepted that they have to switch between administration to make adjustments.
- Hours remaining: They have chosen to accept the misfit, because the consultant indicated this would become very time consuming and expensive.
- Approving posted hours: They have chosen to accept the misfit, leading to more bureaucracy.
- Lay-outs: They have accepted that they have to hire a consultant every time a lay-out needs to be adjusted.
- Export Excel: They accept the misfit and know that they are missing appraisers in the Excel export.
- No error: They accept that the system does not give an error.
- Order sheet: They have chosen to have one standard order sheet, and not to make an order sheet for every exception.

Adjust process

- Offer: The sales department has to enter offers in the ERP system. This has several advantages. All data has to be entered once and the system contains more information. In the previous process, the financial department had to correct and enter more information. The interviewed user agrees with this.
- Increasing number of operations: Employees have to enter more information than before. For instance the status of a project.

8 Timeline

- January 2009: Implementation started
- October 2010: ERP system went live.

9 Live

Upgrades and updates are a problem according to the Head IT, because there has been made some customizations. It is expensive and time consuming to modify this customizations to function in the updated/upgraded software. Therefore, the starting point is to follow as much as possible the standard. However, the head IT states that it is not possible to avoid customizations, because some functionality is really needed. But the updated/upgraded version of the software contains useful functionalities, so it is a dilemma whether to upgrade/update or not.

10 Gespreksverslagen

Uitwerking 3.1

Rol: Financial controller
Datum: 15-6-2012

Organisatie
C. is groot in taxaties voor zowel roerende als onroerende zaken. Dit doen ze voor twee doeleinden:

- Verzekeringsdoeleinden;
- Bedrijfseconomische doeleinden.

Dit is het grote onderscheid. Voor de twee doeleinden verschillen de waarderingsgronden. Voor verzekeringstaxaties, gaat het erom wat iets kost en wat de verzekering moet betalen voor iets nieuws. Voor bedrijfseconomische doeleinden gaat het bijvoorbeeld om de waarde van een pand als men het wil verkopen.
Daarnaast is er ook nog een apart bedrijf genaamd C. XXX, wat schadeafhandelingen doet als contra-expertise. Dit wordt gedaan voor de verzekerde.

De strategie van C. is om zo goed mogelijk de waarde van roerende en onroerende zaken te bepalen. C. is niet de goedkoopste, maar is wel marktleider op het gebied van taxaties en expertise. C. staat bekend als betrouwbaar en heeft voornamelijk grote klanten.

Implementation

- De insteek van de implementatie was dat het systeem leidend werd voor de ondersteunende processen. Volgens De financial controller betekent dit dat de afdeling HRM en financiën zich moeten schikken naar het systeem en de standaard moeten volgen, behalve als ze hele goede argumenten hebben dit niet te doen. Volgens De financial controller is de achterliggende gedachte dat men zich op deze processen niet hoeft te onderscheiden. De financial controller geeft aan dat voor het onderdeel taxaties de standaard Dynamics NAV plus de branche specifieke standaard van de leverancier zijn geïmplementeerd. Daaromheen zit volgens De financial controller 20% maatwerk. Dit maatwerk is ontwikkeld door de leverancier.
- Men is ruim twee jaar bezig geweest met de implementatie en heeft zowel uitloop in tijd (>1 jaar) als budget (“ruim over budget”) gehad, wat door De financial controller te wijten valt aan het ontwikkelen van het maatwerk, moeilijke dataconversie en een gebrek aan voortschrijdend inzicht. De implementatie is een aantal keer uitgesteld. Sinds oktober 2010 is men (geforceerd) live gegaan met Dynamics NAV. “Toen bleek wonderwel dat het allemaal goed liep”.

Fit
<u>Financieel</u>
Ondanks dat de afdeling financiën de standaard moest volgen, vond men dat het systeem niet helemaal aansloot bij wat men zou willen. Men was gewend met Exact te werken en vond dat Dynamics NAV een aantal tekortkomingen had.

Taxatie

De branche specifieke add-on is met name ontwikkeld voor de zakelijke dienstverlening zoals advocaten, accountants etc, die zo projecten per klant kunnen registreren, waarop ze bijvoorbeeld uren kunnen schrijven. Alleen is een taxatie niet alleen een project, het moet ook gekoppeld zijn aan de locatie van een klant. Dit was wat men voornamelijk miste in de branche specifieke standaard van de leverancier. Op deze manier zijn de bedrijfsprocessen van C. zo goed als hetzelfde gebleven als in de oude situatie. “We hebben niet zoveel procesveranderingen gedaan”.

Misfits

Financieel

- Na 6 jaar vervalt een taxatierapport van een gebouw en na 3 jaar vervalt een taxatierapport van inventaris. Dit betekent dat je na deze vervaltermijn een nieuwe taxatie moet doen. Omdat je dan inzicht wilt in de oude taxatie (wie, hoe, wat, waar, wanneer etc.), zijn deze oude rapporten van belang. “C. rust veel op het verleden om de toekomst te bepalen”. Hierdoor zijn er veel zaken in de conversie overgezet naar het nieuwe systeem. Het probleem hierbij was dat de bestandsformat van het oude systeem niet helemaal strookte met het nieuwe systeem en hierbij zijn wat problemen geweest. Het gevolg hiervan is dat men niet vertrouwt op de data in het nieuwe systeem en nog steeds het oude systeem gebruikt. De medewerkers van de afdeling financiën willen dat er maatwerk wordt gemaakt, zodat men net als voorheen de historische data terug kan vinden. Dit verzoek is niet gehonoreerd.
- C. heeft een aantal factuurmethodes: op vaste prijs en op promillage (factureren van een promillage van de verzekerde waarde). In het geval de verzekerde waarde verandert bij het factureren op basis van promillage, dan betekent dit niet dat automatisch het te factureren bedrag evenredig meeveranderd. Dit moet opnieuw worden besproken met de klant. De backoffice handelt de facturen af, maar volgens het systeem moet de financiële afdeling hier ook bij meedoen. De prijsaanpassing in het systeem vereist teveel stappen bij iedere prijsaanpassing, waardoor het proces niet efficiënt is. Deze stap kan overgeslagen worden, waardoor iemand in het systeem alle klikken achter elkaar moet doen.

Taxatie

- Centraal gegevens beheer: In Dynamics NAV worden de projecten bijgehouden in een centrale administratie. Daaronder hangen de decentrale bedrijven, waarin de financiële administratie wordt afgehandeld. Bij deze decentrale bedrijven wordt een onderscheid gemaakt tussen taxaties en een apart bedrijf kunsttaxaties. Er is continu verkeer tussen een decentrale administratie en de centrale administratie, maar de decentrale administratie factureert uiteindelijk. In de decentrale administratie kan men niets aanpassen, dus als men iets wil wijzigen, moet men steeds in- en uitloggen in verschillende administraties. Dus degene die factureren switchen vaak van administratie. Hierbij kan men in Dynamics NAV niet zien in welke administratie men zit, wat leidt tot problemen. Zo komt men bijvoorbeeld met vragen dat men niets meer kan en dan blijkt dat men in de verkeerde database zit te werken.

Maatwerk

Het maatwerk omvat 20% volgens De financial controller en is ontwikkeld door de leverancier. Dit is erg lastig, aangezien je steeds zegt wat je wilt, een functioneel ontwerp terugkrijgt en je vervolgens dit functioneel ontwerp moet lezen en je nog niet ziet hoe het er in het echt uitziet. Het is lastig om

op basis van dit functionele ontwerp te beoordelen of het systeem zo gaat doen wat jij als gebruiker wilt dat het gaat doen. Het is een aantal keer voorgekomen dat hetgeen gebouwd niet precies was wat men wilde hebben. De financial controller geeft aan dat één van de valkuilen is dat de leverancier onderschat heeft wat men bij C. wilde. Hierbij merkte De financial controller een groot verschil tussen Sales en de uitvoering door de leverancier.

Financieel

- In Dynamics NAV is het niet mogelijk om over periodes heen te boeken. Als je een factuur binnenkrijgt, dan kun je met deze functionaliteit deze factuur over meerdere periodes verdelen. Bij het niet hebben van deze functionaliteit, moet men dit handmatig met journaalposten oplossen. Dit heeft men vooralsnog altijd zo gedaan. In de nieuwe versie van Exact zou deze functionaliteit opgenomen zijn, daarom had men de wens dat dit in het nieuwe Dynamics NAV zou zitten. Hiervoor is vervolgens maatwerk opgeleverd.

Taxatie

- Een taxatie is een project waarop men o.a. uren kan schrijven. In de taxatiebranche, is het echter van belang dat de taxatie gekoppeld is aan de locatie van een klant, bijvoorbeeld als het om een gebouw of inventaris gaat. Deze informatie is belangrijk voor de taxatie. Dit miste in de standaard en daarvoor is maatwerk ontwikkeld.
- Vervolgens houdt men van deze locatie de waardes vast, zoals de verzekerde waarde, getaxeerde waarde, opruimingskosten etc. Dus het is belangrijk dat er een aantal criteria die belangrijk zijn voor een taxatie kunnen worden vastgehouden aan een locatie. Dit is wat ontbrak en hiervoor is maatwerk ontwikkeld.

Workarounds

- Projectnummers: De taxateurs van C. zijn vanuit het verleden gewend in locaties te denken en niet in projectnummers. Echter weergeeft Dynamics NAV alleen projectnummers en geen locatie. Het is moeilijk om projectnummers te onthouden. Dit heeft men opgelost door de locatie in het omschrijvingsveld in te voeren. Men heeft dit zo opgelost, omdat het anders te duur werd.

Tekortkoming geaccepteerd

- De taxateurs willen weten hoeveel uur ze al hebben geschreven op een project en hoeveel uur ze nog kunnen schrijven. Dit wordt in Dynamics NAV niet weergegeven. Deze tekortkoming heeft men geaccepteerd, omdat de leverancier aangaf dat dit erg veel tijd en geld zou kosten.
- Op het moment dat ingevoerde uren moeten worden goedgekeurd, is het volgens De financial controller te bureaucratisch. Het gaat naar diverse personen. Men vindt bij C. dat slechts 1 manager dit hoeft te accorderen, waarna de uren geboekt kunnen worden.

Processen aangepast

- Sales registreerde in het oude systeem alleen orders en niets van offertes. In het nieuwe systeem is men dit wel bij gaan houden. Het voordeel hiervan is dat als je de offerte goed invoert, je hier vervolgens later weinig meer aan aan hoeft te passen. Voorheen deed men dit later in het proces op de afdeling financiën. Dit is dus naar voren verschoven. Dit heeft tot

weerstand geleid. Vooral als een offerte niet doorgaat, heeft men het idee dat het voor niets is ingevoerd. Vanuit C. wil men deze informatie toch in het systeem hebben.

Weerstand

- De afdeling financiën kijkt nog steeds in het oude systeem, omdat men niet vertrouwt op de data in het nieuwe systeem, of men kan de data in het nieuwe systeem niet vinden. Daarnaast nemen ze volgens De financial controller ook niet de moeite om het in het nieuwe systeem op te zoeken.
- De afdeling verkoop moet in de nieuwe situatie ook offertes invoeren. Men vindt dit overbodig, omdat niet alle offertes doorgaan en daarom wil men dit niet doen. Men 'dramt' nog steeds om de offertes versimpelt in te voeren.

Change management

- Voor de implementatie was een stuurgroep opgericht met daaronder projectgroepen. De medewerkers zaten in de projectgroepen en konden daarin meebeslissen en praten over de inrichting van het nieuwe systeem. Het gevaar hiervan is volgens De financial controller dat mensen op hun oude manier willen blijven werken.
- Na de oplevering van een stuk maatwerk moesten de gebruikers hier vervolgens naar kijken. Een valkuil hierbij was dat mensen weinig tijd hadden en niet of gedeeltelijk keken naar de verandering, waardoor later weer problemen naar boven kwamen als men er echt mee moest gaan werken.
- Er zijn key-users aangesteld.
- De gebruikers hebben training gehad. In het begin hebben ze een knoppencursus gehad. Vervolgens hebben ze een interne training gehad on the job, waarbij men uitleg kreeg van de key-users op de afdeling. Deze training is vlak voor de live-gang gegeven.
- De gebruikers gaven aan dat de communicatie slecht is. Volgens De financial controller komt dit omdat niet alle verzoeken zijn gehonoreerd en dat ze zich daardoor niet gehoord voelen.
- Het management van C. was vertegenwoordigd in de stuurgroep. Zo zat de financieel directeur van het onderdeel taxaties in de stuurgroep.

Uitwerking 3.2

Rol: Head IT
Datum: 15-6-2012

Adoption

Het oude systeem voor expertise en BBC was Exact. Voor het onderdeel taxaties had men zelf (intern) een systeem gebouwd. De volledige financiële administratie werd in Exact gedaan, dus ook voor het onderdeel taxaties. Dit was begonnen met een standaard, maar door de jaren heen, is dit systeem steeds verder uitgebouwd op gebruiker specificatie. Dit systeem is 15 jaar gebruikt.

Men heeft besloten over te stappen naar een nieuw (standaard) systeem, omdat het oude systeem volgens het hoofd IT 'op' was. De apparatuur en programmatuur die hiervoor werd gebruikt raakte steeds meer verouderd. Daarnaast was er teveel aangebouwd. Het hoofd IT geeft aan dat de gebruikers verwend waren geraakt, omdat veel van hun eisen werden gemaakt door de systeemontwikkelaar.

Acquisition
Het ERP systeem heeft een ondersteunende functie voor C. De scope van de implementatie was alle vestigingen van C. in Nederland.

Men heeft in de markt rondgekeken en kwam tot een shortlist van Exact, AFAS en Dynamics NAV. Deze hebben een presentatie gehouden. Hierna is men tot de conclusie gekomen dat Dynamics NAV het beste aansloot en men had hierbij het beste gevoel. Vervolgens is men naar de Microsoft gestapt die een leverancier aanbeval.

Implementation
Hetgeen geïmplementeerd is, is het standaard Dynamics NAV in combinatie met de branche specifieke oplossing van de leverancier. Deze branche specifieke oplossing is een module gericht op werken in projecten.

De eerste opzet was om Dynamics NAV in zijn geheel in te zetten voor alle onderdelen van C. Dynamics NAV is alleen geïmplementeerd voor het verzekeringsstuk. Het bedrijfseconomische stuk wordt financieel afgehandeld in Dynamics NAV, maar de projectadministratie zit in het oude systeem, Exact. Voorheen had men een apart pakket voor HRM en payroll, dit wilde men nu ook gaan afhandelen in Dynamics NAV.

Misfits
<u>Taxatie</u>

- Na anderhalf jaar is het systeem nog steeds niet door iedereen omarmd en ziet men nog steeds niet de toegevoegde waarde van het ERP systeem. Men vind dat het systeem teveel handelingen omvat (grootste klacht). Dit komt mede omdat men het systeem vanuit C. beter wil gaan gebruiken en dus meer zaken wil registreren. Bijv. in de oude situatie kon men alleen zien of een project lopend was of klaar was. Nu wil men kunnen zien als het lopend is, wat de status dan is. Dit vereist de invoer van extra data, wat de gebruiker als onnodig ervaart.
- Het lay-out stuk valt erg tegen volgens Het hoofd IT. Met de standaard lay-outs van Dynamics NAV kun je niet veel en daarom moet er iemand ingehuurd worden om de lay-outs aan te passen. Vooraf wilde men wel dat men dit zelf zou kunnen doen, maar dit kan dus niet.
- Ook het rapportagestuk valt tegen en daarom heeft men een ander pakket aangeschaft: JetReports. Met dit pakket kun je in een Excel-achtige omgeving die met de database communiceert managementrapportages opstellen. Op basis hiervan worden de KPI's bijgehouden.
- Het systeem is volgens Het hoofd IT met name gebouwd voor grotere projecten. Hierdoor kost een klein project relatief veel tijd. Men is nu aan het kijken of hiervoor iets gebouwd kan worden, maar Het hoofd IT geeft aan dat men in principe bij de standaard wil blijven. Het hoofd IT geeft aan dat het systeem hierin wel tekort schiet en niet goed aansluit op het verwerken van offertes voor kleine projecten, aangezien alles hiervan moet worden ingevoerd.

<u>HRM en salarisadministratie</u>

- Men wilde de HRM en salarisadministratie functionaliteit geïntegreerd hebben in Dynamics NAV. Deze deed echter niet wat C. wilde hebben (employee self service (ESS) en management self service (MSS)). Volgens Het hoofd IT zou dit leiden tot een verslechtering en niet tot de verbeteringsslag die men zou willen. Hierop heeft men besloten de integratie los te laten en voor deze functionaliteit de standaard van AFAS te nemen. Omdat deze functionaliteit helemaal los ligt van de rest, vond men het geen probleem dit systeem los te kopen. Deze functionaliteit werd ook ontwikkeld door de leverancier voor Dynamics NAV, maar omdat men dan nog een half jaar zou moeten wachten, is toch gekozen voor AFAS.

Maatwerk

- Het was in de standaard niet mogelijk om een taxateur aan een project toe te wijzen. Dat kon niet met de standaard en hiervoor is maatwerk ontwikkeld.
- Een taxatierapport heeft een vervaldatum. Men wil weten wanneer het taxatierapport vervalt en wanneer er dus mogelijk nieuw werk ontstaat voor C. Hiervoor wil men een melding ontvangen. Dit is ook maatwerk geweest.
- De afdeling sales wilde aan kunnen geven of een klant zilver, platina of goud is. Dit is op maat gemaakt.
- Uit een contact komen in Dynamics NAV klanten voort. In Dynamics NAV is het niet mogelijk om klanten te blokkeren. Dit heeft men op maat laten maken.
- In Dynamics NAV kun je geen resources voor een project blokkeren. Bijvoorbeeld voor een bepaalde klant mogen alleen een aantal taxateurs worden ingezet. Dit heeft men op maat laten maken.

Een aantal maatwerk verzoeken zijn niet gehonoreerd, omdat die te ver gingen. Dit ging om zaken als een veldje of een knop ergens bijzetten, omdat de gebruiker dit ‘wel handig vond’. Deze staan in een issuelijst die doorgestuurd wordt.
Door eisen en wensen wil men nieuw maatwerk, hiermee moet men oppassen, omdat niet alles nodig is. Wel worden er verzoeken gehonoreerd.

Weerstand

- Een deel van het personeelsbestand werkt al lang bij C. en dus ook lang met het oude ERP systeem. Hierdoor was er volgens Het hoofd IT de nodige weerstand tegen de verandering en onkunde.

Onkunde

- Men weet niet genoeg van het systeem en probeert ook niet genoeg uit. Zo blijft het filter bij Dynamics NAV opgeslagen, wat leidt tot problemen. Men heeft hier geen weet van. Ook weten mensen bijvoorbeeld niet dat je makkelijk exportjes kunt maken naar Excel etc.
- Het hoofd IT geeft aan dat volgens hem mensen tegenwoordig hoger opgeleid moeten zijn om met het systeem overweg te kunnen, dan voorheen. “het is minder recht toe recht aan”.

Overige

- Omdat je kiest voor de branche specifieke oplossing van een leverancier, zit je vast aan die leverancier.

- De dataconversie is niet goed gelukt. Men heeft niet goed bepaald wat wel en wat niet mee over te nemen. Nu is zowat alles over en staat er 'teveel' in het nieuwe systeem. Hierdoor is het databestand vervuild. Het hoofd IT geeft aan dat dit deels komt omdat het personeels-bestand verouderd is. Deze kennen alle oude opdrachten nog en willen hiervan meer meenemen dan nodig is.
  In het oude systeem kon men per relatie maar maximaal 4 locaties kwijt. Bestond een relatie uit meerdere locaties, dan maakte men nog een relatie aan. In het nieuwe systeem kan een oneindig aantal locaties aan een relatie worden gekoppeld. Deze zijn in het nieuwe systeem gezet zonder deze 'dubbele' relaties samen te voegen. Nu wordt er dus op verschillende relaties die eigenlijk dezelfde zijn, projecten ingevoerd, terwijl dit allemaal op 1 relatie zou moeten.
- Upgrades/updates zijn een probleem, aangezien het veel tijd en geld kost om maatwerk aan te passen. Toch moet men updates doorvoeren, aangezien men anders geen ondersteuning bij problemen krijgt van de leverancier. Daarom is het uitgangspunt om zo min mogelijk aan te passen. Toch ontkom je niet aan maatwerk, omdat je bepaalde functionaliteit moet hebben. Daarnaast bevat de update functionaliteit die erg handig kan zijn en die je ook graag wilt hebben.

Uitwerking 3.3

Rol: Consultant (leverancier)
Datum: 22-6-2012

De consultant is gespecialiseerd in de add-on voor de zakelijke dienstverlening.

Adoption
De reden om een nieuw ERP systeem te nemen was om niet meer afhankelijk te zijn van het zelf ontworpen systeem. Het afhankelijk zijn van maatwerk kent een aantal risico's die zo worden vermeden.

Implementatie
De consultant geeft aan dat de implementatie bij C. een "special case" was. Wat is geïmplementeerd is standaard Microsoft Dynamics NAV, aangevuld met een branche specifieke oplossing voor de zakelijke dienstverlening.

Tijdens de implementatie is een analyse van de bedrijfsprocessen gemaakt en hiervan zijn procesbeschrijvingen gemaakt. Deze waren nog niet aanwezig binnen C.

Tijdens de implementatie is het nodige maatwerk geleverd. Voor het financiële stuk niets of nauwelijks, maar voor de bedrijfsspecifieke processen van C. is het nodige maatwerk geleverd. De consultant geeft aan dat een deel van het maatwerk voorkomen had kunnen worden. Bij C. had men de bedrijfsprocessen niet geoptimaliseerd en inzichtelijk.

Weerstand/kennisgebrek/wensen
- De gebruikers van het ERP systeem bij C. hebben jarenlang op dezelfde manier gewerkt. Nu dwingt een nieuw ERP systeem opeens de gebruikers net iets anders te gaan werken. Dat leidt tot weerstand.

- Het management, die heeft besloten een nieuw ERP systeem te implementeren, ziet de voordelen van het nieuwe systeem in. Volgens de consultant ervaren de gebruikers het nieuwe systeem eerder als last. Zo moeten de gebruikers meer informatie vast leggen, zodat er later in het proces minder werk gedaan hoeft te worden, het minder foutgevoelig is en er meer managementinformatie uit te halen valt. Hierbij zagen de gebruikers niet direct het voordeel en het nut van het systeem in.
- Volgens de consultant is er geïnvesteerd in maatwerk, omdat de gebruiker iets perse wilde, maar niet kon kwantificeren hoe vaak de functionaliteit nodig was. Hier zou de consultant zelf niet voor kiezen, omdat het zo moeilijk is bepaalde investeringen te verantwoorden. Een voorbeeld hiervan is het zoeken op postcode.

Change management

- De gebruikers hebben trainingen gehad. In het begin van de implementatie hebben de key-users een basistraining gehad, zodat ze mee konden praten over de inrichting van het systeem. Daarnaast hebben de eindgebruikers een specifieke gebruikerstraining gekregen. Deze training is er heel erg op gericht waar je op moet klikken om je werk te doen. De gebruikerstraining was zo dicht mogelijk tegen de live-gang gehouden.
- Het oppikken van het nieuwe systeem was voor de meeste gebruikers een hele overschakeling en is best moeizaam gegaan. Ze dachten vaak hoe ze het voorheen deden en hoe ze dit vervolgens hetzelfde konden doen in het nieuwe systeem.
- Na het live-traject is live begeleiding gegeven. Hieronder valt het antwoord geven op vragen en het oplossen van problemen die over het hoofd gezien zijn. Volgens de consultant was dit redelijk verlopen, maar waren de gebruikers niet heel erg tevreden over de doorgevoerde verandering.
- Gebruikers hebben trainingsdocumentatie gekregen. Daarnaast heeft C. tijdens de implementatie voor hun eigen gebruikers werkinstructies gemaakt.

Fit

De fit van het financiële deel van Dynamics NAV met de financiële processen van C. was goed volgens de consultant. De fit met de core business daarentegen was minder. De branche specifieke oplossing is ervoor bedoeld om uren te schrijven in projecten. Op basis van deze uren wordt vervolgens gefactureerd. De processen van C. wijken hier sterk van af.

Misfits

- **Locatie:** Waar moet er getaxeerd worden. Dit Wordt niet door de standaard ondersteund.
- **Verdienmodel:** De standaard is erop gericht dat het verdienmodel gebaseerd is op de geschreven uren. C. wil wel uren verantwoorden, maar de prijs wordt niet bepaald door deze uren. Bij C. komt de prijs tot stand op basis van een percentage van de taxatiewaarde. Volgens de consultant is er ook geen standaard oplossing die specifiek is gericht op taxateurs.
- **Project:** In de standaard is een project een project met een begin en een einde. Bij C. is een taxatie een project en dit heeft niet echt een eindpunt, omdat een taxatie terug blijft komen (bij veranderingen aan het object en door de wet). Men grijpt hierbij steeds terug op eerdere taxaties. In Dynamics NAV moet je echter een project afsluiten. Het is bij C. meer een doorlopend proces, dan een projectmatig proces.

- **Systeem taxatiegegevens:** Men gebruikte een apart systeem om taxatiegegevens vast te leggen, zoals foto's, taxatieverslag etc. Men wilde dit perse in dit losse systeem houden, terwijl het volgens de consultant mee had kunnen worden genomen in de implementatie. Hierdoor heeft men een koppeling moeten maken.
- **Postcodes:** Bij C. was men gewend om postcodes te zoeken op basis van straatnaam. Deze functionaliteit zit niet standaard in Dynamics NAV (andersom wel). De consultant geeft aan dat men niet kon kwantificeren hoe vaak men postcodes nodig heeft, anders kon men dit ook via internet opzoeken. Toch wilde het management deze functionaliteit perse in het systeem, omdat anders de gebruikers het niet zouden accepteren.
- **Termen:** Veel termen voldeden niet aan de termen die de gebruikers gewend waren te gebruiken. Zo is een project in Dynamics NAV bij C. een taxatierapport. En heeft een project in Dynamics NAV een einddatum, maar hanteert men bij C. de term vervaldatum. Dit is aangepast in het systeem.

Volgens de consultant dwingt het systeem een strak proces af. Bij C. had men de workflow niet goed in kaart gebracht en iedere afdeling heeft net een iets andere werkwijze die met één systeem geautomatiseerd moeten worden. Hierbij is er veel discussie geweest tussen de gebruikers over hoe het ERP systeem in te richten.

Overige
Volgens de consultant het is het doel bij de implementatie van een ERP systeem niet om de bedrijfsprocessen te veranderen. Deze bedrijfsprocessen moeten op orde zijn. Op basis hiervan selecteer je een zo goed mogelijk passend pakket. Misfits kunnen vervolgens opgelost worden door het proces te conformeren aan het systeem.

Uitwerking 3.4

Rol: Medewerker planning en controle
Datum: 27-6-2012

De taak van de medewerker planning en controle is om voor een project (taxatie) de meest geschikte taxateur te plannen in het project. Iedere taxateur heeft zijn eigen expertises. Zo zijn er taxateurs die gespecialiseerd zijn in landbouw. Op het moment dat er dan een taxatie moet worden gedaan van een stal, dan is deze taxateur het meest geschikt. Hetgeen waar deze medewerker planning en controle Dynamics NAV voor gebruikt is om de taxateurs aan de juiste taxatie te koppelen in het systeem en voor managementinformatie.

Tekortkomingen

- **Management rapportages:** De benodigde managementrapportages voor de planning en controle afdeling voldeden niet in de standaard en zijn op maat gemaakt. De standaard overzichten boden teveel en verkeerde informatie. Een project bevat erg veel informatie en voor de planning is maar een beperkte hoeveelheid data nodig. Vervolgens is dit op maat gemaakt.

- **Excel export:** Aan een project kunnen meerdere taxateurs gekoppeld zijn. Bij een export naar Excel, kan er maar één taxateur in het veld 'taxateur' staan. Zo mist men in de exportbestanden dus belangrijke informatie. Dit is nog niet opgelost.
- **Overzicht:** Een overzicht bevat niet alle informatie die nodig is. Het is altijd wel nodig om naar andere schermen te klikken, "je moet bladeren of zelfs naar andere afdelingen". In het oude systeem was dat niet. Dit is met name vervelend als men een klant aan de lijn heeft.
- **Invoer vergeten:** Er moet zoveel ingevoerd worden dat je weleens iets vergeet. Dynamics NAV geeft dan vervolgens geen foutmelding waardoor je er in een later stadium achter komt dat je informatie niet hebt ingevoerd en het dan voor problemen zorgt. Dus Dynamics NAV stuurt te weinig volgens de medewerker planning en controle.
- **Versnelde order:** Als een taxateur direct weg moet, dan moet er een versnelde procedure zijn en moet het niet zo zijn dat de taxateur moet wachten totdat alle gegevens in Dynamics NAV ingevoerd staan. Men heeft geprobeerd een versnelde procedure, met alleen de noodzakelijk informatie in Dynamics NAV, te maken. Maar dit werkt niet, omdat je zo in de knel komt achteraf, omdat je niet weet wat je wel en niet hebt ingevoerd. Ze missen dus een versnelde procedure. Volgens de medewerker planning en controle zou het wel moeten kunnen in Dynamics NAV, maar men weet niet hoe. "het zou op zich wel mogelijk moeten zijn".

Opleggingen

- Volgens de medewerker planning en controle, moet er veel meer vastgelegd worden in Dynamics NAV dan voorheen. Wel kun je meer output krijgen met Dynamics NAV. Men is uiteindelijk met het nieuwe systeem langer bezig om zaken in te voeren. Dit is te wijten aan het niet goed kennen van het systeem en omdat er meer ingevoerd moet worden. Deze keuze is door de organisatie gemaakt. "Dynamics NAV is vele malen arbeidsintensiever".
- Er zijn teveel tabbladen. De meesten worden niet gebruikt, dus dit kan een stuk minder.
- **Urenregistratie:** De taxateurs schrijven op ieder project hun uren in een apart urenregistratiesysteem. Deze informatie is nodig in Dynamics NAV voor facturatie. Om de uren in Dynamics NAV te krijgen, moet men twee extra stappen doen (accorderen door manager in urenregistratie systeem en omzetten uren van urenregistratiesysteem naar Dynamics NAV. Soms duren deze twee extra stappen een week of twee weken, waardoor men niet op tijd kan factureren. Voorheen had men dit probleem niet en kon dit één op één worden gedaan.
- **Status:** Sinds de implementatie is men gebruik gaan maken van statussen voor projecten. Hierdoor kun je bij bepaalde statussen sommige functionaliteit niet uitvoeren. Bijvoorbeeld als een project op status "wijzigen" staat, kan een taxateur zijn uren niet kwijt (dat kan pas als het een status verder is). Volgens de medewerker planning en controle is het werken met statussen niet nodig, omdat je altijd kan zien wanneer iemand welke handeling heeft uitgevoerd voor een project en weet je ook waar een project zich bevindt.

Weerstand/Kennis Dynamics NAV

- In het begin was er vel weerstand tegen de verandering en wist men niet goed hoe het systeem werkt. Ook een jaar na de implementatie is men nog vrij negatief.
- "er is zoveel mogelijk in Dynamics NAV, dat ik niet durf te zeggen of ik functionaliteit mis".
- Aanvankelijk stonden de werknemers heel negatief tegenover de implementatie.

- Dynamics NAV is een stuk ingewikkelder dan het oude systeem. Dit leidt tot frustraties, omdat mensen soms wel eens iets vergeten of langer bezig zijn.
- De medewerker planning en controle vraagt zich af of men het nut inzag van het nieuwe systeem.
- Aan het begin van de live-gang kwam het af en toe voor dat klanten later teruggebeld moesten worden, omdat ze er met het systeem niet uitkwamen.

Change management

- Op het moment van live-gang had niemand een zeker gevoel bij het systeem en waren er nog veel vragen.
- Van iedere afdeling is een key-user aangewezen en betrokken bij de inrichting.
- Binnen de organisatie zijn veel medewerkers werkzaam die op leeftijd zijn en een lange periode met het oude systeem hebben gewerkt.
- De gebruikers zijn op de hoogte gesteld van de implementatie en de communicatie naar de gebruikers was uitvoerig.
- De gebruikers hebben een “goede” cursus gehad.
- De een had meer moeite om om te leren gaan met het nieuwe systeem dan de ander.
- Er is uitvoerig getest.
- De gebruikers hadden inspraak, maar daar is niet altijd iets mee gedaan.
- De voor- en nadelen zijn gecommuniceerd.

Proces veranderd

- Over het algemeen is Dynamics NAV sturend geweest.
- Men is met statussen gaan werken.
- Aan de voorkant van het proces moet meer informatie worden ingevoerd, waardoor men achter in het proces minder hoeft te doen. Organisatorisch zijn er werknemers achterin het proces weggehaald (meer dan gehalveerd) en zijn deze aan de voorkant bijgeplaatst.

Perceived misfits

- **Excel bestand:** Men heeft een centraal Excel bestand aangemaakt wat door meerdere personen wordt gebruikt. In dit bestand zet men alle orders die eraan komen en of het spoed heeft of niet. Men weet niet of het mogelijk is om dit in Dynamics NAV te doen. “Wellicht is dit mogelijk in Dynamics NAV, maar weten we dit niet”. Men heeft ervoor gekozen dit zo op te lossen omdat dit in Dynamics NAV naar hun weten te tijdrovend zou worden.
- **Opdrachtformulier:** Er zijn in het klantbestand veel uitzonderingen die allemaal een ander opdrachtformulier nodig hebben. Er is vaak een verzoek geweest om opdrachtformulieren op maat te maken voor iedere uitzondering. Deze verzoeken zijn niet gehonoreerd.

Overige

- Volgens de medewerker planning en controle bevat Dynamics NAV teveel mogelijkheden en gebruik je 90% niet. Er is een heleboel mogelijk, maar dit maakt het soms ingewikkelder als je je werk gedaan wilt krijgen. Bijvoorbeeld: een klant en een project kunnen opmerkingen bevatten. Als je een opmerking op klantniveau zet, dan krijg je dit niet te zien op projectniveau.
- Soms werd op een maatwerk verzoek te snel nee gezegd, omdat men de praktijk niet kent.

APPENDIX E – ELABORATION CASE STUDY COMPANY D

Interviewees:

- Consultant;
- Head IT of D;
- System Developer A of D;
- System developer B of D.

1 Description company D

D. was established in 1998. D. is an organization that collects and processes waste for nine municipalities in the Netherlands. D. also manages environmental parks in those municipalities and takes care of street cleaning, transportation, cycle activities, and gritting. Besides serving civilians in the nine municipalities, D. helps organizations to manage their waste. The nine municipalities are shareholders of D.

D. has about 330 employees, of which 60 users of the ERP system Dynamics NAV. D. uses the ERP system to support their business processes. D. has an own software development department, consisting of three employees. This software development department has the knowledge to make customizations into Microsoft Dynamics NAV.

Strategy D.

The strategy of D. is to do everything as cheap as possible. They aim at being as efficient as possible. D. has contracts with the municipalities and has to determine each year for every municipality a budget. The lower the costs, the better they perform. D. does not aim to make profit, and wants to serve the citizens as good as possible.

2 Adoption

The main reason mentioned by the interviewees to adopt a new ERP system was because the old ERP system, named 'Clear' was outdated. During the ten years before implementation, the old ERP system was built exactly how the users wanted it. This has led to a system with a lot of customizations, not performing efficiently anymore.

Another reasons was that D. had a lot of separate computer systems, and wanted to have a more integrated information system. By implementing a new ERP system, D. (wanted to achieve consistency insert data at one location) and efficiency (insert data once). The ERP system will not replace all legacy system, but it will reduce the amount of systems.

3 Acquisition

By inquiry of the head IT, it became obvious that D. had not followed the traditional ERP selection route, where requirements and wishes are mapped leading to a long list, short list and ultimately to the best suiting ERP system. The head IT states that in 2006 there was only one software package which offered some functionality for the waste industry. This ERP system was Microsoft Dynamics NAV complemented with the industry-specific solution. Therefore, they have chosen to implement this system and customize it so it would fit the old way of doing business. Not having a good as possible fit in the beginning was no problem for D, because they have their own software development department.

In the waste processing business there are two main streams: purchasing and selling. Selling means collecting waste and getting paid. Purchasing means paying for the service to destroy the waste. These basic processes are supported by the industry specific module, and was missing in the standard Dynamics NAV. According to the interviewees, this was the main reason to purchase the industry specific module. The remainder functionalities of the industry specific module were very poor.

4 Implementation

Together with standard Dynamics NAV and the industry specific module, a maintenance module was implemented.

The implementation did not meet budget and time. The actual costs of the implementation were more than twice as high as the initial budget of 485.000. According to the system developer A, the implementation was around 1,5 year delayed. The project started in 2006 and the ERP system went live in 2008.

The head of the IT department and the consultant indicate that the main reason why the implementation was difficult, was because the employees of D. did not know what functionality they exactly wanted. According to all interviewees almost every wish and requirement has led to customizations, leading to a lot of customizations not meeting the wishes and requirements of the users. The head IT indicates that ignorance of the users, and the users being spoiled are the main reasons for this. The system developers both agree with this and state that a lot of customizations are not used anymore. Sometimes the users wanted things, which were already in the standard Dynamics NAV. According to the Head IT and the system developers, users within D. are spoiled and get almost everything they want. He states that there is lack of a critical view, whether these customizations are really needed or not. “Sometimes users even wanted to have a customization, so they have to click once instead of twice to make a print”.

The issue register of D shows more than 3000 issues requested by users, varying from small adjustments to big customizations.

5 Change management

Change management checklist:

- User training and education: Users have followed different trainings. In the beginning, users have followed a basic Dynamics NAV training. According to the Head IT, the users even had some trainings during the live phase. He indicates that some people need more training than others. “Some users need one explanation and they understand it, some need ten explanations and they do not understand it.” The Head IT also states that organization D. is no “high tech organization regarding its users”. During one or two months they have runned both systems and users had to use both systems. System developer A states that the system went live after all departments showed they could work with the new system.
- Achieve commitment of users and users should understand the benefits and drawbacks:
    - According to Head IT, users were informed about the advantages and disadvantages of Dynamics NAV that were familiar before implementing the ERP system.
- Involve users in the system design: The key-users of each department were involved by the system design, because they know the old processes the best. The users indicated how they

have always worked and this was translated to functionality. In most cases the department system development has built what the user wanted. The key-users had to give input for his/her department. The users actively participated in the implementation, because a lot of customizations have been made on user specification. According to the Head IT and system developers, sometimes this went too far and there was lack of a critical view whether those customizations were needed or not.

- Support users: When a user has questions, it is supported by the key-users of the specific department. In case the key-user cannot solve the problem, the IT department will help to solve the problem or answer the question. According to system developer A, the users have got a lot of support.
- Users have to be informed: Users were informed about the implementation.
- Build management commitment: According to documentation and inquiry of the Head IT, management was involved with the implementation. Most of the managers were in the steering group of the project. Other managers were keeping informed.

Resistance to change

According to all interviewees there was a lot of resistance to change at the beginning of the implementation. People had fear for something new and unfamiliar. Later when the users got used to the new ERP system, the resistance to change decreased. System developer A indicates that resistance to change was managed by giving as much as guidance as possible.

System developer A indicates that a lot of functionality is specifically developed for the system users, but some functionality is not used anymore. He argues that this is caused by ignorance and resistance to change.

Ignorance

Because users lack knowledge of Excel and Dynamics NAV, a lot of customizations have been made which were not necessary. For instance, it is possible to make exports of some data from Dynamics NAV to Excel. Using pivot tables and filters gives users a lot of information, but according to system developer B they do not know how to do this.

According to system developer B and the Head IT, most users did not have any experience with Dynamics NAV, leading to not knowing the possibilities of this system. They state also that it is too easy for users to make mistakes in the system.

Wishes

According to all interviewees, the users of D. were spoiled by having a system development department which was customizing almost everything the users wanted. This has led to a lot of customizations which were not really necessary.

6 Misfits

1. **Chips:** D. uses chips in various containers. In the standard ERP system, every chip has to be programmed manually and placed/linked to a container. The head IT of D. indicates that this standard process is fault sensitive, because for instance a user can link the wrong chip to the wrong container. Another problem is that when a driver has to deliver a container, he gets a specific container assigned and he has to deliver that specific container. Next, the driver has to search for the container with this specific chip in the storage. This process imposes D. to

manually program every chip and to deliver exactly a specific container. However, the customer does not care which container he gets, as long as it is the right type of container.

2. **Printing:** To print documents or overviews, users have to navigate to the print options of Dynamics NAV. Users have indicated that the print button should be on every screen in Dynamics NAV, so they do not have to navigate through Dynamics NAV.
3. **Openness of the system:** D. has chosen to only contract people for a year for some departments. This leads for these departments to people and their knowledge leaving the company after a maximum of three years. So a lot of new employees are contracted, and most of them do not know anything about the ERP system of D. The head IT indicates that standard Dynamics NAV is very open, giving users a lot of influence, leading to mistakes. According to the head IT, the system should force people more to do their work in a specific way, leading to a reduction of faults made.
4. **Missing input fields:** According to the Head IT, users are often complaining that they cannot insert all information in the system, resulting in "misusing" the field 'remainder'. According to the head IT, it is possible to insert all information, but the users do not know where to insert it.
5. **Vacancy:** When a citizen moves out, sometimes their neighbours uses their container, so they do not have to pay themselves. Because this container is not linked to a citizen, the costs of emptying the container cannot be allocated. The municipalities have demanded to block these containers, but this is not possible in Dynamics NAV.
6. **Hour registration:** Every day six cars are driving around to clean or repair containers, clean-up garbage bags next to full containers etc. Municipalities are demanding the registration of the hours spend on every task. This data cannot be stored in Dynamics NAV.
7. **Service set:** With the service set it can be determined which service can be delivered for which object. This functionality was present in the industry specific module, but system developer A argues that this functionality was not flexible enough. For instance it was not possible to see when to empty containers on a specific location.
8. **Generating service set:** When generating large amounts for the service set, it leads to performance issues.
9. **Work planning:** The standard functionality for work planning mainly suited the needs of the work planning department. However, some forms were missing, but needed.
10. **Bulletin screen:** D. always has worked with a bulletin screen. This screen is an overview of weighing notes, available transportation and personnel. The standard bulletin screen did not give a good overview.
11. **Register failures:** Within **t**he standard ERP system it is not possible to register failures of underground containers. Users were complaining about missing this functionality. However, according to System developer A, this functionality is not needed, because D. does not need this data.
12. **Plan board:** The functionality of the plan board in the standard ERP system was not sufficient. The standard plan board shows orders from the system. However, it should also be possible to link resources (employees, containers etc.) to orders. This was not possible in the way D. wants it.
13. **Maintenance module:** The maintenance department creates work orders when it has to repair something for instance. The overviews of the work orders in the standard maintenance module were not sufficient.

14. **Overviews:** A lot of overviews used by the user were not good enough. The System developers indicate that because D. has its own system development department they got a lot of request to adjust overviews exactly as the user wants it.
15. **Amount of emptying:** The municipalities wants that D. registers for each container how often it is emptied. This functionality was missing in the standard software.
16. **Order focused:** In the old situation, a lot happened on paper. In the new ERP system, a driver needs an order to deliver a container for instance. Without this order, a container cannot be delivered anymore. In Dynamics NAV it was not possible to do this on paper anymore.
17. **DIFTAR:** Some municipalities are starting with DIFTAR (citizens have to pay for the weight of their waste). The consequence of this, is that D. has to register the weight of the waste per household. This functionality is not supported by the standard ERP system.

7 Solutions

Customization

- **Chips:** They have built a system that generates a serial sticker automatically. By scanning the container at delivery, the container is linked to the address. In this new situation it is not predetermined which specific container the customer gets. Of course the type should be right, but at the last moment the specific container is linked to the address.
- **Openness of the system:** D. has customized the system that it forces employees to work in a certain way.
- **Vacancy:** This has been customized, so it is possible to block a container when a citizen moves out. This leads to the truck refuses a blocked container.
- **Service set:** This functionality has been customized, so it is now possible to see more information about the service set.
- **Work planning:** The lay-outs are custom made.
- **Bulletin screen:** The standard is extended with customizations.
- **Register failures:** The system developer A indicates that a module has been made to have this functionality. However, he also indicates that this functionality was not really needed and is not used anymore.
- **Plan board:** The consulting organization has developed the new plan board. The consultants had developed a plan board based on user requirements. However, the users believe the custom made plan board is still not good enough, so they use Excel next to Dynamics NAV, to get ‘a better overview’.
- **Maintenance module:** This overview has been customized
- **Overviews:** All requests are custom made.
- **Amount of emptying:** This functionality has been custom mad, so they can register the amount a container has been emptied.
- **DIFTAR:** Because DIFTAR is demanded by local regulations, the functionality is really needed. They have customized this.

A lot of input and output issues are custom made. Because of all these customizations, it is hard to upgrade the ERP system. In case D. wants to upgrade its ERP system, it has to develop all functionality again, because the customizations are in the core of Dynamics NAV. According to system developer A, an upgrade would be a reimplementation. In case D. chooses for this option, it will be more critical, because a lot of customizations are not used anymore.

Workaround

- **Missing input fields:** The users have found another way, by using the field ‘overige’.
- **Hour registration:** D. stores this information in an access database.
- **Generating service set:** Generate multiple service sets in smaller amounts.

Accept

- **Printing:** The IT department found it not necessary to customize this.

Business processes

- The financial department mainly follows the standard of Dynamics NAV.
- **Order focused:** Process has been adapted.

8 Timeline

- The implementation started in 2006
- The system went live in 2008.

9 Gespreksverslagen

Uitwerking 4.1

Rol: Hoofd ICT

Datum: 7-6-2012

Organisatie / Strategie

De strategie van D. is om alles zo goedkoop mogelijk te doen en daar waar mogelijk efficiëntieslagen te behalen. D. heeft een gemeenschappelijke regeling en moeten ieder jaar voor de gemeentes een budget vaststellen. Hoe goedkoper ze het doen, hoe beter ze het doen.

D. heeft 330 medewerkers, waarvan 60 dagelijkse Dynamics NAV gebruikers.

Adoption

Men wilde een nieuw ERP systeem, omdat het oude systeem, genaamd Clear, niet meer aan de verwachtingen voldeed en een verouderd systeem was. Daarnaast was er sprake van teveel eilandautomatisering met losse systemen. Men wilde naar een nieuw ERP systeem om consistentie en efficiëntie te bereiken.

Selection

Er is geen pakketselectie geweest volgens de traditionele methode, waarbij men eisen en wensen opstelt en vervolgens via een long list en short list uitkomt bij het best passende systeem. Omdat er maar één pakket was dat enige functionaliteit bezat voor de afvalindustrie, is direct voor dit pakket gekozen. Dit pakket was een branche-specifieke oplossing van Q, dat bestond uit Dynamics NAV aangevuld met een bolt-on QWMR. De eisen en wensen die men had, was dat het uiteindelijk dezelfde functionaliteit moest hebben als het oude ERP systeem.

Binnen D. zijn altijd twee stromen. Als afval wordt opgehaald wordt het eigenlijk ingekocht, maar het moet ook verkocht worden. Zaken die hiervoor nodig zijn, zijn een afval balans (bij aanmaak

inkooporder, wordt direct een order voor verkoop aangemaakt). Dit is de basis wat door QWMR ondersteund wordt. Deze functionaliteit was niet aanwezig in de basis van Dynamics NAV.

J. geeft aan dat niet is gekeken of de functionaliteit van het pakket past bij de bedrijfsprocessen van D. Het pakket is puur genomen omdat het de enige oplossing was op dat moment die bruikbaar was voor de afvalindustrie. Een adviseur van de leverancier heeft een demo gegeven

Implementation

Omdat D. een eigen systeem-ontwikkel afdeling heeft, was het geen probleem om het gekozen ERP systeem aan te passen daar waar nodig.

De implementatie is ruim over budget en tijd gegaan. Het budget was aanvankelijk 485.000 euro. De uiteindelijk kosten waren ruim boven de miljoen. De implementatie is begonnen in 2006 en is afgerond in 2008. Volgens J. was de implementatie een heel moeilijk traject. Dit kwam enerzijds doordat D. niet precies definieerde wat ze wilden hebben. Hierdoor werd er vaak maatwerk opgeleverd dat men toch niet wilde hebben. J. geeft aan dat dit te wijten is aan onkunde van de gebruikers.

De gebruikers kregen bijna alles opgeleverd wat ze wilden en volgens J. werd er niet kritisch genoeg gekeken of dit daadwerkelijk nodig was. “Hier wordt meer gemaakt dan eigenlijk nodig zou zijn”. Dit ging zo ver, dat men twee keer moest drukken om te kunnen printen en men wilde dit kunnen door middel van een druk. Zulke zaken zijn volgens J. te vaak gebeurd.

De externe consultant van de leverancier heeft een vrij grote rol gehad in de implementatie. Deze drukte dermate zijn stempel op het project, zonder echt te kijken wat de medewerkers van D. wilden. Op een gegeven moment is er afscheid van deze consultant genomen.

Change management

- De gebruikers werden vanaf het begin betrokken bij de implementatie en hadden inspraak in hoe het uiteindelijke systeem eruit moest komen te zien. Er is van iedere afdeling een key-user aangesteld die input moesten leveren. De key-users hadden kennis van de oude processen en dat is uiteindelijk gebouwd. Uiteindelijk is er volgens J. “heel veel naar de wens van de gebruiker gebouwd”.
- In het begin was er veel weerstand tegen de implementatie. Er was angst voor iets nieuws en onbekends. Later toen men wat meer bekend raakte met het systeem, zwakte dit af en kregen sommige gebruikers er zelfs ‘zin in’.
- Er zijn diverse medewerkers die veel moeite hadden om het nieuwe systeem te snappen. Zelf nu nog, 5 jaar na de implementatie zijn er mensen die nog niet overweg kunnen met het systeem. “Het is geen high-tech organisatie qua gebruikers”. Sommige gebruikers hebben volgens J. zelfs moeite met het instellen van een filter.
- Gebruikers hebben veel inspraak gehad bij de implementatie, aangezien er veel is gemaakt naar wens van de gebruiker.
- De gebruikers hebben diverse Dynamics NAV trainingen gehad. Zelfs na de live-gang hebben gebruikers nog een aantal trainingen gehad.

- Volgens J. weet de gemiddelde manager niet hoe het systeem werkt. Door de implementatie zijn veel papierstromen geautomatiseerd.
- De gebruikers zijn vooraf op de hoogte gebracht van de voor- en nadelen die bekend waren over Dynamics NAV.
- Het management was betrokken bij de implementatie doordat het merendeel van het MT in de stuurgroep voor de implementatie zat. De overige managers zijn steeds op de hoogte gehouden door de projectleider.

Fit

Omdat het ERP pakket de enige oplossing was die in de buurt kwam, sloot het ERP systeem niet volledig aan op de bedrijfsprocessen van D..

Maatwerk

Men heeft de oude functionaliteit nagebouwd bovenop wat in Dynamics NAV aanwezig was. Uiteindelijk is er heel veel maatwerk gemaakt.

Proces aanpassen

Processen zijn daar aangepast waar nodig. Het is altijd een combinatie gebleven. Geen enkel proces is hetzelfde gebleven. Het zwaartepunt lag aan de customization kant.

Documentatie

Er is geen documentatie aanwezig ten tijde van de implementatie

Misfits

- Het proces met uitventen van de chips voor containers was volgens J. een vreemd proces in Dynamics NAV. Hierbij was het nodig dat iemand heel de dag chips zat te programmeren. Hier is men van afgestapt, daar maatwerk te implementeren, bespaart men 90% van de tijd.
- Om te printen moesten twee klikken worden gedaan, de gebruiker wilde dit door middel van één druk op de knop.
- Men miste de functionaliteit van ledigingen.
- Binnen D. is de keuze gemaakt dat er geen vaste medewerkers in dienst komen. Men werkt met jaarcontracten. Hierdoor verdwijnt er steeds veel kennis en komt er steeds weer iemand te zitten die niet genoeg kennis heeft van het ERP systeem. Voor D. is het systeem te open voor de gebruiker. De gebruiker heeft te veel invloed, wat leidt tot fouten. Men heeft dit vervolgens allemaal zo geprogrammeerd dat het systeem meer dwingend is.
- J. geeft aan dat gebruikers vaak klagen dat ze niet alle informatie in het systeem kwijtkunnen. Volgens J. kan dit wel, maar weet de gebruiker niet waar hij/zij het kwijt kan. Zo wordt vaak het tekstveld ‘overige’ misbruikt om informatie weg te zetten, die men nergens anders kwijt kan.
- Tabbladen structuur:
- Uitventen: Iemand programmeerde voorheen een chip, deze ging in een zakje, ging een label op, chip ging in de container, label ging op de container. In dit proces werden veel fouten gemaakt. Dit zijn ze anders gaan doen, door een serienummer te gebruiken, waardoor je niet meer hoefde te programmeren. Hiervoor is een systeem gebouwd dat meteen een

serienummersticker uitprint. Dat ging vervolgens in een zakje en zo werd een hele ton met zulke zakjes gevuld. In een route zitten vervolgens diverse bakken van verschillende types. Bij levering kijk je alleen naar het type bak, die lever je en dan scan je de container. Vervolgens wordt een container aan een adres gekoppeld. J. noemt dit een 'behoorlijke optimalisering van een proces'. Het aantal fouten hierdoor is sterk verminderd. In het oude proces was het systeem leidend, maar hierbij niet meer. Hier is het systeem aangepast aan het ideale proces.

- De gemeentes willen tijdelijke leegstand voorkomen. Als een burger verhuisd is, dan zijn er zo nu en dan buren die hun afval in de container gooien van het leegstaande huis. Omdat deze container niet gekoppeld is aan een burger kunnen ze de kosten niet kwijt. De gemeentes eisten dat deze containers geblokkeerd zouden worden. Dit is vervolgens zo geprogrammeerd.
- Er rijden dagelijks 6 wagens rond die schoonmaak doen. Bijvoorbeeld naast ondergrondse container geplaatste zakken opruimen, met verf bekladde containers schoonmaken. De gemeente eist dat geregistreerd wordt hoeveel tijd men hieraan besteedt. Dit kon niet in Dynamics NAV worden opgenomen en is in een Access database opgeslagen. Deze tekortkoming heeft men geaccepteerd.

Overige

- Het aantal applicaties naast Dynamics NAV is steeds minder door de jaren heen geworden. J. geeft echter wel aan dat je niet alles perse in je ERP systeem moet willen doen. Als software gecertificeerd is door een betrouwbare partij en aan de eisen voldoet, dan kan dit gewoon gebruikt worden.

Uitwerking 4.2

Rol: Systeemontwikkelaar
Datum: 7-6-2012

Implementatie

Men heeft standaard Dynamics NAV geïmplementeerd samen met een branche specifieke software module. Daarnaast heeft men de maintenance module geïmplementeerd. Tijdens de implementatie is er veel maatwerk geleverd, wat soms te ver doorsloeg. Uiteindelijk heeft men ruim 1,5 jaar vertraging opgelopen. Men wilde binnen driekwart jaar live gaan, maar dit is dus niet gelukt.

Misfits

- Dienstenset: Met de dienstenset kun je bepalen welke dienstverlening je voor welk object kunt leveren. De functionaliteit van deze dienstenset is specifiek ontwikkeld voor de gemeentelijke inzameling en zat niet standaard in de branche specifieke module. De branche specifieke module was hiervoor niet flexibel genoeg. Zo was ook het commerciële contractenbestand zoals dit nu bij D. gebruikt wordt niet standaard in de branche specifieke module voor handen.
- Als je met de dienstenset grote aantallen gaat genereren, dan leidt dit tot performance problemen. Hierdoor zijn medewerkers genoodzaakt kleinere aantallen te genereren.
- Werkvoorbereiding: De functionaliteit die aanwezig was in de standaard voldeed deels. Zo werd de standaard functionaliteit van de werkplannen gebruikt, maar moesten er een aantal

kleine zaken zoals functionaliteiten en formulieren worden aangepast, zodat het voldeed aan de wensen van D.

- De standaard bevatte geen bulletinscherm, waarmee in een oogopslag weegbonnen, transport- en personeel uren konden worden verwerkt op order niveau, zodat deze later kunnen worden doorgeboekt en gefactureerd. De standaard bulletins boden geen overzicht, waardoor deze voor D. niet bruikbaar waren. De basis is gebruikt en daarbovenop is maatwerk gemaakt.
- Verder is voor het project I&R (identificatie en registratie) compleet nieuwe functionaliteit gerealiseerd:
    - Automatische synchronisatie van object (adressen) en subject (persoonsgegevens) met de gemeenten.
    - Automatische synchronisatie van container mutaties en ledigingen met de gemeenten.
    - Registratie van container ledigingen.
    - Registratie van stortingen op ondergrondse containers
- De order functionaliteit van de standaard voldeed, alleen het planboard schoot te kort. Op het planboard worden orders getoond uit het systeem. Zo kun je resources koppelen aan een order (bijv. rijtijden, personeel etc.) Dit planboard werd ontwikkeld door programmeurs van de leverancier welke te weinig kennis hadden van de afvalbranche. Deze hadden in eerste instantie iets ontwikkeld wat niet voldeed, waarna de gebruikers pas echt kritisch mee ging kijken en duidelijker aangaven hoe ze het wilde hebben en waaraan het moest voldoen.
  Er was vanuit de afdeling logistiek weerstand tegen deze manier van werken en men gebruikt er nu nog steeds een Excel bestand naast. Men neemt in dit Excel bestand gegevens over uit Dynamics NAV. Dit vindt men op de afdeling logistiek overzichtelijker. Dit Excel bestand mag als workaround blijven worden gebruikt en is het oude en vertrouwde waar ze niet vanaf te krijgen zijn.

Proces aangepast

- Voor de financiële module is voornamelijk de standaard gevolgd. Dit is volgens M. ook logisch omdat Dynamics NAV van oorsprong een financieel ERP pakket is. Door de implementatie is eigenlijk iedereen anders moeten gaan werken.
- In de nieuwe situatie moest ordergericht gewerkt worden. Zo werd voorheen veel op papier gedaan, maar nu moet bijvoorbeeld een chauffeur een opdracht met ordernummer hebben om bijvoorbeeld containers te leveren. In de oude situatie schreef een chauffeur een bon ter plekke bij de klant. Dit was de grootste procesmatige verandering.
- De Commerciële binnendienst moet nu op de nieuwe wijze contracten aanmaken. Dit vergt gestructureerd werken met standaard diensten, contracten en brieven. In het verleden werd handmatig in Word een contract en brief op maat gemaakt waardoor veel verschillende soorten dienstverleningen ontstonden. Dit is nu niet meer mogelijk.

Onkunde/weerstand

- Verder is er functionaliteit ontwikkelt die achteraf niet gebruikt werd, het zij door weerstand of door onwetendheid.

Change management

- De gebruikers hebben diverse trainingen gehad.

- De gebruikers hebben veel uitleg en ondersteuning gehad. Omdat over werd gegaan van een papieren stroom naar een digitale orderstroom. Gebruikers snapten in eerste instantie niet wat nu precies een order was en wat ze ermee moesten. Dit leidde tot veel weerstand. Dit heeft men gemanaged door zoveel mogelijk begeleiding te geven. Key users aan te stellen.
- Key-users zijn aangesteld, die ervoor moeten zorgen dat een afdeling draait. Vragen en verzoeken van gebruikers moeten via de key-users aan de afdeling ICT worden gesteld. Als de key-user het probleem niet op kon lossen, dan werd het pas doorgespeeld naar de afdeling ICT. De key-users zijn betrokken bij de implementatie.
- De gebruikers zijn betrokken bij de implementatie. Zij moesten hun manier van werken aangeven en dit werd vervolgens omgezet naar functionaliteit. In overleg met de gebruiker is maatwerk gemaakt. Er is te vaak exact gedaan wat de gebruiker wilde en kon hier af en toe kritischer naar worden gekeken.
- Op het moment van live gaan, is men 1 á 2 maanden schaduw gaan draaien. Gebruikers moesten hierbij op de nieuwe en oude manier naast elkaar werken. Op het moment dat men bewees goed op de nieuwe manier te kunnen werken, is men volledig overgegaan naar Dynamics NAV. De key-user legde aan de overige gebruikers uit hoe men moest gaan werken en was het eerste aanspreekpunt. Na de uitleg is men dus meteen aan de slag gegaan met het nieuwe systeem.

Overige

- M. geeft aan dat de gebruiker steeds meer verwend raakte en zelfs op een gegeven moment niet meer twee keer wilde klikken. “De gebruikers zijn te verwend”. Dit is men later gaan beseffen, waardoor men kritischer is gaan kijken naar de verzoeken. Als een gebruiker bijvoorbeeld een filter wil in een export, dan moet hij dit zelf in Excel doen en is het niet nodig dat dit geprogrammeerd wordt.
- Zowel invoervelden als overzichten zijn op maat gemaakt.
- Upgrades: Door het vele maatwerk is het moeilijk om up te graden. Men heeft een aantal upgrades doorgevoerd en werkt momenteel op de laatste versie van Dynamics NAV. Alleen met de branche specifieke module (branche specifiek) werkt men nog met de geïmplementeerde versie. In geval men dan wil upgraden, moet men alles opnieuw ontwerpen. Men is momenteel aan het onderzoeken wat de consequenties zijn van een upgrade en of dit mogelijk is. In het geval van een upgrade zou het een herimplementatie worden, want het maatwerk zit in de kern van de standaard ingebouwd. In het geval men hier voor kiest, dan wil men alleen nog gaan maken wat ook echt nodig is. Nu zit er veel maatwerk in wat niet meer gebruik wordt of alleen voor verwende gebruikers is.

Uitwerking 4.3

Rol: Systeemontwikkelaar
Datum: 7-6-2012

Men heeft standaard Dynamics NAV geïmplementeerd en daarbovenop de branche specifieke standaard QWMR. Daarnaast heeft men erg veel maatwerk ontwikkeld, omdat men een eigen ontwikkelafdeling heeft. Door in de historie te kijken, zijn er al ruim 3000 changes geweest (groot en klein), waarbij de afdeling systeemontwikkeling iets heeft moeten programmeren. W. geeft aan dat er niet altijd kritisch is gekeken of iets wel echt nodig was.

Misfits

- Het logistieke gedeelte voor de commerciële inzameling werd voorheen in Access gedaan. Hierbij is getracht de functionaliteit en data een op een over te nemen in Dynamics NAV. Achteraf bleek dat de standaard functionaliteit niet voldeed aan de wensen en eisen van D. Het was niet mogelijk om de commerciële inzameling en gemeentelijke inzameling gecombineerd te laten rijden. Hiervoor is ook extra maatwerk gerealiseerd boven op de standaard branche specifieke module.
- Maintenance module: Deze module is voor de technische dienst bedoeld, waar ze onder andere werkorders in kunnen aanmaken. Ook deze standaard module voldeed niet, waardoor hier veel aan is veranderd. De overzichten voldeden niet, waardoor deze opnieuw zijn gemaakt.
- Veel overzichten wilde de gebruiker exact naar wens hebben. Ieder veldje wat de gebruiker wilde moest hierop staan. Dit is ook zo ontwikkeld. Dit geeft aan dat dit vaak erg ver doorsloeg en niet altijd allemaal nodig was.
- Voor het registreren van storingen in een ondergrondse container is een module gebouwd. Door deze module kon per storting van een burger een bedrag in rekening worden gebracht. Deze module werkte prima, maar deze functionaliteit was niet perse nodig.
- De gemeente wil dat per container (die gekoppeld is aan een adres van de burger) wordt geregistreerd hoe vaak deze geledigd wordt (Identificatie en registratie proces). Deze functionaliteit zat niet in Dynamics NAV en de QWMR module, waardoor dit maatwerk is geworden.

Proces aangepast

- Vroeger kon een container worden geleverd zonder dat hiervoor een order was gemaakt. Dit is nu niet meer mogelijk, omdat van tevoren in Dynamics NAV moet worden vastgelegd op welk adres welk type container met welke chip wordt gewisseld (onderdeel van I&R project).

Onkunde

Volgens W. hadden de meeste gebruikers erg weinig ervaring met Dynamics NAV en wisten ze niet goed wat er met het systeem mogelijk was. W. geeft aan dat het systeem de gebruikers teveel mogelijkheden geeft, waardoor fouten kunnen worden gemaakt. Dit heeft men vervolgens proberen te voorkomen door het systeem meer dwingend te maken.

Door een gebrek aan Excel kennis is volgens M. veel maatwerk ontwikkeld in Dynamics NAV. Informatie die verkregen kan worden in Excel met een filter of draaitabel heeft men hierdoor in Dynamics NAV in overzichten moeten programmeren.

Overige

- Zowel invoervelden als overzichten zijn op maat gemaakt.
- De afdeling systeemontwikkeling heeft een aantal cursussen gevolgd om met Dynamics NAV te kunnen ontwikkelen. Daarnaast hebben ze veel geleerd door ‘trial and error’.

Uitwerking 4.4

Rol: Consultant

Datum: 7-6-2012

De organisatie

D. is een afvalverwerker die is ontstaan uit gemeentelijke diensten. D. levert diverse diensten, variërend van: commerciële klanten bedienen, burgerklanten bedienen, kringloopwinkel exploiteren en milieustraten beheren. D. voert in opdracht van een aantal gemeentes het burger gedeelte uit. Tussen de gemeente en D. staat de GBRD. Het GBRD is een uitvoeringsinstantie die adressen registreert en belastingen int bij de burgers etc.

Implementatie

Hetgeen geïmplementeerd is, is Dynamics NAV samen met een branche specifieke oplossing. Omdat er ten tijde van de implementatie weinig keus was uit passende software en dit het meest geschikte systeem was, is gekozen voor deze oplossing. De oplossing bleek echter niet zo ver als de leverancier had toegezegd. Het systeem paste onvoldoende bij de bedrijfsprocessen. Men vond dit geen probleem, omdat men alles toch op maat kon maken met hun eigen ontwikkelafdeling (interne IT afdeling die al in dienst was). Wel hadden de systeemontwikkelaars hiervoor training nodig, om in Dynamics NAV te kunnen programmeren. Geconcludeerd kan worden dat de fit van het te implementeren systeem met D. erg matig was.

Na live-gang sloot het systeem erg goed aan, omdat het precies zo was gemaakt als men binnen de organisatie wilde. Volgens de consultant hebben ze hierbij nu in de operationele fase wel alle nadelen die je met een op maat ontwikkeld pakket kunt hebben. Zo willen ze binnenkort de basis van Dynamics NAV upgraden, maar leidt dit tot veel problemen, aangezien de upgrade niet volledig compatibel is met het ontwikkelde maatwerk.

De implementatie is uiteindelijk moeizaam verlopen en men is ruim over de planning en budget gegaan. Door het vele maatwerk is veel meer tijd nodig geweest dan gepland en dit heeft daarom ook veel meer geld gekost dan aanvankelijk begroot.

Maatwerk

D. heeft een eigen ontwikkelafdeling bestaande uit drie mensen. Volgens de consultant bevindt D. zich op een volwassenniveau betreffende het gebruik van IT ter ondersteuning van de bedrijfsprocessen. Binnen D. ontwikkelt men veel zelf en zijn veel processen geautomatiseerd.

Er wordt binnen D. veel maatwerk gemaakt. De gebruikers zijn hieraan gewend geraakt en komen steeds met nieuwe wensen aanzetten. Vervolgens wordt dit nagenoeg altijd op maat gemaakt. Veel zaken hierbij zijn overbodig en puur voor het gebruiksgemak, zoals extra knoppen en invoervelden.

De consultant geeft echter wel aan, dat men kritischer is gaan kijken naar de verzoeken. Binnen D. vindt men het lastig om de changes de juiste prioriteit te geven. Vanuit de consulterende partij is het advies gegeven om een change advisory board (CAB) op te richten, waar iedere change besproken wordt tussen de managers van de bedrijfsprocessen en de ICT afdeling.

Wet en regelgeving

De gemeentes die opdracht geven aan D. hebben besloten tot DIFTAR over te gaan. DIFTAR is er in twee soorten: frequentie en volume. Dit betekent dat de burgers betalen per lediging of per kilogram

afval. Dit is volgens de consultant branche specifieke regelgeving en iets waar je als organisatie aan moet voldoen. Deze functionaliteit zit niet in het standaard systeem. Leveranciers van systemen zijn bezig deze functionaliteit in te bouwen. D. heeft dit zelf gerealiseerd in het branchespecifieke pakket.

APPENDIX F – MANUAL CATEGORIZATION

Recap

De introductie bevat een korte beschrijving wat ik tot nu toe heb gedaan en waar ik naar toe wil betreffende mijn onderzoek. Vervolgens volgt in hoofdstuk 2 wat je moet doen in hoofdlijnen (soort stappenplan). In hoofdstuk 3 staat vervolgens meer uitgelegd per stap uit hoofdstuk 2. Hierbij worden de categorieën en definities onder andere duidelijk uitgelegd. In hoofdstuk 4 volgt vervolgens per case een beschrijving van de implementatie, die wat meer achtergrondinformatie geeft. Verder is in de bijlage van de mail ook nog een 'print document' te vinden, waarin het framework, decision tree en een aantal overzichten staan. Dit is handig om er bij te houden, omdat je dit steeds nodig hebt.

1 Introductie

Afgelopen maanden ben ik bezig geweest met het houden van een literatuurstudie en het verzamelen van data. Hieronder beschrijf ik in het kort wat ik tot nu toe heb gedaan.

Literatuurstudie

Door het houden van de literatuurstudie heb ik een definitie van een misfit opgesteld en ben ik tot een framework gekomen. Dit framework kan gebruikt worden om misfits te categoriseren.

Case study

Door het houden van interviews en verzamelen van documentatie heb ik per case informatie ingewonnen. Het doel van de dataverzameling was om per case een lijst met misfits te krijgen. Uiteindelijk gaat het om deze lijst met misfits en wil ik achterhalen waar nu de meeste misfits binnen het MKB door worden veroorzaakt en of er een patroon zit in de oplossingen die gekozen zijn. De case study is begonnen met een pilot, waarna drie andere cases volgden.

Pilot case study

Tijdens de pilot casestudy bij bedrijf A. ben ik erachter gekomen dat niet alles wat als misfit wordt gezien door een geïnterviewde, ook daadwerkelijk een misfit is. De gebruiker kan namelijk iets als een misfit ervaren, maar dit hoeft het niet perse te zijn. Op basis van deze pilot heb ik het framework uitgebreid met een categorie voor perceived misfits. Deze perceived misfits lijken te worden veroorzaakt door drie verschillende oorzaken:

- Weerstand;
- Onkunde/onwetendheid;
- Wensen.

2 Wat moet je doen?

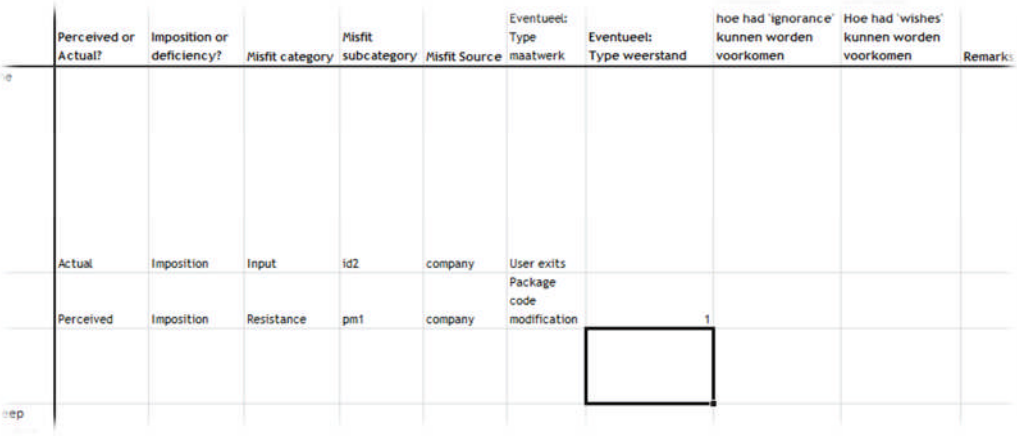
Om zinnige uitspraken te kunnen doen, moeten de misfits juist gecategoriseerd zijn. Omdat dit vrij subjectief werk is, wil ik dit door meerdere personen laten doen, waaronder ikzelf. Op basis van iedere individuele categorisatie, kan ik met statistiek (Cohens Kappa) berekenen hoe goed de overeenkomsten waren tussen de verschillende beoordelaars. Dus hoe beter de overeenkomsten tussen de verschillende beoordelaars, des te betrouwbaarder zullen mijn resultaten zijn, dus deze stap is erg belangrijk voor mijn onderzoek.

In de mail zit een Excel bestand. Dit Excel bestand bevat per tabblad een case met alle misfits van die case en hoe deze zijn opgelost. De bedoeling is dat je iedere misfit classificeert volgens het

framework. Hiervoor moet je per misfit de volgende kolommen invullen (zie hoofdstuk 3 voor gedetailleerde uitleg per stap):

1. Lees de achtergrond informatie van de case (hoofdstuk 4)
2. Is de misfit actual or perceived? (Gebruik hiervoor de decision tree en de definities van beide begrippen uit hoofdstuk 3).
3. Legt het iets op, of is het een tekortkoming?
4. Wat is de categorie van de actual/perceived misfit?
    1. Actual:
        - Input;
        - Process;
        - Output;
        - Environmental.
    2. Perceived:
        - Resistance (to change) [pm1];
        - Ignorance [pm2];
        - Wishes [pm3].
5. Indien een actual misfit, Welke subcategorie heeft de misfit?
6. Wat is de bron van de misfit (Bovenste helft framework)?
    - Country (specific);
    - Industry (specific);
    - Company (specific).
7. Indien er als oplossing gekozen is voor ‘customization’, welk type maatwerk is het dan?
8. Indien er sprake is van ‘resistance to change’, welk type weerstand is het dan?
    1. The desire not to lose something of value;
    2. Misunderstanding the change;
    3. Lack of trust;
    4. Believing that the change does not make sense;
    5. Fear of not being able to develop the new skills and behavior required.
9. Indien er sprake is van ‘ignorance’ hoe had dit dan voorkomen kunnen worden?
10. Indien er sprake is van ‘wishes’ hoe had dit dan voorkomen kunnen worden?
11. Vul eventueel ‘overige’ in.

Voorbeeld



	Perceived or Actual?	Imposition or deficiency?	Misfit category	Misfit subcategory	Misfit Source	Eventueel: Type maatwerk	Eventueel: Type weerstand	hoe had 'ignorance' kunnen worden voorkomen	Hoe had 'wishes' kunnen worden voorkomen	Remarks
	Actual	Imposition	Input	id2	company	User exits				
	Perceived	Imposition	Resistance	pm1	company	Package code modification	1			

3 Informatie per stap

In dit gedeelte beschrijf ik de door mij gehanteerde definities en beschrijf ik het framework. Zorg ervoor dat je goed weet wat iedere categorie inhoud en dat je het 'print document' (zie bijlage) afdrukt, want dit heb je continu nodig. Wat in dit document staat wordt hieronder uitgelegd.

Framework

In het 'print document' vind je het framework. Dit framework komt uit de literatuur en heb ik aangevuld met de perceived misfit categorie. Uiteindelijk is het de bedoeling dat alle misfits een categorie in dit framework hebben en ze dus in 'het juiste bakje' liggen.

3.1 Lees achtergrondinformatie cases

In hoofdstuk 4 vindt je per case meer informatie over de case, zodat je enigszins een beeld krijgt van wat er zich heeft afgespeeld bij de implementatie en om wat voor type bedrijf het gaat.

3.2 Actual or perceived?

Het eerste onderscheid dat je moet maken is of de misfit een actual of perceived misfit is.

De definitie van een actual misfit is:

> *"A mismatch between the structures embedded in the ERP system and the structures embedded in an organization utilizing the system (as reflected by its strategy, procedures, rules and norms), leading to inefficiency or missing important functionality on organizational level"*
>
> An actual misfit can be viewed from two perspectives. The first perspective is from the ERP system point of view. The ERP system can impose the organization to work in a certain way which can be inefficient. Strong and Volkoff (2010) call this perspective an imposition. Extra features of the ERP system that are present but not problematic are not misfits. The other perspective is from the organization point of view. The organization requires some functionality which the standard ERP system does not offer. Strong and Volkoff (2010) call this missing functionality a deficiency. Missing this functionality should lead to problems to be a deficiency. So when functionality, which is really needed, is missing (deficiency) or when the ERP system imposes an inefficient way of working (imposition), it is a legitimate issue and thus an actual misfit. To determine whether a misfit is a legitimate issue, it is important to know whether the needed functionality is really needed or not.

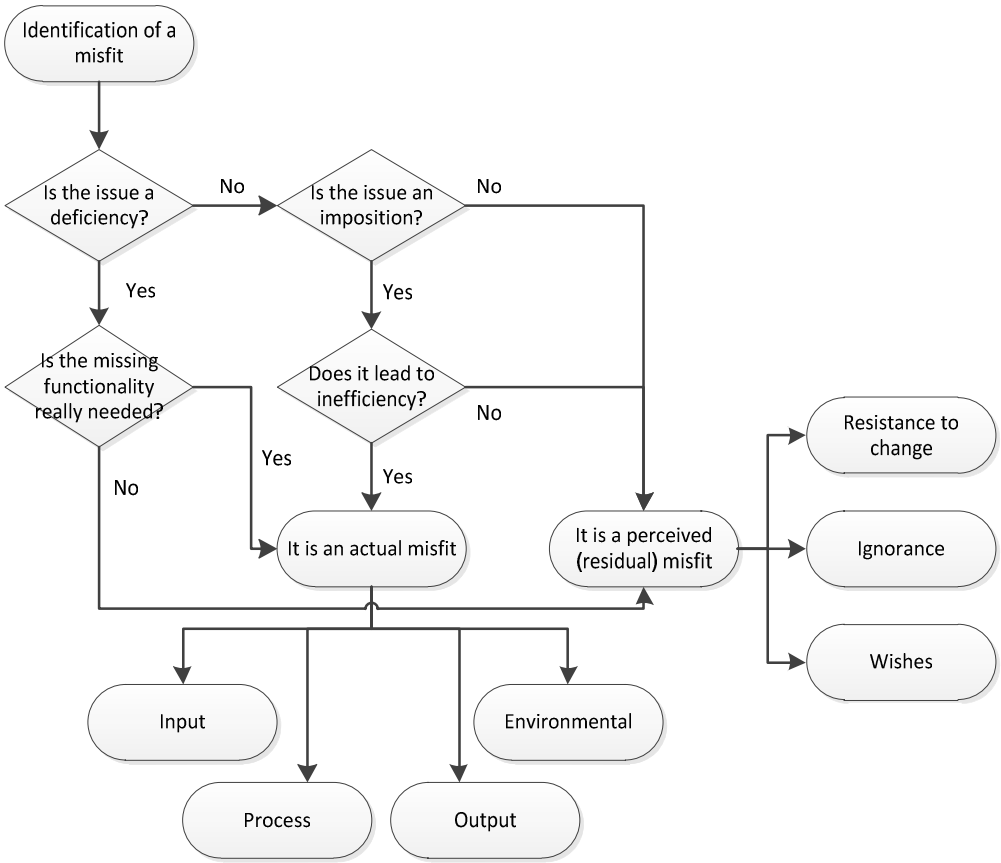
Van een actual misfit is dus sprake als:

- **Imposition:** Het systeem legt zaken op, waardoor de manier van werken minder efficiënt wordt.
- **Deficiency:** Het systeem heeft tekortkomingen en mist belangrijke functionaliteit en de afwezigheid hiervan leidt tot problemen.

De definitie van een perceived misfit is:

> Een perceived misfit is geen actual misfit. Dus een actual misfit is een echte misfit, de perceived misfit wordt alleen door de gebruiker als een misfit ervaren, maar het is in werkelijkheid geen echte misfit die inefficiënte zaken oplegt op problematische tekortkomingen heeft.

Om te bepalen of een misfit actual of perceived is, gebruik je onderstaande ‘decision tree’. Hierbij is een deficiency een tekortkoming en imposition een oplegging door het systeem.



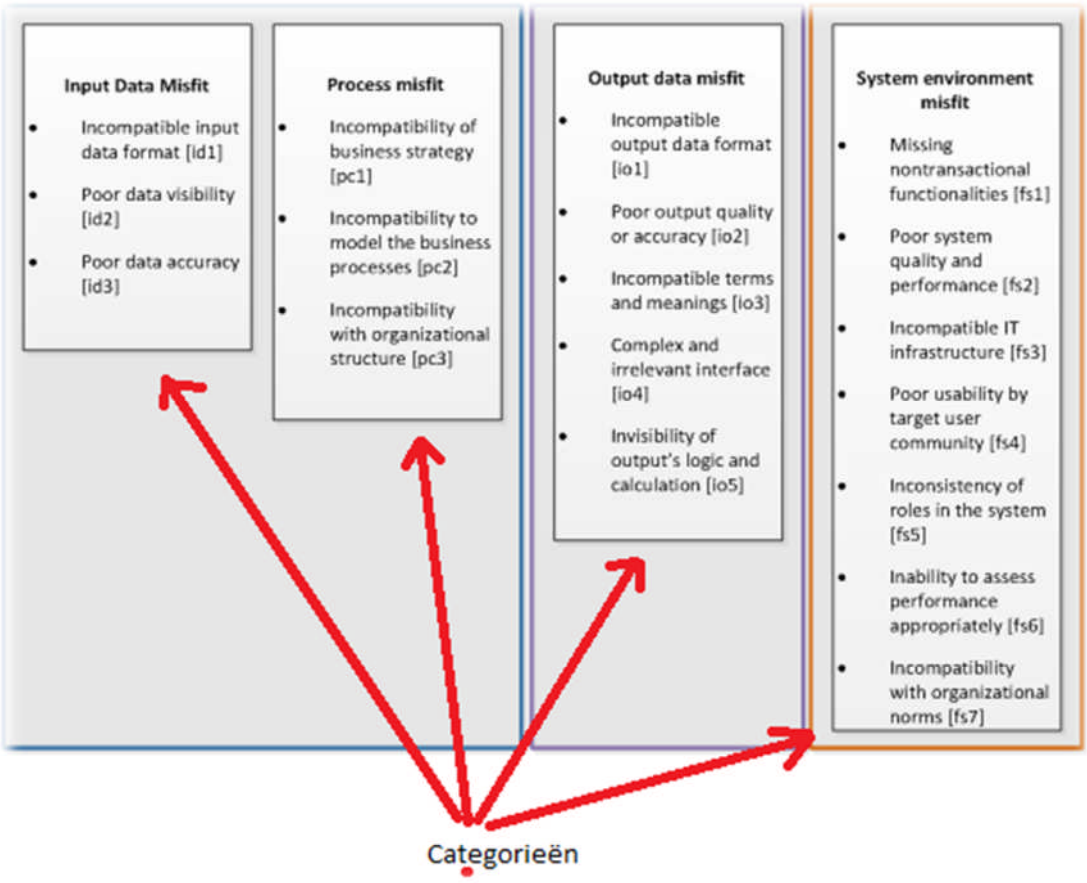
3.3 Oplegging of tekortkoming?

Je hebt het hierboven al bepaald als het goed is, Dus legt het systeem je iets op om te doen (verplicht het je tot iets), of schiet het juist tekort?

3.4 Bepaal de categorie van de misfit

Actual misfit

Als de misfit een actual misfit is, dan moet deze binnen de volgende categorieën vallen van het framework (zie figuur hieronder).



Data misfit

A data misfit or input misfit occurs when there are incompatibilities between the requirements of an ERP system and the organization in terms of data format or the relationships among entities as represented in the underlying data model (Soh et al. 2000).Yen et al. (2011) describes a data misfit as the incompatibility of the ERP system to capture various object attributes or documents into the database of the ERP system.

Process misfit

A process misfit or functional misfit occurs when there are incompatibilities between the organizational and ERP system requirements in terms of processing procedures (Soh et al. 2000). An example of a process misfit is the incapability of an ERP system to model the workflow of the organization.

Output misfit

An output misfit occurs when there is an incompatibility between the organizational and ERP system requirements in terms of the data presentation and information content of the output. Yen et al. (2011) calls this also an interface misfit, and defines it as problems with the output of the ERP system, such as reports, interface, and the view of the system.

System environmental misfit

The system environment category involves misfits regarding system usability and IT infrastructure compatibility. This category of misfits involves issues as the quality of the ERP system in the

information system context, the flexibility and reliability of the ERP system, and the backup capability of the ERP system.

Perceived misfit

Als een misfit dus niet terecht is, dan is deze perceived en moet een keuze gemaakt worden uit één van de onderstaande categorieën.

- Resistance to change;
- Ignorance;
- Wishes.

Resistance to change

Because of resistance to change, employees want to do their work the same way as before the ERP implementation. Regardless of whether the new way of working leads to benefits, people (for various reasons) do not want to change their way of working.

According to literature, there are various forms of resistance to change:

- The desire not to lose something of value;
- Misunderstanding the change;
- Lack of trust;
- Believing that the change does not make sense;
- Fear of not being able to develop the new skills and behavior required.

Ignorance

Lack of knowledge leads to not knowing possible functionalities, possibly leading to missing functionality, which actually is in the system.

Hierbij gaat het om het niet optimal gebruik maken van het ERP system, omdat men niet over genoeg kennis beschikt. Zo doet men bijvoorbeeld iets heel omslachtig, terwijl er een simpele functie is in het systeem om hetzelfde te doen, maar men weet niet hoe het makkelijker kan. Ook het niet kennen van de voordelen van het nieuwe systeem valt hieronder.

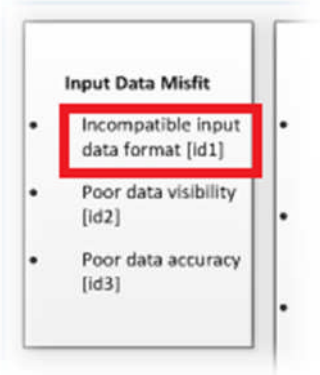
Wishes

Because of the wishes of employees, the new ERP system does not fulfill the exact needs of the user. A user indicates something as a misfit, which is not an actual misfit. For instance the user thinks some functionality will be more convenient or the user has an overkill of wishes for the new ERP system. However, this wished for functionality does not lead to become significantly more efficient or not having this functionality leads to missing crucial functionality. In the case of A. this type of misfit occurred when the users got somewhat spoiled. The functionality for the calculation department was missing, and the decision was made to customize this functionality. According to the consultant and the interviewees of the implementing organization, the users went at some point to far, by wanting everything customized, because it was a misfit according to the users. For instance the overview misfit (A4). Dynamics NAV let the user insert information in a specific screen. However, the users wanted to insert this information in another screen. They wanted to have this customized. However, not every screen can be custom made only because the users think it is more convenient. De

belangrijke vraag is dus: wil men niet? (weerstand), kan men niet of weet men niet beter? (ignorance) en wil men teveel? (wishes)

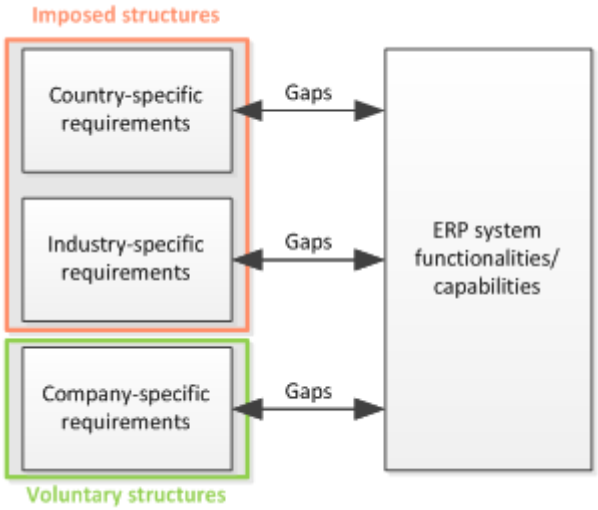
3.5 Indien een actual misfit, welke subcategorie?

Gebruik hierbij de code die in het framework vermeld staat. Bijvoorbeeld bij een actual misfit in de input categorie: Kies vervolgens de subcategorie, bijv. 'Incompatible input data format', waarbij je de code 'id2' vermeld. Zie de afbeelding hieronder voor het voorbeeld.



3.6 Wat is de bron van de misfit?

Een misfit wordt op één van de drie niveaus, zoals in onderstaande afbeelding, veroorzaakt.



Country-specific misfits

Country-specific misfits arise in organizations within countries that have unique regulatory, social and/or cultural practices, that are not supported by the ERP system (Soh and Sia 2004; Sia and Soh 2003). Organizations in different countries will evolve different structures over time. Country-specific misfits could be identified in case the organization which is implementing an ERP system originates from a different country than the developer of these ERP system (Yen et al. 2011). Wang et al. (2006) has demonstrated that ERP systems from the same country as the implementing organization leads to less misfit problems, because in that case the ERP system is developed in the same cultural/social context, with the same practices, assumptions, values, and rules.

Industry-specific misfits

Industry specific misfits arise from incompatibilities between different industries. Most ERP systems are standards, added with some industry specific standards. This creates misfits at organizations where generic modules like sales, HRM, and finance are differently designed (Soh and Sia 2004; Sia and Soh 2003). An industry specific misfit could also arise when professional and/or industry institutions exert normative authority on organizations through guidelines on professional conduct, industry accreditation, or recognition. To keep a good standing, organizations have to adopt forms and procedures. In case the packaged ERP system does not support those forms and procedures, there is an industry-specific misfit. According to the misfit typology of Sia and Soh (2007), an industry-specific misfit is often the result of imposed acquired structures of the organization. Only when the industry requirement is not applicable to other organizations in the same industry, the requirement could be voluntarily acquired.

Company-specific misfits

Company-specific misfits are differences between organization structure and the structure embedded in the ERP package. Over time, organizations acquire different structures, which differentiate organizations from each other. Organizations have to make strategic choices to obtain a favorable position within their environment. Based on the chosen strategy, organizations will develop distinctive routines and structures. Those organizational structures are more or less voluntarily acquired, because an organization has relatively much choice (Soh and Sia 2004; Sia and Soh 2003). According to the misfit typology given by Sia and Soh (2007), a company-specific misfit is often the result of voluntarily acquired structures of the organization. However, the degree of voluntary depends on whether the company-specific misfit is related to core issues, such as management structure, product differentiation, or business strategy, while others are less pervasive (Sia and Soh 2007).

3.7 Indien er als oplossing gekozen is voor 'customization', welk type maatwerk is het dan?

Volgens de literatuur zijn er de onderstaande vormen van maatwerk. Van boven naar beneden neemt de impact toe. Geef hierbij de naam aan uit de eerste kolom. Bijvoorbeeld 'Workflow programming'.

Screen masks	Creating of new screen masks for input and output (soft copy) of data	Integrate three screens into one	Communication layer
Extended reporting	Programming of extended data output and reporting options	Design new report with sales revenues for specific criteria	Application layer and/ or database layer
Workflow programming	Creating of non-standard workflows	Set up automated engineering change order approval process	Application layer and/ or database layer
User exits	Programming of additional software code in an open interface	Develop a statistical function for calculating particular metrics	Application layer and/ or database layer
ERP Programming	Programming of additional applications, without changing the source code (using the computer language of the vendor)	Create a program that calculates the phases of the moon for use in production scheduling	All layers
Interface development	Programming of interfaces to legacy systems or 3rd party products	Interface with custom-build shop-floor-system or with a CRM package	Application layer and/ or database layer
Package code modification	Changing the source-codes ranging from small change to change whole modules	Change error message in warning; modify production planning	Can involve all layers

3.8 Indien er sprake is van 'resistance to change', welk type weerstand is het dan?

- The desire not to lose something of value;
- Misunderstanding the change;
- Lack of trust;
- Believing that the change does not make sense;
- Fear of not being able to develop the new skills and behavior required.

3.9 Indien er sprake is van 'ignorance' hoe had dit dan voorkomen kunnen worden?

Bijvoorbeeld door meer training of ondersteuning te geven? Of zit het in het aard van het beestje en valt het niet te voorkomen. Omdat hier weinig literatuur van is, heb ik weinig over deze categorie. Wat je dus ook te binnenschiet, kun je hier vermelden.

3.10 Indien er sprake is van 'wishes' hoe had dit dan voorkomen kunnen worden?

Kan dit voorkomen worden door de gebruikers minder te verwennen, duidelijker te zijn etc? Omdat hier weinig literatuur van is, heb ik weinig over deze categorie. Wat je dus ook te binnenschiet, kun je hier vermelden.

3.11 Overige

Mocht je nog vragen/twijfels hebben of andere opmerkingen, dan kun je die in dit veld kwijt.

4 Achtergrondinformatie cases

4.1 CASE A.

Description company A.

Company A. is a manufacturer and trader of flexible conduits and hoses for various applications. Examples are the metal hoses in phone booths. This all is partially a standardized product, but on

customer specification, hoses and conduits can be custom made. The custom made product concerns the combination of various items (i.e. hose with a specific connector), the development of a completely new product, and cutting a hose or conduit to the right size.

A. has about 50 employees, of which 20 users of the ERP system Dynamics NAV. They use this ERP system mainly to automate processes and process data. The CEO uses the ERP system for some overviews. He is interested in the revenues of each product group and country. Based on this information he can make decisions.

Strategy A.
A. distinguishes itself from competitors by being flexible (quickly switching and producing small batches), offer a great variety of solutions (whatever the customer wants), and quickly respond to the market. A. has long enduring relations with its customers (common in the industry). Therefore it is very hard to gain new customers.

There are two types of conduits and hoses. Conduits and hoses for electrical products, and conduits and hoses for fluids and gasses. Because the conduits and hoses for electrical products have a larger margin and brings along less risks, A. focuses more on these types of conduits and hoses. Within this type of conduits and hoses, A. produces both products from its catalogue, and products on customer specification. Producing something on customer specification includes designing, calculation, testing, and offering.

Adoption

A. had a custom made ERP system that has been used and adjusted since about 25 years. An IT-employee had developed this system and he maintained the system. Based on the requirements of the system users, the system developer has built the system and added functionality over time. A. completely depended on the system developer, because he was the only one who knows how the system is built, works, and how to maintain the system. Because the system developer retires within a few years, A. needed a new ERP system which could be maintained by other people.

Implementation

The implementation started in February 2010. A. had attracted an external project leader for the implementation. A. wanted to avoid customizations, because they do not want any problems with future updates. Therefore, the plan was to implement standard Dynamics NAV. According to the vendor, manufacturing companies face several misfits when implementing Dynamics NAV. Therefore, besides Dynamics NAV they have also implemented an industry specific bolt-on. This bolt-on can also be seen as a standardized piece of software and is certified by Microsoft. Besides this industry specific standard, a bolt-on for hour registration and purchase invoices was implemented

Budget overrun and delay
The implementation had big delays and a budget overrun. The CEO indicates that the costs of the new ERP implementation were more than twice has high as estimated. According to the CFO the total direct costs were around €350.000. The consultant indicates that the duration of the implementation project was much longer than for similar organizations.

According to all parties, the major reason for the delay was the customization of the calculation functionality. Another often mentioned reason for the delay is that the users moved the testing work aside and did not understand the new ERP system. The aged workforce had difficulties getting used

to the new ERP system, and also had not much time to work with the system, because A. had a lot of orders to process. The consultant indicates a third reason for the delay. He says that all communications were going via the Head IT. Instead of contacting a key-user, the Head IT had to be contacted, which contacted the key-user. This resulted in a bottleneck which made it hard to do multiple things at the same time.

Change management

- User training and education: Directly at the beginning of the implementation, the key users have followed a Dynamics NAV training. This training was a basic training of Dynamics NAV for a bicycle manufacturer. According to the CFO the users were not attracted by this example at all. All three interviewees of A. indicate that A. has an aged workforce who have difficulties using software like 'Word' and 'Excel'. This is supported by documentation like meeting minutes. For those people a basic training is not sufficient. Also because it was never clear when the system was going to be live, the training of the users had taken place more than a year before going live. Meanwhile they had forgotten everything about the new system.
- Achieve commitment of users and users should understand the benefits and drawbacks:
    - Together with the key-users, A. had chosen for Dynamics NAV. Some had the preference for ISAH 7, but where convinced by the arguments to choose for Dynamics NAV.
    - Because the years during the implementation project were very busy for A. most users did testing next to their job and did not take it very seriously. This indicates that they were not aware of the importance of the project.
    - According to the interviewees of A. and the consultant, the attitude of people was "we will see what will come" (we zien het wel). They could be more driven.
    - The external project leader came by once a week and had difficulties dealing with the type of people of A. According to the CEO his people need continuous guidance, which cannot be given by being present once a week.
    - According to the external project leader, the benefits of Dynamics NAV were shared but not understood by some employees.
- Users have to be informed: Users were informed in the beginning about the new ERP system. According to the external project leader and the Head IT, clear decisions about which procedures to follow were not made by the management. This led to ambiguities. The Head IT gives an example of the logistic process. For this process the standard process of Dynamics NAV was followed. However, this was not communicated to the employees of the logistics department, resulting in employees who do not know how to do their work in the new situation.
- Involve users in the system design: For the calculation functionality, the users were involved in giving requirements. For the configuration, the key-users were involved.
- Support users: Because the users had difficulties using Dynamics NAV, the consultant had made demo-scripts. These scripts exactly tell a user what to do (every click). Besides these scripts, consultants of the vendor have guided the users one by one.
- Build management commitment:
    - Management was aware of the importance of the implementation of a new ERP system. They were all involved in the selection of Dynamics NAV. However, the CEO

tells he was standing on the side line at first. After the external project leader had gone, he became the project leader and interfered. He prepared a separate testing room, where users had to test (which became mandatory) and could not do their work meanwhile. The consultant agrees with this and says that the real management commitment came when the CEO had taken the lead.

- The consultant mentioned that the logistic manager walked away at the start of the implementation project with the argument that it was “not his thing”. The interviewees of A. did not mention this.

Because the users had difficulties and did not spend enough time on getting to know Dynamics NAV, the CEO had decided to go live anyway at 1-1-2012. This should force people to use and learn Dynamics NAV. He says that at that moment the basic functionalities of Dynamics NAV were functioning and that arising problems would be solved.

Because the testing was not done adequately, a lot of problems were not detected during the implementation phase. This has led to frustrations and problems during the live phase.

4.2 CASE B.

Description company B.

B. was established in 1999. D. is an organization that collects and processes waste for four municipalities in the Netherlands. Those municipalities are the shareholders of B. and the most important clients. Other activities of B. are cleaning, gritting, pest control, serving commercial clients, running a thrift shop and managing an environmental park. B. has mainly two different processes. A process for the civilians of the four municipalities, and a process for commercial clients.

B. has about 170 employees, of which 26 users of the ERP system Dynamics NAV. B. uses the ERP system to support their business processes.

Strategy B.

According to the head IT, the general strategy of B. is customer intimacy. B. wants to take over the worries of clients about their waste. B. is not the cheapest waste processor, but it wants to take over the care of waste from the four municipalities. B. finds it also important to be sustainable and to control costs.

Adoption

According to the financial controller and the head IT, the reason to replace the old ERP system: Exact for Windows, is because this software was outdated and the continuity of this software package could not be guaranteed. The consultant adds another reason. He says that within B. there were multiple separate systems, leading to multiple versions of the truth. Therefore, by implementing a new integrated ERP system, the risk of having multiple separate administrations would be gone.

The purpose of the new ERP system is to use it for the financial administration and some additional functionalities which are now fulfilled by the home grown system. In the new situation the civilian process stays in the home grown system, but the commercial process will be in Dynamics NAV.

Implementation

B. has implemented standard Microsoft Dynamics NAV, complemented with the industry specific software. For the payroll, the application called Mercash is installed. Besides Dynamics NAV, B. runs its own developed application. This software is used to register containers and the emptying of containers. After implementation, the own developed application will only be used for the civilian process. The commercial process will be completely handled in Dynamics NAV. The head IT states that it off course will be the best solution when all functionality is in a single system, but such systems do not exist. According to the financial controller and head IT, the own developed application functions perfect and has everything the organization needs. Therefore they do not have an argument to replace this piece of software by Dynamics NAV. According to the Head IT, the own developed application has better and completer overviews, and is therefore faster to work with. When helping a civilian this is needed. The financial controller states that the separation between Dynamics NAV and the own developed application is very clear.

In September 2010 the implementation started. According to all interviewees, the implementation was successful, because budget and planning were met. The system went live on 1-1-2011 and total costs stayed below 200.000. The standpoint was to keep the amount of customizations as low as possible. The external project leader and the consultant state that there were little customizations during the implementation. The employee of the sales department agrees with this and mentions that following the standard really happened.

According to documentation of the ERP vendor and the interviewees, the degree of fit between the standard software and company B, was high. By inquiry of the different interviewees, it became clear that the amount of customizations was very minimal. However, according to the financial controller, the fit was better or the financial part, than for the industry specific part.

Change management

- User training and education: At the beginning of the implementation, all users followed a basic Dynamics NAV training given by the ERP vendor. The standing point was on the job training. The financial controller indicates that they have trained employees as late as possible before the live-phase. This approach was chosen to ensure that people did not forget how to work with the new ERP system. The external project leader states that the on the job training took place a month before going live.
- Achieve commitment of users and users should understand the benefits and drawbacks: According to the sales department employee, the younger employees did understand the benefits better than the older employees. There was some resistance in the beginning, but once working with the new system, people were seeing the benefits (employee of the sales department). They found the new ERP system more efficient, because it is all in one system.
- Users have to be informed: At the beginning of the implementation, there was a kick-off meeting. During this kick-off meeting, the user was informed about the implementation, the way of implementing Dynamics NAV and the time planning. According to the external project leader, the management of B. had made very clear that B. would follow the standardized software.
- Involve users in the system design: Key-users were appointed for every department. The key-users had a voice in the system configuration and design. The Head IT indicates that the users of a department knows best how the processes should be.

- Support users: According to the employee of the sales department, older users needed more support than the younger ones. However, they have got this support. After going live, the ERP vendor gave support by solving problems and answering questions.
- Build management commitment: According to the financial controller, the management (except for the financial manager) saw the implementation as an IT-project and were not deeply involved. They only wanted to know the status of the project once in a while. However, the external project leader indicates that the financial controller was very deeply involved and was important for the successful implementation.

Resistance to change

According to the financial controller, the head IT, employee of the sales department, and the consultant there was a lot of resistance to change in the beginning at two departments: Sales and the workshop. For instance, the sales department was still using the legacy system to look things up, while Dynamics NAV was already live. The external project leader does not agree with this and state that there was little resistance to change, only by some people. According to the head IT, for a lot of people it was hard to let go the Excel sheets they have always used.

Ignorance

According to the financial controller, the sales department creates orders in both the old system and the new ERP system, because they are afraid the system will 'forget' something or it will malfunction. The employee of the sales department supports this statement. According to the financial controller nine out of ten times ignorance is the problem.

4.3 CASE C

Description company C.

C. is one of the leading valuation firms in the Netherlands and the world. C. does valuations for two purposes:

- Insurance purposes;
- Economic valuation purposes.

Those two are the main streams of company C (also in the ERP system). The two valuation purposes have different accounting principles. Insurance valuations are about the costs of an object when it has to be replaced. Economic valuations are about value of assets like buildings, machine parks, goodwill etc. Besides, C. also has an department that is specialized in counter-expertise for the insured party.

Strategy C.

The strategy of C is to give an as good and independent valuation as possible for movable and immovable properties. C. is not the cheapest valuation firm in the market, but they are known for their reliability and expertise. C. has mainly large clients.

Adoption

C. was using Exact for the counter-expertise part and had built its own system for the valuation part (both insurance and economic valuations). However, C. did the entire financial administration in Exact (also for the valuation part). The custom made system was started as a standardized ERP system 15 years ago. During time this system was built more and more to customer specification.

According to the head IT, this system was outdated and too much customizations were made. The consultant states that C. became too dependent on a custom made ERP system.

Implementation

The standard Dynamics NAV complemented with an industry specific solution were implemented. This industry specific solution is specially developed for organizations working in projects for business services.

According to the financial controller, the aim of the ERP system implementation was to make the ERP system leading, and to have as less customizations as possible. At first, the aim was to do this for all parts of C. But in the end, Dynamics NAV was only implemented for the insurance valuation part (and the financial administration of the business economic part). The financial controller states that this means that the financial department and human resources need to follow the processes in Dynamics NAV, unless they have very good arguments. The reason for these departments to follow the standard is that C. does not have to distinguish itself compared to competitors on these processes. The consultant agrees with this and states that only minor customizations are made for the financial/HRM part.

Planning and budget

The implementation lasted more than two years. Both deadline and budget were not met. The financial controller states that the implementation was finished more than a year after planned.

Fit

The fit for the financial part was good according to the financial manager and the consultant. However, some users were complaining, that Exact (the legacy system) had more functionalities. The fit for the valuation part was less, because the industry specific solution is made for business services in general and there are some differences between business services in general and the business services of C.

Resistance to change and ignorance

- The sales department does not want to work in the new situation. They think entering every offer is too much work. The employees of the sales department are still arguing to enter offers in a simplistic way.
- The financial department still uses the old system to look up old valuations. They do not trust the new ERP system, or they do not know how they can find data in the new ERP system. According to the financial controller, they do not take the effort to learn the new system.
- According to the head IT, the employee planning and control, and the consultant, the employees of C. are aged and have worked a long time with the old ERP system. According to the head IT, this has led to some resistance to change, because the employees were forced to work in another manner.
- According to the interviewed user, people are still negative about Dynamics NAV, and there has been a lot of resistance to change.
- The head IT states that people do not know enough about Dynamics NAV. They also do not try things and play with the new ERP system. For instance they some employees do not know how to make an export to Excel. The interviewed user agree with this and states that Dynamics NAV has too much possibilities and that they often not know what is possible with the system and what is not.

- According to the head IT, employees have to be higher educated than before, to handle an ERP system. “It is less straightforward”.
- According to the consultant C. has invested in customizations because the user argued the functionality was really needed. However, the user often could not say how much he used the functionality.
- In the beginning of the live-phase, it sometimes happened, that customers had to be called back, because the employees of C. could not find certain information in the system.

Change management

- User training and education: In the beginning of the implementation the users had a basic Dynamics NAV training. Just before going live, the users of the new ERP system had an internal on the job training, given by the key-users. During this internal training, the focus was on where to click to do the job. The interviewed user was satisfied with the training.
  Users were given training documentation and instructions.
- Achieve commitment of users and users should understand the benefits and drawbacks: The users had a basic Dynamics NAV training at the beginning of the implementation. According to the consultant, the purpose of this training was to get users familiar with Dynamics NAV, so they could participate in discussions about the ERP system design.
  Learning the new ERP system was difficult for most users. According to the consultant, they often were thinking how they did their job before, and how they could do this the same in the new ERP system.
  The head IT and the consultant state that after one and a half year begin live, the users still do not embrace the new ERP system. They do not see the benefits of the system and think Dynamics NAV contains too much operations. However, the reason for this is that the management of C. wants to make better use of the ERP system, which involves more operations to be performed.
  The user doubts whether the other users saw the benefits of the new ERP system.
- Users have to be informed: According to the financial controller, users were complaining that communication was not good enough towards the users of the ERP system. The financial controller states that the main reason for this was that not all requests of the users were accepted.
- Involve users in the system design: For the implementation, a steering group was established. Under this steering group were several project groups. Those project groups existed of employees (key-users). The key-users were involved in the decisions made about the ERP system design. The financial controller indicates that it is a risk that people want to work in the old way. The interviewed user states that the users were involved, but they did not always listen to the users.
  After a customization had been delivered, the users of this customization had to test this. A pitfall is that people do not take the time to adequately test this customization, leading to problems when the new functionality really had to be used.
- Support users: At the moment of going live, user were not confident about the system and had a lot of questions. After going live, users were supported: Answer was given on questions from users and occurring incidents were solved. According to the consultant, this went well, but users were not very satisfied about the new way of working.

- Build management commitment: The management of C. was present in the steering committee of the implementation project.

4.4 CASE D.

Description company D.

D. was established in 1998. D. is an organization that collects and processes waste for nine municipalities in the Netherlands. D. also manages environmental parks in those municipalities and takes care of street cleaning, transportation, cycle activities, and gritting. Besides serving civilians in the nine municipalities, D. helps organizations to manage their waste. The nine municipalities are shareholders of D.

D. has about 330 employees, of which 60 users of the ERP system Dynamics NAV. D. uses the ERP system to support their business processes. D. has an own software development department, consisting of three employees. This software development department has the knowledge to make customizations into Microsoft Dynamics NAV.

Strategy D.

The strategy of D. is to do everything as cheap as possible. They aim at being as efficient as possible. D. has contracts with the municipalities and has to determine each year for every municipality a budget. The lower the costs, the better they perform. D. does not aim to make profit, and wants to serve the citizens as good as possible.

Adoption

The main reason mentioned by the interviewees to adopt a new ERP system was because the old ERP system, named 'Clear' was outdated. During the ten years before implementation, the old ERP system was built exactly how the users wanted it. This has led to a system with a lot of customizations, not performing efficiently anymore.

Another reasons was that D. had a lot of separate computer systems, and wanted to have a more integrated information system. By implementing a new ERP system, D. (wanted to achieve consistency insert data at one location) and efficiency (insert data once). The ERP system will not replace all legacy system, but it will reduce the amount of systems.

Implementation

Together with standard Dynamics NAV and the industry specific module, a maintenance module was implemented.

The implementation did not meet budget and time. The actual costs of the implementation were more than twice as high as the initial budget of 485.000. According to the system developer A, the implementation was around 1,5 year delayed. The project started in 2006 and the ERP system went live in 2008.

The head of the IT department and the consultant indicate that the main reason why the implementation was difficult, was because the employees of D. did not know what functionality they exactly wanted. According to all interviewees almost every wish and requirement has led to customizations, leading to a lot of customizations not meeting the wishes and requirements of the users. The head IT indicates that ignorance of the users, and the users being spoiled are the main

reasons for this. The system developers both agree with this and state that a lot of customizations are not used anymore. Sometimes the users wanted things, which were already in the standard Dynamics NAV. According to the Head IT and the system developers, users within D. are spoiled and get almost everything they want. He states that there is lack of a critical view, whether these customizations are really needed or not. “Sometimes users even wanted to have a customization, so they have to click once instead of twice to make a print”.

The issue register of D shows more than 3000 issues requested by users, varying from small adjustments to big customizations.

Change management

- User training and education: Users have followed different trainings. In the beginning, users have followed a basic Dynamics NAV training. According to the Head IT, the users even had some trainings during the live phase. He indicates that some people need more training than others. “Some users need one explanation and they understand it, some need ten explanations and they do not understand it.” The Head IT also states that organization D. is no “high tech organization regarding its users”. During one or two months they have runned both systems and users had to use both systems. System developer A states that the system went live after all departments showed they could work with the new system.
- Achieve commitment of users and users should understand the benefits and drawbacks:
    - According to Head IT, users were informed about the advantages and disadvantages of Dynamics NAV that were familiar before implementing the ERP system.
- Involve users in the system design: The key-users of each department were involved by the system design, because they know the old processes the best. The users indicated how they have always worked and this was translated to functionality. In most cases the department system development has built what the user wanted. The key-users had to give input for his/her department. The users actively participated in the implementation, because a lot of customizations have been made on user specification. According to the Head IT and system developers, sometimes this went too far and there was lack of a critical view whether those customizations were needed or not.
- Support users: When a user has questions, it is supported by the key-users of the specific department. In case the key-user cannot solve the problem, the IT department will help to solve the problem or answer the question. According to system developer A, the users have got a lot of support.
- Users have to be informed: Users were informed about the implementation.
- Build management commitment: According to documentation and inquiry of the Head IT, management was involved with the implementation. Most of the managers were in the steering group of the project. Other managers were keeping informed.

Resistance to change

According to all interviewees there was a lot of resistance to change at the beginning of the implementation. People had fear for something new and unfamiliar. Later when the users got used to the new ERP system, the resistance to change decreased. System developer A indicates that resistance to change was managed by giving as much as guidance as possible.

System developer A indicates that a lot of functionality is specifically developed for the system users, but some functionality is not used anymore. He argues that this is caused by ignorance and resistance to change.

Ignorance

Because users lack knowledge of Excel and Dynamics NAV, a lot of customizations have been made which were not necessary. For instance, it is possible to make exports of some data from Dynamics NAV to Excel. Using pivot tables and filters gives users a lot of information, but according to system developer B they do not know how to do this.

According to system developer B and the Head IT, most users did not have any experience with Dynamics NAV, leading to not knowing the possibilities of this system. They state also that it is too easy for users to make mistakes in the system.

Wishes

According to all interviewees, the users of D. were spoiled by having a system development department which was customizing almost everything the users wanted. This has led to a lot of customizations which were not really necessary.

APPENDIX G – FLEISS' KAPPA

$$\kappa = \frac{\bar{P} - \bar{P}_e}{1 - \bar{P}_e} \quad (1)$$

$$P_i = \frac{1}{n(n-1)}[(\sum_{j=1}^{k} n_{ij}^2) - (n)] \quad (2)$$

$$p_j = \frac{1}{Nn}\sum_{i=1}^{N} n_{ij}, \quad (3)$$

$$\bar{P} = \frac{1}{N}\sum_{i=1}^{N} P_i \quad (4)$$

$$\bar{P}_e = \sum_{j=1}^{k} p_j^2 \quad (5)$$

- N=The total number of misfits
- n=The number of ratings per misfit
- k=The number of misfit categories
- The misfits are indexed by i=1,…, N
- The misfit categories are indexed by j=1,…, k
- n_{ij}=The number of raters who assigned the i-th misfit to the j-th misfit category
- κ= Fleiss' Kappa

(Source: Fleiss 1971)

APPENDIX H – KAPPA CALCULATIONS

KAPPAS CASE A.

Fleiss Case A			
N(misfits)	15		
n(raters)	5		
k(categor)	2		
	Actual	Perceived	Pi
A1	5		**1,00**
A2		5	**1,00**
A3		5	**1,00**
A4	4	1	**0,60**
A5		5	**1,00**
A6	4	1	**0,60**
A7	5		**1,00**
A8		5	**1,00**
A9	4	1	**0,60**
A10	1	4	**0,60**
A11	4	1	**0,60**
A12	5		**1,00**
A13	3	2	**0,40**
A14	5		**1,00**
A15	2	3	**0,40**
Total	**42**	**33**	**75**
pj	0,56	0,44	
Pgem	0,79		
Pe	0,5072		
Kappa	**0,5671**		

Fleiss Case A Perceived								
N(misfits)	5							
n(raters)	5							
k(categor)	3							
	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
A2				4	1		**0,60**	5
A3						5	**1,00**	5
A5				2	1	1	**0,17**	4
A8				2	2		**0,33**	4
A10					3	1	**0,50**	4
Total	**0**	**0**	**0**	**8**	**7**	**7**	**22**	
pj	0	0	0	0,3636	0,3182	0,3182		
Pgem	0,52							

Pe	0,3347
Kappa	**0,2785**

Fleiss Case A Actual

N(misfits)	9
n(raters)	5
k(categor)	3

	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
A1	5						**1,00**	5
A4	4						**1,00**	4
A6	1	3					**0,50**	4
A7	5						**1,00**	5
A9	3		1				**0,50**	4
A11		3	1				**0,50**	4
A12		5					**1,00**	5
A13	3						**1,00**	3
A14	1	3					**0,50**	4
Total	**22**	**14**	**2**	**0**	**0**	**0**	**38**	
pj	0,5789	0,3684	0,0526	0	0	0		

Pgem	0,78
Pe	0,4737
Kappa	**0,5778**

KAPPAS CASE B.

Fleiss Case B

N(misfits)	18
n(raters)	5
k(categor)	2

	Actual	Perceived	Pi
B1	4	1	**0,60**
B2	1	4	**0,60**
B3	3	2	**0,40**
B4	1	4	**0,60**
B5	5		**1,00**
B6		5	**1,00**
B7	4	1	**0,60**
B8	5		**1,00**
B9	5		**1,00**
B10	5		**1,00**
B11	5		**1,00**
B12	5		**1,00**
B13		5	**1,00**

B14		5	**1,00**
B15		5	**1,00**
B16	5		**1,00**
B17	5		**1,00**
B18	2	3	**0,40**
Total	**55**	**35**	**90**
pj	0,6111	0,3888	
Pgem	0,84		
Pe	0,5247		
Kappa	**0,6727**		

Fleiss Case B Perceived

N(misfits)	8
n(raters)	5
k(categor)	3

	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
B1				3	1		**0,50**	4
B2				2	1	1	**0,17**	4
B4					1	3	**0,50**	4
B6				1	3		**0,50**	4
B13				5			**1,00**	5
B14				5			**1,00**	5
B15				4	1		**0,60**	5
B18				1		2	**0,33**	3
Total	**0**	**0**	**0**	**21**	**7**	**6**	**34**	
pj	0	0	0	0,6176	0,2058	0,1764		

Pgem	0,58
Pe	0,45501
Kappa	**0,2202**

Fleiss Case B Actual

N(misfits)	10
n(raters)	5
k(categor)	3

	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
B3			3				**1,00**	3
B5		5					**1,00**	5
B7		3	1				**0,50**	4
B8	2	3					**0,40**	5
B9	5						**1,00**	5

B10	4	1					**0,60**	5
B11	5						**1,00**	5
B12	4						**1,00**	4
B16	1	3	1				**0,30**	5
B17	4						**1,00**	4
Total	**25**	**15**	**5**	**0**	**0**	**0**	**45**	
pj	0,5556	0,3333	0,1111	0	0	0		
Pgem	0,78							
Pe	0,4321							
Kappa	**0,6126**							

KAPPAS CASE C.

Fleiss Case C			
N(misfits)	32		
n(raters)	4		
k(categor)	2		
	Actual	Perceived	Pi
C1		4	**1,00**
C2	4		**1,00**
C3	2	2	**0,33**
C4	4		**1,00**
C5	4		**1,00**
C6		4	**1,00**
C7	2	2	**0,33**
C8		4	**1,00**
C9	4		**1,00**
C10		4	**1,00**
C11		4	**1,00**
C12		4	**1,00**
C13	3	1	**0,50**
C14	3	1	**0,50**
C15		4	**1,00**
C16		4	**1,00**
C17	4		**1,00**
C18	4		**1,00**
C19	2	2	**0,33**
C20	3	1	**0,50**
C21	4		**1,00**
C22	1	3	**0,50**
C23		4	**1,00**
C24	1	3	**0,50**
C25		4	**1,00**
C26	4	0	**1,00**

C27	1	3	**0,50**
C28		4	**1,00**
C29		4	**1,00**
C30		4	**1,00**
C31	1	3	**0,50**
C32		4	**1,00**
Total	**51**	**77**	**128**
pj	0,3984	0,6016	
Pgem	0,83		
Pe	0,5206		
Kappa	**0,6415**		

Fleiss Case C Perceived

N(misfits)	19
n(raters)	5
k(categor)	3

	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
C1				1	1	1	**0,00**	3
C6				4			**1,00**	4
C7					1	1	**0,00**	2
C8				3	1		**0,50**	4
C10				2	1	1	**0,17**	4
C11				4			**1,00**	4
C12				3		1	**0,50**	4
C15				1		3	**0,50**	4
C16					1	3	**0,50**	4
C22					3		**1,00**	3
C23				2	1	1	**0,17**	4
C24				2		1	**0,33**	3
C25				2	1	1	**0,17**	4
C27					2		**1,00**	2
C28					3	1	**0,50**	4
C29				2		2	**0,33**	4
C30				2	2		**0,33**	4
C31					3		**1,00**	3
C32						4	**1,00**	4
Total	**0**	**0**	**0**	**28**	**20**	**20**	**68**	
pj	0	0	0	0,4118	0,2941	0,2941		
Pgem	0,53							
Pe	0,3426							
Kappa	**0,2795**							

Fleiss Case C Actual								
N(misfits)	13							
n(raters)	5							
k(categor)	3							
	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
C2	4						**1,00**	4
C3			2				**1,00**	2
C4	4						**1,00**	4
C5	3	1					**0,50**	4
C9		3					**1,00**	3
C13		3					**1,00**	3
C14		2	1				**0,33**	3
C17	4						**1,00**	4
C18	4						**1,00**	4
C19	1		1				**0,00**	2
C20	3						**1,00**	3
C21	4						**1,00**	4
C26		3					**1,00**	3
Total	**27**	**12**	**4**	**0**	**0**	**0**	**43**	
pj	0,6279	0,2791	0,0930	0	0	0		
Pgem	0,83							
Pe	0,4808							
Kappa	**0,6790**							

KAPPAS CASE D.

Fleiss Case D			
N(misfits)	17		
n(raters)	4		
k(categor)	2		
	Actual	Perceived	Pi
D1	2	2	**0,33**
D2		4	**1,00**
D3		4	**1,00**
D4		4	**1,00**
D5	4		**1,00**
D6	4		**1,00**
D7	3	1	**0,50**
D8	4		**1,00**
D9	3	1	**0,50**
D10	4		**1,00**
D11		4	**1,00**
D12	4		**1,00**

D13	2	2	**0,33**
D14	1	3	**0,50**
D15	4		**1,00**
D16		4	**1,00**
D17	4		**1,00**
Total	**39**	**29**	**68**
pj	0,5735	0,4265	
Pgem	0,83		
Pe	0,5108		
Kappa	**0,6593**		

Fleiss Case D Perceived

N(misfits)	6
n(raters)	5
k(categor)	3

	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
D2				2		2	**0,33**	4
D3				1	3		**0,50**	4
D4					4		**1,00**	4
D11						4	**1,00**	4
D14				1	2		**0,33**	3
D16				2	1	1	**0,17**	4
Total	**0**	**0**	**0**	**6**	**10**	**7**	**23**	
pj	0	0	0	0,2608	0,4348	0,3043		
Pgem	0,56							
Pe	0,3497							
Kappa	**0,3165**							

Fleiss Case D Actual

N(misfits)	11
n(raters)	5
k(categor)	3

	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Pi	Raters
D1	2						**1,00**	2
D5	4						**1,00**	4
D6	3						**1,00**	3
D7	3						**1,00**	3
D8			4				**1,00**	4
D9		3					**1,00**	3
D10		4					**1,00**	4
D12	2	2					**0,33**	4

D13		2					**1,00**	2
D15	3	1					**0,50**	4
D17	4						**1,00**	4
Total	**21**	**12**	**4**	**0**	**0**	**0**	**37**	
pj	0,5676	0,3243	0,1081	0	0	0		
Pgem	0,89							
Pe	0,4390							
Kappa	**0,8109**							

APPENDIX I – DETAILED RESULTS SINGLE CASE ANALYSIS

APPENDIX OUTLINE

Each case contains the same subsections. The first subsection starts with the distribution of the identified misfits. This gives insight into what percentage of misfits are actual and perceived. In the second subsection the results of the actual misfits are shown. What caused the actual misfits, how were they solved, and what were the reasons mentioned to customize, workaround or accept a misfit? The third subsection shows the results for the perceived misfits. What have caused the perceived misfits and why was chosen to solve a perceived misfit via a workaround or customization? Finally, in the fourth subsection an overview can be found of all misfits, including the type, category, and chosen solution for the specific misfit.

1 CASE A

1.1 Actual vs. perceived

Based on the propositions of section 6.3 and the extended analytical framework of Figure 15, the five experts firstly rated whether each misfit identified in case A is an actual or a perceived misfit. The Fleiss' kappa for this rating is 0.5671. According to the table for interpreting kappa values of Landis and Koch (1977), there is moderate agreement between the five raters. After discussion of two misfits, the raters reached agreement that ten misfits (67%) are actual misfits and five misfits (33%) are perceived misfits as can be seen in Table 28 together with the distribution of the categories of both types of misfits.

Table 28: Distribution of misfits and their categories at case company A.

Actual/ Perceived	Deep	Structure	Latent	Resistance	Ignorance	Wishes	Ignorance/ resistance	Total
Actual	6 (60%)	4 (40%)	0	-	-	-	-	10 (67%)
Perceived	-	-	-	1 (20%)	2 (40%)	1 (20%)	1 (20%)	5 (33%)
Total								**15 (100%)**

1.2 Actual misfits

Of the fifteen identified misfits, 67% was identified as being an actual misfit. Of the ten actual misfits the inter-rater agreement about the categories (deep structure/surface structure/latent structure) had a kappa of 0.5778 which is moderate agreement. Of the ten actual misfits, six misfits were classified as deep structure misfits (60%) and four as surface structure misfits (40%). Latent structure misfits were not found in this case. Table 29 shows an overview of the actual misfits identified at A and which solution was chosen. The columns surface and deep shows the solutions choses for each category of actual misfits. The last column shows the total of solutions chosen for actual misfits.

Table 29: Solutions chosen for actual misfits at case company A.

Solution	Deep structure	Surface structure	Latent structure	Total
Customization	1 (16,7%)	1 (25%)	-	2 (20%)
Workaround	4 (66,7%)	-	-	4 (40%)
Accept misfit	-	3 (75%)	-	3 (30%)
Adapt business process	1 (16,7%)	-	-	1 (10%)

Total	6 (100%)	4 (100%)	-	**10 (100%)**

Customization

The customization of the deep structure misfit (A1) was a heavy customization (ERP programming) and was the major cause for the delay and budget overrun. After each delivery of the customization, the users were not satisfied and adjustments had to be made again. This process was time and budget consuming (lasted more than a year). The argument for this customization was that they could not function without this functionality.

The customization to solve the surface structure misfit (A14) was a much simpler customization (extended reporting). A has stocks in both Italy and The Netherlands and therefore wants to see the articles in stock for each location. Without this functionality they do not know what they have in stock for each location.

So, both customizations were made because important functionality was missing.

Workaround

Of the four misfits that are solved via workarounds, two misfits (A4 and A7) are solved by finding an alternative to have the same functionality in the system, and two misfits (A12 and A13) were solved by manually working around the system. In all four cases a workaround was chosen to solve the misfit, because using a workaround leads to an acceptable result and adaptation of the ERP system or business processes could be prevented. For instance misfit A4; Dynamics NAV imposes the user to insert the operation time spent on every part. However, the business process of A. is not designed to keep track of operation time per part. Adjusting the process is not an option because they only need to know the operation time for the completed product. Also adjusting the ERP system is not needed, because the workaround creates functionality which is acceptable, despite of making a big loss on one part in the system.

Accept misfit

Of the three actual misfits that were solved by accepting the misfit, two misfits (A11 and A15) were accepted, because buying or customizing the functionality was too expensive. Of the third misfit the reason to accept the misfit is not clear from the information collected.

1.3 Perceived misfits

The raters had more difficulties classifying the perceived misfits, as can be derived from the kappa of 0.2785. According to Landis and Koch (1977) this kappa indicates that there was fair agreement between the raters. Of all misfits identified at organization A 33% are perceived misfits. As can be seen in the bottom row of Table 30, one perceived misfit is caused by resistance to change directly, two are caused by ignorance, one by wishes, and one by ignorance leading to resistance to change.

Table 30: Solution chosen for perceived misfits at case company A.

Solution	Resistance	Ignorance	Wishes	Ignorance/ resistance	Total
Customization	-	-	-	-	-
Workaround	-	1 (50%)	-	-	1 (20%)
Accept misfit	-	-	-	-	-
Adapt business process	-	-	-	-	-
No solution	1 (100%)	1 (50%)	1 (100%)	1 (100%)	4 (80%)

Total	1 (100%)	2 (100%)	1 (100%)	1 (100%)	**5 (100%)**

Only one perceived misfit was solved by using a resolution strategy of Soh et al. (2000). The solution chosen was a workaround to obtain the required functionality in another way. The other four perceived misfits, were not resolved. For perceived misfits A2 and A8, the users use the legacy system again, because they are convinced the old way of working is faster. As a result, the new ERP system is not used as intended and not all data is entered in the same ERP system. Perceived misfit A3 was rejected by A by letting the users know that not everything they want is possible or necessary. For perceived misfit A5, the result is that the users of the invoicing department spend much time on correcting and checking, just because they do not know how to do this in an easier way.

1.4 Final categorization

Table 31 below shows an overview of every misfit, the category, the source, and the chosen solution of the organization to solve the misfit.

Table 31: Final categorization Case A.

Misfit code	Actual/ Perceived	Category	Source	Solution
A1	Actual	Deep structure	Company-specific	Customization
A2	Perceived	Resistance to change	-	-
A3	Perceived	Wishes	-	-
A4	Actual	Deep structure	Industry-specific	Workaround
A5	Perceived	Ignorance	-	-
A6	Actual	Surface structure	Company-specific	Accept misfit
A7	Actual	Deep structure	Company-specific	Workaround
A8	Perceived	Ignorance/Resistance to change	-	-
A9	Actual	Deep structure	Country-specific	Process adaptation
A10	Perceived	Ignorance	-	Workaround
A11	Actual	Surface structure	Industry-specific	Accept misfit
A12	Actual	Deep structure	Industry-specific	Workaround
A13	Actual	Deep structure	Company-specific	Workaround
A14	Actual	Surface structure	Company-specific	Customization
A15	Actual	Surface structure	Company-specific	Accept misfit

In case the 'solution' field of Table 31 is empty, there was no solution chosen. For instance users were complaining that it was too difficult in Dynamics NAV to change something in an offer and therefore start working in the old way. Not choosing a solution is only possible for perceived misfits, because actual misfits are legitimate issues and therefore need a solution. For instance, when someone complains about the ERP system, this complaints can be ignored, leading to no solution. Besides, only actual misfits have a source of a misfit.

2 CASE B

2.1 Actual vs. perceived

The kappa of the categorization between actual and perceived misfits was 0.6727 which is substantial agreement. After discussion of two misfits, the raters reached agreement that ten misfits (56%) are actual misfits and eight misfits (44%) are perceived misfits as can be seen in Table 32, together with the distribution of the categories of both types of misfits.

Table 32: Distribution of misfits and their categories at case company B.

Actual/ Perceived	Deep	Surface	Latent	Resistance	Ignorance	Wishes	Ignorance/ Resistance	Total
Actual	5 (50%)	4 (40%)	1 (10%)	-	-	-	-	10 (56%)
Perceived	-	-	-	6 (75%)	1 (13%)	1 (13%)	-	8 (44%)
Total							**-**	**18 (100%)**

2.2 Actual misfits

Of the eighteen identified misfits, 56% percent was categorized by the five experts as being an actual misfit. Of the ten actual misfits the inter-rater agreement about the categories had a kappa of 0.6126 which is substantial agreement. After discussion of one misfit, the raters reached agreement that of the ten actual misfits, five misfits were classified as deep structure misfits (50%), four as surface structure misfits (40%), and one as a latent structure misfit (10%). Table 33 shows an overview of the actual misfits identified at B and which solution was chosen. The columns surface, deep and latent shows the solutions chosen for each category of actual misfits. The last column shows the total of solutions chosen for actual misfits at B.

Table 33: Solutions chosen for actual misfits at case company B.

Solution	Deep structure	Surface structure	Latent structure	Total
Customization	2 (40%)	3 (75%)	-	5 (50%)
Workaround	3 (60%)	1 (25%)	1 (100%)	5 (50%)
Accept misfit	-	-	-	-
Adapt business process	-	-	-	-
Total	5 (100%)	4 (100%)	1 (100%)	**10 (100%)**

Customizations

Most of the customizations were minor customizations (B7, B8, B10, B16), such as making an interface and adjusting overviews/reports. The interface was really needed, because they use the home grown ERP system still for a part of the clients. Also the overviews and lay-outs needed to contain the right information. One customization was large and had to be made, because local authorities were demanding B. to keep track of the weights of waste collected at each client. The standard ERP system was not supporting this functionality.

So the reasons for B. to customize are missing important functionality which is needed because the local authorities demand it. Other reasons are to keep working with the legacy system, and to complete overviews/lay-outs of which B had not the expertise in house.

Workaround

Of the five misfits that are solved via workarounds, three misfits (B3, B5, and B9) are solved by manually working around the system, and two misfits (B12 and B17) are solved by finding an alternative in the ERP system. For misfits B3 and B5 a workaround was chosen because the needed functionality was not used often enough to buy additional software or customize the functionality. For misfit B9 they have created a workaround and meanwhile they are looking for a better solution, so the workaround is temporary. For misfit B12 the workaround leads to sufficient functionality, so no customization is needed. For misfit B17 the workaround has been created, because the standard functionality is too complex. By using the workaround this complex functionality can be evaded.

So, the reasons for B. for workarounds are saving money because the functionality is only needed once in a while, thinking about a better solution meanwhile (temporary), evade complexities, and the workaround is offering sufficient functionality, so no customizations are needed.

2.3 Perceived misfits

The raters had more difficulties classifying the perceived misfits, as can be derived from the kappa of 0.2202 which is fair agreement. Of all misfits identified at organization B. 44% are perceived misfits. As can be seen in the bottom row of Table 34, six perceived misfits were caused by resistance to change, one by ignorance, and one by wishes (after discussion of two misfits). The perceived misfit category where ignorance leads to resistance was not found at case B.

Table 34: Solution chosen for perceived misfits at case company B.

Solution	Resistance	Ignorance	Wishes	Ignorance/ resistance	Total
Customization	-	-	1 (100%)	-	1 (12,5%)
Workaround	-	-	-	-	-
Accept misfit	3 (50%)	-	-	-	3 (37,5%)
Adapt business process	3 (50%)	-	-	-	3 (37,5%)
No solution		1 (100%)	-	-	1 (12,5%)
Total	6 (100%)	1 (100%)	1 (100%)	-	**8 (100%)**

Of the perceived misfits one misfit was solved by customizing the ERP system. The other seven perceived misfits were solved by adapting the process, accept the misfit or no solution was chosen.

The customization of perceived misfit (B4) was made because users always worked with the description and not with the number that Dynamics NAV generates. So the user does not need to adapt.

2.4 Final categorization

Table 35 below shows an overview of every misfit, the category, the source, and the chosen solution of the organization to solve the misfit.

Table 35: Final categorization case B.

Misfit code	Actual/ Perceived	Category	Solution
B1	Perceived	Resistance to change	Process adaptation
B2	Perceived	Resistance to change	Accept misfit
B3	Actual	Latent structure	Workaround
B4	Perceived	Wishes	Customization
B5	Actual	Surface structure	Workaround
B6	Perceived	Ignorance	-
B7	Actual	Surface structure	Customization
B8	Actual	Surface structure	Customization
B9	Actual	Deep structure	Workaround
B10	Actual	Deep structure	Customization
B11	Actual	Deep structure	Customization
B12	Actual	Deep structure	Workaround
B13	Perceived	Resistance to change	Process adaptation
B14	Perceived	Resistance to change	Accept misfit
B15	Perceived	Resistance to change	Process adaptation
B16	Actual	Surface structure	Customization
B17	Actual	Deep structure	Workaround
B18	Perceived	Resistance to change	Accept misfit

3 CASE C

7.1 Actual vs. perceived

The kappa of the categorization between actual and perceived misfits was 0.6415 which is substantial agreement. After discussion of five misfits, the raters reached agreement that thirteen misfits (41%) are actual misfits and nineteen misfits (59%) are perceived misfits as can be seen in Table 36, together with the distribution of the categories of both types of misfits.

Table 36: Distribution of misfits and their categories at case company C.

Actual/ Perceived	Deep	Structure	Latent	Resistance	Ignorance	Wishes	Ignorance/ resistance	Total
Actual	8 (62%)	4 (31%)	1 (8%)	-	-	-	-	13 (41%)
Perceived	-	-	-	7 (37%)	7 (37%)	4 (21%)	1 (5%)	19 (59%)
Total								**32 (100%)**

7.2 Actual misfits

Of the thirty-two identified misfits, 41% percent was categorized by the five experts as being an actual misfit. Of the thirteen actual misfits the inter-rater agreement about the categories had a kappa of 0.6790 which is substantial agreement. Of the thirteen actual misfits, eight misfits were classified as deep structure misfits (62%), four as surface structure misfits (31%), and one as a latent structure misfit (8%). Table 37 gives an overview of the actual misfits identified at C and which

solution was chosen. The columns surface, deep, and latent shows the solutions chosen for each category of actual misfits. The last column shows the total of solutions chosen for actual misfits at C.

Table 37: Solutions chosen for actual misfits at case company C.

Solution	Deep structure	Surface structure	Latent structure	Total
Customization	8 (100%)	-	-	8 (62%)
Workaround	-	-	-	-
Accept misfit	-	3 (75%)	-	3 (23%)
Adapt business process	-	-	-	-
Buy additional software	-	1 (25%)	1 (100%)	2 (15%)
Total	8 (100%)	4 (100%)	1 (100%)	**13 (100%)**

Customization

Of the eight customizations, only C2 is a misfit for the financial process. The seven other misfits are company specific, were the industry specific solution does not meet the requirements of C. All seven customizations are made because important functionality was missing in the deep structure. For instance a valuation has a location. In the standard solution it was not possible to add a location on a project (valuation). Therefore a field is added to the database. The other customizations are similar.

Accept misfit

The reason to accept misfit C9 was because the consultant indicated that it was too expensive to customize this requirement. The reason to accept misfit C13, is because it is not possible to customize a lay-out builder in Dynamics NAV, so it is too complex. Misfit C26 they accept, but they know they are missing important information. The real reason why they accept missing this important information is unknown.

Buy other software

For misfit C3 and C14, C has bought other software. They were arguing that the reporting and hour administration had poor functionality in Dynamics NAV. Instead of customizing this functionality, they have chosen to buy other software for both issues.

7.3 Perceived misfits

The raters had more difficulties classifying the perceived misfits, as can be derived from the kappa of 0.2795 which is fair agreement. Of all misfits identified at organization C 59% are perceived misfits. As can be seen in the bottom row of Table 38, seven perceived misfits were caused by resistance to change, seven by ignorance, four by wishes, and one by ignorance leading to resistance to change (after discussion of five misfits).

Table 38: Solution chosen for perceived misfits at case company C.

Solution	Resistance	Ignorance	Wishes	Ignorance/ Resistance	Total
Customization	3 (43%)	-	-	-	3 (16%)
Workaround	1 (14%)	-	1 (25%)	-	2 (11%)
Accept misfit	1 (14%)	5 (71%)	-	-	6 (31%)
Adapt business process	2 (29%)	-	-	-	2 (11%)
No solution	-	2 (29%)	3 (75%)	1 (100%)	6 (31%)
Total	7 (100%)	7 (100%)	4 (100%)	1 (100%)	**19 (100%)**

Of the perceived misfits three misfits were solved by customizing the ERP system, and two via a workaround. The other fourteen perceived misfits were solved by adapting the process, accept the misfit or no solution was chosen.

C23 was customized because this way, the users could still use the old system in combination with Dynamics NAV. C24 was customized to keep the users satisfied. C25 was customized so the user did not have to get used to new definitions. For misfit C8 a workaround was created to let the users work the same way as before. For misfit C32 the users created an Excel sheet to keep track of the priorities of the valuations. As a result not every data is in the central system.

7.4 Final categorization

Table 39 shows an overview of every misfit, the category, the source, and the chosen solution of the organization to solve the misfit.

Table 39: Final categorization case C.

Misfit code	Actual/ Perceived	Category	Solution
C1	Perceived	Ignorance	Accept misfit
C2	Actual	Deep structure	Customization
C3	Actual	Latent structure	Buy other software
C4	Actual	Deep structure	Customization
C5	Actual	Deep structure	Customization
C6	Perceived	Resistance to change	Accept misfit
C7	Perceived	Ignorance	Accept misfit
C8	Perceived	Resistance to change	Workaround
C9	Actual	Surface structure	Accept misfit
C10	Perceived	Ignorance	Accept misfit
C11	Perceived	Resistance to change	Process adaptation
C12	Perceived	Resistance to change	Process adaptation
C13	Actual	Surface structure	Accept misfit
C14	Actual	Surface structure	Buy other software
C15	Perceived	Wishes	-
C16	Perceived	Wishes	-
C17	Actual	Deep structure	Customization
C18	Actual	Deep structure	Customization
C19	Actual	Deep structure	Customization
C20	Actual	Deep structure	Customization
C21	Actual	Deep structure	Customization
C22	Perceived	Ignorance	-
C23	Perceived	Resistance to change	Customization
C24	Perceived	Resistance to change	Customization
C25	Perceived	Resistance to change	Customization
C26	Actual	Surface structure	Accept misfit
C27	Perceived	Ignorance	Accept misfit
C28	Perceived	Ignorance	-
C29	Perceived	Wishes	-
C30	Perceived	Ignorance/resistance	-

C31	Perceived	Ignorance	Accept misfit
C32	Perceived	Wishes	Workaround

4 CASE D

4.1 Actual vs. perceived

The kappa of the categorization between actual and perceived misfits was 0.6593 which is substantial agreement. After discussion of two misfits, the raters reached agreement that eleven misfits (65%) are actual misfits and six misfits (35%) are perceived misfits as can be seen in Table 40 together with the distribution of the categories of both types of misfits.

Table 40: Distribution of misfits and their categories at case company D.

Actual/ Perceived	Deep	Structure	Latent	Resistance	Ignorance	Wishes	Ignorance/ resistance	Total
Actual	7 (64%)	3 (27%)	1 (9%)	-	-	-	-	11 (65%)
Perceived	-	-	-	1 (17%)	2 (33%)	3 (50%)	-	6 (35%)
Total								**17 (100%)**

4.2 Actual misfits

Of the seventeen identified misfits, 65% percent was categorized by the five experts as being an actual misfit. Of the eleven actual misfits the inter-rater agreement about the categories had a kappa of 0.8109 which is almost perfect agreement according to Landis and Koch (1977). The four raters could not reach agreement about the subcategory of one actual misfit. After discussion of this misfit, the raters reached agreement that of the eleven actual misfits, seven misfits were classified as deep structure misfits (64%), three as surface structure misfits (27%), and one as a latent structure misfit (9%). Table 41 shows an overview of the actual misfits identified at D and which solution was chosen. The columns surface, deep and latent structure shows the solutions chosen for each category of actual misfits. The last column shows the total of solutions chosen for actual misfits at D.

Table 41: Solutions chosen for actual misfits at case company D.

Solution	Deep structure	Surface structure	Latent structure	Total
Customization	6 (86%)	3 (100%)	-	9 (82%)
Workaround	1 (14%)	-	1 (100%)	2 (18%)
Accept misfit	-	-	-	-
Adapt business process	-	-	-	-
Total	7 (100%)	3 (100%)	1 (100%)	**11 (100%)**

Customizations

Of the nine customizations, three misfits (D5, D15, and D17) were solved by customizing the system, because the local authorities obliged D to do the waste processing in a certain way. The reason to customize to solve misfit D1 was to become more efficient. The functionality in the standard system worked, but was not very efficient. For misfits D7, D9, D10, D12, and D13, D customized because the functionality of the standard was not sufficient on these points.

D has three full time system developers. Having these system developers allows D to make the customizations themselves, so the barrier to customize is lower.

Workarounds

Of the two workarounds that were created, one was created, because it was not possible to store some data in the Dynamics NAV database, so they created an Access database. Because of performance issues, they created a workaround for misfit D8. This could not be solved with a customization.

4.3 Perceived misfits

The raters had more difficulties classifying the perceived misfits, as can be derived from the kappa of 0.3165 which is fair agreement. Of all misfits identified at organization D 35% are perceived misfits. As can be seen in the bottom row of Table 42, one perceived misfits was caused by resistance to change, two by ignorance, and three by wishes (after discussion of two misfits).

Table 42: Solution chosen for perceived misfits at case company D.

Solution	Resistance	Ignorance	Wishes	Ignorance/ Resistance	Total
Customization	-	1 (50%)	2 (67%)	-	3 (50%)
Workaround	-	1 (50%)	-	-	1 (17%)
Accept misfit	-	-	1 (33%)	-	1 (17%)
Adapt business process	1 (100%)	-	-	-	1 (17%)
No solution	-	-	-	-	-
Total	1 (100%)	2 (100%)	3 (100%)	-	**6 (100%)**

Of the perceived misfits, three were solved by customizing the ERP system and one via a workaround. The other two perceived misfits were solved by adapting the process or accepting the misfit.

Of the customized perceived misfits, two were customized because the user wanted it. The system development department has built it, but later it became obvious that they do not use the customizations. Misfit D3 was customized, to force employees to work in a certain way. For misfit D4, the users have initiated the workaround themselves, by using the field 'remainder' to insert all data they cannot insert in other field.

4.4 Final categorization

Table 43: Final categorization case D.

Misfit code	Actual/ Perceived	Category	Solution
D1	Actual	Deep structure	Customization
D2	Perceived	Wishes	Accept misfit
D3	Perceived	Ignorance	Customization
D4	Perceived	Ignorance	Workaround
D5	Actual	Deep structure	Customization
D6	Actual	Deep structure	Workaround
D7	Actual	Deep structure	Customization
D8	Actual	Latent structure	Workaround
D9	Actual	Surface structure	Customization

D10	Actual	Surface structure	Customization
D11	Perceived	Wishes	Customization
D12	Actual	Deep structure	Customization
D13	Actual	Surface structure	Customization
D14	Perceived	Wishes	Customization
D15	Actual	Deep structure	Customization
D16	Perceived	Resistance to change	Process adaptation
D17	Actual	Deep structure	Customization