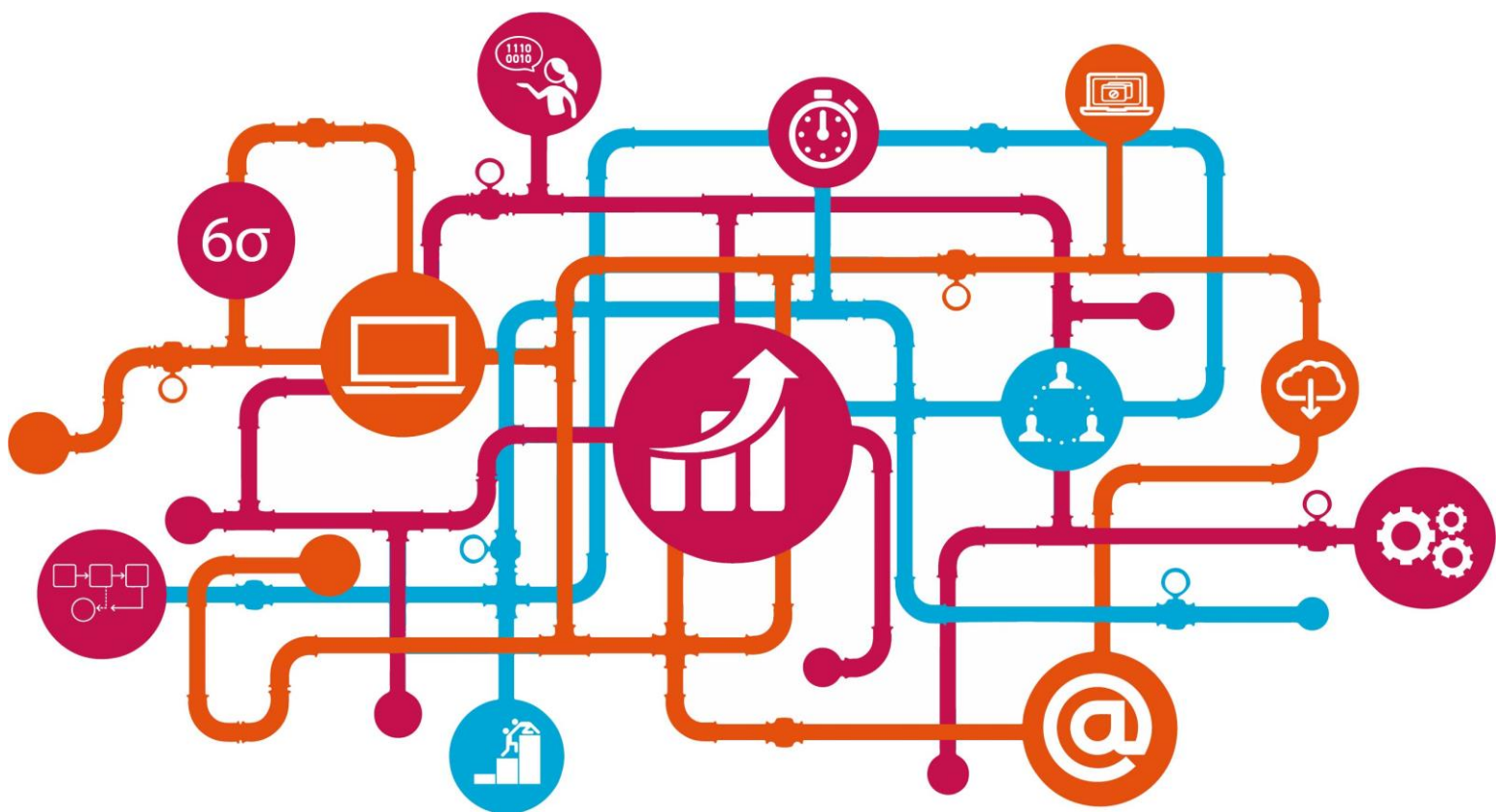


# ICT as Enabler or Inhibitor of Lean Six Sigma Process Improvement

A Case Study at Eneco Back Office





# ICT as Enabler or Inhibitor of Lean Six Sigma Process Improvement

A Case Study at Eneco Back Office

By

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## Executive summary

Due to changing policy, customer satisfaction has gained an increased importance for energy suppliers. Especially in back offices there are still large efficiency gains to achieve. This is also the case for Eneco, one of the largest energy suppliers in the Netherlands. In order to increase a process' efficiency, several improvement methods are available, such as Lean Six Sigma (LSS), but also the use of ICT can increase a process' efficiency. However, in sociotechnical environments ICT can influence the implementation of LSS. It is not yet clear though to what extent ICT enables or inhibits implementation of LSS in sociotechnical environments and what characteristics of ICT are responsible for this effect.

Orlikowski's duality of technology underscores the socio-historical context of technology and the dual nature of technology, as objective reality and as socially constructed product. In this thesis her theory is applied to the interaction between ICT and improvement by LSS. The objective of this thesis is to identify characteristics of ICT that could enable or inhibit LSS process improvement in sociotechnical systems and to find out to what extent these characteristics act as enabler or inhibitor. In order to achieve this, the following main research question is established:

*To what extent can ICT enable or inhibit implementation of LSS in Back Office processes in sociotechnical systems?*

The extent to which ICT can influence improvement is explained by different characteristics. Literature, observations and interviews are used to design a qualitative model that describes these characteristics of ICT that influence improvement, the relations between these characteristics and how they influence improvement. These characteristics are classified into five categories, nature of ICT, ICT system, IT department, culture and other. Table I shows the characteristics and their corresponding category. In addition, the relations between the characteristics and their influence are described in this thesis work. Furthermore, a case study of two cases not only validates most of the characteristics, it also adds new characteristics to the model, as shown in Table I.

*Table I Characteristics of ICT that were found to influence implementation of LSS (terms in bold are validated by data triangulation, terms in italics were found in the case study)*

IT department	ICT system	Nature of ICT	Culture	Other
IT resources	Ease of use	ICT legacy	<b>Neglected politics</b>	Unclear ICT policy
Resources maintenance	<b>Allowance variation</b>	<b>Hard to predict success</b>	<b>Inter department communication</b>	Difficulty IT changes unknown
ICT flexibility	<b>Changeable settings</b>	<b>Silver-bullet syndrome</b>	<b>Intra department communication</b>	Employee's IT knowledge
Learning phase	<b>KPI presentation</b>	<b>Gold-plating</b>	<b>Different values</b>	<b>Radical change of IT</b>
ICT policy		<b>Testing difficulty</b>	<i>Trust</i>	<i>Degree of IT</i>
		IT language	<i>Character</i>	<b>LSS tools for ICT</b>
		<b>Process overview</b>	<i>Old system back-up</i>	Overestimation of IT
		<i>Multiple roles</i>		
		<b>Detention</b>		
		<i>Data acquiring</i>		
		<i>Start-up problems</i>		

The first case includes process improvement by LSS and without the use of ICT, whereas the second case includes process improvement with the use of ICT and without LSS. These excellently show the dual nature of ICT. As intricate part of a sociotechnical system, it is difficult to separate ICT and the process. The presence of ICT does not necessarily lead to inhibition of improvement however.

Both enabling and inhibiting influences of ICT are found in the case study. Especially the nature of ICT, the ICT system and culture show to have an enabling or inhibiting influence. An enabling effect is found during data collection, detention and identification part of LSS. However, ICT also shows an inhibiting effect due to its low predictability of changes in ICT (*testing difficulty* and the *difficulty to predict success*) and the high expectancy of ICT changes (*gold-plating* and the *silver-bullet syndrome*).

In addition, the ICT system has an enabling or inhibiting effect depending on its design. An ICT system with *low allowance of variation*, *no changeable settings*, *little KPI presentation* and *no process overview* inhibits improvement, while the opposite is true when these characteristics are highly present.

Furthermore, culture has a large influence on improvement. The differences in culture between the user of an ICT system and the developers of it expresses itself in a *difference in values*, such as data security and privacy. Also, differences in culture between the initiator of improvement and employees are identified. These differences can be explained by Hofstede's organizational culture dimensions. Difference in a process- or result-oriented mentality and a tight or loose control environment show to be major differences in culture and a closed system culture inhibits *communication* between the members of the department. A culture of *neglecting politics* can also lead to inhibition of improvement.

Recommendations for further research are to validate the model quantitatively and in different environments for external validation. It is also suggested to extend the research to the different phases of LSS or different types of improvement. Also further research could be done on different improvement methodologies.

## Preface

This master thesis is the final project for my study Management of Technology at the TU Delft. Being a chemistry student of origin, it was both fun and challenging to discover the broader picture of technology and also explore the more social and managerial side. During my master I learned many things about companies, but this stayed too theoretical for me. Therefore, I wanted to experience what it would be like to walk around in a company and chose to do my graduation project in the form of an internship. Having always been interested in sustainable energy and Eneco being advanced at sustainable energy, Eneco immediately caught my attention, even if it did not have anything to do with my subject. Also, during my master I found the course *Business Process Management and Technology* extremely interesting and this shaped my determination to find a research project in this particular field. Fortunately, this was possible at Eneco and my project could start.

As I would not have been able to successfully finish this master thesis without any help, I would like to express my gratitude to my graduation committee. Also, I would like to specially thank my direct supervisor, Huib Aldewereld for his support and guidance and helping me when I was stuck.

I would also like to thank all my colleagues at Eneco for the inspiring environment during my thesis project. I would like to thank the management team for offering me complete freedom in choosing a project that I liked and supporting me when needed. Also, the other interns I would like to thank for both the fun times and the advices and exchange of experiences with graduating.

Last but not least, I would like to thank my family and friends for the support they gave me during these 5 months, but also the interesting conversations that helped me in my research.

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## 1. Introduction

### 1.1. Background

Before the year 2004, the Dutch government regulated the energy market and Dutch citizens could not choose their energy supplier. However, from July 1<sup>st</sup> 2004 the energy market was liberalized, allowing Dutch inhabitants to choose their own electricity and gas supplier (ACM, 2004). The liberalization initiated competition between the different energy suppliers in the Netherlands and forced them to provide better services and reduce prices in order to retain their competitive advantage (van den Engel, 2013). These changes in the energy market were especially beneficial for the Dutch consumers and put customer satisfaction on the priority list for all energy suppliers (Fernandez, Guerra, & Veenman, 2014).

On top of these policy changes, the rest of the business environment changed as well. Due to the rapid development of new technologies, companies in service industries are increasingly facing automation and reorganizations ("Automatisering bedreigt banen in administratieve sector," 2015, "Nieuwe reorganisatie KPN klap voor personeel," 2014, "Ralph Hamers wil met ingreep ING uit de 'technologische middenmoot' halen," 2014) and energy suppliers are no exception to this trend. Consequently, energy suppliers are experiencing two trends, increased customer satisfaction and rapid changes in technology.

### 1.2. Research problem

#### 1.2.1. Problem exploration

Due to the increased importance of customer satisfaction and the rapid changes in technology, energy suppliers need to work more efficient in order to stay competitive and retain customer satisfaction. Especially in back offices there are still large efficiency gains to achieve (Williams & Duray, 2012). To increase a process' efficiency several improvement methods are available, such as lean, Six Sigma or Lean Six Sigma (LSS)<sup>1</sup> (Nave, 2002). The methodology of Lean Six Sigma combines the two methodologies lean and Six Sigma. It focuses on removing the waste in a process as described by lean, in which waste is every task that is not necessary or does not add value to the customer (Atkinson, 2004; Bell & Orzen, 2010; Nave, 2002; Womack & Jones, 1996). In addition, it focuses on reducing variation as described by Six Sigma (George, 2003; Nave, 2002). LSS aims to increase customer satisfaction by increasing product and service quality and simultaneously reducing process lead times (Bortolotti & Romano, 2012; Reijns, 2010).

Another way to increase a process' efficiency is the use of ICT. New technologies keep emerging and most companies are using ICT for their business processes. The use of ICT can accelerate data processing and improve the information exchange and communication between employees (Houy, 2005). This can boost a company's performance tremendously and improve its customer satisfaction by increased process speed. The use of ICT systems can also lead to automation of processes, which can also increase process efficiency (Bortolotti & Romano, 2012). As back offices are often sociotechnical systems, where people and technology are working closely together, ICT can have a large influence on back office efficiency.

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<sup>1</sup> These three improvement methodologies are extensively explained in section 3.1.

The combination of using both ICT and lean, Six Sigma or LSS as measures to make processes cheaper and more efficient, has been heavily researched already (Bell & Orzen, 2010; Goeldner & Powell, 2011; Houy, 2005; Ilebrand et al., 2010; Nauhria, Wadhwa, & Pandey, 2009; Riezebos et al., 2009). In the 1970s, when both computer systems and lean management had just been introduced, most people were still convinced the approaches were contradicting. According to Sugimori et al. (1977) computer systems in production logistics would not be useful, as they would only introduce unnecessary costs, over-production and uncertainty and the focus should be on simplicity and lean processes (Riezebos et al., 2009). Within lean production literature, ICT systems have often been seen as sources of waste (Powell, 2013). This view contradicted with the trends seen in Western countries in the 1970s and 1980s, where computer systems were intensively used in order to gain competitive advantage (Bortolotti & Romano, 2012). These clashing views led to the conclusion that the use of ICT could not contribute to a lean approach.

However, over the years, this view has largely changed and improvement methods and ICT are combined often in different ways. Concurrent application of lean production and ICT has been researched and has led to the conclusion that ICT systems can be deployed to support the use of lean approaches, when implemented correctly (Alaskari, M.M, Dhafr, & Pinedo-Cuenca, 2012; Powell, Alfnes, Strandhagen, & Dreyer, 2013). Also, when Six Sigma and LSS were introduced, these were used in combination with ICT systems as well (Nauhria et al., 2009; Sheldon, 2005; Skalle & Schuster, 2008).

The aforementioned improvement methodologies have also been successfully applied to information systems itself (Bevilacqua, Ciarapica, & Paciarotti, 2015; Hejazi & Levy, 2012; Hicks, 2007; Kaplan & Norton, 2008; Lin, Frank Chen, Wan, Min Chen, & Kuriger, 2013; May, 2005) and are used in IT departments and software development itself, as these areas are adopting more lean and agile forms of working (Bell & Orzen, 2010; Brunninkhuis, 2013; Power & Conboy, 2014). Governments follow these trends as well. Most have adopted technology in their processes and are now transforming their business processes into a more lean form (Janssen & Estevez, 2013; Kuk, 2002; Radnor & Johnston, 2013). As most energy suppliers were previously owned by the State, these trends can be seen in these companies as well, as most of these companies retained the same culture (Maassen, 2015).

### 1.2.2. Knowledge gaps

Though successful implementation of both ICT and LSS has proved to be possible, there are still questions concerning the relation between ICT and the applicability of change. Kuk & Janssen (2013) show that modifying an organization's technology is not that simple when implementing change. As the theory of duality of technology (Orlikowski, 1992) states, technology cannot be seen as either a socially constructed product or an objective force, but it is a combination of these both. She states that technology's design and development is influenced by human actors through the different meanings they attach to the technology and the various features they emphasize and use (Orlikowski, 1992). However, once the technology is developed and in use, it tends to become an institutionalized object that is difficult to change for the human actors working with it. Technology in this form can then either enable or constrain change (Kuk & Janssen, 2013).

It can be said that technology and change definitely influence each other. However, this is only researched on an organizational level and not within individual processes. This is also the criticism

on Orlikowski's theory (Orlikowski, 1992), as it is designed on an abstract level and her theory has not been researched on the shop floor. Also, most researches focus on organizational change and not on small incremental change as described by lean improvement. Moreover, they describe the influence of an organizational technology structure and system, but not the specific ICT used in an individual process. Consequently a knowledge gap can be identified. The influence of ICT on improvement methodologies such as LSS has not been researched.

Furthermore, when using the search engine Web of Knowledge, Google Scholar and Scopus with the search terms 'lean', 'Six Sigma', 'Lean Six Sigma', 'LSS', 'ICT', 'IT', 'characteristics', 'inhibitor', 'enabler', 'improvement', 'implementation' and combinations of these terms, no papers can be found that fill the above stated knowledge gap.

### 1.2.3. Problem statement

The institutionalization of technology as described by Orlikowski (1992) can also be applied to ICT. The institutionalization of ICT may enable or inhibit improvement methods. Examples of characteristics of ICT that could influence LSS application are the characteristics of the ICT system and the IT department in an organization. ICT systems are widely used by service companies in their business processes and most energy suppliers use such a system for their customer data storage. These systems are often used in a sociotechnical environment, where people and technology are interacting in the workplace. The nature of this system can influence the applicability of LSS. For example, one could imagine that when applying LSS to a process, one takes into account the human waste and does not always investigate the waste in the ICT part of the process. However, this could include waste as well (Bortolotti & Romano, 2012; "Geschoond MVS gaat live," 2015; Ilebrand et al., 2010). ICT can therefore influence the possibility of change for a system. Also IT departments can influence improvement. As mentioned before, IT departments are incorporating a more agile and lean way of working, which means they can work more efficient, but also that they cannot accept every request for change. This could constrain LSS implementation, as not every request for change will be executed. There is also the possibility that it enables improvement, as changes in ICT are now executed faster. Thus the way that IT departments do their work could possibly influence the inhibiting character of ICT.

To conclude, ICT could possibly act as enabler or inhibitor of implementation of LSS in sociotechnical systems. The influence of ICT on LSS has not been researched. It is assumed that the influence of ICT depends on different characteristics, such as the degree of ICT, characteristics of the ICT system and characteristics of the IT department. It is not known which characteristics these are and to what extent they enable or inhibit LSS implementation. This leads to the following problem statement:

*It is not clear to what extent ICT enables or inhibits implementation of Lean Six Sigma in sociotechnical environments and what characteristics of ICT are responsible for this effect.*

Figure 1.1 shows the different factors that could influence process improvement and that are investigated during this research.

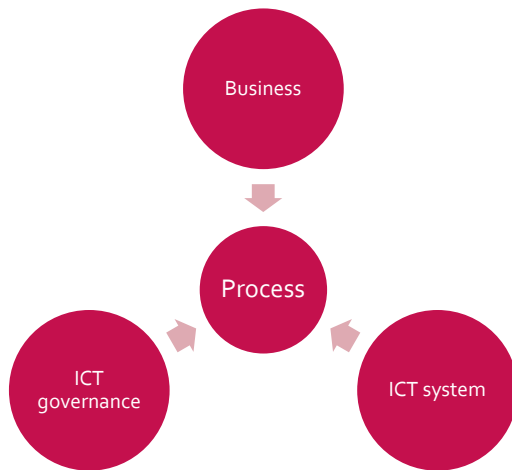


Figure 1.1 Factors influencing process improvement

Two notes have to be mentioned about the delineation of this problem statement on ICT and LSS. The problem statement mentions both the enabling and inhibiting character of ICT. This is meant to identify the both enabling influence and the inhibiting influence that existing ICT can have, and to see whether possibly inhibiting features of ICT could also act as enabler, when they are modified. For example when communication with the IT department acts as inhibitor, it could be said when communication is improved, it could act as enabler. To avoid confusion, emerging new technologies as enabler of process improvement will not be included in the scope of this research. The term ICT used in this thesis concerns the ICT system itself deployed by companies, as well as the organization around ICT, such as the ICT policy, IT department, ICT legacy, etc. The ICT architecture will not be considered however.

Next to Lean Six Sigma, there are more improvement methodologies, such as lean, Six Sigma and the Theory of Constraints. However, to make this project doable in time, it was chosen to focus on only one methodology. As the processes at Eneco Back Office will be the object of study, these were taken into account when choosing a methodology. The Theory of Constraints does not require total participation and values the separation between worker and management (Nave, 2002). However, at Eneco Back Office they strive to include the employee in the improvement process, and therefore Theory of Constraints was not chosen. LSS focuses on removal of waste, improved flow time and values visual change, but also focuses on quality by variation reduction (Nave, 2002). As LSS includes all these advantages of both lean and Six Sigma, the combination of both was chosen for this research. Therefore LSS is chosen as improvement methodology for this research. Future research could investigate these other improvement methodologies, however.

#### 1.2.4. Relevance

This research will contribute to reducing costs for back office processes using ICT. By investigating to what extent ICT enables or inhibits LSS implementation, organizations can use this knowledge to change the influencing characteristics in order to enable LSS implementation. This research will give more information about how to implement/change technology in order to enable change and which characteristics are important for this. Next to reducing costs for companies, the increased efficiency in customer information processes can also lead to a higher degree of customer friendliness.

The scientific relevance can be found in the fact that this research will fill multiple knowledge gaps. The subject of ICT as enabler or inhibitor of LSS implementation has not been investigated in previous research. It is assumed that the role of ICT depends on different characteristics of both the degree of ICT included in the process as the process itself in the complete sociotechnical system. It is not known which characteristics these are and to what extent they enable or inhibit LSS implementation. Therefore this research will give an understanding about the way ICT enables or inhibits implementation of LSS.

### 1.3. Eneco

Also Eneco, one of the largest energy suppliers in the Netherlands, is inclined to work more efficient to preserve customer satisfaction. Eneco was created in 1955 by a fusion of the municipality utilities Rotterdam, The Hague and Dordrecht. Until 2000 the organization was still separated into different regional companies, but from 2000 they have combined into one large commercial organization. In 2011, Eneco has taken over the smaller energy supplier Oxxio. Eneco provides energy to 2.2 million customers daily (Fernandez et al., 2014).

Due to changing policy, technology and customers, energy companies are forced to reorganize their business structures and business models. As green energy is increasing in popularity, a transition is possible to decentralized energy generation where costumers generate their own energy and previous energy suppliers will only act as a mediator (Bosma, 2012; PwC, 2015). These developments in the energy market also have a major influence on the current and future conduct of business for Eneco. Eneco needs to change its organizational structure in order to keep ahead of the turbulent environment in which it operates (Fernandez et al., 2014). Also with new technologies arising, Eneco wants to work more effective and efficient and automate a number of processes in the coming years (Fernandez et al., 2014).

As mentioned before, large efficiency gains can be achieved at back offices and this is also the case for the Back Office of Eneco. Despite the emerging new technologies, many processes still consist of many manual interactions and run inefficient. The Back Office of Eneco has already taken several measures to increase their efficiency, but still improvement is needed.

At the Back Office all administrative processes are handled and at the department Markt, the part of the Back Office where this research is conducted, the moves and supplier switches of customers are processed. Normally these processes run automatically, but for a certain amount of customers the automated process fails, creating rejects (uitval in Dutch). The main goal of the department is to process these rejects. In order to improve efficiency, the Back Office desires to halve the inflow of rejects and double the outflow of solved rejects.

The Back Office is considered a sociotechnical system and the rejects are processed using an ICT system, called MVS. MVS is a database for customer data storage. ICT therefore has a large influence on efficiency improvement, both the ICT system itself, as everything around it. Most employees at the Back Office want to work more efficient but are held back by technology. Examples of this are having to press OK 3 times before being able to continue to the next step or needing 3 to 4 screens in MVS in order to solve a problem for one customer. Also the Back Office Taken Lijst was generated (BTL), which was a task list system that would generate a new case after finishing the previous for an employee. It took around 10 seconds to save when finished, making the process slower than before the BTL was introduced.

Next to improvements in MVS itself, there is also room for improvement in the process around MVS. Even though the issues with MVS are known and reported, they are not solved as fast as one would want to. The IT department also had to cut down on cost, having to manage with only half of their budget from 2014 to 2015. This has resulted in a large backlog of issues for the department Markt, some issues date back six months, resulting also in frustration for the Back Office employees. In order to manage, the teams at the IT department have adopted a scrum and agile form of working. This means the IT department has to prioritize requests, but the policy in prioritizing is not clear for the employees at the Back Office. Communication can thus be distinguished as one of the main causes of frustration. Other than communication, more problems can be designated, such as an unclear ICT policy and prejudice towards the IT department.

Not only ICT is the cause of the inefficiency at the Back Office though. There are also many improvements that can be done without changing the ICT system. For example, checking things multiple times unnecessarily. Furthermore, previously an employee was writing a report every day, taking two hours per day, but never wondered who read it and when looking into it, it turned out no one ever read it. Another cause of inefficiency is communication with other departments. The department Markt works together with the departments Nota (billing), Credit Management and the Front Office. Inefficiency is created by the fact that a case is passed on to multiple persons (multiple hands-off), while it could be solved by only one person. Due to these inefficiencies, a customer can now cost more money for the Back Office than Eneco yields from this customer. For example when a customer is rejected in an early stage of the customer process, but this is not immediately solved due to a large backlog, this can result in rejections in later stages of the customer process as well. This means that one problem results into rejections at multiple teams of the Back Office, leading to multiple hands-offs and higher costs.

To conclude, both in the work processes themselves as in the ICT system efficiency gains can be achieved. As this department is so related to ICT, it is an interesting question at this department whether ICT can enable or inhibit improvement.

## 1.4. Research Objective & Research Questions

### 1.4.1. Objective

The objective of this research is:

*To identify characteristics of ICT that could enable or inhibit LSS process improvement in sociotechnical systems and to find out to what extent these characteristics act as enabler or inhibitor.*

The deliverable is a model describing the ICT characteristics that enable or inhibit implementation of LSS in sociotechnical environments. In addition, several recommendations are delivered concerning how to deal with these ICT characteristics. Furthermore, during the case study suggestions will be made on how to improve a process at Eneco Back Office according to Lean Six Sigma, as will be explained in section 1.5.



### 1.4.2. Research question

The main research question of this thesis is:

*To what extent can ICT enable or inhibit implementation of LSS in Back Office processes in sociotechnical systems?*

The sub-questions accompanying the main research question are:

1. What is Lean Six Sigma and how do you implement it in Back Office processes?  
*This first sub-question will be answered by a description of lean, Six Sigma and their history and the combination of them into Lean Six Sigma. This will serve as a theoretical base before the discussion on the duality of technology can start.*
2. What is meant by the duality of technology?  
*This sub-question is used to describe Orlikowski's theory about the duality of technology, which will be the underlying theory of the influence of technology on improvement in this research.*
3. Why would ICT enable or inhibit LSS?  
*The previous sub-question gives an idea on the dual nature of technology, but does not specifically describe the influence of ICT on implementation of LSS. To get a first idea of the ICT characteristics that could have an influence on implementation of LSS, literature is searched for these characteristics.*
4. What are Hofstede's organizational culture dimensions?  
*Process improvement requires change and the use of ICT requires inter-department communication. Also in order to establish real improvements, organizational culture needs to be taken into account as well. Therefore it is expected that theory about organizational culture will be needed and this will be Hofstede's theory about organizational culture dimensions. This sub-question will describe Hofstede's organizational culture dimensions in order to explain the influence of ICT characteristics.*
5. What are the characteristics of ICT that could influence implementation of LSS in sociotechnical environments?  
*This sub-question is the start of the model that will be designed. Building on sub-question 3 it will describe the specific characteristics of ICT that can inhibit or enable implementation of LSS.*
6. How do the characteristics of ICT influence implementation of LSS?  
*This sub-question will describe the influence of the characteristics found by sub-question 5 on LSS and whether these are of an enabling or inhibiting character.*

### 1.5. Research approach

Figure 1.2 shows a visualization of the research approach of this thesis. The research approach consists of different phases. The first phase is the research proposal containing the research problem and the methodology. The research problem is described by the scientific problem statement, the problem statement at Eneco and following from these, the research questions and objectives. After the first phase, the second phase is orientation. Here, literature research is conducted to describe the theory underlying this research and to answer the first four sub-questions. Next to that, interviews are held and observations are documented in order to design a model in the next phase. This is the model design phase and the model is designed by determining

the characteristics that influence implementation of LSS and the nature of their influence. This forms the answer to sub-questions 5 and 6. The findings are used to set up a case study to test the validity of the model in the validation phase. This case study includes the improvement of two different processes using LSS. In the finalization phase, the conclusion & reflection and future research & recommendations are presented and the main research question is answered.

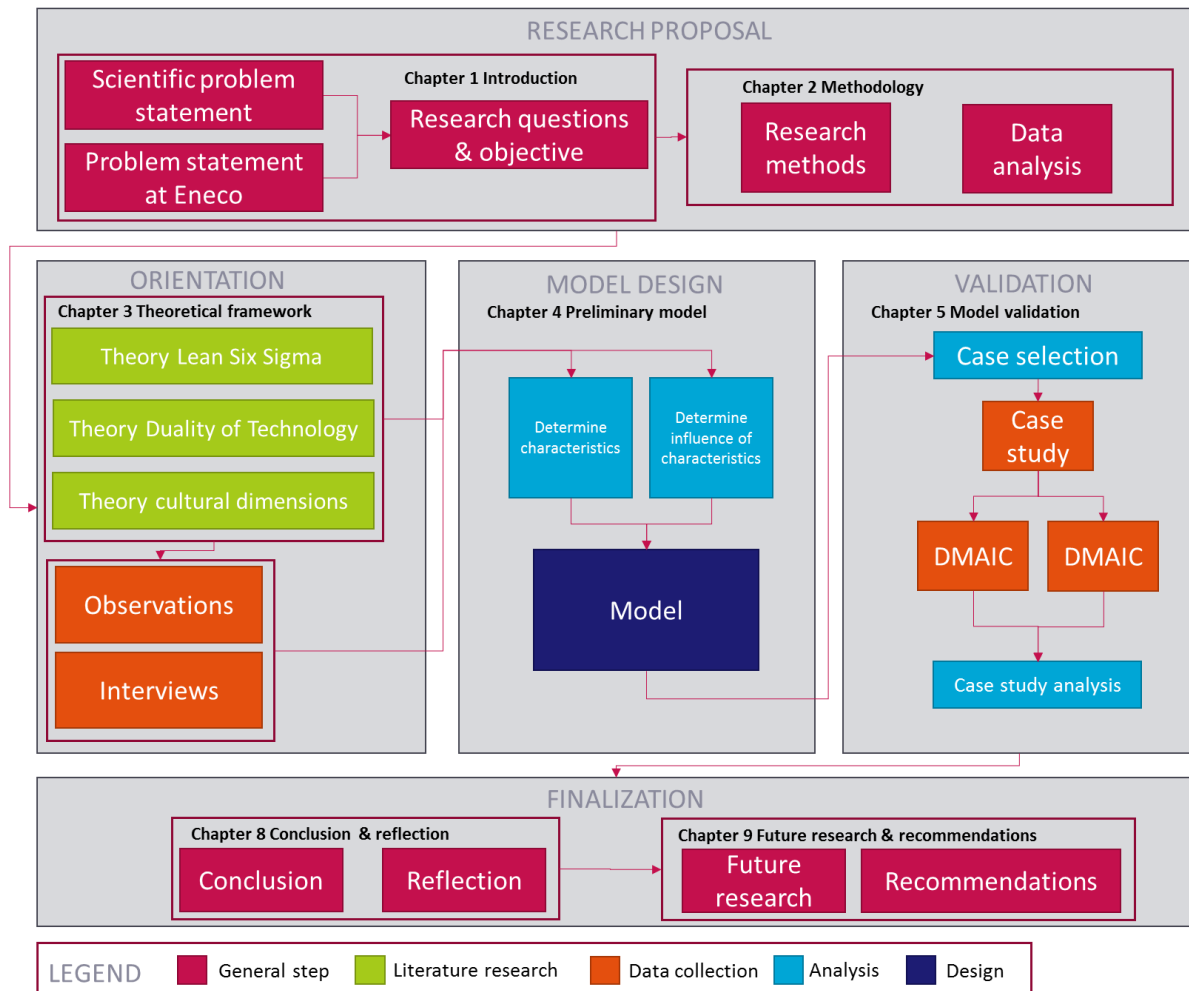


Figure 1.2 Research design

### 1.6. Subject validation with relation to master program

This research is the final project of the master Management of Technology and therefore it is important that the subject is in line with the contents of the master. The master Management of Technology combines the technology perspective with a business perspective. Students are taught how firms can use technology to design and develop products and services that contribute to improving performances, such as customer satisfaction, corporate productivity, profitability and competitiveness (TPM, 2015). The master includes subjects such as multi-actor systems and their values and students learn how technology can be used as a powerful resource. It aims to teach management in relation with high-tech companies. The research subject of this thesis is in line with the master's content, as it is conducted at a high-tech company, it relates to multi-actor systems and their values and it investigates the use of ICT as a valuable resource. The relevance of the topic

of this thesis is further illustrated by the course *Business Process Management and Technology*, which is a mandatory part of the master's program.

### 1.7. Structure

The structure of this thesis is as follows. Chapter 2 describes the research methodology, containing the used methods that will be used to answer the research questions and data analysis plan. The theoretical framework used for this research is presented in chapter 3. Chapter 3 describes the Lean Six Sigma improvement methodology, the theory of duality of technology and a small section on Hofstede's cultural dimensions. Subsequently the designed model is presented in chapter 4, using the results from observations and interviews. The results of the case study are provided in chapter 5. To complete the thesis, the conclusion and reflection are discussed in chapter 6 and further research is suggested accompanied by recommendations for Eneco in chapter 7.

Table 1.1 shows the thesis chapters and the sub-questions they answer.

Table 1.1 Thesis chapters including titles and sub-questions

Sub-question	Chapter
1. What is Lean Six Sigma and how do you implement it in Back Office processes?	3
2. What is meant by the duality of technology?	3
3. Why would ICT enable or inhibit Lean Six Sigma?	3
4. What are Hofstede's organization cultural dimensions?	3
5. What are the characteristics of ICT that could enable or inhibit implementation of LSS in back office processes?	3, 4 & 5
6. How do the characteristics of an ICT influence implementation of LSS?	4 & 5
Main research question	6

## 2. Research Methodology

### 2.1. Research methods

In this research a model is designed that describes the enabling and inhibiting characteristics of ICT on the implementation of LSS in sociotechnical systems. This model is developed using both literature research and interviews. Interviews are held with both IT experts and back office experts, to get more insight into the inhibiting ICT characteristics. This information (from the found literature and interviews) is used to design a model about which characteristics of ICT are expected to inhibit LSS implementation. The design of this model is based on Design Science Research (Hevner & Chatterjee, 2010), which takes into account both the relevance in business environment and the knowledge base for scientific rigor. This model is tested by a case study. The case study includes improvement in two processes using LSS, so the influence of ICT as inhibitor can be described qualitatively. The rest of this section will elaborate on these research methods.

#### 2.1.1. Design Science Research

This research is performed by the use of Design Science Research (Hevner & Chatterjee, 2010). Design Science Research is usually employed in Information System research projects, which makes it applicable for this research, as this research project is related to Information Systems. Design Science Research combines the contextual environment of the research project (relevance) with the scientific knowledge base, based on theories, experience and expertise (rigor) (Hevner & Chatterjee, 2010). This is schematically shown as three cycles: the relevance cycle, the design cycle and the rigor cycle. Figure 2.1 shows the research framework of Design Science Research. First literature, observations and interviews are used to generate a model, which is tested by the case study. New characteristics from the observations, interviews and case study are then searched in literature, as the cycling nature of Design Science Research indicates. As mentioned in section 1.3 three artifacts are designed, these are a model describing the inhibiting characteristics of ICT systems, an advice of how to improve change and suggestion on improving processes for Eneco Back Office.

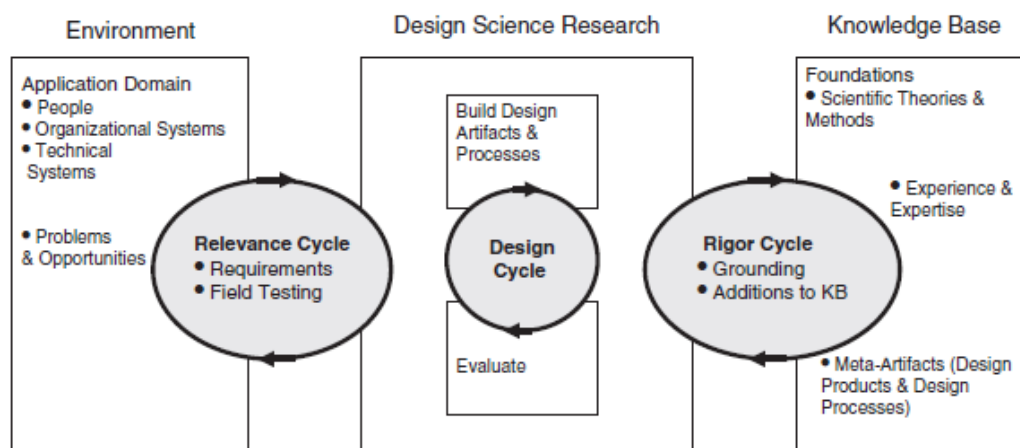


Figure 2.1 Design Science Research cycles, retrieved from Hevner & Chatterjee (2010), fig 2.2, page 16

#### 2.1.2. Literature research

Literature research is conducted to answer the descriptive sub-questions. This therefore contains literature about implementation of Lean Six Sigma, the duality of technology, but also literature about characteristics of ICT to get a first impression and theory about Hofstede's organization

cultural dimensions to describe the communication between the different departments. In order to find literature, different search machines are used. These were namely Web of Knowledge and Google Scholar, but also Scopus was used occasionally.

As a perspective for this research mainly two theories are used. First the theory of the duality of technology (Orlikowski, 1992) is used to describe the difference in influence technology can have and it is investigated whether this theory can be applied to ICT in business process as well. The perspective is complemented with theory about implementation of LSS in Back Office processes and service industries. George (2002, 2003) described the implementation of Lean Six Sigma in manufacturing and in services and these theories are mainly used to describe LSS implementation. In order to establish real improvements, culture needs to be taken into account as well. Therefore Hofstede's theory about organization cultural dimensions is used. This only covers a small part of the theory though.

### 2.1.3. Observations

Next to interviews and literature review, observations are used as data as well. These consist of attended meetings, but also informal conversations. These observations give extra information about both communication and the prejudices between departments. Also ICT characteristics could already be found during observations. These observations are also useful for gaining tacit knowledge about the back office department, as these might be forgotten to mention during the interviews. All observations are described in Appendix I.

### 2.1.4. Interviews

Interviews could give information in more detail about the knowledge gaps that are not covered by the literature research. They are very useful for gaining more in-depth knowledge about a certain subject. As this is a qualitative research, the interviews are semi-structured and are conducted through a topic list (Stewart & Cash, 2008; Thiel, 2007). The topic list differs for the different functions the interviewees have. The topic lists of the interviews is shown in Appendix A. The topic list contains questions about the characteristics of ICT already found in literature and new characteristics. To introduce the subject to the interviewees, it was chosen to first ask question about the researcher's known characteristics to give them some idea of the characteristics that the researcher looked for. After these questions, it is asked whether they know other characteristics of IT that either enabled or constraint them to improve their work. Also the interview starts with introductory questions to make the interviewee feel comfortable and at ease, so the answers would be as honest as possible.

Interviews are held with Eneco employees and these consist of employees of the IT department, employees of the Back Office and employees of 'Functioneel Beheer en Innovatie' (FB&I), functional management and innovation, as this department forms a link between the Back Office and the IT department. An IT employee could give more insight into the flexibility of the technology and the functionalities of the ICT system. Also information could be acquired about which requests are executed and which are not, to get informed about the ICT policy employed by Eneco. Employees of the Back Office could explain about processes that they see most often or that costs most time and the relation with ICT on the subject. Also the management team of the Back Office is interviewed, as they might have a different view on the technology than the employees of the Back Office. It is important to interview people that have some overview, but still work hands-on, so they know

enough details. Next to that, people are selected who are considered to be interested in the technology improvements and have some knowledge about this.

Department	Employees	Management
Back Office	3	1
IT	0	2
FB&I	0	1

The interviews take place between October 20<sup>th</sup> and November 4<sup>th</sup> 2015. They were held face-to-face and took 50 to 60 minutes. All interviews were recorded and transcribed. The coded interviews can be found in Appendix J.

#### 2.1.5. Case study

Case studies include a small number of situations that are thoroughly researched in much detail (Thiel, 2007). The case study is used to validate the model. A case study is used for this research, because it gives in-depth information about the ICT characteristics and is useful for explorative studies. Two processes are selected. The first case includes process improvement without changing ICT and by applying Lean Six Sigma. The second case describes a changed ICT interface in a process and the consequent influence on the process. For both case studies the meter reading validation process is chosen, but with different scopes of the process. This process is further described in chapter 5. These cases were chosen based on the characteristics that were found by the literature, observations and interviews. As validating all individual characteristics was not feasible in time, it was chosen to focus on one category of characteristics, namely nature of ICT (described in chapter 4). Therefore, one process is improved without changing ICT and one process improvement is started with change in ICT.

Case studies also have drawbacks, in particular in the validity and reliability of the research. A disadvantage is that it can be difficult to generalize the investigated case to other cases, because of the unicity of the case or the context connection of the findings (Flyvbjerg, 2006). Therefore it is important to realize during this research to constantly seek external validity, instead of only internal validity. Another drawback of case studies is that it is very labor intensive and this should be taken into account when planning the research. As this research consists of only five months, it is not a longitudinal case study, but only has one measuring point. Triangulation is one of the most important ways to protect validity and reliability in case study research. This is ensured by using both literature research, interviews and observations. Another threat in case studies is that by the labor intensive research, the researcher becomes subjective and selective (Thiel, 2007).

## 2.2. Data analysis

Next to the consideration of research methods, it is also important to think about the data analysis of a research beforehand. As the research is conducted by means of interviews and a case study, qualitative data is gathered. As this is mostly unstructured data, it is important for the validity and reliability of the research to analyze the data systematically. The analysis is conducted in three steps: gathering, ordering and analyzing, these steps are often not sequentially executed, but the process is often more iterative or cyclical of nature (Thiel, 2007). It is recommended to use coding when analysis qualitative data (Sekaran & Bougie, 2010). A code is used to indicate the subject of a

specific data unit. Later in the process, this code can easily be used to compare different data about one specific subject (Thiel, 2007).

As prescribed by Thiel (2007), open, axial and selective coding were used during this project. Open coding generated the first characteristics by analyzing the interviews and comparing them with the characteristics found in literature. This gave a large amount of characteristics, thus axial coding was used to reduce this number of characteristics by combining similar characteristics into one and changing the name if needed. This process was done iteratively until a manageable amount of characteristics was found. Last, but not least, selective coding was used to relate the different concepts to each other. The characteristics were grouped into five categories and their influence on each other was investigated.

Data is gathered from observations, interviews and a case study. The data from interviews includes opinions of the employees of the back office, IT department and FB&I department. The data from the case study mostly contains the researcher's findings during LSS implementation. With the use of data triangulation the reliability of these data is increased. Also observations were made by the researcher during the case study, but this contained different persons than the ones interviewed, thus also different opinions.

The major drawbacks of qualitative data, therefore, are the validity and reliability. Three corresponding criteria are credibility, transferability and dependability, where the first relates to internal validity, the second to external validity or generalizability and the latter to reliability (Shenton, 2004; Thiel, 2007). Another drawback is that the analysis may be subjective as the findings are mostly interpretations of the researcher. This can be prevented by recording all choices and consult other researchers, experts or respondents. Another drawback is that it is difficult to prove any causality in the research. In quantitative research one can use the term statistical significance, but this is not possible in qualitative research. Therefore, qualitative research does generally not lead to proved theories, but forms building blocks for the generation of one (Thiel, 2007).

### 3. Theoretical Framework

In this chapter the theory used in this research will be discussed. Firstly, Lean Six Sigma will be described in section 3.1 where lean and Six Sigma will be discussed first, followed by combining them into Lean Six Sigma. In section 3.2 Orlikowski's theory about the duality of technology will be presented. The chapter will end with a small section on Hofstede's organizational culture dimensions in section 3.3.

#### 3.1. Lean Six Sigma

To get a full understanding of Lean Six Sigma, lean and Six Sigma are first described separately in section 3.1.1 and 3.1.2, respectively. In section 3.1.3 the combination of them into Lean Six Sigma is described.

##### 3.1.1. Lean

###### *History of lean*

Lean was first introduced by Toyota manufacturing in the 1950s (Powell, 2013). Toyota implemented lean successfully in their car production line and when the successes of lean in the automotive industry reached the rest of the world by the 1980s, it soon was introduced in not only the automotive industry but also other manufacturing sections. It is most useful for discrete, repetitive assembly-type operations (Brunninkhuis, 2013; Powell, 2013), such as automotive industry, which makes it also applicable to the back office processes.

The main principle of lean is to remove waste in a process. There are two types of waste (also called *muda* in Japanese). The first type is described as every Non-Value Added activity (NVA), which is defined as:

*"Any activity which clearly creates no value, which can be removed immediately with minimum or no capital investment, and with no detrimental effect on end value."* (Bell & Orzen, 2010)

This is classified as Type Two Muda by Womack and Jones in Lean Thinking. There is also Type One Muda, which is described as Necessary but Non-Value Added activity (NNVA), which is defined as:

*"Any activity which again creates no value but is unavoidable, given the current operating constraints of technology, production assets and operating procedures"*. (Bell & Orzen, 2010)

It is the goal of lean to eliminate all Type Two Muda and minimize all Type One Muda. By reducing waste, lean can be used for doing more with less (Liker, 2007).

###### *Lean in the back office*

In recent years lean has also been introduced in service industries. However, there is a difference between the service industry and service operations. Companies in service industry can still contain manufacturing-like processes. Especially when customer contact is limited, process in a service company may be designed with manufacturing-like principles in mind (Safizadeh, Field, & Ritzman, 2003). While service operations are mainly applicable to front-office operations, which contain much customer contact, back office operations have more in common with manufacturing operations with large volume and low variety throughput (Collier & Evans, 2009). As the processes at the back office both consist of repetitive tasks on large scale with almost no customer contact, they may take



advantage of standardization and automation to enhance efficiency and effectiveness of operations (Safizadeh et al., 2003).

### Waste

Seven forms of waste can be identified according to Taiichi Ohno, the Toyota Executive. These seven forms are shown in Figure 3.1. As the wastes from manufacturing are not directly applicable to back office wastes, the wastes described in this section are valid for several disciplines. These disciplines include not only service industry, but also information systems and IT.



Figure 3.1 Seven forms of waste, based on Abdi (2006), Fig 1, page 192

One form of waste was added later, the loss of human potential. These eight wastes can be explained as follows:

#### 1. Overproduction

Overproduction is caused by producing more and/or sooner than the customer wants (Bell & Orzen, 2010). This can result in an excess of products and inventory that are produced too early (Hicks, 2007). In IT systems this is caused by unnecessary computation, data storage/ traffic by an illogical structure and incorrect use of applications and databases (Liefers & Huesmann, 2011). It can also correspond to information overload leading to extra time and costs to overcome the excess information (Hicks, 2007). Other examples are having to re-enter data, repeat details on forms, copy information across, researching a matter already done in another situation and answer queries from several sources within the same organization (Bicheno & Holweg, 2009; Eric Young Associates, 2015). Overproduction can therefore be seen in terms of too many things produced or in terms of too much information gathered, stored and maintained (Barcia & Boardman, n.d.).

#### 2. Waiting

Waiting or delay is caused by improper scheduling of production or slow response and process times. These can be due to slow e-mail, slow systems, system downtime, waiting for authorization, time to "get back into it" or waiting for a colleague to show up for a meeting (Eric Young Associates, 2015; Liefers & Huesmann, 2011). Especially when customers are the one that are experiencing the delay, customer satisfaction can be affected (Bicheno & Holweg, 2009).

### 3. Inappropriate/extra processing

Inappropriate or extra processing involves performing unnecessary work and extra operations. This may be caused by using wrong tools, inadequate training, failure to understand what the customer wants, but also due to rework, reprocessing or handling that occur because of defects, overproduction, too detailed request forms or excess inventory (Bell & Orzen, 2010; Brunninkhuis, 2013; Hicks, 2007). Overprocessing in information systems can be caused by unnecessary data monitoring and control, oversized IT platforms or datacenters, mitigating unlikely risk and overcoming a lack of information by either generating new information or acquiring additional information (Eric Young Associates, 2015; Hicks, 2007; Liefers & Huesmann, 2011).

### 4. Defects

Defects result in products or services that do not conform to the customer's wishes and are therefore waste (Hicks, 2007). These can be errors in the service transaction, product defects or lost or damaged goods (Bicheno & Holweg, 2009). Other examples are paperwork errors, incorrect data entry or incorrect or partial information provided (Eric Young Associates, 2015). Defects lead to customer dissatisfaction and extra processing by requiring to correct or verify information (Hicks, 2007). It also causes unnecessary and inappropriate activities from the use of incorrect information. Applied to IT systems, this form of waste can be seen as bad functioning IT-equipment and information systems that do not act as they should.

### 5. Transport

Transport can cause waste by unnecessary movement of materials or carrying paperwork between departments (Abdi, Shavarini, & Hoseini, 2006). In general, transport adds time to the process while no value is being added to the product or service and handling damage can occur (Hicks, 2007). For IT systems this can mean unnecessary data traffic for a transaction due to data on different locations (Brunninkhuis, 2013; Liefers & Huesmann, 2011). Waste can also be recognized in unnecessary mass electronic communication. While the actual movement of the material itself may not be considered waste, the time of the recipients determining the value of the received information is (Hicks, 2007). The same applies for unclear communication, leading to waste by seeking clarification (Bicheno & Holweg, 2009). Also multiple hand-offs lead to waste (Eric Young Associates, 2015).

### 6. Inventory

All inventory that is either unnecessary or incorrect is considered waste as well. This can be inventory that is not directly required for customers, being out-of-stock, substitute products/ services and not having the required products (Bicheno & Holweg, 2009; Hicks, 2007). Inventory includes raw materials, work-in-progress and finished goods. It can lead to additional handling, extra space and extra processing. In information systems inventory is often not a significant waste, as it hardly occupies any physical space and does not incur any significant financial cost. However, large archives of legacy information can affect the performance of the user retrieving information (Hicks, 2007). Also extra IT-components can be seen as unnecessary inventory in IT systems (Liefers & Huesmann, 2011). Another example of inventory can also be unanswered email/ voicemails or documents awaiting processing (Eric Young Associates, 2015).

### 7. Unnecessary motion

Unnecessary human motion can be bending, lifting or stretching of the employees due to poor ergonomics in the workplace and can cause safety and health issues as well. Unnecessary machine

motion can cause additional maintenances and machine wear, leading to quality problems (Bell & Orzen, 2010; Bicheno & Holweg, 2009). It leads to extra steps taken by the employees and equipment caused by inefficient layout of the workplace, but it is also caused by the other kinds of waste: defects, reprocessing, over processing or excess inventory. It takes time while it adds no value (Hicks, 2007). In information systems, an example of unnecessary motion is caused by 'gatekeepers'. One individual is trained to use a particular software application in order to reduce training and license costs. However, this can lead between moving between computers and users waiting for gatekeepers (Hicks, 2007). Other examples of unnecessary motion in information systems are looking for data and information and a poorly organized computer hard drive (Eric Young Associates, 2015).

### 8. Loss of human potential

The eighth form of waste is the loss of human potential and was added later to the seven forms of waste (Abdi et al., 2006; Bell & Orzen, 2010). This means employees are not leveraged to their own potential and therefore their capabilities are underutilized. They have limited authority and responsibility and persons can be put on a wrong job. As this form is based on people, it cannot easily be extended to information systems. Few examples exist, however, such as using software without proper training and some IT employees may be favorites of end users for their questions while other IT employees are not, indicating underutilized capabilities (Barcia & Boardman, n.d.) (Liefers & Huesmann, 2011).

### Lean implementation

Lean implementation can be described by five key principles (Hicks, 2007; Nave, 2002; Womack & Jones, 1996). Figure 3.2 shows these five principles.

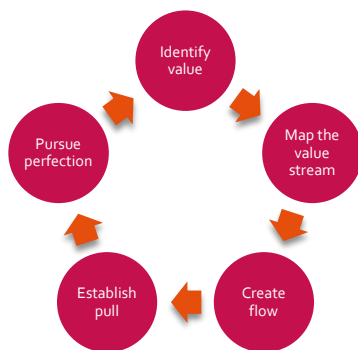


Figure 3.2 Five key principles of lean

A description of the five principles is as follows:

#### 1. Identify value

The first step is to specify value from the perspective of the end customer. This is done by recognizing which features create value. How the specific product meets the customer's need at a specific price at a specific time determines value.

#### 2. Map the value stream

The second step is to identify all steps in the entire value stream and eliminate waste. This means that the activities that contribute value are identified and all activities that are not necessary and do not add value are removed from the process. The value stream is the entire sequence of activities.

### 3. Create flow

Thirdly, the remaining value adding steps are made to flow. Flow is the uninterrupted movement of the product or service through the value stream to the customer. This can be done by removing barriers of flow, such as work in queue, batch processing and transportation.

### 4. Establish pull

During the fourth step, customer pull is allowed by designing and providing only when the customer wants it. The process should be responsive to the customer demand.

### 5. Pursue perfection

In the last step of the cycle, one needs to strive for perfection by repeating these principles and continually removing successive layers of waste, improve flow and satisfy customer delivery needs.

#### *Criticism*

Despite all the success stories around lean, it also has some limitations. The lean principles do not always apply, for example when customer demand is unstable and unpredictable. In this case, it is necessary to have inventory, to avoid congestion in the supply chain. Also, the organization may become very susceptible for change due to lean, which may lead to reduced flexibility and less ability to react to a new environment (Andersson, Eriksson, & Torstensson, 2006). Next to that, lean does not explicitly take into account the necessary culture and infrastructure required to achieve and sustain improvement (George, 2003). Another shortcoming of lean is that statistical and system analyses are not valued (Nave, 2002). It cannot bring a process under statistical control (George, 2003) and this makes it difficult to reduce variation in a process. Fortunately Six Sigma excels in this point.

#### 3.1.2. Six Sigma

##### *History of Six Sigma*

Six Sigma was first launched by Motorola in the 1980s in the manufacturing industry (Reijns, 2010). When Motorola won the Malcolm Baldrige National Quality Award in 1988, the concept of Six Sigma became well known and led to an increased interest of other companies (Andersson et al., 2006). It did not take long before other companies, such as General Electrics and AlliedSignal, followed their lead and developed the Six Sigma concept further (Pyzdek, 2003). Nowadays Six Sigma is still applied successfully in many companies and has been applied to other industries as well (Reijns, 2010).

The purpose of Six Sigma is to reduce the variation in a process in order to minimize defects. Reduction of defects will lead to an increased quality and increased customer satisfaction (Andersson et al., 2006; Eneco Zakelijck, 2015). Six Sigma uses statistical tools to understand the fluctuation of a process and these can be used to predict the expected outcome of this process (Nave, 2002). It focuses on continuous and breakthrough improvement (Andersson et al., 2006). It originates from the relationship between the variation in a process and the customer requirements associated with that process (George, 2003). Sigma ( $\sigma$ ) is a measure that is used to quantify the amount of variation of a set of data values. The largest concentration of values is around the mean and the sigma level indicates the distance from the mean. Figure 3.3 shows a normal distribution with the sigma levels indicated.

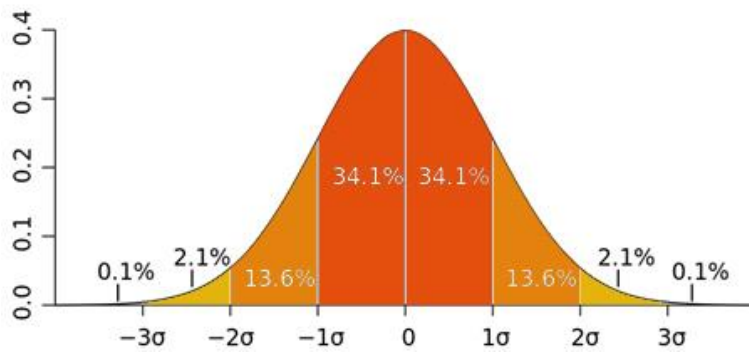


Figure 3.3: Normal Gaussian distribution indicating sigma levels

Thus, the sigma level represents the variability with which the actual output compares to the customer specification values (George, 2003). The values that fall outside the customer specifications are called defects. Table 3.1 shows the relation between the sigma level, amount of defects and the yield of good products. When having a Six Sigma level, there are only 3.4 defects per million opportunities, leading to a yield of 99.9997%. As the defects are defined by customer specification, improving the sigma level will increase customer satisfaction.

Table 3.1 Sigma level: defects per million opportunities and yield, retrieved from George (2002)

Sigma level	Defects per million opportunities	Yield
6	3.4	99.9997%
5	233	99.977%
4	6210	99.379%
3	66807	93.32%
2	308537	69.2%
1	690000	31%

### Implementation of Six Sigma

Six Sigma can be implemented by two project methodologies inspired by Deming's Plan-Do-Check-Act cycle. These are called the DMAIC and DMADV cycle, which stand for Define, Measure, Analyze, Improve and Control, and Define, Measure, Analyze, Design and Verify, respectively. While the DMAIC cycle is aimed at improving existing business processes, the DMADV cycle is used for creating new process designs, also called Design For Six Sigma (George, 2002; Skalle & Schuster, 2008). In this research improvement will be aimed at existing processes, therefore the DMADV cycle will not be explained. The DMAIC cycle is also used in the Lean Six Sigma methodology, thus an explanation of DMAIC can be found in section 3.1.3.

### Roles

One other important aspect of Six Sigma are the implementation roles. The Six Sigma approach also includes specially trained practitioners. These are experts in the Six Sigma field and should be dedicated full-time to the improvement process (Slack, Brandon-Jones, Johnston, & Betts, 2012). Roles that can be distinguished are Master Black Belts, Black Belts and Green Belts, but several companies also use Yellow and White Belts (Andersson et al., 2006). Another key role that plays a large part in Six Sigma implementation is the executive leadership. These include the CEO and top

management. They need to be convinced of Six Sigma's success and need to make sure the other Belts get all the needed resources and freedom for implementation (George, 2003). Master Black Belts are employed full time on improvement projects. As they are experts in Six Sigma, they also act as teachers of the other Belts. Black Belts apply Six Sigma using improvement teams and act as coaches for Green Belts. Green Belts work within the improvement teams and spend 20% of their time on the improvements. Yellow and White Belts have a very basic training in Six Sigma (Slack et al., 2012).

During this research, Lean Six Sigma will be applied to business processes during the case study. None of the above mentioned roles will be hired however, due to limited time and resources. It is important to mention these roles though, as it will give a better understanding of the Six Sigma approach. Also, one member of the Back Office management team is a trained Black Belt, so this knowledge can be used during implementation of LSS.

### *Criticism*

Six Sigma also has some shortcomings. Many critics claim Six Sigma does not contain anything new and contains mostly old methodologies, such as Total Quality Management (TQM) (Näslund, 2008; Paton, 2002; Reijns, 2010). Also, Six Sigma does not put much emphasis on employee involvement as often implementation is done top-down and external consultants are hired, such as Black Belts, to implement the changes. Another shortcoming is that Six Sigma may stifle creativity and is therefore inappropriate for a research environment (Dodg, 2007; Ficalora & Costello, 2007; Richardson, 2007).

### 3.1.3. Lean Six Sigma

#### *Combining Lean and Six Sigma*

The integration of the methodologies lean and Six Sigma is described by the term Lean Six Sigma (LSS) (Pepper & Spedding, 2010). Integrating these two methodologies combines the speed of lean with the quality improvement of Six Sigma and thereby leading to the best of both (George, 2003). Lean focuses primarily on increasing process speed and reducing waste and process complexity, whereas Six Sigma focuses on process quality, reducing variation and performance on critical customer requirements (van Oss, 2011; Zielhorst, 2013). This is shown in Figure 3.4.

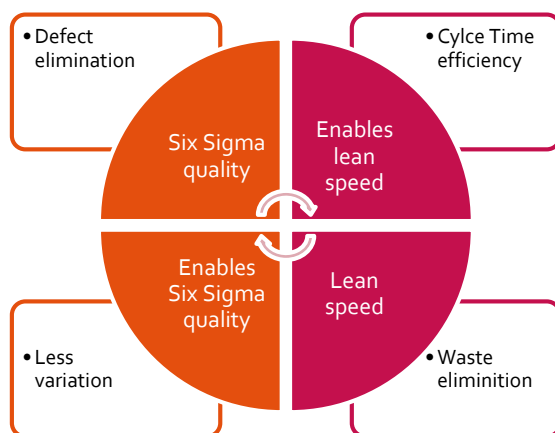


Figure 3.4 Lean and Six Sigma combined

The Lean Six Sigma methodology can be described by the house of Six Sigma. Figure 3.5 shows the House of Six Sigma and shows a schematic overview of all important concepts that Lean Six Sigma uses. LSS is based on data & facts, as the underlying requirement for successful LSS implementation is accurate quantitative data. The most left pillars stand for quality (Six Sigma) and speed (lean). These pillars support customer satisfaction, one of the two most important goals of LSS. The other goal is (continuous) process improvement. This is supported by process flow (lean) and variance and defects reduction (Six Sigma) (van Oss, 2011; Zielhorst, 2013). Combining teamwork with the four pillars leads to sufficient support of the roof: Lean Six Sigma.

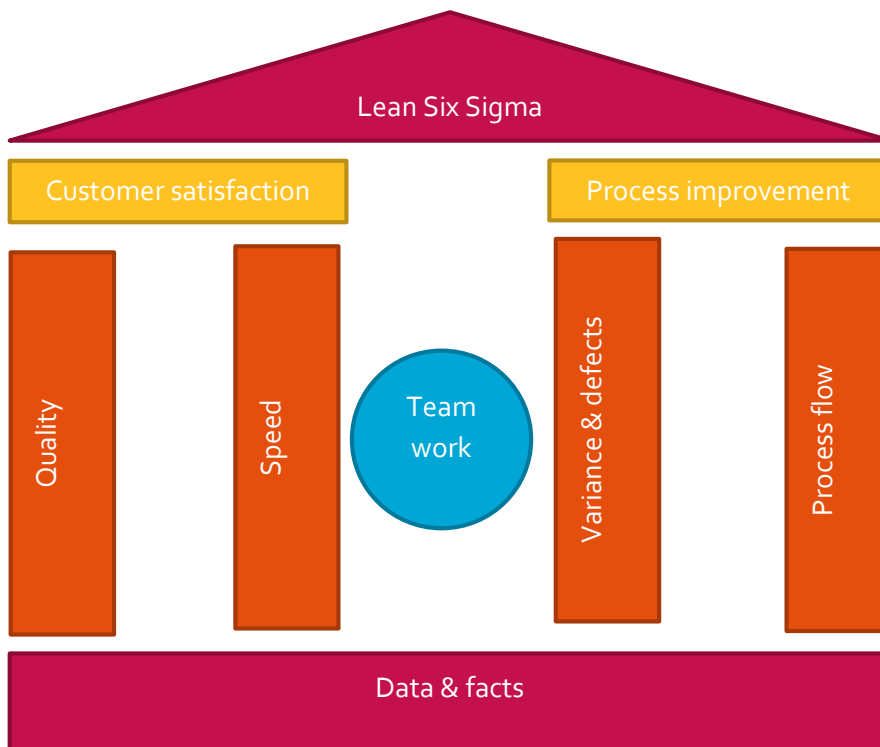


Figure 3.5 House of Lean Six Sigma, based on Zielhorst (2013), figure 13, page 32

#### *Advantages of combining lean and Six Sigma*

As mentioned earlier, a shortcoming of lean is that statistical and system analyses are not valued and it cannot bring a process under statistical control (George, 2003). Lean does not take into account the impact of variance on quality (Zielhorst, 2013), such as Six Sigma does. Another shortcoming of lean is its lack of focus on culture and infrastructure. In Six Sigma the cultural infrastructure is well-defined to generate senior management engagement, formalize training and secure dedicated resources. The DMAIC cycle of Six Sigma can also improve the implementation, as lean is mostly based on improving, but has less focus on defining and measuring (George, 2003).

Just as lean, Six Sigma also had some shortcomings which lean can solve. One of lean's main priorities is waste identification, whereas Six Sigma lacks a focus on waste identification. Six Sigma quality could be reached a lot faster if the non-value adding steps are eliminated (Arnheiter & Maleyeff, 2005). Also, lean accelerates the complete improvement process. Six Sigma focuses on quality by reducing variance, but not by speed of delivery. Lean uses specific tools and focuses on reducing cycle time (George, 2003).

### DMAIC cycle

Lean Six Sigma is implemented by the DMAIC cycle of Six Sigma, this cycle exists of five steps, described here. Within the DMAIC cycle of Six Sigma, the lean techniques are interwoven. Figure 3.6 shows the DMAIC cycle. The methods that are used during the DMAIC cycle are described in the next section.

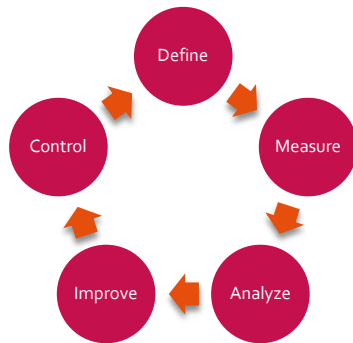


Figure 3.6 DMAIC cycle of Six Sigma

#### 1. Define

In the first step the project is defined. First a process is found that is causing problems and the priority and impact is confirmed. The LSS implementation is most valuable if the problem is high priority and has a high impact. Next goals are defined in terms that are measurable. Last but not least the process is defined by a process map. This can be done by *SIPOC* (Supplier, Input, Process, Output and Customer). Also the customers and their requirements are defined in this phase (George, 2003; Nave, 2002). Also *Value Stream Mapping* (VSM) is sometimes executed in this phase, but it can also be done in later stages (George, 2003; Zielhorst, 2013). A *four Vs analysis* can also be used during this stage to define the volume, variety, variation and visibility of the process.

#### 2. Measure

In this phase the process' current performance is investigated, this is called the as-is situation (Zielhorst, 2013). This requires an indication of the variables that influence performance and requires measurement of these variables. Data collection should be performed to collect reliable data on process speed, quality and costs (Rutte, 2011). Slack et al., (2012) add dependability and flexibility as performance indicators. Again *Value Stream Mapping* can be used in this phase to identify the value stream, but also a *root-cause analysis* can be made to find the causes of problems (Zielhorst, 2013).

#### 3. Analyze

In the third step the data gathered and measured in the previous phase are analyzed. This phase is often intertwined with the measure phase, as *VSM* and *root-cause analysis* can also be valuable in this phase. Another tool that can be used in this phase is a *Pareto diagram*. This can help determine which variables are responsible for the root cause of the process variance (Zielhorst, 2013). Also graphs and diagrams can be used to be able to present the collected data in a clear way. After this phase, the main causes of the problems should be identified, so the process can be improved in the next phase.

#### 4. Improve

During this phase the process can finally be improved. Solutions to the earlier identified causes are developed, which can be found by *brainstorming*, a *weighted criteria matrix* and *pilots*. By measuring



the influencing variables again, one can see whether the changes have led to improvements of the process or more and/or other changes are needed (George, 2003; Zielhorst, 2013). Also a to-be situation can be produced using VSM and this phase and 5S can be applied.

### 5. Control

In the last phase the goal is to maintain process stability. This is done by monitoring using control charts and systems and adjust the process when needed (Zielhorst, 2013). The cycle guarantees continuous improvement by having a feedback loop from the control phase to the define phase.

#### *Implementation tools*

There are several tools available that can be used to implement LSS. The most well-known and implemented are described below and were mentioned in the previous section describing the DMAIC cycle.

#### Four Vs analysis

A Four Vs analysis can be used to determine how processes performs on the four dimensions volume, variety, variation of demand and visibility (Slack et al., 2012). The four dimensions influence the operating costs for a certain business process. A process with a combination of high volume, low variety, low variation and low visibility (the right end) results in low costs for the operation, while the opposite is true for the left end of the diagram, this results in high costs for the operation. Furthermore, the Four Vs analysis provides insight in the way the process needs to be managed. This analysis is performed in order to obtain a general understanding of the current process and recognize possible faults that may be targeted (Slack et al., 2012).

#### SIPOC

SIPOC stands for Supplier, Inputs, Process, Outputs and Customers. SIPOC can be used to create a high-level map of a process (George, 2003). A SIPOC diagram is usually created during the first phase of DMAIC and gives insight in the complete value stream from start to finish. It starts with the suppliers that provide input for the process. Suppliers can be an outside vendor, another division or a coworker. Input can be both information as well as material. The process contains the steps that are used to transfer the input from the suppliers as output to the customers, this contains both value adding and non-value adding steps. The customer can be the next step in the process or the final (external) customer. The output is the product, service or information that the customer receives (George, 2003). A SIPOC diagram is used to define the as-is situation.

#### Value Stream Mapping (VSM)

As mentioned in section 3.1.1, a value stream is the entire sequence of activities that the product or service goes through from start till end, including all detail. Value Stream Mapping is a process mapping method to document the current and future states of the process (Elnadi, 2015). By showing all the steps in the process, it also shows the non-value adding steps and waste can therefore be identified. This makes VSM also the start of the to-be situation by showing which steps can be eliminated (Elnadi, 2015). A VSM can be made by three elements, the process flow, data on how time is spent and the complexity. The complexity indicates how many different types of services/products flow through the value stream. The activities are classified into the three categories mentioned in section 3.1.1: value added, non-value added and necessary but non-value added. A SIPOC diagram can be the input of VSM. Important tips to take into account are walking through the process yourself to get to know the real process. Also starting with a quick scan and go

by each step in detail in a later stage may help. Beginning at the end and work towards the beginning is useful as well. This helps to identify all steps a customer goes through. Next to that, taking a stopwatch and measuring every time yourself, may give you better data, as file data rarely reflect actual times. And last but not least, map the whole value stream yourself, others may help you but make sure you are acquainted with all the steps (George, 2003).

### Root-cause analysis

A root-cause analysis is done to find the root-causes of problems. Popular tools of analysis are by a so-called fishbone diagram or asking 5 times why. Figure 3.7 shows an example of a fish bone diagram. They are used to discover all possible causes for a particular effect. They can lead to causes you would not find otherwise. A greater understanding of the problem can be gained by a root-cause analysis (Elnadi, 2015). A root-cause analysis is mostly used in the measuring and analyzing phase of DMAIC.

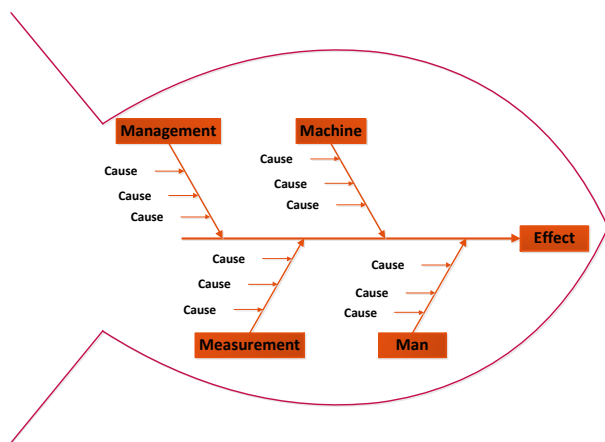


Figure 3.7 Example of a fishbone diagram

### Pareto diagram

A Pareto diagram is a quality chart that helps to identify the most important factors among a set of factors. This can be in terms of types of defects, sources of defects, delay times, customer complaints, etc. (George, 2003; Slack et al., 2012). The Pareto diagram shows the frequency of occurrences and cumulative total of occurrences on a single chart. In Figure 3.8 an example of a Pareto diagram can be seen. It is based on the so-called Pareto principle, which means that 20% of defects, cause 80% of the problem. This is based on the phenomenon of relatively few causes explaining the majority of the effects (Slack et al., 2012). A Pareto chart is used in the analyzing phase of DMAIC.

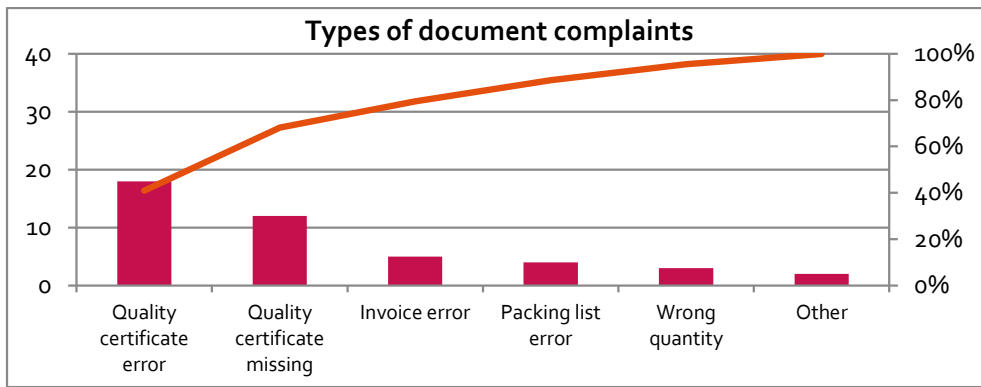


Figure 3.8 Example of Pareto diagram

## 5S

The concept of 5S stands for the 5 Japanese words Seiri, Seiton, Seiso, Seiketsu and Shitsuke. These words stand for sort, set in order, shine, standardize and sustain (Chapman, 2005). 5S is used to create and maintain an organized, clean, safe and high performance work place (Elnadi, 2015). 5S is considered a tool of lean to create the most efficient work place possible and eliminate waste in the workplace that results from a poorly organized workplace (e.g. wasting time by looking for a tool).

The first step is to sort out what is not needed and dispose of it properly. Next, the remaining items are set in order and organized to minimize movement and make everything easy to find. Then, in the third step, the work area is made to shine, meaning everything needs to be cleaned. While cleaning, equipment can be checked for damage. Fourthly, the process is standardized by setting up centralized stations with cleaning and organizational supplies. Finally, the fifth step is to make sure the clean and organized workplace is sustained. Especially the last two steps are important, these will decide the success of the 5S initiative (Chapman, 2005; Elnadi, 2015).

As in this research the workplace is not manufacturing based, but ICT based, 5S can be applied to the ICT system that is worked with. As the organization of this ICT system is expected to influence implementation of LSS, it is important to take this into consideration. 5S can also be applied to office work places, by working in a clean office area.

### 3.1.4. Conclusion

This section explained the theory of lean, Six Sigma and the combination into Lean Six Sigma. Also the implementation cycle by DMAIC was explained and the used tools to implement it were discussed. This research investigates the influence of ICT on the implementation of Lean Six Sigma in relation to Orlikowski's theory. As LSS was explained in this section, the next section will discuss the theory of Orlikowski's and the influence ICT can have on improvement.

## 3.2. Duality of technology

### 3.2.1. Orlikowski's theory

To describe the influence of ICT on improvement, Orlikowski's theory is used as base, for she describes the dual nature of technology. This section describes Orlikowski' theory on the duality of technology, therefore all information in this section is based on her paper (Orlikowski, 1992). Early research studies produced two theoretical models for the interaction between technology and

organizations. One was that technology is an objective, external force that has a deterministic impact on organizational structure. The other is that technology is the outcome of strategic choice and social action (Orlikowski, 1992). In her theory, Orlikowski claims both views are incomplete and suggest a new concept of technology. This new concept underscores the socio-historical context of technology and the dual nature of technology, as objective reality and as socially constructed product. She recognizes two important aspects of the technology concept: scope and role. Scope entails what comprises the technology and role describes how the interaction is defined between the technology and organization.

### *Scope and role of technology*

Orlikowski identifies two views on scope and three types of roles. As for scope, the first is seeing technology as 'hardware', such as equipment, machines and instruments that humans use in productive activities. The second view is a multiple, context-specific definition of technology, in order to also relate it to service organizations. In her theory, Orlikowski uses an intermediate of these two views and restricts the scope to material artifacts. Thereby expanding the scope of technology further than only equipment, but still able to describe the interaction between the artifacts of technology and the second view lacked this as all was described as technology, also the interaction between the different components. This results in a theoretical distinction between the material nature of technology and the human activities that design and use the artifacts.

Furthermore, Orlikowski presents three types of roles of technology, described in different models. The first one is the "technological imperative" model, which treats technology as an independent influence on human behavior or organization properties, that exerts unidirectional, causal influences over humans and organizations. The second model Orlikowski describes is the "Strategic Choice" model. This model suggests that technology is not an external object, but a product of ongoing human action, design and appropriation. The third model is the model of technology as trigger of structural change. Here, technology is posited as an external force having impacts, but where these impacts are moderated by human actors and organizational contexts. Orlikowski frames the role of technology in terms of a mutual interaction between human agents and technology, and hence as both structural and socially constructed. Figure 3.9 shows the three perspectives on roles.

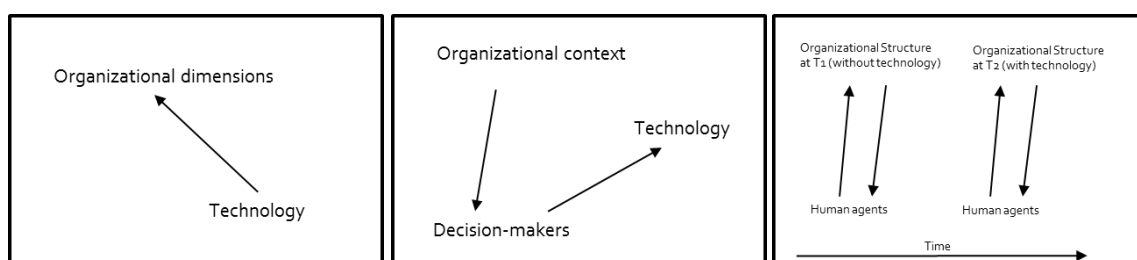


Figure 3.9 Three roles of technology, based on Orlikowski (1992), figures 1, 2 and 3 on page 3, 4 and 7 respectively.

### *The Structural Model of Technology*

The scope and role of technology that Orlikowski constructs are used in her concept of technology, called the Structural Model of Technology (based for a large part on Giddens' (1984) theory of structuration (Giddens, 1984)). Figure 3.10 shows a schematic view of the Structural Model of Technology. As one can see in the figure, the Structural Model of Technology comprises three components. Firstly, human agents can be technology designers, users and decision-makers. Secondly, technology is as material artifacts mediating task execution in the workplace and thirdly,

institutional properties of organizations include organizational dimensions, such as business strategies and culture, but also environmental pressures, such as government regulation and state of knowledge of technology.

Before the model is explained further, first two premises of Orlikowski's model should be explained; these are the duality of technology and interpretive flexibility. Duality of technology means technology is created and changed by human action, yet it is also used by humans to accomplish some action. The interpretive flexible nature of technology comprises the interaction of technology and organizations as a function of different actors and as dependent of the socio-historical context of technology's development and use. The figure shows 4 arrows connecting the three components. Arrow (a) shows that technology is a product of human action. The interpretive flexibility is shown here in two modes of interaction: the design mode and the use mode. Arrow (b) shows technology as a medium of human action, as it facilitates and constrains human action through the provision of interpretive schemes, facilities and norms. Arrow (c) represents the institutional conditions of interaction with the technology. This describes the way that human action is shaped by the organizational contexts. Arrow (d) describes the institutional consequences of interaction with technology. The use of technology by the human actors often reinforces the institutional properties of an organization, but can also transform them.

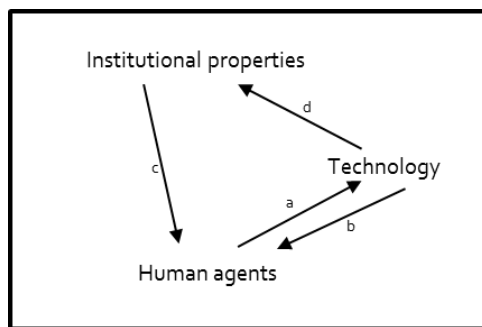


Figure 3.10 Structurational Model of Orlikowski, based on Orlikowski (1992), figure 5 page 17

### 3.2.2. ICT in sociotechnical systems

Many researchers built onto Orlikowski's theory to describe the remarkable relation between ICT and organizational change. ICT can influence change by either implementing a new ICT system, thereby changing things in the company as well or by its nature influence change required by the organization, without changing itself. This influence is caused by different characteristics of ICT and these will be described in this section.

#### *New ICT system implementation*

When implementing a new ICT system, organizational structure and culture can potentially change as well, along with this new system. Established work processes can be disrupted when a new IT system is introduced (Maguire, 2014). For example, information may be presented in a different form than workers are used to or user navigation may be less straightforward than the previous IT system (Maguire, 2014). Implementing new information systems in an organization influences the way people work and think (Dwivedi et al., 2014). A new system can have political implications, IT has the potential to enable some things and constrain others, therefore some people win and others lose. Many of the key issues in IT implementation are thus related to politics, culture and people (Dwivedi et al., 2014). The value of the human experience can be tended to be overlooked in the rush

to automate processes and organizations (Maguire, 2014). System developers might not be aware that it is through organizational change, rather than through a technology's functionality, that change is successfully implemented (Doherty, 2014). Treating IT as a work system instead of a technical artifact, can enable a better integration of ICT and organizational processes (Dwivedi et al., 2014). *Neglected politics* can thus be seen as a characteristic of ICT that can influence improvement.

Next to politics, the *silver-bullet syndrome* is also mentioned by Nelson (2007) as classical mistake in IT project management. This includes that people expect the new technology to solve their problems and are inevitably disappointed (Nelson, 2007). People tend to overestimate the things IT can solve. This also connects to costs, people tend to expect overestimated savings from new tools or methods (Nelson, 2007). This can also have a positive side however. If an organization regards IT as an important asset of their organization, it will most likely place more emphasis and efforts on the alignment of business and IT (Dahlberg, Kivijärvi, & Saarinen, 2015). Thus, this could also influence the organization in a positive way.

Also the alignment of business and IT is important for acceptance of IT systems. Systems may underperform, because new technologies are harnessed to existing business process designs and traditional patterns of employee behavior (Doherty, 2014). Bortolotti & Romano (2012) claim a large problem is the excessive separation between improvements of manual activities and automated activities. There is still a large difference between optimization and automation and between the 'factory' and the IT system (Bortolotti & Romano, 2012). Also requirements or developer *gold-plating* can be a classical mistake in IT project management. This characteristic of ICT means that developers can be fascinated with technology and want to try out new features that are not necessary in the product, it can also mean that the customer wants all kinds of extra things, that are not necessary (Nelson, 2007).

The human factor also forms a difficulty in the design of ICT. People appreciate having the ability to vary their way of performing their task and taking responsibility for their work outcomes. A system should allow for flexibility in the way computer-based tasks are achieved (Maguire, 2014). *Ease of use* of an ICT system and *allowance of variation* in tasks can therefore contribute to improvement. Research also showed that when the IT system was renewed and contained only the screens employees required for their job, it was seen as more complex than what they had before (Bjørn-Andersen & Raymond, 2014; Maguire, 2014). This also forms a reason why developers should take people into account. Another human aspect in system design is allowing workers to see their contribution to the overall output. The user interface can support this for example by showing how the different tasks link together, instead of only giving the user random entry points to a system (Maguire, 2014).

As mentioned by Orlikowski (1992), the users of a system also have an influence on the system by interpretive flexibility. Systems are interpreted and appropriated in various ways and organizations can therefore experience different outcomes with the same technology (Doherty, 2014). However, she also describes ICT as an objective, external force, which shows the possible *detention* of an ICT system.

Another consequence is that the success of the ICT implementation is *hard to predict*. ICT does generally not behave in a well-ordered and predictable manner and many outcomes can be unplanned and unintentional (Doherty, 2014). New IT systems also entail learning to use them and

require training to the employees (Maguire, 2014; Nelson, 2007). One should also take into account the ability and willingness of employees to learn to use a new system (Bjørn-Andersen & Raymond, 2014). For example, computer anxiety can negatively influence IT adoption by employees (Elie-Dit-Cosaque, Pallud, & Kalika, 2011). New IT systems also entail new risks, which will only be discovered by using them (Nelson, 2007).

ICT change can either be realized by new ICT systems or changes in the existing ICT system. The main difference that can be identified is the involvement of users. The former can be seen as pushed by the IT department, whereas the latter can be seen as required by the users. In reality the line between the different kinds of change in ICT is difficult to define. These changes go more often hand in hand however. IT departments are putting more focus on user requirements and involving them throughout the development process. They are adopting a scrum and agile form of working. Therefore in this research these will be seen as one and the same.

### *Change without the use of ICT*

As mentioned in the beginning of this section, ICT can also influence change without changing the ICT system itself. When change is initiated by the organization, ICT's nature can influence the change. When the system is not flexible and does not *allow variation* in task execution, this can inhibit process improvement initiatives. One can find that a certain task can be performed much more efficient, but when the ICT system does not allow this, technology can act as an external, objective force. When the ICT system allows variation though, the other side of the duality of technology starts to play a role and users can define the technology by their use of it (Leonardi, 2011; Orlikowski, 1992). Also process visualization can influence the improvement initiatives. When employees have a complete *overview of the process* performed by them and others, it is easier to see improvement possibilities (Maguire, 2014). Also Slack et al. (2012) states that a high visibility of flow promotes staff to share in its management and improvement.

When change in ICT system is required in response to improvement in business processes, *different values* is a characteristic that can also play a role. For example the IT department also has to consider the protection of private or sensitive information, whereas employees do generally not take this into consideration (Maguire, 2014). Not much information can be found on IT factors influencing process improvement, however. For this reason it is researched in this thesis.

### 3.2.3. Conclusion

This section provided an explanation of Orlikowski's theory and the in literature found ICT characteristics that influence improvement. These characteristics were neglected politics, the silver-bullet syndrome, gold-plating, ease of use, process overview, hard to predict success, allowance of variation and different values. These characteristics will be complemented by Hofstede's organizational culture dimensions in the next section.



### 3.3. Hofstede's organizational culture dimensions

Culture is an important issue when implementing change. When improving a process, this generally also involves change and therefore culture. Also, this thesis includes change by ICT and inter-department communication can play an important part. To include the culture side of improvement, Hofstede's organizational culture dimensions are needed. Originally Hofstede based his five cultural dimensions on differences in culture between nationalities (Hofstede, 1984). Later Hofstede also described cultural dimensions inside organizations (Hofstede, 1998). These can be used to describe the difference in culture inside organizations. The dimensions generated by Hofstede are used to explain and to complement the found characteristics. These dimensions include process-oriented vs. results-oriented, employee-oriented vs. job-oriented, parochial vs. professional, open system vs. closed system, loose control vs. tight control and pragmatic vs. normative. These will be described in this section.

#### *Process-oriented vs. result-oriented*

This dimension is also described as means-oriented vs. goal-oriented and describes either a focus on the means or on the goal (Hofstede, 2015). In a process-oriented culture the main focus lays on the "how". Importance is placed on the way in which work has to be carried out. People in a process-oriented culture perceive themselves as avoiding risks and making limited effort in their jobs, while each day is pretty much the same (Hofstede, 1998). In result-oriented cultures, the "what" is more important. The employees are focused on achieving an end result, even if these involve substantial risks (Hofstede, 2015). The people perceive themselves as comfortable in new, challenging situations and putting maximal effort (Hofstede, 1998). This dimension is closely connected with organizational effectiveness.

#### *Employee-oriented vs. job-oriented*

This dimension is closely related to the management philosophy. When having an employee-oriented culture, management feels responsible for the happiness, well-being and satisfaction of their employees, even if this is at the expense of their work. In a job-oriented culture, the focus on high task performance can come at the expense of employee welfare (Hofstede, 2015).

#### *Parochial vs. professional*

In a parochial, or local, organizational culture, employees identify with their boss and team members. There is a strong social control, resulting a low level of diversity, but a high amount of predictability (Hofstede, 1998, 2015). In a professional organizational culture employees identify with their profession or the content of their work. They consider their private lives their own business and they feel the organization hires on the basis of job competence only (Hofstede, 1998, 2015).

#### *Open system vs. closed system*

This dimension reflects how newcomers and other people are received in the company. In open systems newcomers are welcomed easily. People are open to both insiders and outsiders and they believe that anyone will fit well with the organization. In a closed system the organization and its people are felt to be closed and secretive, even among insiders (Hofstede, 1998, 2015).

#### *Loose control vs. tight control*

This dimension refers to the work discipline and the amount of internal structure and control. In a loose control culture, the work approach is informal, unpredictable and loose, which facilitates



innovation. In a tight control culture employees are very cost-conscious, punctual and serious (Hofstede, 2015).

#### *Pragmatic vs. normative*

This dimension is also referred to by internally driven vs. externally driven (Hofstede, 2015). In a normative, or internally driven, culture employees emphasize on correctly following the organizational procedures. They believe that business ethics and honesty matters most and that they know best what is good for the customer (Hofstede, 2015). In a pragmatic, or externally driven, culture employee's emphasis is on meeting customer needs. Results are more important than correct procedures (Hofstede, 1998, 2015). This dimension is distinguishable from the process- vs. result-orientation, because it is meant to specifically describe the customer or market orientation of the business, rather than general internal processes that may not impact the customer (Reference for Business, 2015).

### 3.4. Conclusion

This chapter provided a theoretical base for this thesis by answering the first four sub-questions. The first section explained the concept of Lean Six Sigma. Lean Six Sigma combines the methodologies of lean and Six Sigma. Integrating these two methodologies combines the waste identification and speed of lean with the quality improvement and statistical analyses of Six Sigma and thereby leading to the best of both. Lean Six Sigma is implemented using the DMAIC cycle, which stands for define, measure, analyze, improve and control. These phases are executed by the use of different tools. The application of these tools for the back office was investigated as well, but this was not described in literature yet for all tools. Much information could be found about the wastes of lean in IT environments, but little could be found of the tools of LSS.

Section 3.2 answered the second and third sub-question by giving more insight into Orlikowski's theory and providing ICT characteristics found in literature that influence improvement. Orlikowski describes the interaction between technology and organization as the so-called duality of technology. She describes that technology is not seen as an objective, external force, but it is also not only an outcome of social action. Her new concept underscores the socio-historical context of technology and the dual nature of technology, as objective reality and as socially constructed product. Orlikowski's theory is used as theoretical base to describe the interaction between ICT and improvement by LSS. Orlikowski's duality of technology gives an idea of the dual nature of technology, but does not specifically describe the influence of ICT on implementation of LSS. One can find that a certain task can be performed much more efficient, but when the ICT system does not allow this, technology can act as an external, objective force. When the ICT system allows variation though, the other side of the duality of technology starts to play a role and users can define the technology by their use of it. A distinction was made between improvement in ICT and improvement in the process without the use of ICT. To get a first idea of the ICT characteristics that could have an influence on implementation of LSS, literature was searched for these characteristics and showed several characteristics of ICT that can influence improvement. These were *neglected politics, silver-bullet syndrome, gold-plating, ease of use, process overview, hard to predict success, variation allowance* and *different values*. These were used as a starting point for the design of the model and were used to set up the interviews.

In the last section Hofstede's cultural dimension were explained and the fourth sub-question was answered. Originally Hofstede based his five cultural dimensions on differences in culture between nationalities. Later Hofstede also described cultural dimensions inside organizations. These include process-oriented vs. results-oriented, employee-oriented vs. job-oriented, parochial vs. professional, open system vs. closed system, loose control vs. tight control and pragmatic vs. normative.

The theory of this chapter will be used as a base for the next chapters. The influencing ICT characteristics will be further investigated by the interviews and observations and will be combined with Hofstede's theory about organizational culture into the model presented in chapter 4. This model will be validated during the case study of chapter 5 with the use of the theory about Lean Six Sigma.

## 4. Model of ICT characteristics

This chapter presents the model showing the ICT characteristics that influence implementation of LSS and describing their influence. The literature in chapter 3 gave a first idea of characteristics that influence improvement. In addition, observations and interviews were conducted as described in the research methodology. This resulted in several characteristics of ICT that can influence implementation of LSS. These characteristics were analyzed and a model was produced with the relation between these characteristics and their influence on improvement. This chapter describes these characteristics of the model. Before the model can be completely understood, some more information is needed about the current improvement initiatives at the Back Office. This is explained in section 4.1. Section 4.2 will present the model and the description of the different characteristics and their relations. The observations and interviews can be found in Appendix I and Appendix J, respectively.

### 4.1. Issue implementation process

Currently there are some improvement initiatives at the Back Office. Most of these consist of improvements in the ICT system used, called MVS. As mentioned in section 1.3, MVS is a database for customer data storage and all Back Office processes are executed in MVS. Figure 4.1 shows the issues implementation process. Employees of the Back Office (BO) can tell their issues with MVS to a key user, there are about 8 key users. These key users fill in a form together with an employee that is emailed to Functioneel Beheer (FB). This form contains questions about the reduced fte's, customer impact and amount of rejects, it also includes a description of the problem. FB prioritizes these issues and sends the issues that are considered important enough to the product owners. The product owners are the head of IT teams that solve the issues. They also prioritize the issues and decide which issues will be implemented in a three week sprint, this is partly in accordance with their IT teams. When an issue is chosen to be implemented, the end users that will use the function are contacted and can test during the sprint. Often more sprints are needed before the complete issue is solved, and they are implemented in small iterations.

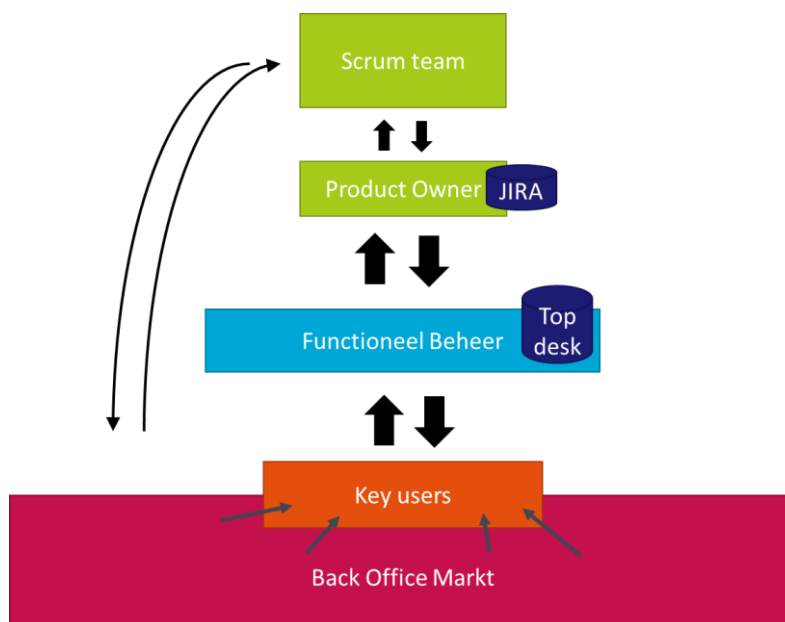


Figure 4.1 Flow scheme of MVS issues

### 4.2. Model

Figure 4.2 shows the model schematically. A model gives a schematic representation of reality and this model gives a schematic representation about the influencing ICT characteristics of the Back Office at Eneco. It shows the characteristics that can have an enabling or inhibiting influence on improvement. The characteristics that were found during the literature research, interviews and observations are classified into five categories: nature of ICT, IT department, ICT system, culture and other. The relations between the characteristics and their influence are also described in this section and were found during the observations and interviews. The separate characteristics and their influence are described below.

The model answers the question of how ICT can influence improvement in sociotechnical environments. The model shows how the different characteristics influence each other and how they influence improvement at Eneco’s Back Office. A distinction is made between improvement in ICT and improvement in a process and these are influenced by different characteristics. Improvement in ICT is especially influenced by the IT department, whereas improvement in a process is largely influenced by the ICT system. One can also see in the model that many characteristics are also related to characteristics from other categories. By analyzing the characteristics that have an influence on improvement, one can also choose to enable or inhibit improvement by changing these characteristics. For example improving the inter-department communication can improve the process overview and thereby the improvement in a process, but also improve the clearness of the ICT policy, which eventually leads to improvement in ICT. Characteristics that have a negative relation with improvement can be reduced or eliminated, while characteristics that have a positive relation with improvement, should be increased to enable improvement.

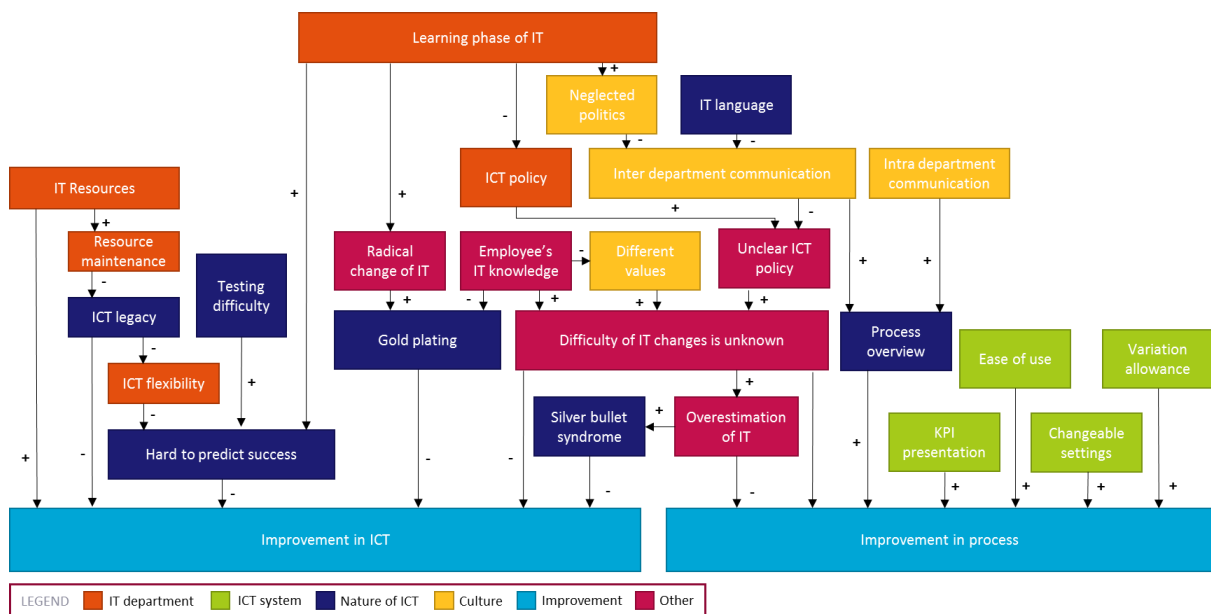


Figure 4.2 Model with ICT characteristics that influence improvement

## Nature of ICT

### ICT legacy

Interviews indicated there is a large ICT legacy within the ICT system. An employee of the Back Office mentioned that there are many notifications in the system from the past that are still there. Meaning there is a lot of code that is actually superfluous or does not work properly anymore (Appendix J). According to another product owner they knew too little about the IT and he compared their coding to a house:

“It is a little bit like a house on which every inhabitant builds an extra piece every two years. After twenty years you have a very bumpy house. This is what many parts of our code also look like.” (Appendix J)

Many companies struggle nowadays with a large ICT legacy reducing their flexibility (KPMG, 2015).

### Testing difficulty

Interviews indicated that testing a new ICT functionality is difficult, because it is not possible to test it 100% (Appendix J). Therefore, there could always remain a small thing that is affected by the new functionality, but you would not see that when developing or testing. This makes it difficult to predict the success of the new ICT implementation. Even with testing, things can go wrong, you cannot take everything into account (Appendix J). Software testing is a well-known issue in ICT environments (Myers, Sandler, & Badgett, 2011).

### Predictability of the success of IT changes

As described in the previous chapter, it is difficult to predict the outcome of ICT changes. Doherty (2014) describes how many outcomes from ICT changes are unplanned and unintentional. Changes in ICT systems are harder to visualize than for example a change in more tangible equipment. Therefore it is hard for IT to predict how long it will take before an issue is delivered, how difficult this is and whether this will work. One cannot see this in advance, but notices it during the process.

The interviewed product owners indicated that it happens often that changes turn out a lot bigger than they initially seemed, but also the other way around (Appendix J). Also an employee and a management member of FB&I agreed with this (Appendix J). An employee indicated:

“Most of the times they [IT department] are in the correct direction, but it is never, almost never, in one time right.” (Appendix J)

An example is the Back Office Taken Lijst (BTL). This is a task list system that would divide the workload automatically instead of by one person every morning. On paper it seemed like a good project, but when implemented there turned out to be more struggles than expected.

### IT language

The developers at the IT department could talk in some IT specific jargon, which is difficult to understand for users that do not know that much about IT. This could influence their communication. A Back Office employee confirmed this, but also said the IT employee she spoke with, tried to explain everything to her, despite his IT jargon (Appendix J). A management member of FB&I also indicated really technical changes could be difficult to explain to users (Appendix J).

### Gold-plating

As mentioned in the previous chapter, both developers and users are apt to include many extra functionalities into an ICT change. A product owner indicated that users came with a small request, but during testing, they wanted many extra things, therefore they now ask their users to choose and select the really important things (Appendix J). He also described that IT developers are apt to adding extra functionalities, because they can easily see things that are also not correct yet and it seems easy to do these things then as well (Appendix I). This is also related to the fact that ICT departments are more into radical change. Another thing is that employees do not know how much effort it is to implement these extra things.

### Silver-bullet syndrome

Nelson (2007) described the silver-bullet syndrome as classical mistake in IT project management, as mentioned in chapter 3. This characteristic was not mentioned during the interviews, because it was found in literature after the interviews, so the topic list did not include this characteristic. It is included in the model however, because it is a reasonable consequence of the overestimation of IT.

### Process overview

Back Office employees indicated that for many employees the complete process is not visible. People mainly know their own step in the process, but not where the 'uitval' came from or who continues with it after they have done their part (Appendix J). Both a management member of the Back Office and a product owner mentioned that processes could be more efficient, when people would talk to each other about this. An example is given by a management member of the Back Office:

"Something was missing in the customer data. Then an Excel file was made using a query, this was sent to another department and they filled in the missing data. It turned out that all cases that went wrong, was because that same department had manually inserted those cases and forgot to fill that field, they forgot to do that, because it was not in their work instruction. No one had thought of the fact that this was one and the same. Probably two different persons in that department did these two tasks, because they were both specialized, so you have to make these people talk to each other." (Appendix J)

As mentioned in chapter 3, literature also states that a high visibility of flow promotes staff to share in its management and improvement (Slack et al., 2012).

## IT department

### IT resources

As mentioned in section 1.3, the IT department of Eneco has decreased over the years and has led to a large backlog of issues. A Back Office employee mentioned that due to large projects in the previous years, maintenance was not possible and was scared that when employees of the IT department might be fired next year, maintenance will be neglected again (Appendix J). Improvement in ICT is difficult when the required amount of IT resources is not available. A product owner mentioned that he can only pick up 2 or 3 issues in one sprint, meaning that the things of which everyone thinks they should happen, do not happen (Appendix J). Besides an inadequate amount of IT employees, other IT resources can have influence as well, for example time, expertise and flexibility. These did not come forward explicitly in this research however.

### Resources for structural maintenance

Product owners indicated that due to large IT projects in the last years, there were hardly any resources for structural maintenance (Appendix J). The long absence of resources and thereby the neglect of maintenance of the system leads to unstructured code. It was mentioned that the low amount of maintenance was bad for the maintainability, difficult for understanding and annoying for testing (Appendix J). A product owner also indicated: "If we simplify the system and perform better maintenance, fewer problems would appear and we would lose less time on these problems" (Appendix J).

### Technology flexibility

Due to a large legacy of coding, the technology of Eneco is not as flexible as one might wish. This leads to the fact that it is more difficult to act on issues that might have been solved faster and easier when the coding and the enterprise architecture are easier. A management member of FB&I indicated that MVS in general is a good system, but it is very difficult for developers to make changes fast, because it is so complicated (Appendix J). A product owner said:

"If you are a new company, you just choose a development platform and you build everything on that platform, then it is a lot easier. Now you drag along everything of 15 years ago."(Appendix J).

Also a Back Office employee indicated that the coding made things slow and difficult, especially for IT when they want to implement changes. They have to figure out what the code is, what it does and what happens if you change it (Appendix J).

### Learning phase of scrum and agile

The IT department is still in transition to a more scrum and agile form of working. It is believed that this form of working will result in a more effective way of working and means doing more with less expensive IT personnel. This means however that they are not experienced yet in applying scrum and agile. Product owners indicate it takes practice to learn it and the scrum teams that exist longer are also better at applying it (Appendix J). This results in the fact that they sometimes forget to include the end user in the process and they are not good at estimating how much time an issue will take (Appendix J). This is mainly experience and they do not have that yet. However, the interviewed product owners indicated this was improving over time (Appendix J).

### ICT policy

As the IT department has only recently adopted a scrum and agile form, there is no ICT policy yet, but they are still in discussion about what values to include (Appendix J). Product owners now make decisions using values such as business value, customer impact, FTE reduction and amount of work (Appendix J).

### ICT system

#### Ease of use

Interviewees indicated that MVS is an easy program to learn how to use (Appendix J). The previous chapter also described that ease of use is an important segment of an ICT system. The ease of use can enable improvement, by making the improvement possibilities in the system clearer to see. However, a product owner mentioned that MVS is by origin a database and people had to find their

way in this system to make changes and base their work instructions on that. This makes the interface not a user-friendly one (Appendix J).

### Changeable settings

A product owner indicated that FB&I could change interior settings in the ICT system (Appendix J). However, users cannot do this themselves and this might inhibit improvement of the business processes, as people cannot adjust it to their needs. This is also found in literature, under the term of tailorability of software (Henderson & Kyng, 1992; Wulf, Pipek, & Won, 2008).

### Allowance variations in MVS

Allowing variation in the way users navigate through the process, can influence improvement. This was also found in literature, as stated in the previous chapter. During interviews, the opinions differed on this point. Some interviewees said that the only variation is shortcut key usage or not, these were mainly employees at the Back Office. According to one of these employees the shortcut key usage did not make any difference in time needed for a task (Appendix J). Most interviewees however concluded (including an employee of the Back Office) that variation in a task is possible. It is possible to use different screens in MVS or even the same screen, but a different process, to do the same task. This could be due to different work instructions over the years, people starting at different times have different ways of working, also without knowing it (Appendix J). It was observed during a day start that an employee said that they found a new way of solving a reject, leading to a faster process, which indicates it is possible (Appendix I). Also a fellow intern said she just learned a faster way of processing from a colleague that was not mentioned by another colleague who trained her (Appendix I). This gives the possibility to improve on this field, but also gives the possibility to not use the most efficient way. It can also influence employee satisfaction, as giving employees more authority or freedom, influences employee satisfaction (Slack et al., 2012).

### KPI representation

Presentation of Key Performance Indicators (KPIs), either manually or automated, could possibly influence improvement (Radnor, 2010). A management member of the Back Office stated that by not showing what improvements have been done including their results, people are not starting to believe in the efficiency gains by improvements (Appendix J). If one could show this in measurable KPIs, this could be improved.

## Culture

### Neglected politics

As mentioned in the previous chapter, it is important to communicate with the users of an ICT system, when building or changing one and a common mistake is to neglect the politics when implementing ICT change. Interviewed product owners indicated that IT is apt to forget to include the users, but that this is also due to the fact that they are still in a learning phase of scrum and agile (Appendix J). One product owner said:

“We are not at all accustomed to asking [users] ‘überhaupt’, so we just continue in the direction of which we think ourselves is the right one and after two months we hear ‘That was not at all necessary’.” (Appendix J)

This results in developers building extra functionalities that the users does not find necessary and influences the inter-department communication.



### Intra- and inter-department communication

Communication is a large bottleneck that results into frustration for many employees. The communication between the IT department and the BO/ FB can lead to IT making things the BO does not necessarily want. However, IT aims to improve this and really involve the end user, leading to a more efficient improvement process (Appendix J). A Back Office employee said:

“That’s not communicated, and if it is communicated, it surely does not reach this department.” (Appendix J)

Also, it is not clear what FB adds to the improvement process. Most people feel they just want to have their say in the process as well. Key users act as filter as well when transmitting issues to IT from regular employees. Also some product owners say they want all the issues FB has received, making no use of the prioritizing of FB (Appendix J). In addition, it seems as if FB is working against the BO instead of representing them towards IT (Appendix J). The difficulties in communication can be explained by Hofstede’s organizational culture dimensions, which were explained in section 3.3. Due to the reorganizations both at the Back Office department as the IT department, people are scared of losing their job, creating a more closed-system culture. This can lead to a secretive environment and can hinder communication.

Also the intra-department communication is not optimal between the employees of the Back Office. Employees indicate they do not really know what things are happening at the department, except for their own work and team (Appendix J). This can also be due to the secretive environment. As said in chapter 1, Eneco has taken over Oxxio a couple of years ago. The Back Office now exists of employees from Oxxio and from Eneco and a large difference in culture can be observed. The employees of Eneco are mainly concerned with customer satisfaction, which can be seen as process-oriented, whereas the employees of Oxxio are focused on speed of reject solving, which can be seen as result-oriented. In addition, former management of the Back Office has always maintained a very tight control culture, which does not facilitate innovation. When the management was replaced by Oxxio employees, a loose control culture was adopted, but it takes time before this has diffused over the complete department. This difference in culture can hinder communication. Bortolotti & Romano (2012) also mention communication can create problems during improvement, as this results in optimization of sub-parts of the process, instead of looking at the whole. Also Harrington & Guimaraes (2005) describe the importance of communication when implementing ICT change.

### Different values

The Back office employees have different values in mind when regarding issues. This was also mentioned in literature as described in the previous chapter (Maguire, 2014). Product owners indicate that also (safety) rules, privacy, compliance and information security are values that need to be considered when implementing changes and the Back Office employees generally do not know about these values (Appendix J):

“Something that a team never takes into consideration is information security: ‘O, but then we just take that from the internet?’, ‘No, we are not allowed to just take that from the internet!’ Such things seem so easy, but are not.” (Appendix J)

This partly depends on the employee’s knowledge of IT. The difference in values can have as a consequence that employees cannot estimate the difficulty of ICT changes. A management member

of FB&I thought that most employees hand in every issue they have and do not think about customer value (Appendix J). However, the IT department does not know about all values of the Back Office employees either. According to a product owner the business side (Back Office employees) can be much more critical in what they really need than IT developers and can tell them what is truly important and what are the things that do not actually matter (Appendix J). Also here Hofstede's organizational culture dimensions can be used. The Back Office employees can be seen as more process-oriented, for which every day is much the same and they avoid taking risk. The IT employees had this view as well, but due to the new scrum and agile working form, they are becoming more result-oriented. This can result in a difference between their values.

## Other

### Unclear ICT policy

Back Office employees stated that it is not clear for them how the decision is made about which issues will be solved and which will not (Appendix J). This is also confirmed by product owners and management of FB&I. As the IT team has only recently adopted a scrum and agile form, their policy is not clear for them yet either and they have to agree about this with each other. An unclear ICT policy can influence improvement, as employees can find it too confusing when to hand in an issue and when not. Another possibility is that employees hand in every issue they have, making it harder to prioritize for key users, FB&I and the product owners.

### Employees' IT knowledge

An employee's knowledge about IT can influence the way he thinks about IT changes and whether he is familiar with the values that IT regards. According to a product owner it takes two years before a developer can work on changes in MVS independently (Appendix J). This indicates that changes in MVS are rather difficult and it requires quite some IT knowledge to understand them. A management member of the Back Office also mentioned that there are several IT landscape architects that focus on this area (Appendix J).

### Radical change of IT

The IT department and its developers are apt to carry out radical change instead of incremental change. According to a product owner IT has the tendency to do extra things while they are at it, then those things are also fixed immediately (Appendix J). This results in the gold-plating phenomenon, which was mentioned earlier in this chapter. They used to work with radical change in the past, but they are trying to implement more incremental changes (Appendix J). Literature also shows for an agile IT department incremental changes in software are important (Pressman, 2005).

### Difficulty of IT changes unknown

Often Back Office employees do not know how difficult it is or how much time it takes to change something in ICT (Appendix J). This is caused by the difference in values between the departments, the knowledge of IT of the employees and an unclear ICT policy. A product owner indicates users are often disappointed by the time it takes to implement a change in ICT (Appendix J). While some employees think that IT changes are fairly simple, a management member of the Back Office indicates that many employees ask for a simple button to avoid all the different screens, because they think that is easy to realize (Appendix J).

### Overestimation of improvement by IT

Interviews showed that many Back Office employees, but also some of the management, have the idea that all improvements are in MVS. When asking employees about other improvement possibilities during the interviews, outside MVS, they either named the issue board that contains the issues of MVS or social improvement on the department. However, improvement in the work processes without MVS are not mentioned, such as checking too many times or writing unnecessary reports. A Back Office employee mentioned that improvement is either something technical or impotence, because the customer does something wrong. People seem to have so much faith in MVS improvements, that improvements that they can do themselves are forgotten. A management member of FB&I mentioned that you do not necessarily need IT, but can also do a lot of improvement manually. A management member of the Back Office said that some processes went more efficient, but people kept believing it was because of IT, no matter what he told them (Appendix J). As the IT department cannot solve so many issues, this leads to slowing down of improvement.

### 4.3. Conclusion

This chapter presented the model of the ICT characteristics that can influence implementation of LSS in business processes in sociotechnical environments. This was based on literature, observations and interviews, as mentioned in chapter 2. The characteristics are classified into five different categories, being the IT department, ICT system, nature of ICT, culture and other. Furthermore, the relations between the characteristics and their influence on improvement are described. Again a distinction can be made between improvement in ICT and improvement in the process without the use of ICT. Sub-question 5 and 6 were answered by this model by providing the characteristics of ICT that could influence implementation of LSS and describing how these characteristics influence the implementation. Chapter 5 will continue with answering these sub-questions by validating this model with a case study.

## 5. Case study

The model that was described in chapter 4 is validated by a case study. The case study is described in this chapter. The first case includes process improvement without changing ICT and by applying LSS, which is covered in section 5.1. The second case describes a changed ICT interface in a process and the consequent influence on the process, as described in section 5.2. The analysis of these cases and its validation of the model is covered in section 5.3.

For both case studies the meter reading validation process of the Back Office is chosen, but with different scopes of the process. Before the actual case studies are described, the meter reading validation process is first explained briefly.

### *Explanation of current meter reading validation process*

Meter readings come in by two different causes, SVO or PER. When a customer switches supplier or moves to another address, meter readings are needed to make the invoice. These are called SVO (Switchen, Verhuizingen en Opzeggingen). In addition, the customer receives an invoice every year, and as a consequence he needs to submit his meter readings every year. These are called PER (Periodiek). The date is based on the date that the customer subscribed at Eneco. A few weeks before the valuation date, the customer receives the request to submit his meter readings. The process then continues as shown in the BPMN process in Appendix B. Further explanation of the process can also be found in the define phase of case 1 in section 5.1. LSS is applied on this process and it is indicated as case 1. When zooming in on this process, there is also the work a Back Office employee does every day. This is also scheduled in BPMN and given in Appendix G. For this process a new ICT interface is designed, with the goal to increase the speed of the process. This will be used as case 2. Thus in case 1 LSS is used to improve a process, whereas in case 2 ICT is used to improve a process.

### 5.1. Applying Lean Six Sigma without ICT

LSS was applied using the DMAIC cycle as the methodology prescribes. Due to time constraints most focus is on the first three phases in section 5.1.1 and 5.1.2. Section 5.1.3 and 5.1.4 describe the improve and control phase shortly. Section 5.1.5 gives a reflection on the case study and the influence of ICT during LSS.

#### 5.1.1. Define

A customer can submit his meter readings through different media, such as internet, phone or a card. The first validation is automatically done by MVS. Based on previous readings, an estimated year consumption (SJV, Standaard Jaar Verbruik) is calculated by the grid owner and certain boundaries around this SJV are set as validation rules, which decide whether to validate a reading or to reject it. MVS also checks the completeness of the readings. When a reading is either invalid or incomplete, it is rejected and sent to the Back Office Validation team. When the reject is solved, it is automatically sent to EDSN and from there sent to the department Nota. EDSN (Energy Data Services Nederland) is the intermediary for electronic data traffic between the various players in the energy market and approves the readings. The Back Office processes the rejected meter readings and it was chosen to define the starting point of the process at the point where such a reading is received by MVS. There was also the option to start at the point where the employee received the notion of an invalid reading, but that would not give the possibility to include the customers as

suppliers and the boundaries of MVS as input. This will allow for more input to use in the root-cause analysis.

#### Four Vs

The analysis of four Vs shows whether a process is on the low cost end or high cost end. Figure 5.1 shows this analysis for the Back Office meter reading validation process. Especially the dimension of variety contains gains to be made. Also variation of demand could score more to the right-end side.

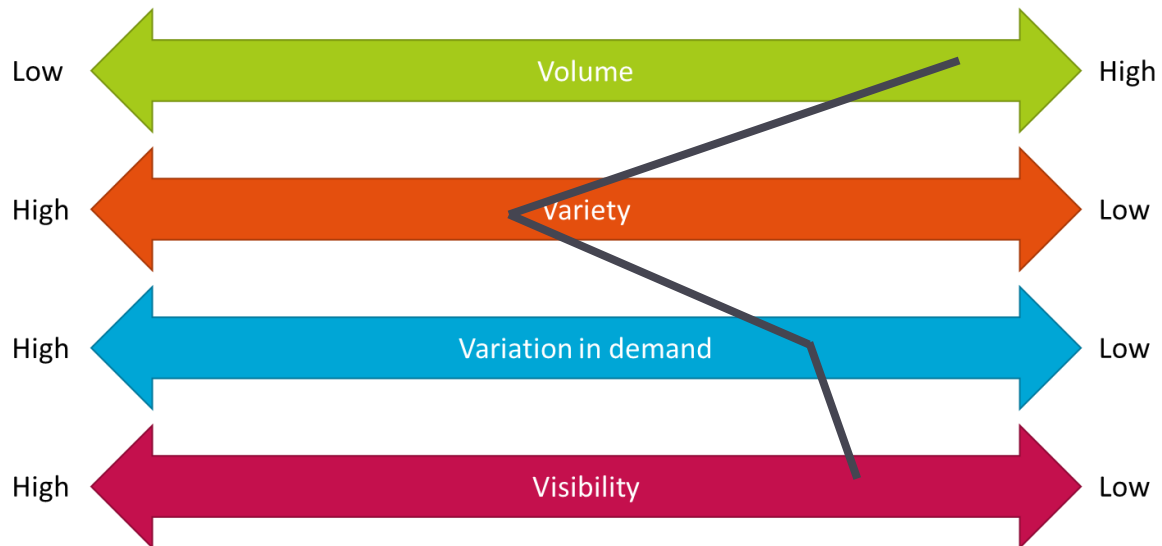


Figure 5.1 Characterization of the Back Office process for meter reading validation, using the principle of the Four Vs. The grey line indicates the process itself. Adapted from (Slack et al., 2012)

#### Volume

The volume is on the high end. The inflow per day is approximately 600 rejects for SVO and 1000 rejects for PER. On top of that there is a high repeatability, which makes the process suitable for specialization. Some sort of this is already happening, as people are categorized by SVO or PER. As these tasks are systemized and repeated, it could be worthwhile to develop specialized technology that gives higher processing efficiencies (Slack et al., 2012).

#### Variety

The variety level of the tasks at meter readings validation is set on intermediate. There are many different causes to the rejects and these need a different solution. The handling process of the rejects follows the same schedule, as can be seen in Appendix B, therefore the variety level is set on intermediate.

#### Variation in demand

The variation in demand is on the low end, but not as low as volume and visibility. As the meter readings are collected throughout the year, there is not much variation during this period of time, but there is some. Figure 5.2 shows the variation in demand during the year. In the summer months many people have holidays and less meter readings are received.

There is also variation in demand during the week. As many meter readings come in during the weekend, Monday's supply is high compared to Friday's supply. Conversely, the Back Office uses the valuation date as deadline and the valuation dates that fall in the weekend also need to be solved on Friday (the Back Office is closed during the weekend), therefore Fridays are high in demand.

Fortunately, the meter readings are received often long before the valuation date and this gives some margin to prepare for the large demands. This makes it also predictable. Nevertheless, unpredictability is created as the tasks are done in an ICT system. When the IT department makes changes in the ICT, it is very susceptible to errors, leading to more rejects. Fortunately, coworkers of different teams also know some of the basics tasks of meter reading validation however, hence they can be deployed to catch up.

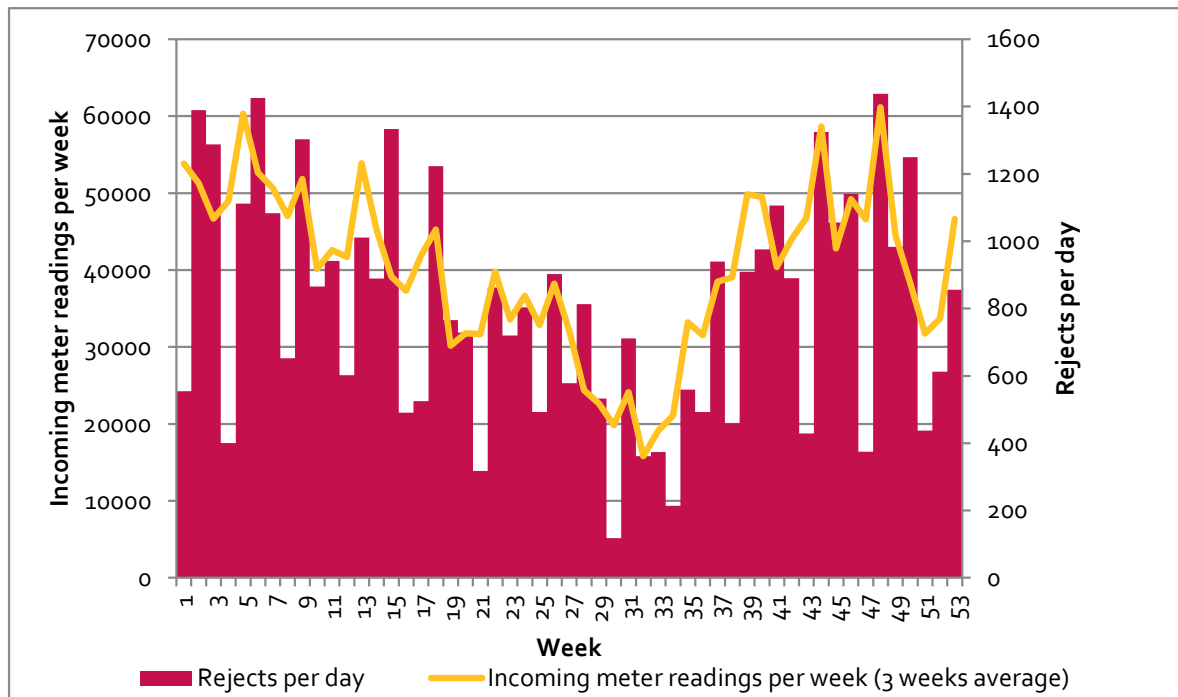


Figure 5.2 Variation in demand of incoming meter readings and rejected meter readings during the year

### Visibility

The visibility of the process is set at low, as the process is not visible for the customers. There is no direct contact with the customer, unless by e-mail or phone in the incidental cases. This is a main characteristic of the back office. This means that there can be a time lag between customer request and response and low contact skill.

### Process in BPMN

Appendix B shows the flowchart of the current process. It shows the automatic validation of MVS and the process of validated and rejected readings. It ends with the meter readings being sent to EDSN.

### SIPOC

A SIPOC is a diagram that can be used to define the as-is situation and to map all the important things in a process. Figure 5.3 shows the SIPOC for this process. The SIPOC indicates TMR and EDSN as suppliers. TMR (Toegankelijk Meetregister) gives an overview of all previous meter readings of a location, also of other suppliers. EDSN was explained in the beginning of this section. Though the customers, TMR and EDSN are not mentioned in the process as suppliers, they are the ones that supply the meter readings to MVS, therefore they are put in the SIPOC diagram. The same is true for the Nota department and the (Eneco) customers as customers of the process, they might not be the direct receivers of the valid meter readings, they are valuable customers and therefore

mentioned in the SIPOC. It is not the purpose of the SIPOC diagram to give direct targets for improvement, but is used for defining the process.

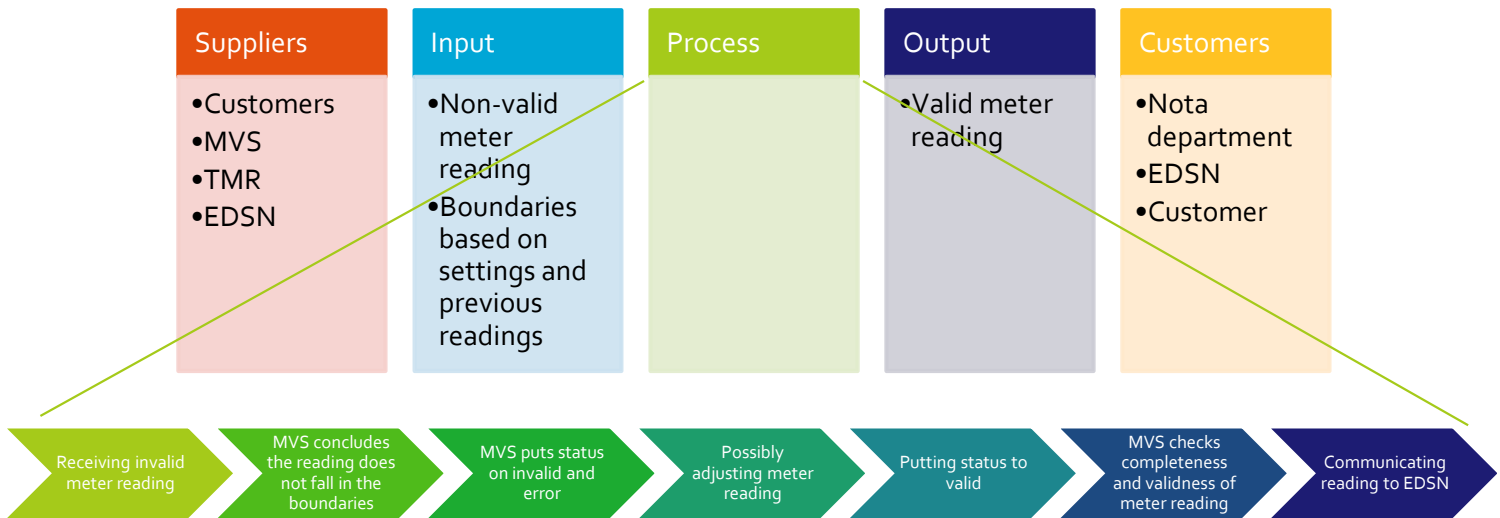


Figure 5.3 SIPOC diagram of the meter reading validation process

### Value Stream Mapping

Value Stream Mapping can be used to identify the value adding activities. Figure 5.5 show a Value Stream Map (VSM) for the meter reading validation process.

A customer submits his meter readings through media external of the Back Office. This is put in the database of MVS. The senior employee runs a query every morning, which returns an Excel file with all the invalid meter readings. This has a backlog of approximately 5000 cases. The meter readings are prioritized on valuation date, thus cases of which the valuation date is closest, are given top priority. The senior employee distributes the cases over the employees and every employee receives a list in Excel with approximately 200 cases. These cases are solved during the day and when finished an employee can ask or make a new list with more cases. The then valid cases are processed overnight in MVS and sent via EDSN to the department Nota, which then sends an invoice to the customer.

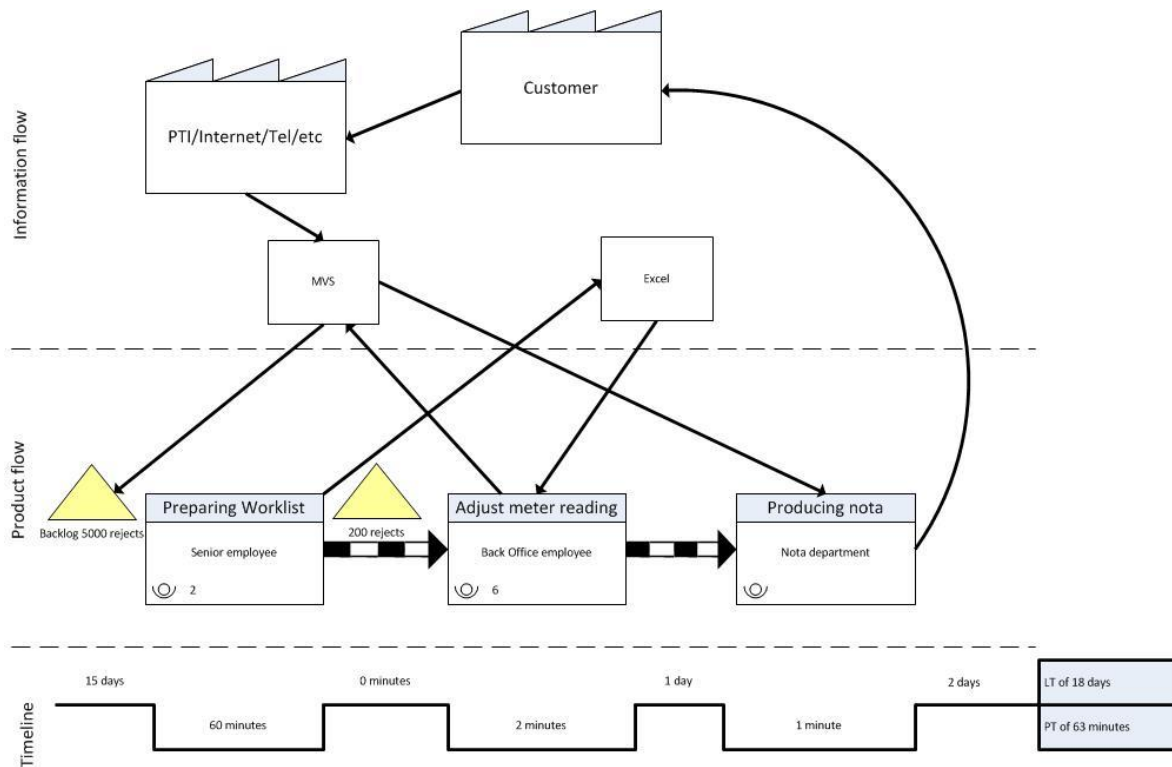


Figure 5.4 Value Stream Map for meter reading validation process

### Waste

According to the lean methodology, making a value stream map also includes identifying waste and eliminating this. The different kinds of waste that were mentioned in chapter 3 will be identified in this process. Firstly, the lean methodology prescribes to establish a pull from the customer in the value stream map. But establishing pull in this process is more difficult. The invoice is pulled by the customer and needed on the valuation date. In order to do this, the customer receives a request for his meter readings a few weeks in advance. One could say that from the moment you receive the meter readings from the customer, there is an established pull. However it is also possible that there is only a pull at the valuation date, so only just before the moment that the meter readings need to be valid. As the former option could create waste by having employees wait for incoming rejects, the latter option would be optimal. The former option could also be considered as push, as meter readings come in while they are not needed yet, creating an inventory. The Back Office also uses the latter option. This is partly caused by the large backlog forcing them to work this way. This also explains the low process time (PT) compared to the lead time (LT). The process thus contains inventory and produces the valid meter readings before they are pulled by the validation date. This could be seen as waste, according to lean, but as described in section 3.1.1, inventory in ICT systems is not very significant waste. Moreover, this inventory is necessary to create margin for the Back Office to solve the cases, hence it is identified as a Necessary but Non-Value Added activity (NNVA). Other wastes that can be recognized are extra processing and defects. These are characteristic for the back office, as they handle all defect meter readings. If the automated validation would not contain any defects, there would not be any Back Office needed, therefore the work that the Back Office performs can be seen as over-processing. Loss of human potential is caused by having very easy cases be solved by employees, while these could also be solved automatically by a computer.



Of course there are more wastes to mention, but these are largely present in the IT system. As these will be covered in the next case with ICT, these are not mentioned in this section.

### 5.1.2. Measure and Analyze

The next steps in the DMAIC cycle are the measure and analyze stage. This includes the use of Key Performance Indicators, a Pareto diagram and a root-cause analysis.

#### *Key Performance Indicators*

The measurement and analyzing will be done using certain Key Performance Indicators (KPI). Figure 5.5 presents these indicators, which consist of quality, speed, dependability, flexibility and cost (Slack et al., 2012). To demarcate this project, only one of these KPIs was chosen. The management also has KPIs, but takes KPIs of the complete Back Office in consideration. The ones relevant for the meter reading validation process are invoices sent based on actual meter readings, amount of estimated readings over 2 years and days to invoice. In addition other KPIs were chosen that were also considered important for this team, based on literature (Slack et al., 2012).

It was chosen to focus on the inflow of rejects, as the ICT solution will already focus on the outflow of rejects, to avoid any bias. Therefore the KPI that was focused on is backlog. Reducing the backlog by reducing the inflow of rejects, can possibly also influence the amount of valid meter readings, by solving the causes of invalid readings.

Quality	Speed	Dependability	Flexibility	Cost
<ul style="list-style-type: none"> <li>•Customer satisfaction</li> <li>•Valid readings (not estimated)</li> </ul>	<ul style="list-style-type: none"> <li>•Delay</li> <li>•Response time</li> </ul>	<ul style="list-style-type: none"> <li>•ACM percentage</li> <li>•<b>Backlog</b></li> </ul>	<ul style="list-style-type: none"> <li>•Coping with changes in demand</li> </ul>	<ul style="list-style-type: none"> <li>•Outflow</li> </ul>

Figure 5.5 Key Performance Indicators of the Meter Reading Validation process at the Back Office

#### *Root-cause analysis*

Root causes can be found for either the inflow of rejects or the outflow of these. It can be examined where the rejects come from in order to reduce these or one could examine why the processing of rejects is inefficient and where the improvement possibilities are in this part. As the backlog was chosen as the KPI to focus on, the causes of inflow will be analysed. Figure 5.6 gives the fishbone diagram of the root-cause analysis. Four main causes can be identified. It starts with a defect meter or an incorrectly filled in meter reading. The next step is the translation from the readings measured by the customer to MVS. Different mediums are used for this, such as internet (Online), Voice Response, card or phone. The last step is the automatic validation of MVS. MVS has certain boundaries, which decide whether to validate a reading or to reject it.

The defect meter and the mistakes in medium from customer to MVS are not in the reach of this Back Office, as these are also related to external companies. The MVS calculation and the incorrectly filled in meter reading are causes that can be investigated. Again a distinction can be seen between improvement in ICT and in not ICT related things. For the changes in MVS ICT could generate more rules to include other causes of rejects as well. Such as checking for an extra number or switching the readings. Employees do have the possibility to change the boundaries, but the

calculated SJV (estimated year consumption) is generated by the grid owner. The main cause of the incorrectly filled in meter readings is incomprehensibility. The on purposely filling in incorrect meter readings can be more difficult to solve. Therefore, improvements will focus on the incomprehensibility. Appendix C and Appendix D show the meter reading submission process for internet and by card. One can see that many things have already been done to improve the comprehensibility of the submission of meter readings. An advantage of internet is that it gives the possibility to give direct feedback on the filled in meter readings. Especially in combination with the Pareto diagram, the root-cause diagram is a powerful tool to find the major causes of rejects.

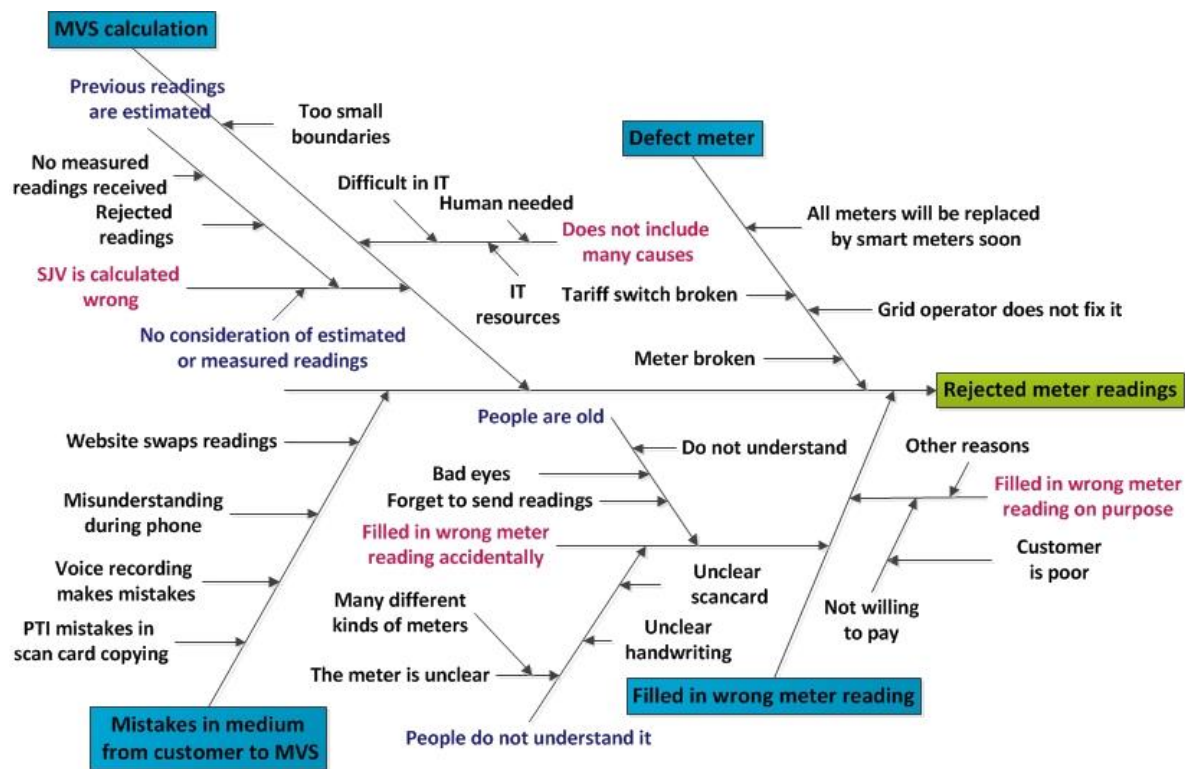


Figure 5.6 Root- cause diagram for the causes of rejected meter readings at the Eneco Back Office (the colors are for clearness, they do not indicate any difference in importance)

### Pareto diagram

Two Pareto diagrams were made to analyze the root causes of rejects. Figure 5.7 shows the Pareto diagram of the media through which the rejected meter readings are submitted. Figure 5.8 shows the most frequent causes of rejected meter readings. The calculation of these numbers and the data on which it is based can be found in Appendix E. Figure 5.7 shows the most frequent medium is far-out internet. Next in line are the smart meter, scan card, telephone or VRS (Voice Response). It is wise to focus on these media as these cause most of the rejects. Two cases that stand out are the smart meter and the telephone. All rejected meter readings from the smart meter are immediately validated by the employee, so these overrule all other validation rules. However, this is not built into MVS yet, but this could save 35% of the rejects. One note is that around 3% of the smart meters is not working properly, so an extra measure should be implemented here. The other case is the case of the telephone. As the customer has direct feedback by this medium, one would expect to have a low amount of rejects through this medium. It should be taken into consideration however, that these numbers show the numbers of the rejected meter readings. The data of all meter readings were not available. It could be for example that only 2% of the readings through internet are

rejected, whereas 50% of meter readings from scan cards are rejected. This could indicate that the level of understanding of the scan card has more opportunity to be clarified than the internet submission. However, as the goal is to reduce the inflow of rejected meter readings, it is in this case more important which medium causes the most rejects. Improvements will be covered in the next section.

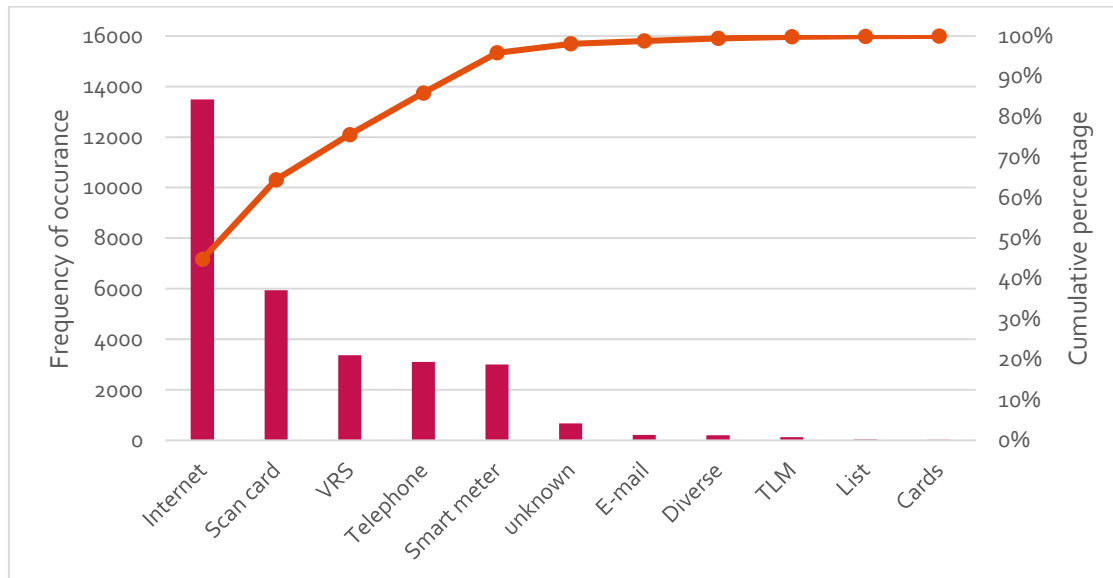


Figure 5.7 Pareto diagram of medium through which rejected meter readings are submitted (VRS is Voice Response, TLM is data communication) for PER

Figure 5.8 shows that most meter readings are not changed by a Back Office employee, as the reading remains equal before and after validation. However, the data did not include whether this meter reading was indeed validated or not. The employee can choose to either validate the reading and this reading is then used to calculate the consumption or to leave the readings status on invalid and put the metering status on informative, which means the consumption will be estimated and the submitted readings will not be used. It is also possible that the meter is defect, in which case the readings also remain unchanged, but a correction consumption is filled in. The defect meter was also mentioned in the root-cause analysis, this is the responsibility of the grid owners, but as the old meters are replaced by smart meters in the near future, the grid owners do not want to repair the defect meters. The ratio between the three causes of equal readings was not available in the acquired data. The data did show that approximately 2000 rejects of the equal readings were caused by a smart meter, which means that it is immediately validated.

Also for many rejects the cause was unknown, most employees do not give an explanation when they solve a case. Due to limited time in this research project, more causes were not looked into. Next, swap readings was a frequent cause of reject. However, 90% of these were for the Oxxio customers and IT is currently working on solving these cases. Also for the cause of too few numbers the IT department is building a solution. To make hard conclusions about this Pareto diagram, more data needs to be available about the unknown cases and the equal numbers.

To conclude, the 'equal numbers' now exists of three possibilities, the reading was valid, the meter was defect or the reading made no sense. However the ratio between these three is unknown. For a reading that was valid, the validation rules of MVS (including for the smart meter) could be adjusted,

this also resulted from the root-cause analysis. The readings that make no sense and remain invalid could be solved by fixing the comprehensibility of the submission media. The submission media that are most important are the internet, smart meter, scan card and telephone. As mentioned before though, for the smart meter the comprehensibility is not the problem, but the MVS validation rules. Also the defect meter could be improved by adjusting the MVS validation rules.

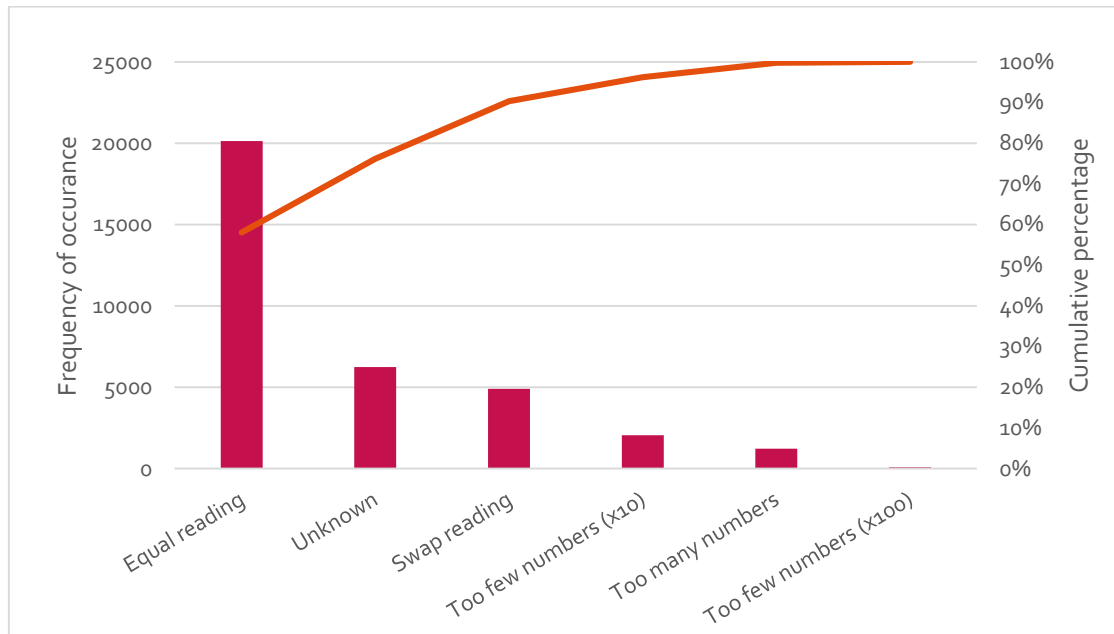


Figure 5.8 Pareto diagram of the causes of rejected meter readings, based on the reading before and after validation for PER

### 5.1.3. Improvement

From the defining, measuring and analyzing phase, several improvement possibilities came forward. The four Vs analysis showed that the variety could be reduced to move the process to the low cost end. The same applies for the variation in demand. The SIPOC analysis especially helped to define the process, but did not bring a specific improvement point. The macro view of the process by the VSM did not show that many wastes and this is most likely because most improvement in the process can be found in the individual steps and not in the overall process. One could also see from the VSM that the whole process would be affluent if the amount of rejects could be reduced. This was also the conclusion from the KPIs, namely reducing the rejects. The Pareto diagram and the root-cause analysis showed incomprehensibility and the MVS calculation as the major improvement possibilities. The Pareto diagram showed the internet, scan card and telephone were frequent media that caused rejects, therefore the focus should be on these three media to solve the comprehensibility.

To reduce the variety, the number of defect causes could be reduced. This was done with the root-cause analysis and the Pareto diagram. The root-cause analysis indicated that the MVS calculation and the incorrectly filled in meter readings were cases that could be improved in the reach of the Back Office. Figure 5.9 shows possible improvements. These were found by brainstorming.

The improvements are categorized on with or without ICT. One can see that many improvements use ICT, even though this case study was meant to not use ICT for improvement. Due to time restrictions, these improvements could not be implemented, so their realizability and effect could

not be tested. Probably, many improvements require the use of ICT, even they are not in the ICT system itself. This can slow down the implementation of the improvements. The improvements are explained further in Appendix F.

	MVS calculation	Incorrect submission
<b>ICT</b>	Check swapped numbers Check extra number Check defect meter Check previous mistakes Improve SJV calculation Check previous estimated readings	Photo possibility Adjust card to specific meter More online feedback Receive customer feedback
<b>No ICT</b>		Promote online submission Educate phone employees about validation rules More clear scan card

Figure 5.9 Improvement possibilities with ICT and without ICT

Another option to reduce the variety is to find a way to categorize on the type or reason of the defect. Partly this is already done at the Back Office, but not completely. However, finding the cause of the defect is one of the main time consuming tasks during the meter reading validation. Therefore, categorizing this manually would not save time at all. If it was possible to automate this, it would probably be easier to adjust the boundaries using these rules as well. For example, if there is a reject of which the cause is that the customer forgot to write down the last number. An employee now fills in an extra number and then lets MVS check whether it falls into the boundaries. If MVS would be able to recognize these cases, it could easily validate this as well and an employee would not be needed anymore (except for the more difficult cases). Therefore only categorizing on causes will not be that useful, unless you automate the rest of the process as well.

#### 5.1.4. Control

The control phase includes maintaining the improvements and ensuring a continuous improvement environment. However, time was limiting in this case and no implementation was possible. It is possible that this phase also contains inhibition or enabling by ICT, but that was not researched during this project. It is speculated that as most improvements are in ICT, the *overestimation of IT* will play a large role. However, when implemented, maintaining the changes will be easier, as ICT is more difficult to change (*detention*).

#### 5.1.5. Reflection

The case study was meant to validate the model given in chapter 4 by implementing Lean Six Sigma in a process without using ICT to improve it, and seeing the influence of ICT on during the improvement process. Therefore, this section will reflect on the LSS process and the influence of ICT.

#### *ICT influence during the DMAIC cycle*

The defining stage was both enabled and inhibited by ICT. It is easier to *acquire numbers and data information*, whereas it is more difficult to get an *overview of the process*. The four Vs analysis was partly influenced by ICT. The easy measuring of volume and variation in demand was enabled by the use of ICT. The variety and visibility were more difficult to come by, but that might not per se be caused by ICT.

The construction of the SIPOC diagram, the VSM and the BPMN file was difficult, because it was hard to get a *process overview*, as most processes were in ICT. As people cannot actually see what happens and what other people do, it is difficult to see the improvements. This was also seen in the model of chapter 4.

Also, during the construction of a SIPOC diagram, it was found that it was not clear if MVS should be a supplier for the employee or is simply a medium to work in. The same difficulty was found when making a Value Stream Map. Though some information can be found about VSM for office environments, it was not considered ideal for sociotechnical systems (Bonaccorsi, 2011; Martin, 2010; Rother & Shook, 2003). VSM acknowledges ICT systems, but mainly sees these as a medium and does not focus on the processes inside the ICT. It was found that ICT can adopt *multiple roles* and this characteristic of ICT has an influence on defining the process.

This is also related to the fact that a macro approach was taken and in this process many information flows were automated. This does not only make the construction of a VSM more difficult, but also results in many improvements in ICT. As this case study would focus on process improvement without ICT, it was chosen to investigate the inflow of defects instead of the outflow of these. It was found that especially solving them was difficult in a sociotechnical environment without using ICT. It might therefore have been a better choice to investigate the outflow. However, the process did not offer that many transfer points, as the VSM described. Also zooming in on the process and defining case 1 as the same as case 2 could offer more improvement possibilities without ICT, but this could lead to bias.

In addition, during the making of the VSM, it was difficult that this process did not require multiple people doing something. Most of the activities are done by one employee, while VSM is used to demonstrate the lead time between the activities the product undergoes by different employees or machinery. However, this is not necessarily caused by ICT, but is also possible in a manufacturing process. If there were only one activity that one person does, it would also be difficult to make a VSM of the complete process, without focusing on that one person's activities. So due to the macro approach of this process, there was focus on the complete process and not on the exact steps of one employee.

Also waste was more difficult to identify, especially as this case did not focus on ICT, while the work is performed in a sociotechnical environment containing ICT. It was also difficult to look from the perspective of the Back Office to the complete process as the Back Office picks up the defects.

During the measure and analyze stage, some enabling and inhibiting factors of ICT were found as well. *KPI presentation* was not done in the ICT system, therefore it was not clear at the beginning where the exact improvement opportunities were. Fortunately, it was *easy to obtain data*, due to the use of ICT, which makes documentation and measuring easier. Some KPIs were drawn by management, but these were for the complete department, not only for this team. These are also not communicated to the team. The backlog, inflow and outflow is given every day, but not any other of the KPIs. The *KPIs* needed first to be found, which could set a barrier for easy improvement.

The root-cause analysis showed that the MVS calculation was not always correct. Though the automatic validation of MVS is a large advantage, it can also inhibit improvement, as it is difficult to change. Key-users of the department can change the boundaries of the validation rules though. This

allows making small improvements. An important thing to realize is that improving processes by implementing ICT change or automation can also make later process improvement more difficult. The *degree of ICT* in your processes will influence the improvement possibilities in the processes.

During the construction of a Pareto diagram, *data acquiring* was easy due to ICT. Also analyzing the data could be easily done. This is an enabling effect of ICT.

In the improving and control phase the influence of ICT was also identified. Even though this case study was meant to not use ICT for improvement, most improvements that were found used ICT. So even with a focus on process improvement without ICT, the *degree of ICT* in this process, made it difficult to find these improvements. When most improvements are in ICT, investigating other possibilities could be inhibited, as it is easier to recognize the things that need to change in ICT. However, when implemented, maintaining the changes will be easier, as ICT is more difficult to change. This also related to the *overestimation of IT*, which means that it is easier to see the changes that IT can do. The use of ICT also means maintaining the changes is easier, *detention*, as the ICT is not so easily changed back.

#### *ICT influence compared to model*

When comparing these findings to the findings of the model in chapter 4, it is seen that the influence of *process overview*, *changeable settings*, *KPI presentation* and *overestimation of IT* were found in both the model and during the validation. Depending on the level of these characteristics, they can either result in inhibition or enablement. During the interviews though, mainly questions were asked about the improvement phase, therefore the characteristics found in the model mainly influence this phase, as the other phases of LSS were not investigated during the interviews and observations.

During the case study extra characteristics were found in the other phases. These were the *multiple roles of ICT*, *easy data acquiring* and the *degree of ICT* in the processes. The *multiple roles of ICT* can inhibit improvement, but the latter two can either enable or inhibit it. Also, it was found that many *LSS tools are not applicable* yet for processes in sociotechnical environments that use ICT, such as VSM. This can inhibit improvement. This is also found in literature, where hardly any information can be found on how to apply LSS tools on ICT (Brunninkhuis, 2013; Hicks, 2007; Liefers & Huesmann, 2011). As the case study focused on the inflow of rejects and not the outflow, the *ease of use* and *variation allowance* were not tested, which were also identified in the model.

Moreover, the characteristics found in the model of chapter 4 have influence in the stage before DMAIC where people take the initiative to improve some things in a process. Thus many found characteristics in the model inhibit the start of LSS, but do not have an inhibiting influence during LSS. As in this case study the researcher took the initiative, these characteristics were not tested. This is also difficult to test. A possibility is to interview people about if they ever wanted to improve a process and why they did or did not. The danger is, however, that people do not realize taking initiative or not, but do it unconsciously.

Also, LSS was executed by the researcher, but LSS advises to use a team and involve the employees in the LSS project, so maybe a different case study was needed, to also include the more culture related characteristics. Another disadvantage of this case study is that there was no implementation. Therefore, many blocks in the model that were culture related could not be tested during this case study.



## 5.2. Improvement using ICT

This section covers the second case, in which ICT is used to improve a process. To be able to compare the two cases, the DMAIC cycle is used to describe this process as well. LSS was not applied though, as ICT was used as improvement. Some of the LSS tools will be used however, to analyze the improvement. Especially in the define phase of section 5.2.1 and the improvement phase of section 5.2.3 these tools proved to be useful for analyzing. Section 5.2.2 and 5.2.4 cover the measure, analyze and control phase shortly and the section end again with a reflection on the case study in section 5.2.5. During the case study, the implementation of the new ICT interface was observed and analyzed. The analysis can also be found in the reflection. Before this analysis can be understood, a small explanation is necessary. The new interface was initiated by an advisor of the department, called the promotor in the rest of this chapter. Also, two employees were involved in the development and the implementation. A scrum team with a product owner is responsible for the development of the new interface. Observations took place during the implementation of the new interface.

### 5.2.1. Define

The process is defined as the process that the employees perform. It starts at the point where the employee has received his Excel list from the senior employee and starts with a case from the Excel file. It ends when the employee has solved the case. In the current situation the employee uses MVS to solve a case and in the future case he does this using the new ICT interface Outsystems. The current and future process are illustrated in Appendix G and Appendix H.

#### *BPMN*

Appendix G shows the flowchart of the current process. The BPMN flow chart shows the process that a rejected meter reading undergoes. This is mainly a decision tree that the employee goes through.

#### *Waste*

Also in this case, waste was identified according to the lean methodology that was explained in chapter 3. As this case described the implementation of a new ICT interface, the waste will focus on the waste inside ICT systems. Firstly, the information needs to be copied or re-entered in several different ICT systems, this can be seen as overprocessing or unnecessary transport. Also, employees tend to look up additional information, to be absolutely sure of their judgement, this is also overprocessing. Secondly, waiting occurs due to systems downtime, which will slow down production. Thirdly, mistakes during the validation process can be seen as defects, these either lead to calls from customers and customer dissatisfaction or extra work for another team within Eneco. Fourthly is inventory. MVS has a large database and many extra IT components, which can make the system slower. Fifthly, as employees currently work in the database of MVS, it is not made for the process that an employee goes through. This results in many 'mouse clicks' of the employee, leading to unnecessary motion. Finally, also human potential can be improved, as there are now many repetitive tasks that could be automated, such as copying the customer ID to MVS or to TMR.

### 5.2.2. Measure and analyze

In section 5.1.2 the KPIs were mentioned for the Back Office. The new ICT system was focused on the speed of solving cases as KPI. Therefore the main measurement that was used during this case



study was the number of cases an employee can solve in one day. Most employees now reach 200 cases, but the planning is to reach 400 cases using Outsystems.

### 5.2.3. Improvement

The new interface provides several improvements, according to management these were automated distribution of work, faster processing of rejects and one overview of all the correct and required information. These three improvements will be analyzed with a BPMN flow chart and with a 5S analysis.

#### *BPMN*

Appendix H shows the flow chart of the future process based on the new ICT interface Outsystems. One can see that the overall process and decision process stays the same, but mainly the individual steps are improved. First of all, Excel is not needed anymore, which also eliminates the copying of the customer ID and the switching between the screens. Outsystems gives a new case as soon as the previous one is saved. Also the necessary information from the main screen and more detailed screen in MVS are now combined, which removes the extra step of opening the detail screen. Furthermore, there is no more a button to run the validation rules of MVS again, an employee has to check for himself whether the readings falls between the upper and lower limit. Also, when an employee changes the reading, the status is automatically put to valid. Moreover, there is also no need to put the status on informative (INF) when the reading is invalid. If you do not validate the reading, it will automatically save it as INF in MVS. Also MVS asks for an explanation before you can save it and Outsystems does not. In the current Outsystems there is no automatic link yet to TMR, but this will be added in the future.

#### *5S*

As explained in section 3.1.3, 5S can be used to assure an organized workplace and can also be applied to ICT systems. The changes by the new Outsystems interface will be explained by the use of 5S. The first step is to sort what is needed and what is not needed. As the interface is a complete new environment, instead of getting rid of the unnecessary things as in a manufacturing environment, the things that are needed are sorted. Figure 5.10 shows the main screen in MVS in which a reject is processed. One can see that this contains a lot of information. The Back Office employees indicated which information was necessary and which was not. Table 5.1 shows the most necessary information from the main screen. Figure 5.11 shows the interface of Outsystems with these concepts. Figure 5.12 shows the more detailed screen, which an employee now has to open as extra. Table 5.1 also shows the information of this detail screen that is necessary to have in Outsystems.

Table 5.1 Necessary information in Outsystems, concepts in italics are required information that has not yet been implemented in Outsystems

Main screen	Details screen
EAN code	Estimated year consumption (SJV)
Reading (stand)	Lower limit (Ondergrens)
Indicative consumption (Indicatief verbruik)	Upper limit (Bovengrens)
Status metering (status meting)	Physical capacity (Fysieke capaciteit)
Occasion metering (aanleiding meting)	<i>Medium</i>
Tariff normal/low (Tarief: normaal/laag)	
Reading date (Stand datum)	
Origin (Herkomst/type)	
Previous reading (Vorige stand)	
Previous reading date (Vorige stand datum)	
Previous reading type (Vorige stand type)	
Last actual reading date (Laatste WSD datum)	
Last actual reading (Laatste WSD stand)	
Last actual consumption (Laatste WSD verbruik)	
Valuation date (Afreken datum/ Event datum)	
Customer explanation (Klantverklaring)	
Type of supply (Type levering)	
Consumption profile (Verbruiksprofiel)	

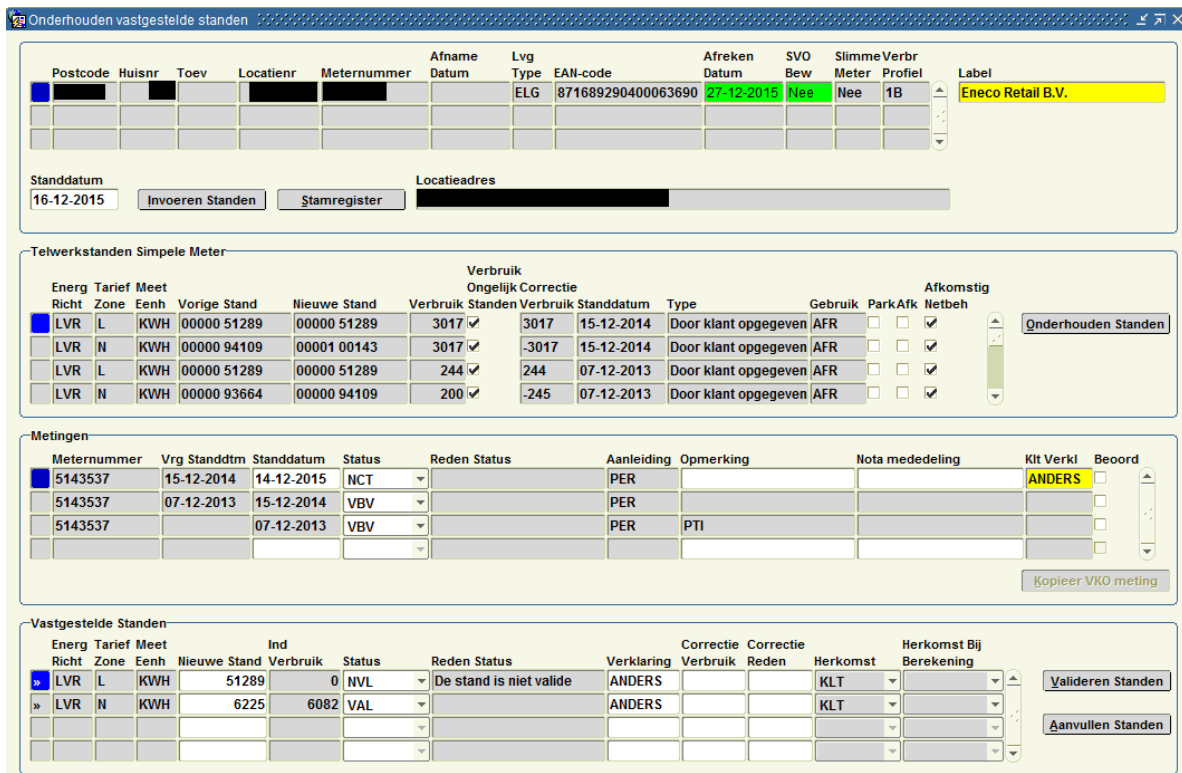


Figure 5.10 Main screen MVS (Onderhouden vastgestelde standen)

**Valideren standen betreffende locatie** [REDACTED]

Portal > Levering & Meterstanden > Taken

**Eneco**

<b>Aansluiting EAN-code</b> 871689290400063690L	<b>Type levering</b>	<b>Fysieke capaciteit</b> 135	<b>Verbruiksprofiel</b> 1B	<b>Status meting</b> NCT	<b>Aanleiding meting</b> PER	<b>Klant verklaring</b> schakelt niet over van dag/nacht; meter telt 24u per dag op onderste telwerk.	<b>Afreken- Of Eventdatum</b> 27-12-2015
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Telwerk	Ondergrens	Stand	Akkoord?	Ind Verbruik	Bovengrens	Stand datum	Herkomst	SJV	Vorige stand datum	Vorige stand	Vorig verbruik	Vorig stand type	Laatste WSD datum	Laatste stand	Laatste WSD verbruik
L-1-Laag	i 52763	51289	✘	0	57186	14-12-2015	Door klant opgegeven	2939	15-12-2014	00000 51289	3017	WSD	07-12-2013	00000 51289	244
L-2-Norm	i 1016	6225	✔	6082	11786	14-12-2015	Door klant opgegeven	2938	15-12-2014	00001 00143	3017	WSD	07-12-2013	00000 94109	200

**Opmerking meting**

**Toelichting parkeren**

Verwerkt in MVS

Figure 5.11 Interface Outsystems

**Details Vastgestelde Stand**

**Meting**

<b>Aansluiting</b>	<b>Status</b>	<b>Overig</b>
EAN-code Asn: 871689290400063690	Status: NCT	Oorsprong: LVSMOP120
Soort Asn: EAG	Statusdatum: 14-12-2015	Aanleiding: PER
Meternummer: [REDACTED]	Reden Status: [REDACTED]	Oorspr Standdatum: 14-12-2015
Lvr EAN-code: 8714252007107	Opmerking: [REDACTED]	Standdatum: 14-12-2015
Nbr EAN-code: 8716892000005	Nota Mededeling: [REDACTED]	User Beoordeeld: [REDACTED]
Locatiennr: [REDACTED]		<input type="checkbox"/> Beoordeeld
Klantnr: 11533843		<input checked="" type="checkbox"/> SR Gebruikt
		<input type="checkbox"/> Standen Omgedraaid

**Vastgestelde Stand**

<b>Telwerk</b>	<b>Status</b>	<b>Validatie Gegevens</b>
Energierichting: LVR	Status: NVL	Oorspronkelijk Stand: 51289
Tariefzone: L	Statusdatum: 14-12-2015	Stand: 51289
Meeteenheid: KWH	Reden Status: De stand is niet valide	Overloop: 0
Telwerkidentificatie: 1		Controle Datum: 14-12-2015
Telwerkfactor: 1	<b>Overig</b>	Validatiemethode: WCO
Aantal Telwielen: 5	Medium: INT	Bron Vorige Stand: TSD
	Herkomst: 22	Val Vorige Standdatum: 15-12-2014
	Herkomst Bij Berekening: [REDACTED]	Validatie Vorige Stand: 51289
	Verklaring Code: ANDERS	Val Volgende Standdatum: [REDACTED]
	Correctie Code: [REDACTED]	Validatie Volgende Stand: [REDACTED]
	Correctie Verbruik: [REDACTED]	Geschat Jaarverbruik: 2939
	Lvr Verbruik: [REDACTED]	Ondergrens Stand: 52763
	<input type="checkbox"/> Lvr Verbruik Ind	Bovengrens Stand: 57186
	<input type="checkbox"/> Afwijkende Stand Ind	

Figure 5.12 Details screen (Details Vastgestelde Stand)

Furthermore, it is not only important to have the right information, it is also important to have them in an organized and intuitive way. As said by the 5S concept, set in order to minimize movement and make everything easy to find. For example, Outsystems puts the meter reading between the upper and lower limit that is generated by MVS, which makes it very intuitive for the user. Also the general customer information is in a separate box above the specific meter reading information. The third step is to shine and to check for damage. This is a trend that is seen in the IT department as they are now picking up maintenance in the code that was not before. The last two steps are guaranteed by the nature of ICT. This is not so easily changed and making sure that the organized workplace is maintained.

This method clearly demonstrates the both inhibiting and enabling character of ICT. In a manufacturing environment people could move things themselves, though maybe not the really big machinery. However, if you look at Orlikowski's theory about the duality of technology, these huge machinery could already be seen as technology. Therefore technology's role on improvement can be distinguished as both inhibiting as enabling. When an interface needs to be changed to improve processes, employees are dependent on the ICT department, this inhibits improvement (*changeable settings*). When the interface is there though, it is easy to maintain the new organized workplace and this *detention* can be seen as enabling. One should take into account though that the interface needs to constantly change to deal with the flexible environment businesses exist in, this could be a disadvantage of ICT as well. This was also seen in the previous chapter, as ICT tends to *radical change*.

#### 5.2.4. Control

Currently the implementation phase is still not finished and only 2 of the 6 members are using it. Also not everything is possible in Outsystems yet, for some things checking MVS is necessary. IT is working on these changes though, but this takes time.

In the control phase it is important to maintain the improvements and keep improving, thus starting a new cycle of DMAIC. This can be seen in two ways during this implementation process. On the one hand, the users keep seeing improvement points, so one could say that they are repeating the cycle and aiming for continuous improvement. On the other hand, as soon as they find something that does not work perfectly, they switch to the old way of working, so the improvements are not maintained. So a balance needs to be found where there are not too many improvement points that will block the implementation of the new system, but still enough to maintain continuous improvement. Also, one could say that by using the system, even though it is not completely finished, you find more improvement points, this also relates to the *difficult testing* of ICT systems. The use of ICT can improve the *detention* of the improvements, as the ICT system is not so easily changed back. This can be inhibited by having the *old system as a back-up* though.

#### 5.2.5. Reflection

This second case study used an improvement with ICT to validate the model in chapter 4. This was done by analyzing the influence of ICT on the improvement and the process. The observations can be found in Appendix K. Many other characteristics were found during the case study, these will be described together with the characteristics of the model.

### *ICT characteristics during the DMAIC cycle*

During the defining phase, the influence of ICT made it hard to have a *process overview*, as was also the case during the previous case study. During the generation of the BPMN flowcharts it was seen that every employee has a different way and order of doing his tasks. Due to the use of ICT, it is more difficult to see what other people do. This results in *allowance of variation*, which can both enable and inhibit improvement, as explained in chapter 4. *Communication* can improve the process overview an employee has, both intra-department as inter-department. Defining the waste was considered easy, because much literature was available on applying lean in ICT systems.

In the measuring phase it turned out *KPI presentation* was important. When using MVS, employees received a list of 200 cases, so it was clear how many cases you could solve. However, in Outsystems there is no count of how many cases you solve, which makes it hard to check the speed improvement of the new ICT interface. Also, employees indicated they missed the fulfilling feeling of finishing a list. Another drawback of no *KPI presentation* is that it makes discussions harder. For example one employee had the feeling that one particular actions would be faster in MVS than in Outsystems. However, it is not measured and everyone makes his own assumptions, which makes discussing them very hard (Appendix K).

Though there was no observation during the development of the improvements in the improve stage, it seems that the users have been involved, so there was probably no *neglected politics*. This enhanced the improvement process, as the needed information was represented in the new ICT interface. This can also be seen by the fact that the old way of working is still possible, having the *old system as a back-up*. The employees are not forced to work with the new system, but can decide when to do this themselves. Though this might help in accepting the new system, it has as a drawback that the employees are hesitant in using it and are not pushing IT to improve the system further. Therefore this might also slow down the improvement.

As mentioned in chapter 4, the fact that ICT improvements are *difficult to test* can inhibit the improvement process. It is difficult to see if the code is influencing any other part of the ICT system and when something gives an error, it is hard to see what causes it. This was also noticed during the case study (Appendix K). The list of Outsystems was not equal to the list generated by a query in Excel. However, it is not so easy to see whether this is a small mistake or really important cases are missing. At the start of an ICT implementation there can be many *start-up problems* like these. These will be found when the users start to use the ICT system. This is related to the difficulty to *predict the success* of an ICT change. It was noticed during the case study though, that people were afraid to use it, they first wanted the ICT to work perfectly (Appendix K). Employees also did not have much *knowledge about IT* and did not know how *difficult changes in ICT* are. During formal meetings the advantages of Outsystems were not discussed, but only the weaknesses and this trend was also noticed during informal conversation with other employees about Outsystems (Appendix K). This relates to *gold-plating* and the *silver-bullet syndrome* as well, as here people also expect ICT to work perfectly and solve all their problems. The fact that the IT department of Eneco does not have so *many IT employees*, has as a consequence that it takes long before these changes are implemented and this does not enable the use of the system by the users.

Many of the above mentioned things, depend on the *character* of a person. Large differences could be noticed between the users and the promotor. It was noticed during the implementation from

conversations and formal meetings, that the users were hesitant to take initiative. They waited for IT to solve things and were not persevering. The promotor however went to the IT department and asked questions to solve issues as fast as possible. This also led to disappointment on the side of the promotor (Appendix K). As described in chapter 4, there is a culture difference between the Oxxio employees and the Eneco employees. Since the promotor is an Oxxio employee and the employees are Eneco employees, this can explain the difference in culture between the promotor and the employees. The promotor is more result-oriented, whereas the employees are more process-oriented. This effects the *intra-department communication*. In addition, the employees rarely talk to the IT department, which indicates low *inter-department communication*.

Culture is also an aspect that was found here. The *different values* people had, not just compared to IT, but also to each other, lead to difference in opinion. While the users thought everything should be perfect and no things can go wrong (as mentioned before with the *start-up problems*), the promotor thought that the increased speed would be more important than these other small things (Appendix K). So even though people had the same goal, they were driven by *different values*, quality versus speed. This can also be explained by the culture difference between the promotor and the employees. The employees focus on customer satisfaction and can therefore be seen as normative, the promotor focuses and is therefore more pragmatic, according to Hofstede's organizational culture dimensions. Again the fact that there were *no numbers*, did not help in these discussions. In a meeting with the product owner of the scrum team, the product owner suggested to play poker just like in the scrum teams (Appendix K). This helped a lot, the discussions were more structured and everyone could mention their arguments. Also the fact that you could easily change your mind and were even promoted to do this, was improving the coming together of all parties. This shows the relation between *communication* and *different values*.

During the implementation of a new ICT system, change management can also be an important subject. As mentioned in chapter 4, previously there was a tight control culture on the Back Office department, which hindered change and improvement. This can make changing more difficult for them than the Oxxio employees, which are used to a very loose control atmosphere. It also seemed as if the employees did not always have faith or *trust* in the promotor. For example when the two employees would start to use it one day, but were not sure they could manage by just the two of them, he said he would help them as well the whole day. However, he did not have time, and started working with it only in the afternoon (Appendix K). This did not help the trust level. Also when a new user wanted to use Outsystems, she asked her team leader for permission (Appendix K). The team leader and promotor are both in the management team though, so you would expect them to have the same thoughts about this. It seems as if they have yet to realize that they are all on the same team and are working towards the same goal, though they might do that in their different ways. Currently they more seem to make sure in discussion that their opinions are not overlooked, which only costs a lot of energy. As said before, mainly the negative points of Outsystems were highlighted during meetings, but in informal conversations without the promotor, the employees also mentioned the advantages (Appendix K). This trend was also noticed when the product owner took part in the meeting, the promotor and employees were working together more as they had to convince the product owner of the importance of their issues (Appendix K). When using Hofstede's organizational culture dimensions, this could again be explained by the secretive and closed system culture, which does constrains *trust*. In addition, the difference in culture between the promotor and the employees can reduce the *trust* in each other.

### *ICT influence compared to model*

When comparing these found characteristics to the model, most are found back. Just like in case 1, *process overview*, *changeable settings* and *KPI presentation* influenced process improvement. In addition, the following characteristics were found to influence improvement in ICT.

- *testing difficulty*
- *gold-plating*
- *silver-bullet syndrome*
- *different values*
- *intra- and inter-department communication*
- *radical change of IT*
- *neglected politics*
- *hard to predict success*
- *allowance of variation*
- *difficulty of changes is unknown*
- *IT knowledge of employees*
- *applicability of LSS tools to ICT*

Other characteristics from the model of chapter 4 came forward during the case study as well, but not explicitly and are therefore not considered to have been tested. Especially the characteristics of the IT department (orange blocks in Figure 4.2) were not tested, since the observations mainly took place at the Back Office and there were not so many contact moments with the IT department.

Many extra characteristics were found during this case study. Having the *old system as back-up* could reduce resistance to change. Anxiety of *start-up problems* was found to inhibit implementation of the new system. In addition, the *character* of a person decided whether it was easier to change or not, but this is not per se related to only ICT change. Furthermore, *detention* was identified during the 5S analysis as important characteristics that can enable improvement. Finally, *trust* in each other and in management influenced especially the *communication* and thereby the implementation of the new ICT system.

The characteristics of the ICT system (green blocks in Figure 4.2) would be expected to be tested here. As these are now partly changed, one could see the influence on the possibility of improving the rest of the process. However, the implementation took so long, that this was not the case yet during this project.

During this case study, mainly characteristics that have an influence during the improve phase were found. This was caused by the fact that the observations were observed during this phase and was not present during the other phases. However, many characteristics that can be found during implementation could also be found during the initiative phase, as this largely depends on a person's character and the culture.

## 5.3. Conclusion

### *ICT characteristics*

The case study of these two cases was done to validate the model presented in chapter 4 to answer the sub-questions 5 and 6. In both cases there was a clear influence of ICT and different

characteristics had this influence. The cases did not only validate most characteristics, also new characteristics were found. Table 5.2 gives a summary of the found characteristics.

Table 5.2 ICT characteristics that can enable or inhibit improvement and the data in which they were found (terms in bold were found in three data sources or more).

Characteristics	Enabling (+)/ inhibiting (-)	Literature	Observations and interviews	Case 1	Case 2
<b>Allowance variation</b>	+	✓	✓		✓
<b>Changeable settings</b>	+		✓	✓	✓
Character	+/-				✓
Data acquiring	+			✓	
Degree of IT	-			✓	
<b>Detention</b>	+	✓		✓	✓
<b>Different values</b>	-	✓	✓		✓
Difficulty IT changes unknown	-		✓		✓
Ease of use	+	✓	✓		
Employee's IT knowledge	+		✓		✓
<b>Gold-plating</b>	-	✓	✓		✓
<b>Hard to predict success</b>	-	✓	✓		✓
ICT legacy	-	✓	✓		
ICT flexibility	+		✓		
ICT policy	+		✓		
<b>Inter department communication</b>	+	✓	✓		✓
<b>Intra department communication</b>	+	✓	✓		✓
IT language	-		✓		
IT resources	+		✓		✓
<b>KPI presentation</b>	+	✓	✓	✓	✓
Learning phase	-		✓		
<b>LSS tools for ICT</b>	+	✓		✓	✓
Multiple roles	-			✓	
<b>Neglected politics</b>	-	✓	✓		✓
Old system back-up	+				✓
Overestimation of IT	-		✓	✓	
<b>Process overview</b>	+	✓	✓	✓	✓
<b>Radical change of IT</b>	-	✓	✓		✓
Resources maintenance	+		✓		
<b>Silver-bullet syndrome</b>	-	✓	✓		✓
Start-up problems	-		✓		✓
<b>Testing difficulty</b>	-	✓	✓		✓
Trust	+				✓
Unclear ICT policy	-		✓		

During the case study, again a distinction was made between improvement in ICT and improvement in the process without the use of ICT. Case 2 represented the former option and case 1 the latter.



Case 1 contained a process improvement without ICT, therefore the expected characteristics were especially the blocks on the right hand side in Figure 4.2. *Changeable settings* were found to influence process improvement, but *ease of use* and *variation allowance* of the ICT system were not tested by the case. Also culture related characteristics were not tested, due to the fact that this case was executed by the researcher. *Overestimation of IT* was a characteristic that was both found in the model as during the case study. Extra characteristics that were found were *easy data acquiring*, *multiple roles of ICT*, the *degree of ICT* and *LSS tools for ICT*. During case 2 the more culture-related characteristics were tested. Furthermore, new characteristics such as the *character* of a person, the *trust* in management, *old system as a back-up* and *start-up problems* were recognized. Table 5.2 shows whether these characteristics have an enabling or inhibiting effect. One can see that this is approximately equally distributed. One note is that the even though some characteristics are indicated to have an enabling effect, the absence of these characteristics leads to inhibition of improvement. Therefore, the influence of these characteristics depends on to what extent they are present. For example, when IT resources are present in a large amount, this enables improvement, however at Eneco this is not the case and improvement is inhibited.

### *Dual nature of ICT*

These cases excellently showed the dual nature of ICT. As intricate part of a sociotechnical system, it is difficult to separate ICT and the process. The presence of ICT does not necessarily lead to inhibition of improvement however. Both enabling and inhibiting influences of ICT were found in the cases. Enabling effects were mainly found in the data collection, detention and identification part of LSS. Inhibiting effects came forward in the low predictability of changes in ICT and the high expectancy of ICT changes. The low predictability was expressed in the *testing difficulty* and the *difficulty to predict success* of the changes. The high expectancy of ICT changes were due to *gold-plating* and the *silver-bullet syndrome*.

The ICT system and the culture have an enabling or inhibiting effect depending on the way they are established. An ICT system with low *allowance of variation*, no *changeable settings*, little *KPI presentation* and no *process overview* inhibits improvement, while the opposite is true when these characteristics are highly present. Also, a culture with a large *difference in values*, little *communication*, *neglected politics* and a high degree of *radical change* by the IT department, does not favor improvement, whereas the opposite values of these characteristics allows for enablement of improvement.

### *Culture and the duality of technology*

The relation between culture and the dual nature of technology deserves some extra attention. Culture in relation to ICT can be specified as the culture of the IT department or as the organizational culture that influence the use/view of ICT. In both cases Hofstede's organizational culture dimension are applicable. Chapter 4 described the cultural aspects of the IT departments (i.e. *different values*, *communication* and *neglected politics*) and how these relate to Hofstede's dimensions. However, the influence culture can have on the use of ICT (i.e. *character* and *trust*) is not extensively described yet. This relates to the duality of technology, which prescribes that ICT is created and changed by human action, but also used by humans to accomplish some action. This indicates that ICT can be used to maintain or change an organizational culture, but also vice versa, thus organizational culture can determine the use of and view on ICT (Kappos, Rivard, Antonio Kappos, & Suzanne Rivard, 2008). Sørnes, Stephens, Saetre, & Browning (2004) describe this as the

reflexive relationship between organizational culture and ICT. Figure 5.13a graphically shows this relationship. Multiple complex models have already been designed to explain the relationship between ICT and organizational culture (Gallivan & Srite, 2005). Even if there is initially a misfit between ICT and the organizational culture, over time they change and mutually adopt to each other (Gallivan & Srite, 2005). This makes their relation not only reflexive, but also dynamic (Sørnes et al., 2004).

Culture can also influence the duality of technology in its classical view, where not culture, but human action has a reflexive relationship with ICT. Figure 5.13b shows a graphical representation of this influence. Organizational culture determines whether human action is accomplished to change ICT and to what extent ICT is used to perform human action. Technology is used differently in a culture where technology is seen as a valuable resource of the organization, than in a culture where this is not the case. Here, users may feel more inclined to improve ICT by human action, however in the latter case, users only use ICT to accomplish action. For example, when a culture of ICT anxiety prevails, this can result in users clinging to the one way ICT is used, being scared of messing things up.

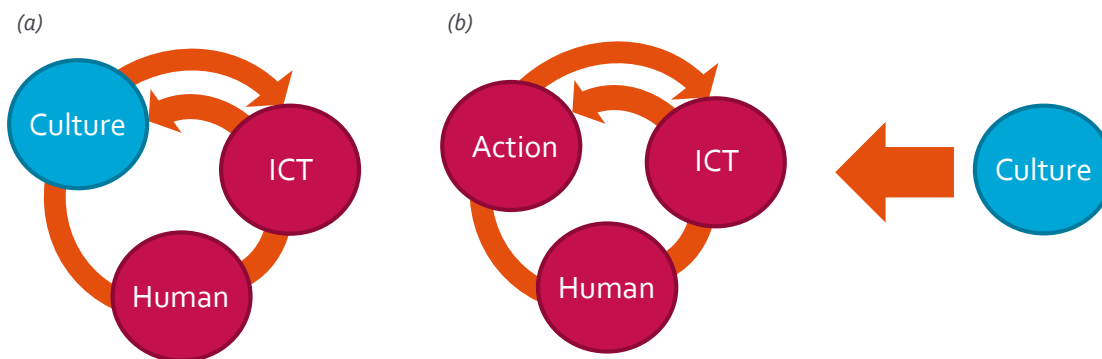


Figure 5.13 Graphical representation of the duality of technology (a) the reflexive relationship between ICT and culture (b) the reflexive relationship of ICT and human action and the influence of culture on this relationship

Both the reflexive relationship between culture and ICT and the influence of culture on the reflexive relationship between human action and ICT, both shown in Figure 5.13, could be described by Hofstede's organizational culture dimensions and this field can be further explored, as described in chapter 7.

#### Case study remarks

Though this was not indicated in the previous model, in the case study it came forward that many characteristics were related to a phase in the DMAIC cycle. The characteristics mentioned during the interviews and observations were mainly related to the initiative before the start of the DMAIC cycle, the definition phase and improvement phase. However, many other characteristics came up when going through all the other phases during LSS. It is recommended therefore to broaden the scope of the interviews to all phases of the DMAIC cycle for further research. Also because some phases of the cycle did not come forward during this research, such as the control phase.

Next to this, it was difficult to keep a difference between the two cases. As they both contained the same subject and employee team, it was difficult to switch between the two cases. It might be easier to have two completely different cases, however this choice was made in order to compare them fairly.

## 6. Conclusion and reflection

In this chapter the conclusion of this thesis will be discussed. This is done by answering the research questions and presenting the theoretical contribution and societal relevance in section 6.1. Section 6.2 reflects on this thesis work and the conclusion.

### 6.1. Conclusion

The objective of this thesis was to identify characteristics of ICT that could enable or inhibit LSS process improvement in sociotechnical systems and to find out to what extent these characteristics act as enabler or inhibitor. In order to achieve this objective, research questions were posed. Section 6.1.1 will answer the research questions of this thesis. It starts with a summary of the answers to the sub-questions, followed by an answer to the main research question. Section 6.1.2 and 6.1.3 will describe the theoretical contribution and societal relevance of this thesis, respectively.

#### 6.1.1. Answers to research questions

##### *Research sub-questions*

The research sub-questions were answered throughout this thesis and are summarized as follows.

##### 1. *What is Lean Six Sigma and how do you implement it in Back Office processes?*

The first sub-question was used to form an idea of improvement and to use this to set up interviews and understand the concepts that will be used during the case study. Lean Six Sigma combines the methodologies of lean and Six Sigma. Integrating these two methodologies combines the waste identification and speed of lean with the quality improvement and statistical analyses of Six Sigma and thereby leading to the best of both. Lean Six Sigma is implemented using the DMAIC cycle, which stands for define, measure, analyze, improve and control. These phases are executed by the use of several tools, which were described in chapter 3. The application of these tools for the back office was investigated as well, but this was not described in literature yet for all tools. Much information could be found about the wastes of lean in IT environments, but little could be found about the tools of LSS. As described later, this made the case study more difficult.

##### 2. *What is meant by the duality of technology?*

This sub-question was used to describe the underlying theory of the influence of technology on improvement. Orlikowski describes the interaction between technology and organization as the so-called duality of technology. She describes that technology is not seen as an objective, external force, but it is also not only an outcome of social action. Her new concept underscores the socio-historical context of technology and the dual nature of technology, as objective reality and as socially constructed product. She uses two concepts for this, scope and role. As scope for technology she restricts it to material artifacts in order to theoretically distinguish between the material nature of technology and the human activities that design and use the artifacts. Orlikowski frames the role of technology in terms of a mutual interaction between human agents and technology, and hence as both structural and socially constructed. Orlikowski also uses two premises, these are the duality of technology and interpretive flexibility. Duality of technology means technology is created and changed by human action, yet it is also used by humans to accomplish some action. The interpretive flexible nature of technology comprises the interaction of technology and organizations as a function of different actors and as dependent of the socio-historical context of technology's development and use. Orlikowski's theory was used as theoretical base to describe the interaction between ICT and improvement by LSS.

### 3. Why would ICT enable or inhibit Lean Six Sigma?

The previous sub-question gives an idea on the dual nature of technology, but does not specifically describe the influence of ICT on implementation of LSS. One can find that a certain task can be performed much more efficient, but when the ICT system does not allow this, technology can act as an external, objective force. When the ICT system allows variation though, the other side of the duality of technology starts to play a role and users can define the technology by their use of it. To get a first idea of the ICT characteristics that could have an influence on implementation of LSS, literature is searched for these characteristics. Literature showed several characteristics of ICT that can influence improvement. These were *neglected politics, silver-bullet syndrome, gold-plating, ease of use, process overview, hard to predict success, variation allowance* and *different values*. These were used as a starting point for the design of the model and were used to set up the interviews.

### 4. What are Hofstede's organizational culture dimensions?

As process improvement requires change and the use of ICT requires inter-department communication, Hofstede's organizational culture dimensions are needed. Originally Hofstede based his five cultural dimensions on differences in culture between nationalities. Later Hofstede also described cultural dimensions inside organizations. These include process-oriented vs. results-oriented, employee-oriented vs. job-oriented, parochial vs. professional, open system vs. closed system, loose control vs. tight control and pragmatic vs. normative. These were explained in chapter 3 and were applied in chapter 4 and 5.

### 5. What are the characteristics of ICT that could influence implementation of LSS in sociotechnical environments?

Chapter 3, 4 and 5 described characteristics of ICT that could have an influence on improvement by LSS. Table 6.1 shows a summary of these characteristics. These are the characteristics that were found during the research from literature, observations, interviews and the case study. Though data triangulation was applied, not all characteristics were found in all data, hence the validity might be reduced. Also the case study focused on validating particular characteristics, not all.

Table 6.1 Characteristics of ICT that were found to influence implementation of LSS (terms in bold are validated by data triangulation)

IT department	ICT system	Nature of ICT	Culture	Other
IT resources	Ease of use	ICT legacy	<b>Neglected politics</b>	Unclear ICT policy
Resources maintenance	<b>Allowance variation</b>	<b>Hard to predict success</b>	<b>Inter department communication</b>	Difficulty IT changes unknown
ICT flexibility	<b>Changeable settings</b>	<b>Silver-bullet syndrome</b>	<b>Intra department communication</b>	Employee's IT knowledge
Learning phase	<b>KPI presentation</b>	<b>Gold-plating</b>	<b>Different values</b>	<b>Radical change of IT</b>
ICT policy		<b>Testing difficulty</b>	Trust	Degree of IT
		IT language	Character	<b>LSS tools for ICT</b>
		<b>Process overview</b>	Old system back-up	Overestimation of IT
		Multiple roles		
		<b>Detention</b>		
		Data acquiring		
		Start-up problems		

### 6. How do the characteristics of ICT influence implementation of LSS?

Not only were the characteristics of ICT identified, but also the influence they have on the implementation of LSS was investigated. The influences were described in chapter 4. It was found that the characteristics also influenced each other and these relations are both shown in the model of chapter 4 as described in the accompanying text. The new characteristics that were found during the case study, were not placed in the model, hence the relations between them and the way they influence LSS is not known exactly. However, chapter 5 gave some indication on which way they probably influence LSS.

#### *Main research question*

The main research question of this thesis was:

*To what extent can ICT enable or inhibit implementation of LSS in Back Office processes in sociotechnical systems?*

This thesis work resulted in a model which describes the influence of ICT on implementation of LSS in sociotechnical systems. This model represents the answer to the main research question and is presented in chapter 4. The extent to which ICT can influence improvement can be explained by different characteristics. The characteristics of ICT in the model were classified in five categories, these were nature of ICT, IT department, ICT system, culture and other. This model described both the influence the characteristics had on each other and the influence they had on improvement (both in the process and in ICT).

This thesis excellently showed the dual nature of ICT. As intricate part of a sociotechnical system, it is difficult to separate ICT and the process. The presence of ICT does not necessarily lead to inhibition of improvement however. Both enabling and inhibiting influences of ICT were found in the cases. ICT has an enabling effect during data collection, detention and identification parts of LSS. The inhibiting effects of ICT are expressed in the low predictability of changes in ICT (*testing difficulty* and the *difficulty to predict success*) and the high expectancy of ICT changes (*gold-plating* and the *silver-bullet syndrome*). The ICT system and the culture have an enabling or inhibiting effect depending on the way they are established.

#### 6.1.2. Theoretical contribution

The subject of ICT as enabler or inhibitor of improvement by LSS was not investigated in previous research. This research applied the duality of technology of Orlikowski to the influence of ICT on improvement in sociotechnical environments. A model is made of the characteristics of ICT that influence improvement by LSS and how these characteristics influence improvement, as an enabler or inhibitor. A distinction was found between improvement in ICT and improvement in the rest of the process. In addition, different ICT characteristics were found to have their influence during different phases of the DMAIC cycle. Also, a large part of the enabling or inhibiting character of ICT was found to have influence before the DMAIC cycle, during the taking of initiative. Though this model is not complete and validated, it is a starting point for further research, as discussed in chapter 7.

#### 6.1.3. Societal relevance

Though the model is not complete and validated yet, it can still be used by organizations to enhance improvement. As this research was conducted at Eneco's Back Office, especially they can use the

characteristics and their influence to enhance their improvement initiatives. This can be done by modifying the degree of certain characteristics to make their influence enabling instead of inhibiting or eliminating the inhibiting characteristics. The model shows also the relations between the characteristics, so with changing one characteristics, this can have an influence throughout the rest of the model. Recommendations for Eneco how to do this are described in chapter 7. Though these results might not be generalizable yet, it is possible that other organizations can use this model as well to enable improvement in their sociotechnical environments. Next to reducing costs for companies, the increased efficiency in customer information processes can also lead to a higher degree of customer friendliness.

## 6.2. Reflection

This section will reflect on the project in terms of the choices and delineation of the project in section 6.2.1. Section 6.2.2 will reflect separately on data limitations during the project. This chapter describes what could have been done differently during this research and gives possibly the reason why these choices were made despite of the drawbacks. Because the reason can be explained for most drawbacks mentioned in this chapter, the researcher would not do many things differently when looking back on this project.

### 6.2.1. General

A number of things have an influence during a project. These are discussed in this section by discussing whether all elements matched and whether it worked out well or not.

#### *Research questions*

The main research question was described by six sub-questions. The first sub-questions about theory were found to be useful for gaining knowledge about LSS, Orlikowski's theory, possibly influencing ICT characteristics and culture differences in organizations. These proved to be sufficient for an adequate knowledge base to start the research with. The other sub-questions fitted the goal of the design of a model very well. Not only the characteristics, but also the influence of them was found. Initially, it was planned to also elaborate in a chapter on advice that would come forward out of the influencing character of the characteristics, but this was not done due to time limitations. Now some small advice is given as recommendations in chapter 7.

#### *Theoretical framework*

As theoretical framework, LSS, Orlikowski's duality of technology and Hofstede's organizational culture dimensions were used. As mentioned in the previous paragraph, these were found useful, but a few things need to be noted about LSS. At the start of the project it was chosen to focus on LSS as improvement methodology. However, during the interviews it was found that it was easier to ask people about improvement in general, instead of only LSS. Furthermore, at the end of the project, an informal source said that LSS is old already and organizations do not use it anymore. For the case study it was easier to focus on only one methodology. This resulted in easy comparison. Another danger of not focusing on LSS is that the research would be too general and not result in concrete conclusions.

#### *Research approach*

As a research approach Design Science Research was employed. The combination of the contextual environment of the research project with the scientific knowledge base turned out to fit well with

the research objectives. The three cycles of relevance, design and rigor were performed simultaneously and multiple times. In the first cycles, a knowledge base was started and the interviews were based on this theory. The results of the interviews were then related to the newly found literature and used to design the model. Also during the case study, the cycles were repeated and more information was found on LSS and ICT characteristics. This led to a comprehensive model containing the most important characteristics.

### *Research methods*

The data acquired from literature, observations and interviews gave sufficient characteristics and relations between the characteristics to create a model. Because the case study was meant for validation and not for further design of the model, the newly found characteristics were not added to the model. This was due to time limitations. Initially the relations between the new characteristics were not investigated during the case study and there was no time to analyze this in a later stage. Speculations could have been made of course, but this would only reduce the validity of the model. During the design of the model the characteristics were classified in categories to make it clearer. This classification was not validated yet though.

### *Scope*

The scope during this research contained LSS as improvement methodology and many ICT characteristics, but not new innovative technologies. The LSS improvement methodology will be discussed in chapter 7. The scope of ICT characteristics delivered a manageable amount of characteristics, though the scope could have been broadened. During the production of the model, IT resources were found to influence improvement. However, mainly an inadequate amount of IT employees was found as IT resources, but other IT resources can have influence as well, for example time, expertise and flexibility. These did not come forward explicitly in this research however and was therefore out of scope.

#### 6.2.2. Data limitations

Since the conclusions are based on the used data of the research, it is important that these data are credible, transferable and dependable, where the first relates to internal validity, the second to external validity or generalizability and the latter to reliability, as described in section 2.2. These will be described in this section. For all data (observations, interviews and case study) the external validity could be improved by investigating multiple companies, instead of only Eneco. Doing an internship at two or more companies was not practical for the researcher though and would also not fit in the time available for this research.

### *Observations and interviews*

During the observations and the interviews, it was unavoidable to analyze only a certain selection of the employees. During the internship the researcher had the desk at a certain team, so most observations were made of the employees of that team. This could have an influence on the reliability of the results. However, also observations were done at the monthly updates which covered all teams. During the interviews, employees of all teams were asked to make the results reliable. A difference in answers cannot be excluded though. Moreover, interviewees with different backgrounds were selected. They had different functions within their team and were of different ages. Furthermore, the Back Office consists of many different people, hence only three employees do not give a good overview. However, the interviews were meant to find characteristics, not to



validate them. In addition, it was tried to have multiple people from each department, but this did not always work, especially for FB&I department. This department did not give many characteristics though, so it is expected that this did not have many consequences, as still many characteristics were found during the interviews. Also, during this research only members of management were interviewed of the IT department and the FB&I department, but employees of these departments could have had different opinions.

Data triangulation increased the validity of the results, because not many differences were found in results of the literature, observations and interviews. One point of difference was that literature showed mainly characteristics of ICT when changes in ICT were initiated by the IT department and the observations and interviewed showed characteristics of changes in ICT requested by the users. There were differences between the results of the case study and the other research methods though. During the case study many new characteristics came forward though. This resulted in difficult comparison. This might be caused by the fact that ICT can have an influence on improvement unconsciously. During interviews people can only tell what they noticed consciously and therefore the unconscious characteristics can be neglected. The case study did show these characteristics and increased the validity. So the case study was initially used for validation of the model, but later it also found new characteristics.

### *Case study*

It was planned to have a case study with contrasting characteristics of the model in order to validate the characteristics. However, this was more difficult than initially thought. There were so many characteristics, that one would not be able to say which characteristic of ICT caused the change in LSS. It was possible to test only one characteristic, but this was considered not so useful. Therefore it was chosen to validate the characteristics of the category nature of ICT. However, during the case study, other characteristics came forward as well, resulting in testing others as well. This decreased the quality of the validation, but gave insight in the total model instead of only one characteristic. Because the model contained so many characteristics, some characteristics were not tested.

The case studies were done at Eneco, meaning the results are limited in their generalization to other organizations. This is a weakness of this project. As it was a qualitative case study and not quantitative, there is no external validity. The case study was mainly intended to validate the model internally.

During the case study, LSS was applied on a process, however, the time for the case study was too limited to execute LSS properly and hence the reliability could be reduced. In addition, the data from the case study will mostly contain the researcher's interpretations during LSS implementation and the analysis of the data might therefore be subjective. Due to bias of the researcher, this does not give a high degree of reliability. A solution could be to have multiple researchers. Also, LSS is generally executed in a team, and in this research it was executed by the researcher alone. It might be closer to reality, if LSS was executed by a team, but this was practically not possible. Also, during the implementation of the new ICT interface, bias of the researcher can influence the reliability of the results. Though the main role of the researcher was to observe, the researcher influenced the results as well, because the employees were asked questions and the researcher participated in the 'poker' game. This might have changed the observation environment, but also led to explicit expression of opinions which are otherwise easily overlooked. Furthermore, validity could be



increased by observing the complete process of a change in ICT, instead of only implementation and observing multiple groups that are in the process of a change in ICT. This was not possible however due to time constraints.

### 6.2.3. Conclusion

The reflection on this thesis work shows that on several points things could have been done differently, but the main limitation was time. If more time was available, the model could have been completed by including the newly found characteristics from the case study, validating them and be extended by giving an advice. In addition, the model's external validity could have been increased by also researching another company. The scope of the project could be broader by investigating other improvement methodologies and more IT resources. Also, the internal validity of the data could be increased. For the observations and interviews this could have been done by sitting at different teams of the Back Office and interviewing more people, including IT and FB&I employees. The case study's internal validity could be increased by observing the complete ICT change process, observing multiple groups, executing LSS with a team and do the research with two researcher instead of only one. These topics are discussed further in the next chapter as further research.

## 7. Further research and recommendations

To finalize this report, further research and recommendations are given in this chapter. First, further research is suggested on this topic in section 7.1. Second, section 7.2 describes recommendations for the Back Office at Eneco and how they can use the presented model to increase their improvement initiatives.

### 7.1. Further research

Many new research ideas came up during this research, but were beyond the scope of this project, which are elaborated in this section.

#### *Quantitative research in different environments*

First of all, this research contained qualitative research, but it would be better to be able to generalize the results by the use of quantitative research. For example by researching the characteristics at different companies and different teams. Another possibility to investigate other sociotechnical environment besides the Back Office. ICT could have a different influence here. This would increase the external validity.

The validity can also be increased by expanding the case study. For example by having a contrasting case study per characteristic to truly analyze its influence. This might not be feasible however, as this will take much time. Moreover, to overcome bias due to the subjective analysis of the researcher, it is recommended to implement LSS with a team, instead of alone.

#### *Distinguish research*

During the execution of LSS, it was found that the characteristics of the model have an influence in different phases of the DMAIC cycle. The characteristics found in the model mainly influence the improvement stage, because the other phases of LSS were not investigated during the interviews and observations. However, many other characteristics came up when going through all the other phases during LSS. It is recommended therefore to broaden the scope of the interviews to all phases of the DMAIC cycle for further research. Also because some phases of the cycle did not come forward during this research, such as the control phase. Categorizing the characteristics into the different phases could also be interesting, in order to see where they have their influence.

Also the phase before LSS is started, was not investigated in the case study, but the interviews showed characteristics that could influence this phase. Therefore, more focus should also be on this initial phase as this has influence on the start of improvement. This might be difficult to test, however. A possibility is to interview people about if they ever wanted to improve a process and why they did or did not. The danger is, however, that people do not realize taking initiative or not, but do it unconsciously.

In addition, it is also possible to categorize the characteristics by ICT change or change without the use of ICT. Throughout this thesis distinctions were made between improvement with the use of ICT and without. Also literature showed especially ICT change initiated by the IT department. Therefore, it would be interesting to classify these characteristics into the different types of improvement.

Also the combination of culture and the duality of technology could be further investigated, as mentioned in chapter 5. More research can be performed on Hofstede's organizational culture dimensions and the reflexive relationship between ICT and organizational culture.

### *Broaden to other improvement methodologies*

As mentioned in the previous chapter, during the interviews it was found that it was easier to ask people about improvement in general, instead of only LSS. This can be overcome by asking questions about each of the phases of LSS for better understanding of the subjects. It is also possible to include other improvement methodologies as well in the research. Here, it was used as a guideline during the case study, but one can do this as well with another methodology. Also it was noticed during the case study that many of the LSS tools were not applicable for ICT, for example VSM. Though this can be seen as a characteristic that inhibits improvement and is therefore a valuable finding, it could be that more characteristics are found, when the first barrier of non-applicable tools is removed.

This thesis especially investigates the influence of ICT on improvement of a process by LSS. However, when a process is ideal already and no improvement can be done, it is possible that the IT department still has an influence on the process. This was out of scope for this research, but is interesting to look into. When assuming the ICT and the process are interrelated and this means also no more ICT improvement is needed, IT will not have much influence anymore. However, it is expected that there are always still improvements in ICT possible, considering the speed with which ICT and technology are growing. Next to changes in ICT, business environments are continuously changing, also leading to changes in processes.

## 7.2. Recommendations

Several characteristics came forward from the model that influence improvement. These can be modified by Eneco to change their influence, for example from inhibiting to enabling, enhance the enabling characteristics or eliminate the inhibiting characteristics. Recommendations will be given in this section for the most important characteristics.

To enable improvement, characteristics need to be modified. Changing the IT department or ICT system do not lay in the reach of the Back Office, but the culture related characteristics, the process overview and the high expectations of IT can be changed. Therefore the focus will be on these characteristics and the IT department and ICT department will only be discussed shortly at the end of this section.

The difference in culture manifests itself in a *difference in values*. The *difference in values* between employees of the Back Office but also between the IT department and the Back Office, can lead to inhibition of improvement. Between the employees of the Back Office the difference in values is caused by having a difference in culture, which is something that is difficult to change. Management can however try to respect the employees' values and take these into account when implementing change. The *difference in values* between the IT department and the Back Office is caused for a large part by ignorance and *communication* could change this. The IT department has values such as the protection of private or sensitive information, whereas for the Back Office business value is more important. Though some employees do not even consider this, but simply report everything they find. It is recommended to show the Back Office employees what values are considered important by the IT department, for example in the newsletter or in the monthly department update. It is also recommended that the IT employees are aware of the values that are important for the Back Office. This is already tried by the IT department by working scrum and agile, ensuring reduction of

*neglected politics*. Also, this could be improved by putting the teams together in the same physical location.

Due to the fact that many employees do not have an *overview* of the complete process, improvement is inhibited. This can be changed into an enabling influence, by making employees aware of the rest of the process. This could be done by moving people with concurrent tasks to the same team or by changing this in ICT, showing them the next step. There are flow-charts available on the intranet, but this could be given a more prominent space. Also lean games are already been organized within the Back Office, this could create the awareness of the importance of process overview, leading to employees searching for overview themselves.

Finally, high expectations influence improvement. This does not necessarily inhibit improvement in processes, but can slow down improvement in ICT. By adding unnecessary gadgets waste is created by *gold-plating*, making a process or ICT system less efficient. This is related to the difference in values. IT employees do not know the needs of the Back Office and add applications they consider important. It is also related to the fact the Back Office employees do not know how *difficult changes in ICT* are and therefore think extra applications are easy to add. Also, this can be improved by increasing *communication*. Workshops could be held by IT employees showing Back Office employees the difficulty of some ICT changes and making them realize this. One characteristic that deserves extra attention is the *overestimation of IT*, as this was observed often. It was found that many employees immediately relate improvement to ICT, while they can also improve things without ICT. Therefore, it is recommended to generate awareness of the ability to improve things yourself without ICT. This could be done by putting more focus on these improvement initiatives without ICT or showing examples of cases where improvement was implemented without the use of ICT. Also, it was found that employees of the Back Office are asked to improve their processes, but they do not get any education in improvement methodologies. This is not related to ICT, therefore it was not recognized in the model, but this could enhance the improvement initiatives at the Back Office as well.

The other characteristics of the model will also be discussed briefly. The large *ICT legacy* and *inadequate amount of resources* of the IT department do not enable easy changes in ICT. The scrum and agile working can help to work more efficient with the resources they have, but focus should also be put on maintenance of the legacy. The ICT system and its functionalities can influence improvement, but as these are developed by the IT department, these might not be so easy to change. When building a new system though, these characteristics should be taken into account. The nature of ICT consists mainly of the characteristics mentioned in the beginning of this section. The other characteristics are very much related to the already mentioned characteristics. The same is true for the characteristics of the categories culture and other.

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## Appendix A Topic list interviews

### Interview topic list Employee Back Office

Introductie achtergrond: invloed van IT op verbetering processen.

Oriënterend interview, dus zoveel mogelijk praten. Als je iets niet begrijpt, kan je dat natuurlijk aangeven. Als je een vraag niet wil beantwoorden, hoeft dat natuurlijk niet.

Het interview is anoniem, is het goed als ik het opneem?

Wil je het verslag van het interview achteraf nog doorlezen?

#### Topic 1 Identiteit

- Hoe lang werk je bij Eneco?
- Hoe ben je bij Eneco terecht gekomen?
- Wat is je functie en rol binnen je team?

#### Topic 2 IT afdeling: communicatie en denkbeeld

##### *Communicatie*

- Op welke manier verloopt contact met IT?
- Kan je het proces tekenen hoe IT verbeteringen doorgevoerd worden?
- Als IT een issue heeft opgepakt, hoe verloopt dan de communicatie met de BO of FB?
- Hoe denk je dat IT beslist over issues?
- Heb je het gevoel dat IT goed begrijpt wat de Back Office nodig heeft?

##### *Denkbeeld IT*

- Hoe denk je over de IT afdeling?
- Hoe denk je over de verbeteringen van IT (BTL of MVS schoning): pakt dit meestal goed of slecht uit?
- Hoe denk je dat IT kan helpen met de verbeterprojecten?

#### Topic 3 Gebruik van technologie

- Hoe denk je over MVS (nutteloze functies, knelpunten)?
- *Interpretive flexibility*: Denk je dat MVS gemakkelijk aan te passen is?
- *Tacit knowledge*: Hoe ervaar je het leren gebruiken van MVS, zowel bij jezelf en anderen?
- *Technical skill requirement*: Hoeveel technische kennis moet je hebben om dit werk uit te kunnen voeren?
- *Allowance variation in process*: Is er verschil in hoe mensen de processen uitvoeren? Zo ja, denk je dat dit verschil maakt in hoe goed ze te verbeteren zijn?

#### Topic 4 Verbeteringen

- Wat versta je onder verbetering?
- Op welke manier verloopt verbetering van processen hier op de afdeling?
- Wat kan er naast verbeteringen in MVS nog meer verbeterd worden?

#### Topic 5 Feedback

##### *Informatie visualisatie*

- Is het duidelijk hoe het hele proces loopt? (Weet je waar de fout vandaan komt en wat de volgende stap is na jouw actie?)
- Heeft het wel/niet weten invloed op de mogelijkheid om het proces te verbeteren?

#### *Feedback Performance Indicatie*

- Krijg je feedback als een proces is verbeterd (wel of niet ICT gerelateerd), bijv. d.m.v. verbetering performance indicators of versnelling van het proces?

#### **Topic 6 Andere karakteristieken**

- We hebben nu een aantal punten besproken, zoals communicatie met IT, naast je eigen stap het hele proces kennen, of MVS makkelijk aan te passen is, etc. Wat heeft naast deze punten nog meer invloed op verbetering op deze afdeling?

Heb je verder nog vragen, opmerkingen of toevoegingen?  
Bedank voor deelname.

### **Interview topic list Management Back Office**

Introductie achtergrond: invloed van IT op verbetering processen.

Oriënterend interview, dus zoveel mogelijk praten. Als je iets niet begrijpt, kan je dat natuurlijk aangeven. Als je een vraag niet wil beantwoorden, hoeft dat natuurlijk niet.

Het interview is anoniem, is het goed als ik het opneem?

Wil je het verslag van het interview achteraf nog doorlezen?

#### **Topic 1 Introductie**

- Hoe lang werk je bij Eneco?
- Hoe ben je bij Eneco terecht gekomen?
- Wat is je functie en rol?

#### **Topic 2 IT afdeling: communicatie en denkbeeld**

##### *Communicatie*

- Op welke manier verloopt contact met IT?
- Kan je het proces tekenen hoe IT verbeteringen doorgevoerd worden?
- Als IT een issue heeft opgepakt, hoe verloopt dan de communicatie met de BO of FB?
- Heb je het gevoel dat IT goed begrijpt wat de Back Office nodig heeft en andersom?
- Hoe denk je dat IT beslist over issues?

##### *Denkbeeld IT*

- Hoe denkt men op de afdeling in het algemeen over de IT afdeling?
- Wat kan de IT afdeling voor de Back Office betekenen?
- Hoe denk je over de verbeteringen van IT (BTL of MVS schoning): pakt dit meestal goed of slecht uit?

#### **Topic 2 Gebruik van technologie**

- Hoe denk je over MVS (nutteloze functies, knelpunten)?
- *Interpretive flexibility*: Denk je dat de mensen op de afdeling een goed beeld hebben van wat er te verbeteren valt in MVS en hoe gemakkelijk of moeilijk dat is?

- *Tacit knowledge*: Hoe wordt het leren gebruiken van MVS ervaren? Is er veel tacit knowledge nodig?
- *Technical skill requirement*: Hoeveel kennis moet je hebben van technologie om dit werk uit te kunnen voeren?
- *Allowance variation in process*: Is er verschil in hoe mensen de processen uitvoeren? Zo ja, denk je dat dit verschil maakt in hoe goed ze te verbeteren zijn?

#### **Topic 4 Verbeteringen**

- Wat versta je onder verbetering?
- Op welke manier verloopt verbetering van processen op de Back Office?
- Wat kan er naast verbeteringen in MVS nog meer verbeterd worden?

#### **Topic 5 Feedback**

##### *Informatie visualisatie*

- Is het duidelijk voor medewerkers hoe het hele proces loopt? (Weet je waar de fout vandaan komt en wat de volgende stap is na jouw actie?)
- Heeft het wel of niet weten invloed op de mogelijkheid om het proces te verbeteren?

##### *Feedback Performance Indicatie*

- Krijg je feedback als een proces is verbeterd (wel of niet ICT gerelateerd), bij verbetering performance indicators of versnelling van het proces?

#### **Topic 6 Andere karakteristieken**

- We hebben nu een aantal punten besproken, zoals communicatie met IT, naast je eigen stap het hele proces kennen, of MVS makkelijk aan te passen is, etc. Wat heeft naast deze punten nog meer invloed op verbetering op deze afdeling?

Heb je verder nog vragen, opmerkingen of toevoegingen?

Bedank voor deelname.

### **Interview topic list IT**

Introductie achtergrond: invloed van IT op verbetering processen.

Oriënterend interview, dus zoveel mogelijk praten. Als je iets niet begrijpt, kan je dat natuurlijk aangeven. Als je een vraag niet wil beantwoorden, hoeft dat natuurlijk niet.

Het interview is anoniem, is het goed als ik het opneem?

Wil je het verslag van het interview achteraf nog doorlezen?

#### **Topic 1 Introductie**

- Wat is je functie en rol?
- Wat doet FB&I precies?

#### **Topic 2 IT afdeling: communicatie en beleid**

##### *Communicatie*

- Kan je het proces tekenen hoe IT verbeteringen doorgevoerd worden?
- Op welke manier verloopt contact met de Back Office?
- Heb je het gevoel dat de Back Office goed begrijpt wat IT nodig heeft?
- Hoe denk je dat de Back Office beslist over de issues die ze doorspelen naar IT?

- Als IT een issue heeft opgepakt, hoe verloopt dan de communicatie met de BO of FB&I?

#### *Beleid*

- Is er een duidelijk beleid in de issues die worden opgepakt?
- Hoe luidt dat beleid?
- Bij wie is dit beleid bekend en hoe wordt het gecommuniceerd?
- Hoe denk je over IT als toevoeging van de verbeterprojecten?

#### **Topic 2 Gebruik van technologie**

- Hoe denk je over MVS (nutteloze functies, knelpunten)?
- *Interpretive flexibility*: Hoe denken de medewerkers van de Back Office over de aanpassingen van IT?
- *Technical skill requirement*: Hoeveel kennis moet je hebben van technologie om met MVS te werken?
- *Allowance variation in process*: Is er ruimte in MVS om gebruikers hun taken op verschillende wijzen uit te laten voeren (sneltoetsen of klikken op icoon)? Zo ja, denk je dat dit verschil maakt in hoe goed de processen te verbeteren zijn?

#### **Topic 4 Extra functionaliteiten & flexibility**

- *Technology Flexibility*: Is MVS gemakkelijk aan te passen?
- Wat is het verschil tussen makkelijke en moeilijke aanpassingen in MVS?
- Worden er wel eens nieuwe functies aan MVS toegevoegd, zo ja, hoe gaat dit in zijn werk?

#### *Feedback Performance Indicatie*

- Heeft MVS de mogelijkheid om directe KPI's te meten en weergeven?

#### **Topic 6 Andere karakteristieken**

- We hebben nu een aantal punten besproken, zoals communicatie tussen de verschillende afdelingen, naast je eigen stap het hele proces kennen, of MVS gemakkelijk aan te passen is, etc. Wat heeft naast deze punten nog meer invloed op verbetering op de Back Office?

Weet je nog andere mensen die ik kan interviewen, bijvoorbeeld van IT zelf?

Heb je verder nog vragen, opmerkingen of toevoegingen?

Bedank voor deelname.

#### **Interview topic list FB**

Introductie achtergrond: invloed van IT op verbetering processen.

Oriënterend interview, dus zoveel mogelijk praten. Als je iets niet begrijpt, kan je dat natuurlijk aangeven. Als je een vraag niet wil beantwoorden, hoeft dat natuurlijk niet.

Het interview is anoniem, is het goed als ik het opneem?

Wil je het verslag van het interview achteraf nog doorlezen?

#### **Topic 1 Introductie**

- Wat is je functie en rol?
- Wat doet FB&I precies?

- Wat doet FB precies?

## **Topic 2 IT afdeling: communicatie en beleid**

### *Communicatie*

- Kan je het proces tekenen hoe IT verbeteringen doorgevoerd worden?
- Op welke manier verloopt contact met de Back Office?
- Op welke manier verloopt contact met de IT afdeling/ product owners?
- Heb je het gevoel dat de Back Office goed begrijpt wat IT nodig heeft?
- Hoe denk je dat de Back Office beslist over de issues die ze doorspelen naar FB?
- Hoe denk je dat de product owner beslist over issues?
- Als FB een issue heeft opgepakt, hoe verloopt dan de communicatie met de BO of IT/PO's?

### *Beleid*

- Is er een duidelijk beleid in de issues die worden opgepakt?
- Hoe luidt dat beleid?
- Bij wie is dit beleid bekend en hoe wordt het gecommuniceerd?
- Hoe denk je over IT als toevoeging van de verbeterprojecten?

## **Topic 2 Gebruik van technologie**

- Hoe denk je over MVS (nutteloze functies, knelpunten)?
- *Interpretive flexibility*: Hoe denken de medewerkers van de Back Office over de aanpassingen van IT?
- *Technical skill requirement*: Hoeveel kennis moet je hebben van technologie om met MVS te werken?
- *Allowance variation in process*: Is er ruimte in MVS om gebruikers hun taken op verschillende wijzen uit te laten voeren (sneltoetsen of klikken op icoon)? Zo ja, denk je dat dit verschil maakt in hoe goed de processen te verbeteren zijn?

## **Topic 4 Extra functionaliteiten & flexibility**

- *Technology Flexibility*: Is MVS gemakkelijk aan te passen?
- Wat is het verschil tussen makkelijke en moeilijke aanpassingen in MVS?
- Worden er wel eens nieuwe functies aan MVS toegevoegd, zo ja, hoe gaat dit in zijn werk?

### *Feedback Performance Indicatie*

- Heeft MVS de mogelijkheid om directe KPI's te meten en weergeven?

## **Topic 6 Andere karakteristieken**

- We hebben nu een aantal punten besproken, zoals communicatie tussen de verschillende afdelingen, naast je eigen stap het hele proces kennen, of MVS gemakkelijk aan te passen is, etc. Wat heeft naast deze punten nog meer invloed op verbetering op de Back Office?

Heb je verder nog vragen, opmerkingen of toevoegingen?

Bedank voor deelname.

## Appendix B Current process of case 1 in BPMN

Figure B.1 shows the flow chart in BPMN of the current process for case 1. The process starts by a message of an incoming meter readings. MVS automatically calculates the boundaries and validates the reading. If a reading is not valid or not complete, it needs to be solved by an employee (this is the process of case 2). If an employee cannot solve the reject, he/she puts the status of the reading on INF and the meter readings are estimated by MVS.

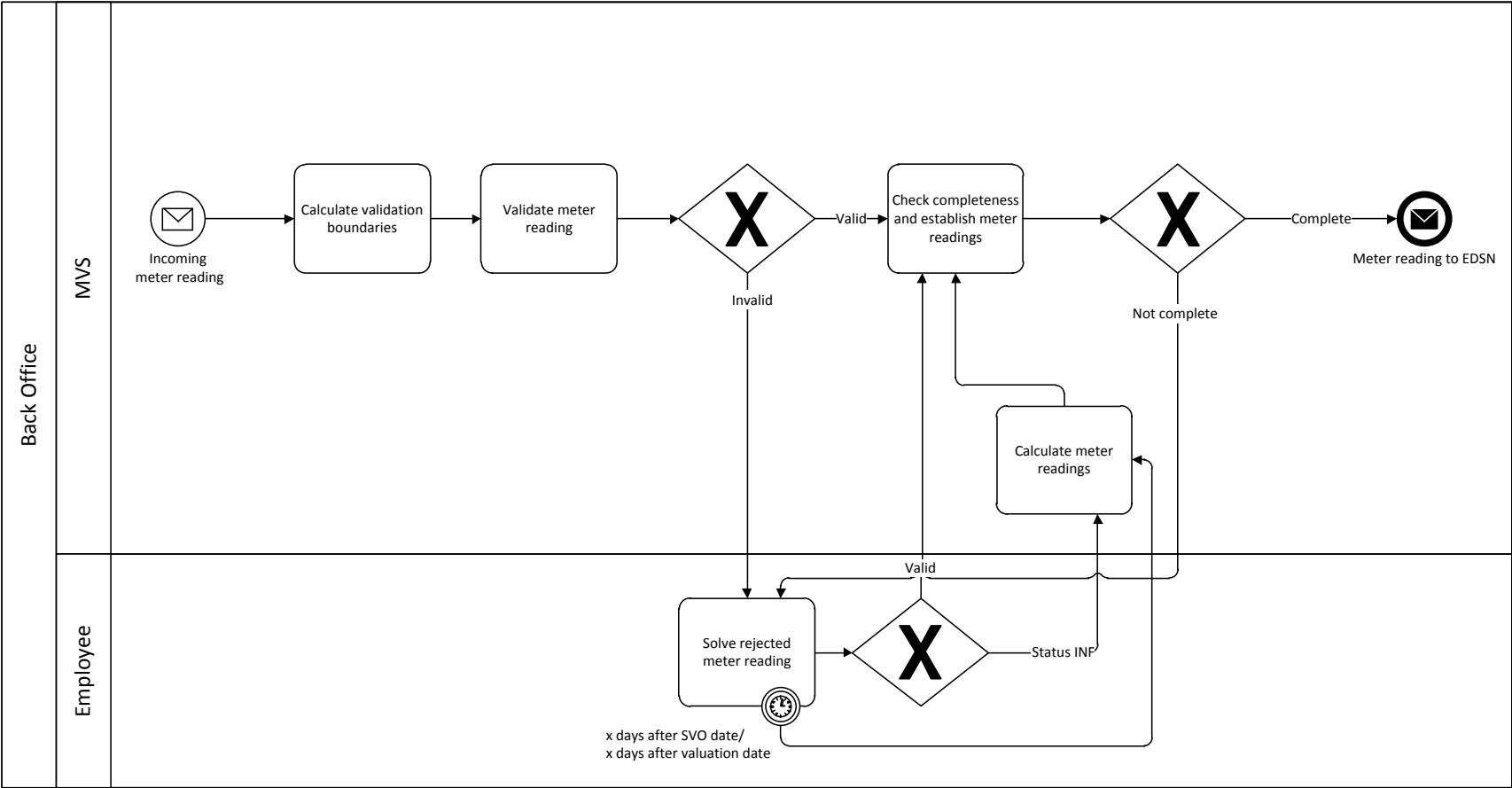


Figure B.1 Process of meter reading validation of all meter readings

## Appendix C Meter reading submission via internet

Figure C.2 and Figure C.3 show the meter readings submissions via internet. One can see that feedback is given when filling in meter readings that were higher or lower than expected.

Thuis Grootzakelijk MKB Over Eneco Mijn Eneco | uitloggen

Eneco Energieproducten Slim met energie Service Stel uw vraag

# Meterstanden doorgeven

## In 4 stappen uw meterstanden doorgeven

1 Opnamekenmerk 2 Meterstanden 3 Controle 4 Bedankt

### Opnamekenmerk

Vul uw opnamekenmerk en huisnummer in.

Opnamekenmerk \*

Huisnummer zonder toevoeging \*

Uw opnamekenmerk (9 cijfers) staat op de meterstandenkaart en in de email die u ontvangen heeft.

NAAR STAP 2

## Meterstanden doorgeven

Heeft u per e-mail of post een meterstandenkaart ontvangen?

✓ Opnamekenmerk 2 Meterstanden 3 Controle 4 Bedankt

### Meterstanden invullen

U geeft voor het volgende adres meterstanden door:

Burgemeester Neetstraat 23  
2935BA OUDERKERK AAN DEN IJSSEL

Opnamedatum 14-06-2014

Tips

- Noteer alle cijfers voor de komma (incl. voorlooppunten en draaiend cijfer).
- Cijfers in de rode vakjes (achter de komma) hoeft u niet door te geven.

#### Elektriciteit

Meternummer: 25720393

Elektriciteit I (kWh) 1 0 2 2 2 X X

Elektriciteit II (kWh) 7 7 9 8 X X

Hoe herken ik mijn elektriciteitsmeter? ↓

#### Gas

Meternummer: 3789686

Gas I (m³) 1 4 3 2 1 X X

Hoe herken ik mijn gasmeter? ↓

NAAR STAP 3

Figure C.2 Meter reading submission screens via Online (step 1 and 2)



**Eneco** Stel uw vraag

## Meterstanden doorgeven

Heeft u per e-mail of post een meterstandenkaart ontvangen?

✓ Opnamekenmerk **2 Meterstanden** 3 Controle 4 Bedankt

### Controleer uw gegevens

Hieronder ziet u de meterstanden die u heeft doorgegeven. Zodra u op 'meterstanden versturen' klikt, worden de meterstanden verwerkt.

**Adres**  
Burgemeester Neetsstraat 23  
2935BA OUDERKERK AAN DEN IJSSEL

**Opnamedatum**  
14-06-2014

**Elektriciteit**  
Meternummer: 25720393  
Elektriciteit I (kWh) 10222  
Elektriciteit II (kWh) 7798

**Gas**  
Meternummer: 3789686  
Gas I (m³) 14321

Ik wil een bevestiging ontvangen van bovenstaande gegevens op het volgende emailadres:  
carmen.quejoperez@eneco.com

**METERSTANDEN VERSTUREN**

## Meterstanden doorgeven

Heeft u per e-mail of post een meterstandenkaart ontvangen?

✓ Opnamekenmerk 2 **Meterstanden** 3 Controle 4 **Bedankt**

### Meterstanden invullen

U geeft voor het volgende adres meterstanden door:

Mozartstraat 84  
1962AD HEEMSKERK

Wanneer heeft u de meterstand opgenomen? \*

**Tips**

- Noteer alle cijfers voor de komma (incl. voorloophulp en draaiend cijfer).
- Cijfers in de rode vakjes (achter de komma) hoeft u niet door te geven.

**Elektriciteit** Meternummer: F8F2000012986507

Elektriciteit I (kWh)  .

**!** We hadden voor dit telwerk een stand ingeschat van maximaal 22099. Controleer of u uw meterstand juist heeft overgenomen. Het kan zijn dat niet alle nullen zijn ingevoerd of dat u misschien de telwerken voor elektriciteit heeft omgewisseld. Indien de stand toch overeenkomt met uw meter, ga dan verder met de volgende stap.

Figure C.3 Meter reading submission screens via Online (step 3 and 4)

## Appendix D Meter reading submission via card

Figure D.4, Figure D.5 and Figure D.6 show the meter readings submission cards that the customers receive. One can see that it is already promoted to fill in the meter readings by internet and there is information per type of meter which numbers to fill in as meter readings.



**Geef uw meterstanden door**

**Geachte heer, mevrouw,**

Wij verzoeken u vriendelijk om uw meterstanden binnen één week aan ons door te geven via internet of telefoon. Uw meterstanden zijn namelijk nodig voor het berekenen van uw jaarlijkse energierekening.

Als meetbedrijf zijn wij verantwoordelijk om jaarlijks de meterstanden door te geven aan uw energieleverancier en uw regionale netbeheerder. Dit is wettelijk geregeld. Wij doen dit voor alle energieleveranciers in het hele gebied van netbeheerder Stedin. U behoort tot dit gebied.

Eens in de drie jaar komt één van onze meteropnemers bij u langs om de meterstanden op te nemen. De overige twee jaar ontvangt u een JaarnotaMeterstandenKaart. Dit jaar vragen wij u om zelf de meterstanden door te geven. Doe dit binnen één week.

Als wij de meterstanden niet op tijd ontvangen wordt er door ons een schatting gemaakt. Wij schatten uw verbruik echter liever niet, omdat dit ertoe kan leiden dat u bij een volgende nota moet bijbetalen.

Geef uw meterstanden bij voorkeur door via internet. Bent u klant van Eneco? Ga dan naar: [www.eneco.nl/meterstanden](http://www.eneco.nl/meterstanden). Heeft u een andere energieleverancier dan Eneco? Ga dan naar: [www.stedinmeetbedrijf.nl/meterstanden](http://www.stedinmeetbedrijf.nl/meterstanden). Kies voor meterstanden doorgeven en volg de aanwijzingen op het scherm.

Mocht het niet lukken om de standen via internet door te geven, bel dan gratis naar 0800 - 0170 om uw standen door te geven. U kunt ook de ingevulde Jaarnota-MeterstandenKaart naar ons terugsturen. Bij voorbaat dank voor uw medewerking.

Met vriendelijke groet,

Stedin Meetbedrijf  
De nieuwe naam van Eneco Meetbedrijf



Figure D.4 Scan card for meter readings submission introductory text



## Appendix E Calculation of Pareto diagrams

Microsoft Excel was used to construct Pareto diagrams. Invalid meter readings were executed by a query by a Back Office employee and received in Microsoft Excel. For both Pareto diagrams pivot tables were made.

### Medium

Table 8.1 shows the pivot table of the Pareto diagram in Figure 5.7. As a filter 'Oxxio standen' was set on zero. Columns was set on 'values', rows was set on 'medium' and values was set on 'sum of everything' twice, one with amount and one with cumulative percentage.

Table 8.1 Pivot table of medium through which invalid meter readings are submitted

Oxxio standen			
0			
Gegevens			
MEDIUM	Som van Alles	Som van Alles2	
Internet	13492		45%
Scan card	5936		64%
VRS	3365		76%
Telephone	3103		86%
Smart meter	2998		96%
unknown	670		98%
E-mail	208		99%
Diverse	193		99%
TLM	125		100%
List	32		100%
Cards	21		100%
<b>Eindtotaal</b>	<b>30143</b>		

The data that was used for the pivot table were invalid periodically meter readings from 18-09-2014 until 03-12-2015, these were 64,999 meter readings of which at least one was invalid.

For the 'Oxxio standen' the following formula was used:

```
=ALS(EN(A2="Oxxio";V2=1);1;0).
```

This resulted in giving all rejects that were caused by Oxxio swapped readings a '1' and others a '0'. Column A indicated the energy supplier, Eneco or Oxxio. Column V indicated whether the readings were swapped.

The 'swapped readings' had the following formula:

```
=ALS(F2=0;0;(ALS(B2=B3;ALS(EN(F2=G3;G2=F3);1;0);0)))
```

The meaning of the columns are shown below. This generated a '1' for swapped readings and a '0' for the others.

The 'Alles' was generated to include all rejects only once. If only one readings is false, all readings are still shown, therefore these need to be excluded. This was done with the following formula:

```
=ALS(Q2=Q1;"";1)
```

A	Energy supplier (Eneco/Oxxio)	G	Original reading
B	Location number	Q	Name (of the customer)
F	Final reading	V	Swapped readings

### Causes

Table 8.2 shows the pivot table of the Pareto diagram in Figure 5.8. As a filter 'Alles uniek' was set on '1'. Columns was set on 'values', rows was set on 'oorzaak' and values was set on 'sum of everything unique' twice, one with amount and one with percentage. The cumulative table was created by =J80+I81.

The data that was used for the pivot table were invalid periodically meter readings from 18-09-2014 until 03-12-2015, these were 64,999 meter readings of which at least one was invalid. All column letters and their meaning are indicated below.

Table 8.2 Pivot table of causes of invalid meter readings

Oorzaak	Aantal van Alles uniek	Aantal van Alles uniek2	Cumulatief
Equal reading	20125	58,09%	58%
Unknown	6252	18,05%	76%
Swap reading	4913	14,18%	90%
Too few numbers (x10)	2061	5,95%	96%
Too many numbers	1218	3,52%	100%
Too few numbers (x100)	77	0,22%	100%
Eindtotaal	34646	100,00%	200,00%

'Equal readings' was calculated by:

=ALS(Q2=Q1;"";ALS(F2=0;0;ALS(OF(SOM(T2:W2)>0;SOM(T3:W3)>0);0;ALS(F2=G2;1;0))))

'Too few numbers (x10)' was calculated by:

=ALS(EN(Q2=Q1;T1=1);0;(ALS(F2=0;0;ALS(F2=(G2\*10+5);1;0))+ALS(F2=0;0;(ALS(F2=(G2\*10);1;0))))))

'Too few numbers (x100)' was calculated by:

=ALS(EN(Q2=Q1;U1=1);0;(ALS(F2=0;0;ALS(F2=(G2\*100+55);1;0))+ALS(F2=0;0;(ALS(F2=(G2\*100);1;0))))+ALS(F2=0;0;ALS(F2=(G2\*100+5);1;0))))

'Swap reading' was calculated by:

=ALS(F2=0;0;ALS(G2=G3;0;(ALS(B2=B3;ALS(EN(F2=G3;G2=F3);1;0);0))))

'Too many numbers' was calculated by:

=ALS(G2=1;0;ALS(EN(Q2=Q1;W1=1);0;(ALS(F2=0;0;ALS(OF(F2=AFRONDEN(G2/100;0);F2=AFRONDEN.NAAR.BENEDEN(G2/100;0);F2=AFRONDEN.NAAR.BOVEN(G2/100;0);F2=AFRONDEN(G2/10;0);F2=AFRONDEN.NAAR.BENEDEN(G2/10;0);F2=AFRONDEN.NAAR.BOVEN(G2/10;0);1;0))))))

'Everything unique' was created as 'Alles'.

B	Relation number	T	Too few numbers (x10)
F	Final reading	U	Too few numbers (x100)
G	Original reading	V	Swap reading
Q	Name (of the customer)	W	Too many numbers

## Appendix F Improvements Case 1

### Improvements for MVS calculation with ICT

#### Check swapped numbers

Let MVS automatically swap the readings of low and normal tariff electricity and check if they then fulfill the validation rules.

#### Check extra number

Let MVS automatically multiply the readings with 10 and check if they then fulfill the validation rules.

#### Check defect meter

If one of the electricity readings is zero and the other is extremely high, let MVS automatically check this and adjust the consumption.

#### Check previous mistakes

If a customer fills in an invalid meter reading every year and this is caused by the same reason (swapped readings, too little numbers, etc.) and either show this to the employee so he can find the cause faster or let MVS automatically check this cause and validate the readings.

#### Improve SJV calculation

The estimated year consumption is calculated by the grid owner, but often this is not correct, as noticed by the Back Office employees. This results in readings not validated wrongly.

#### Check previous estimated readings

If many previous readings of a customer were estimated, the estimation might not be trustworthy anymore as it is not based on any reliable previous readings. Therefore, this could be taken into account in the validation rules or could be mentioned by MVS to the employee to accelerate the finding of the cause.

### Improvements for incorrect submission with ICT

#### Photo possibility

Give customers the possibility to make a photo with for example their mobile device and upload this on the Eneco website or on the Eneco app. Use software that reads the readings from this photo and automatically saves these in MVS.

#### Adjust card to specific meter

Remember what meter is installed at which location and adjust the card or online submission text to this meter, so people can have a clearer view of what they need to fill in.

#### More online feedback

Online customers now receive feedback on too high or low readings. This could be extended to more explanation or give feedback on more causes, such as defect meter or solar panels.

#### Receive customer feedback

Another option is to let the customer give feedback on their filled in meter readings. Are they a 100% sure they filled it in correctly or do they have questions on how to do this? An employee at the Back Office can use this to explain an invalid reading and explanation can be improved when you know what people find unclear.

## Improvements for incorrect submission without ICT

### Promote online submission

Online gives the possibility to give feedback on the meter readings if they will be considered invalid by MVS. Online submission is already promoted, but even more could be possible. Of course it would be necessary how many rejects result from online and how many from the card relatively.

### Educate phone employees about validation rules

When customers call to submit their readings, an employee can give immediate feedback on their readings. If they immediately fill in the readings and MVS tells them whether they are valid, they can also see whether they are correct and ask the customer questions. Back Office employees could know a lot more if they could speak to the customer, but this is often more expensive than just accepting the slightly too low meter readings. This can be solved by educating phone employees about the validation rules.

### More clear scan card

The card people receive when they need to submit their readings could be even clearer. It contains a lot of information already, but this could be improved.



## Appendix G Current process of case 2 in BPMN

Figure G.7 till Figure G.13 show the flowcharts of the current meter reading validation by an employee in the different software and screens that are used. The main task is finding the reason for the reject, which can be easily found or be more difficult to solve, as shown in the flowcharts. Some causes are not included in the flow chart to keep it clear and simple. These are redelivery by solar panels, multiple counters and mechanical meters.

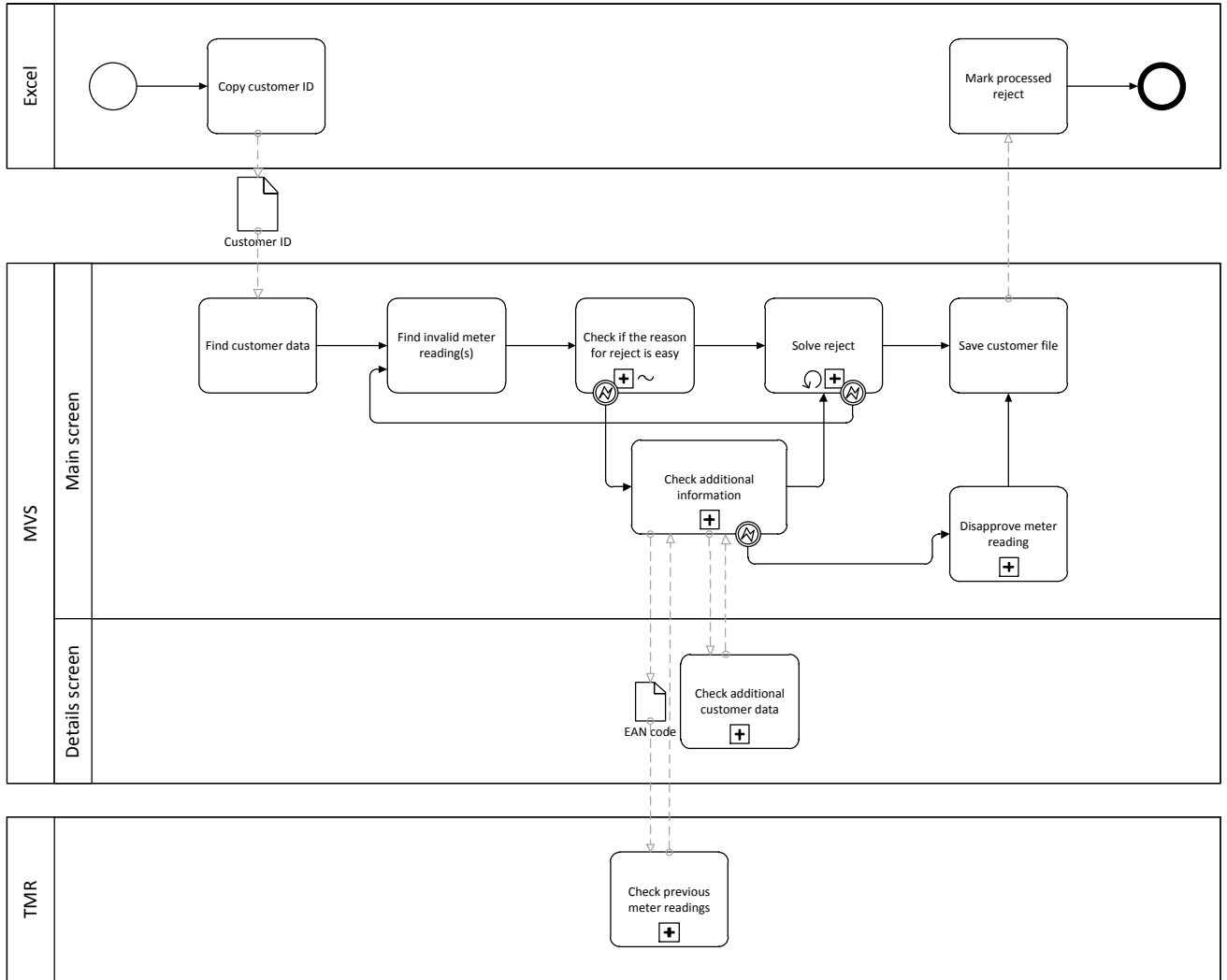


Figure G.7 Current main process of meter reading validation with MVS

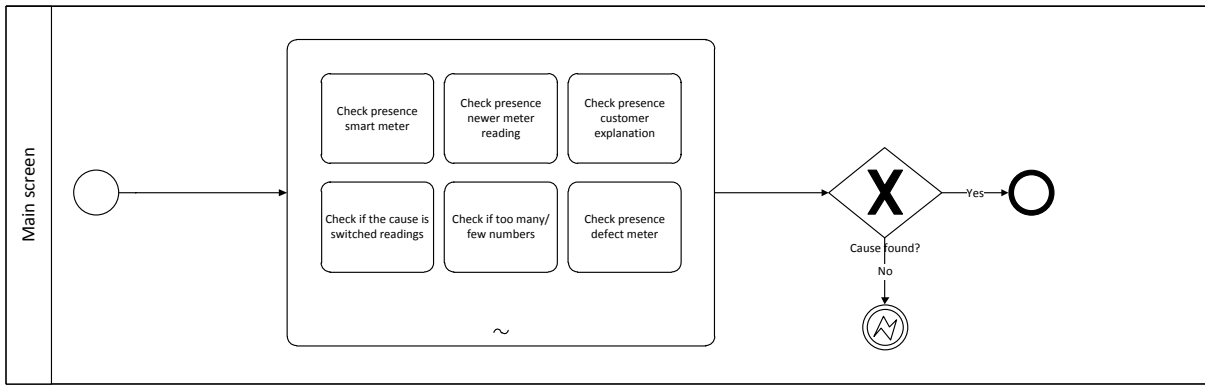


Figure G.8 Sub-process 'Check for easy reason' of current process of meter reading validation with MVS

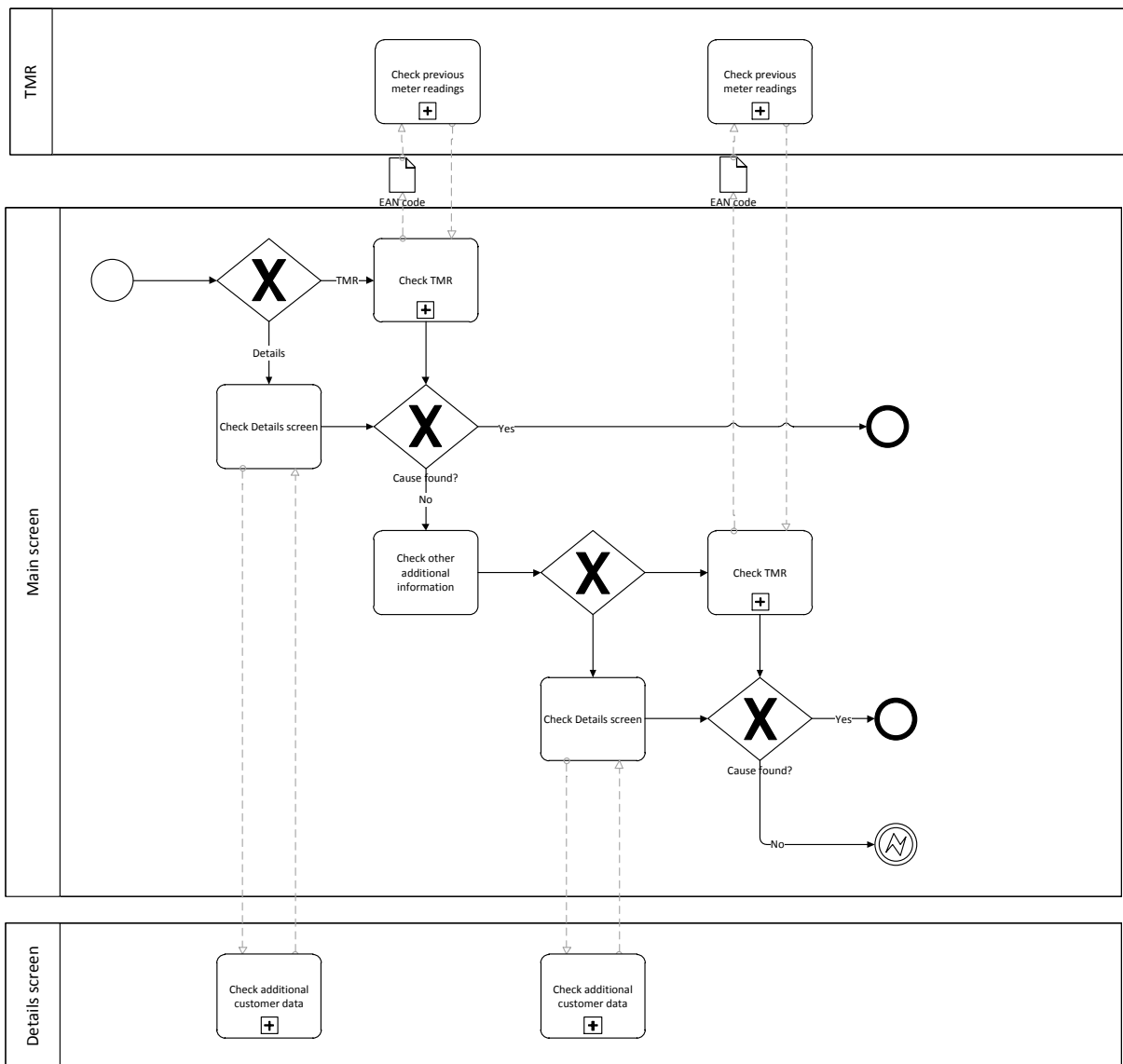


Figure G.9 Sub-process 'Check additional information' of current process of meter reading validation with MVS

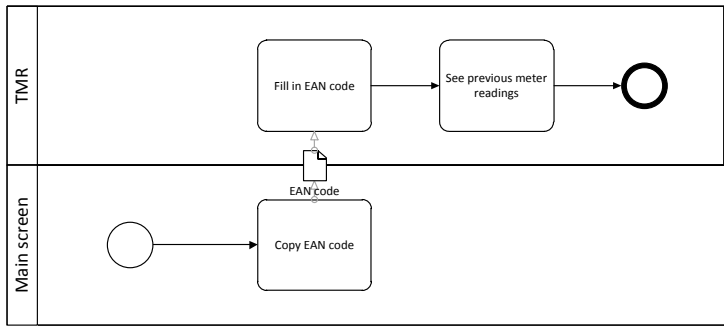


Figure G.10 Sub-process 'Check TMR' of current process of meter reading validation with MVS

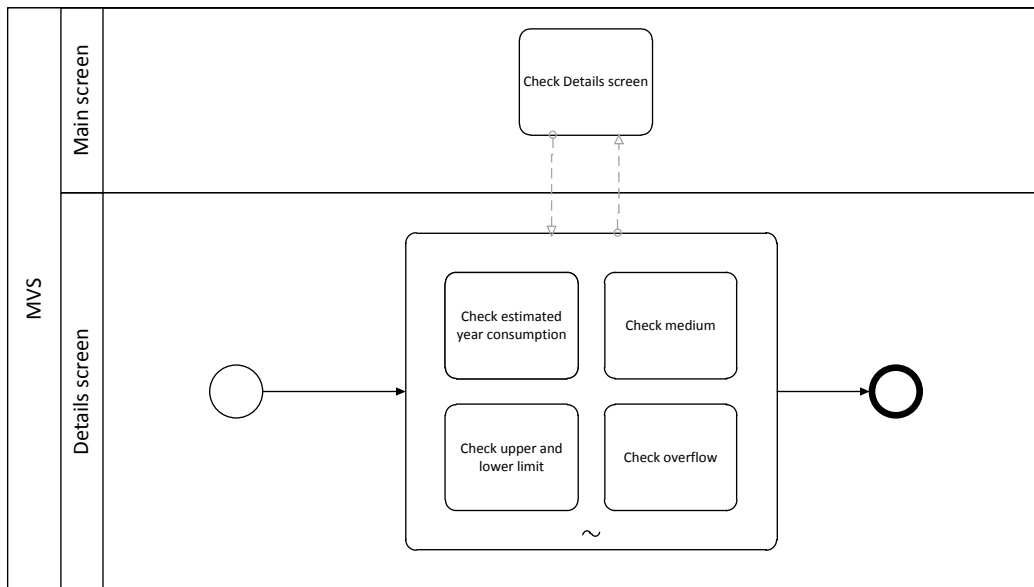


Figure G.11 Sub-process 'Check details screen' of current process of meter reading validation with MVS

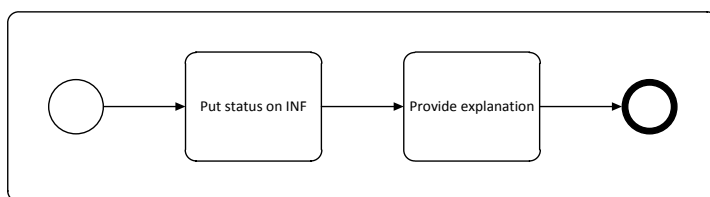


Figure G.12 Sub-process 'Disapproval' of current process of meter reading validation with MVS

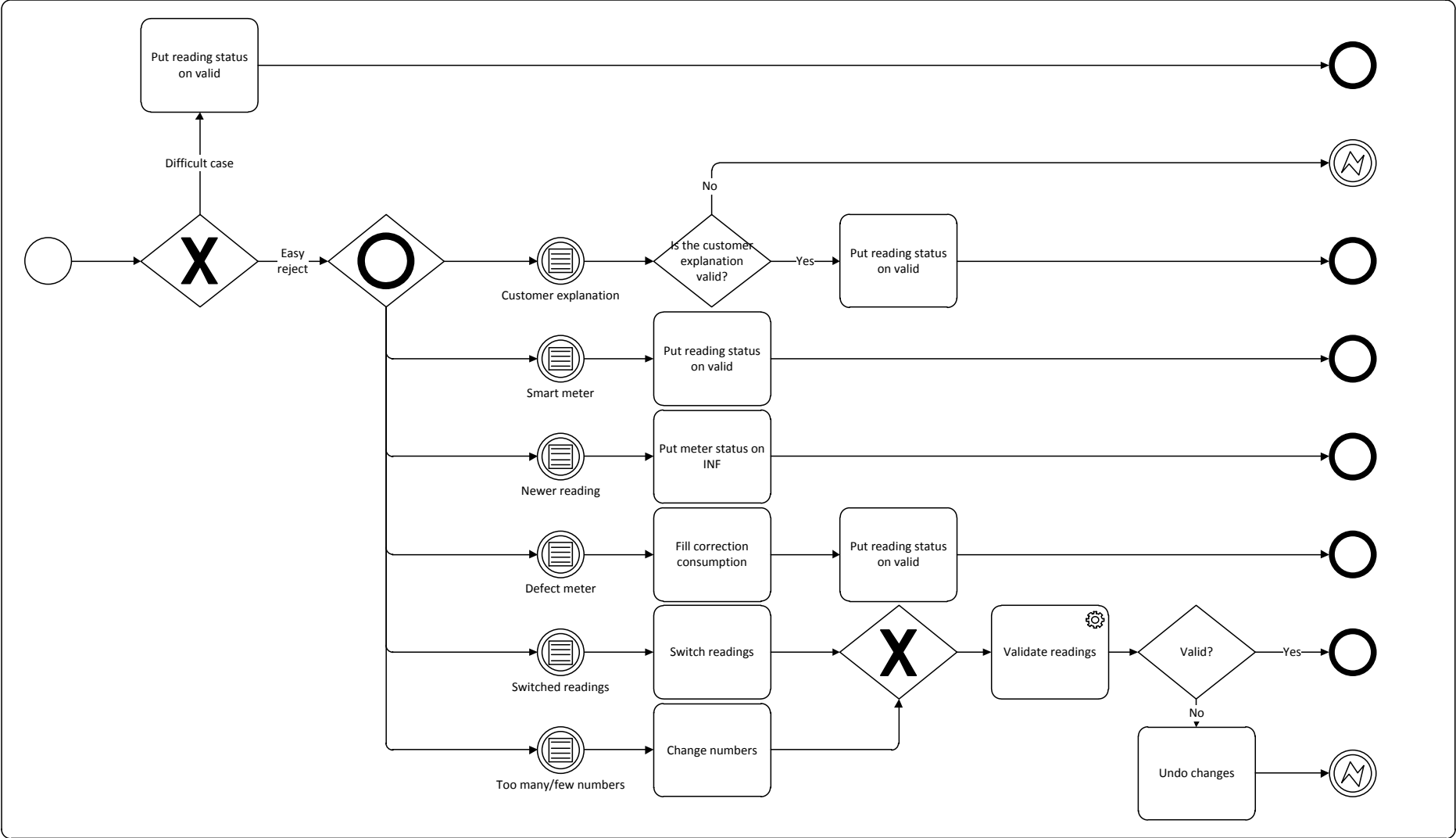


Figure G.13 Sub-process 'Solving' of current process of meter reading validation with MVS

## Appendix H Future process of case 2 in BPMN

Figure H.14 till Figure H.17 show the flowcharts of the future meter reading validation by an employee in the different software and screens that are used. By the use of Outsystems less screens are used than in the current process.

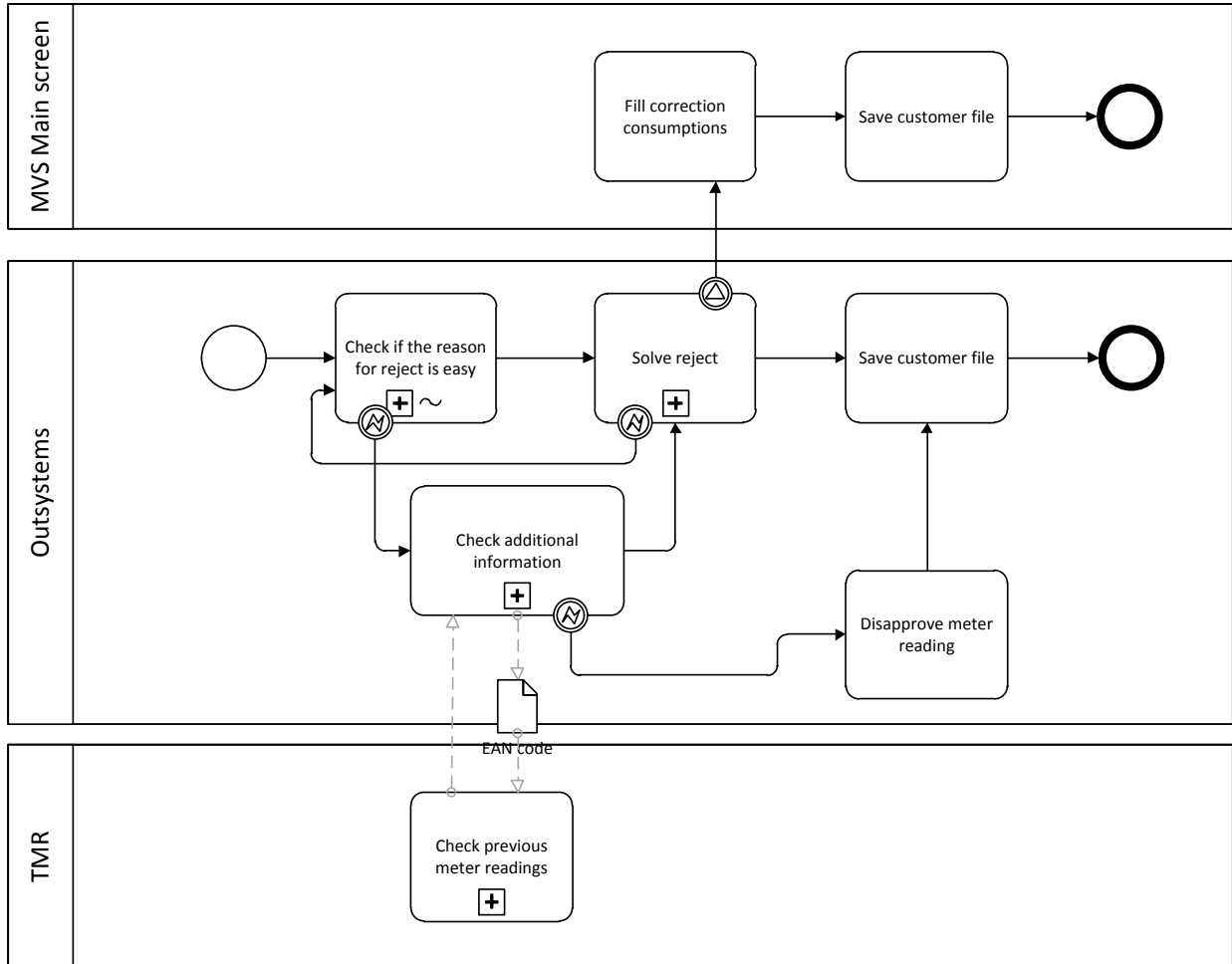


Figure H.14 Future main process of meter reading validation with Outsystems

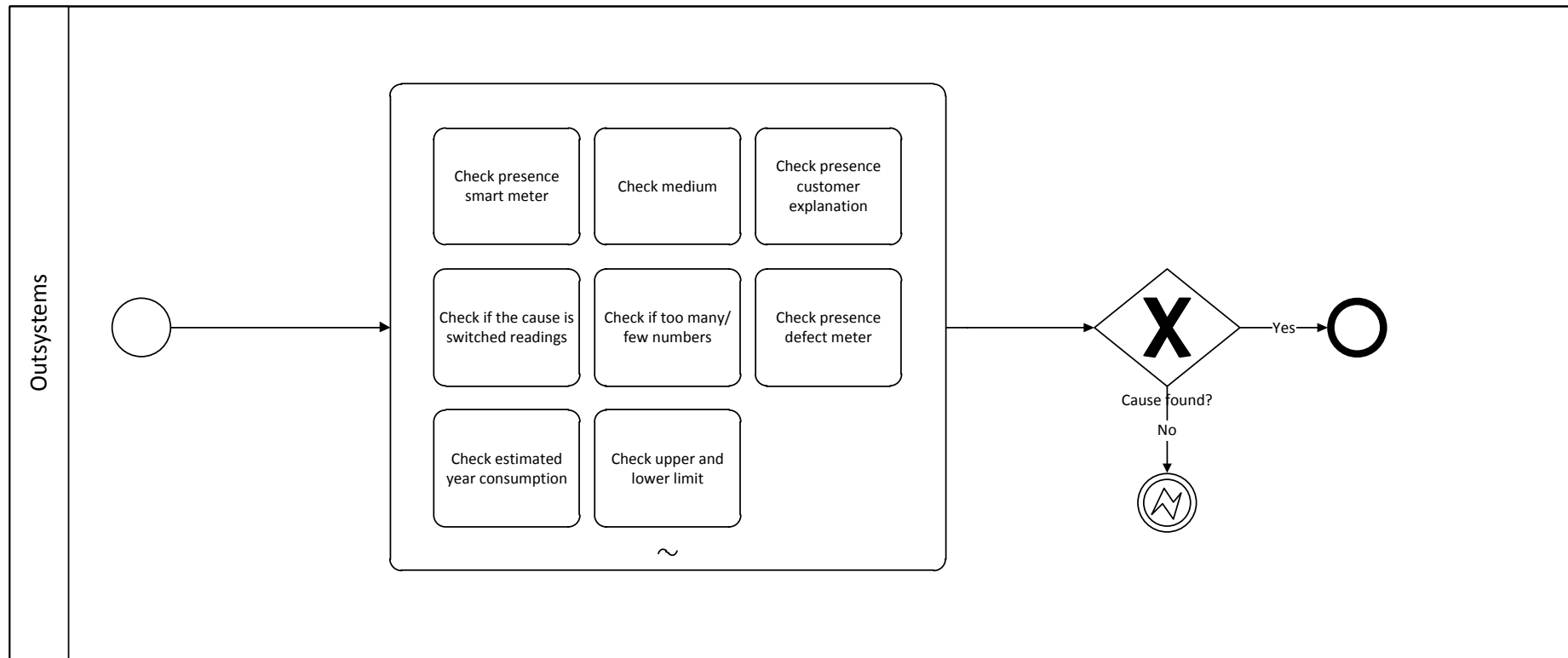


Figure H.15 Sub-process 'Check for easy reason' of future process of meter reading validation with Outsystems

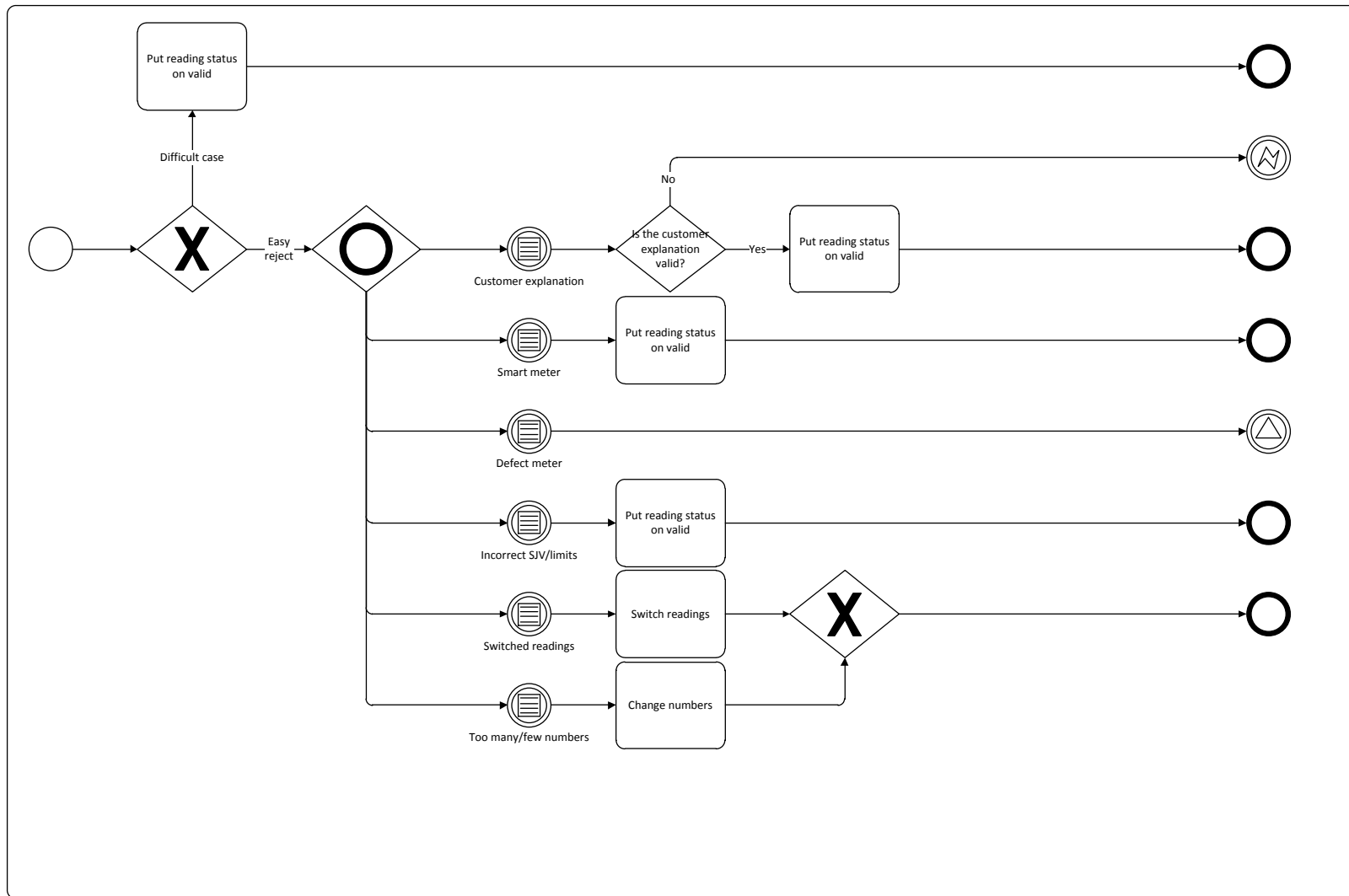


Figure H.16 Sub-process 'Solving' of future process of meter reading validation with Outsystems

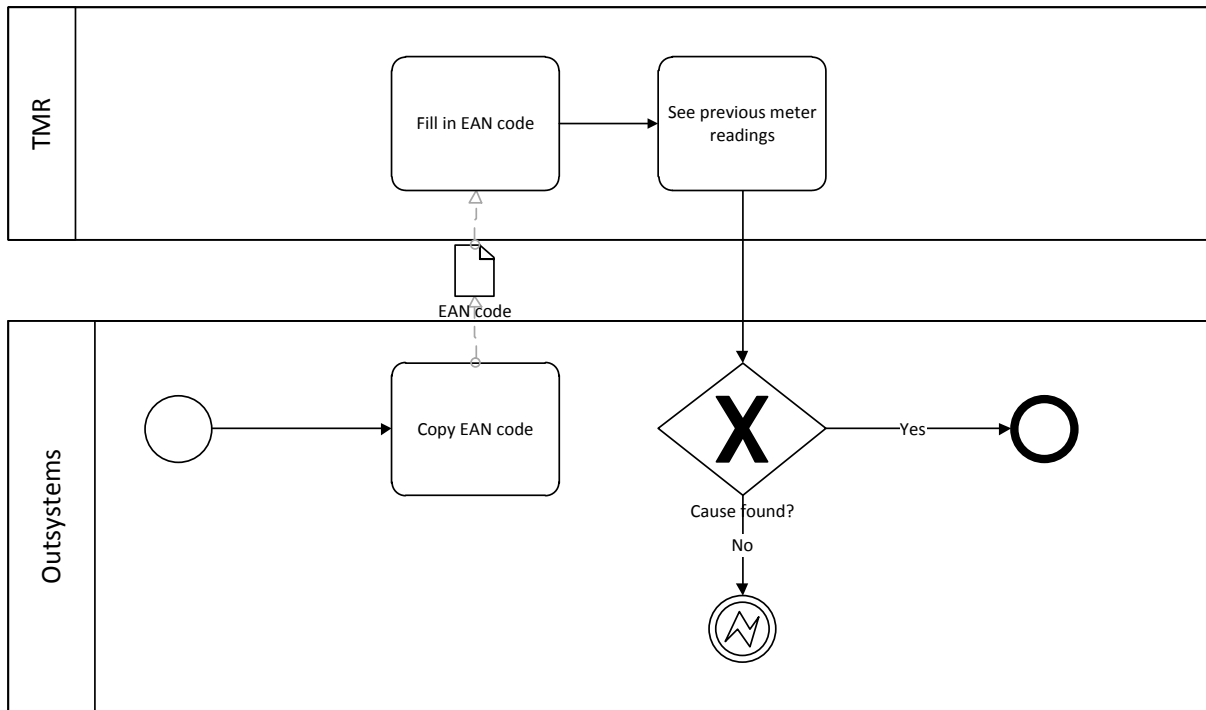


Figure H.17 Sub-process 'Check TMR' of future process of meter reading validation with Outsystems



## Appendix I Observations

Date	Context	Observation
7-9-2015	Informal meeting with management member	ICT has been working on the MVS schoning for very long. They are now trying to become more scrum. The transition to a new system is difficult, that's why everything takes longer.
9-9-2015	Informal meeting with management	Back Office used to work with the BTL, but this took 10 s extra per case, so this was eliminated by a large part of the back office.
10-9-2015	Conversation between employees	Why don't you let Outlook remember you username and password? I'm afraid that if I change my password later, it will crash.
14-9-2014	Formal meeting management	Communication is not optimal between Back Office and IT. The Back Office tells what it wants, but IT does not always give them what they want, this is caused by miscommunication. It would be ideal if we could present the issues as a present to IT.
14-9-2014	Formal meeting management	IT is not per se slow. They had to cut budgets and also they have to work more efficient and therefore prioritize issues.
14-9-2014	Formal meeting management	The prioritizing is also based on costs, if a batch job costs more to solve a certain amount of cases then to let employees work on it, it will not be designed by IT.
6-10-2015	Month update	Lots of issues are communicated to IT, but stay on the list for a long time. This gives a lot of frustration for the employees.
6-10-2015	Month update	There might start a new era, MVS schoning and there will be a new team assigned for Back Office, meaning more issues will be handled.
6-10-2015	Month update	We gooien alles over de schutting en denken lossen jullie het maar op
6-10-2015	Informal conversation with employee	New meetings are being started between an employee of the Back Office, FB&I and IT to better communicate.
6-10-2015	Month update	Most employees that spoke during the month update, seemed to want to improve, but where held back by the slow issue handling of IT. No one spoke of process improvement by not means of IT (cleaning your own kitchen) though.
8-10-2015	Informeel gesprek met medewerker	Medewerker noemt Functioneel Beheer & Innovatie (FB&I) ook wel frustratie, b en Irritatie
8-10-2015	Informeel gesprek met medewerker	Employee wanted to update the query with which the worklist are made. It turned out another employee had done this two years ago, but the former management team was not interested.
16-9-2015	During watching with employee	"Why don't you use the shortcut F8, but only F7?" "I don't know, I always do it like this"
16-9-2015	During watching with employee	The employee keeps a list of all MVS improvements and as soon he finds an issue, he makes a print screen and adds it to the word document. No one has asked for this list until today though, he will discuss the whole list

		during the meeting with the asking person.
19-10-2015	Informal conversation between management and employee.	"This is one and a half month ago and it is still not fixed"... "This will not be good for Eneco's imago"
3-11-2015	Conversation between management and employee during day start	Is dat moeilijk om ze goed te zetten? Ja het is wel even een klusje, maar we hebben nu een snellere manier gevonden.
4-11-2015	Conversation between key-user and employee during day start	Sometimes you have to say something to us again, because a lot of things (issues) are brought in to us and we forget some things as well.
4-11-2015	Conversation with management member	'I heard there were Agile Business Teams that looked at other improvements at the department Markt?' 'Really? I don't know anything about that, but I don't know everything that is happening'
24-11-2015	Conversation between management and employee	Ik weet ook niet precies hoe dat zit, dat weet Soumia beter, iets met SVO zoeken?
9-12-2015	Manager	If there is something with compliance, then that has priority over the Back Office issues.

## Appendix J Coded interviews

<b>Response</b>	<b>Interviewee</b>
<b>Clear ICT policy</b>	
<i>Hebben zij iets van een beleid met hoe ze dingen oppakken, is dat duidelijk voor de afdeling?</i> Nee, het is niet heel duidelijk, het gaat om de prioriteiten, dus als je een issue indient, hoeveel fte het bespaart, hoeveel geld het bespaart, dat bepaalt welke prio het is. En dus iedereen doet dat en dan uiteindelijk heb je 10 issues met prio A en dan komen de A1, A2 qua belangrijkheid en daar uit gaat hij dan uit kiezen.	Employee Back Office
<i>Denk je dat de back office een duidelijk beeld heeft van wat gemakkelijk en moeilijk aan te passen is?</i> Dat is heel wisselend, het verschilt nog al van persoon tot persoon en de afdeling. Er zijn mensen die gewoon één keer iets raars zien en meteen een incident ervan maken en functioneel beheer ermee lastig vallen en dat soort dingen. Er zijn anderen die dat veel minder doen.	Product Owner IT scrum team
Je kan zelf ook een beeld maken van wat enige kans van slagen heeft en wat niet. Als je vindt dat het geen kans van slagen heeft, kom er dan gewoon niet mee.	Product Owner IT scrum team
En wat ik ook denk, is dat niet alle medewerkers bij de back office altijd weten wat ze moeten vragen.	Product Owner IT scrum team
<i>Wat denk je van alle issues die de back office doorspeelt? Let de back office ook op die klant waarde of spelen ze gewoon alles door?</i> Ik denk niet dat ze bij de back office als ze iets indienen, ook kijken naar de klantwaarde. Ik denk dat ze gewoon van alles indienen ja. En dat er bij FB ook een soort filtering inzit, van 'is dit nou echt iets of niet'.	Management FB&I
Dan merk je dat het een klein groepje is en dat ze keuzes moeten maken en het is grappig om te zien dat het via zo'n systeem gaat. Dat zou ik zelf niet verzinnen om het zo aan te pakken.	Employee Back Office
<b>Communication</b>	
Ja, er wordt op zich wel gecommuniceerd, maar niet naar de afdeling toe. Je kan er naar vragen en dan krijg je een antwoord maar het is niet iets dat op intranet staat. Dus mayo daar die zal het niet zo snel te horen krijgen.	Employee Back Office
er zijn nog allerlei discussies over wat functioneel beheer nou precies zou moeten doen	Product Owner IT scrum team
Bij de back office gaat het eigenlijk gewoon maar over één ding, dat is kosten. De kosten moeten naar beneden. Voor Eneco breed gaat het over meer dingen, dan gaat het over klanttevredenheid, dan gaat het over kosten, dan gaat het ook over hoe hard lopen je klanten weg.	Product Owner IT scrum team
Functioneel beheer zit dus echt aan de business kant.	Management FB&I
<i>Als FB een issue doorspeelt naar de product owner, laten ze dat dan weten aan de back office of alleen als er een release is?</i> Ik weet niet of ze zeggen dat ze hem doorspeeld hebben, ik denk het wel dat ze uiteindelijk doorgeven dat hij op de back log is geplaatst. Maar goed, dat zegt uiteindelijk niks, want dat kan pas over een jaar uitgevoerd worden.	Management FB&I
<i>Op welke manier verloopt contact met IT? Via de key user dan?</i> Ja dat denk ik, IT zit boven he. Daar hebben wij nooit geen contact mee. Het loopt bij ons eigenlijk via medewerker 4, key user, denk ik dan, FB&I en die moeten het dan doorgeven aan daar. Maar wij krijgen nooit terugkoppeling, dus moeten we er zelf maar weer achteraan.	Employee Back Office

<i>Wordt dat dan gecommuniceerd naar deze afdeling?</i> Ja, die krijgen echt een terugkoppeling. Wanneer er een conclusie is over de issue, dan wordt het in de weekstart of dagstart medegedeeld.	Employee Back Office
<i>Hoe denk je verder over de IT afdeling?</i> Ik heb niet echt heel veel contact. Alles gaat via een derde als je een verbetering wil doorgeven.	Employee Back Office
<i>Weet je nog kenmerken van IT, die invloed kunnen hebben op de proces verbetering?</i> Dus niet specifiek in MVS, maar meer op de samenwerking? Ja voor mij zijn ze niet heel zichtbaar, omdat het contact via iemand anders gaat. Ik denk dat je een beter antwoord krijgt als je bij een key-user vraagt.	Employee Back Office
Ik vind het wel heel lang duren, maar als je dan uitgelegd krijgt dat het is vanwege verschillende verzoeken die ze binnen krijgen en heel veel werk hebben met kleine teams, dan kan ik wel begrijpen dat sommige dingen niet heel snel opgelost kunnen worden.	Employee Back Office
<b>Different values</b>	
Bij de back office gaat het eigenlijk gewoon maar over één ding, dat is kosten. De kosten moeten naar beneden. Voor Eneco breed gaat het over meer dingen, dan gaat het over klanttevredenheid, dan gaat het over kosten, dan gaat het ook over hoe hard lopen je klanten weg.	Product Owner IT scrum team
Het is niet alleen hoeveel werk, ook hoe moeilijk is het, hoeveel risico zit eraan.	Product Owner IT scrum team
<i>Wat denk je van alle issues die de back office doorspeelt? Let de back office ook op die klant waarde of spelen ze gewoon alles door?</i> Ik denk niet dat ze bij de back office als ze iets indienen, ook kijken naar de klantwaarde. Ik denk dat ze gewoon van alles indienen ja. En dat er bij FB ook een soort filtering inzit, van 'is dit nou echt iets of niet'.	Management FB&I
Waar zij op sturen is zoveel mogelijk klanten verkrijgen en het liefst ook wel goede klanten, maar zo veel mogelijk klanten. Die afdeling credit management zit daar dus een beetje bij, want ja je kan wel 100 klanten winnen, maar als die 100 klanten volgende maand allemaal weg zijn, dan is credit management niet blij. Dus met name credit management zit er op te sturen van 'pas op wie je als klant binnenhaalt'. Bij BO en CM is de drijfveer kostenreductie, wij willen zo goedkoop mogelijk, bij callcenter is de drijfveer klanttevredenheid (KTV), dat is trouwens bij BO/CM ook. En bij campagnes is het klant winnen. En dat staat soms haaks op elkaar. Want in het voorbeeld van de Toon, als wij 10000 Toons extra verkopen, heeft iemand van campagnes een mooie bonus, als die 10000 Toons extra betekenen dat we bij BO/CM 100 man extra nodig hebben om al die facturen te maken, dan hebben wij een groot probleem. Dus wat je ziet in de afweging moet je eens kijken, dus die dingen van die Toon, hoe belangrijk is dat, in het kader van voorkomen dat we hier teveel extra dingen moeten gaan doen. Dat soort afwegingen moet je gaan maken.	Product Owner IT scrum team
De reden dat we die mail versturen, is dat als we over een jaar mot krijgen met die andere leverancier dat we dan nog bewijs hebben met 'dat heb ik je verteld'. Dus we willen dat het wel goed gaat. Dat zijn allemaal dingen die hier wel bij horen, maar wat natuurlijk niet zo maar eventjes hier in zit.	Product Owner IT scrum team
Terwijl de business daar veel kritischer op is, die hebben veel meer het idee van 'dit doet echt pijn en al die andere dingetjes, nou steek daar niet teveel tijd in, want dat vind ik niet zo erg'.	Product Owner IT scrum team
Iets waar bij in zo'n team nooit rekening wordt mee gehouden, is informatie beveiliging. 'oh maar dan halen we dat toch even van het internet', nee, want wij mogen dat niet van het internet afhalen. Dat soort dingen die heel makkelijk lijken	Product Owner IT scrum team

We keken er ook samen naar en hij legde ook uit 'Nou dit doen, omdat het zo en zo hoort' en dan krijg je er een beter beeld bij.	Employee Back Office
Dat je meer met IT overlegt, zij gaan echt over de technische aspecten, terwijl het hier op de afdeling meer gaat over de inhoudelijke kant, hoe de processen in elkaar zitten.	Employee Back Office
<b>Testing difficulty</b>	
Ja, dat kan gewoon gebeuren, maar dat is met het bouwen van issues of software, je kan niet overal rekening mee houden. Ga maar eens allemaal bedenken wat je gaat doen. Hetzelfde geldt voor testers, je kan niet 100% testen. Daar heb je niet de tijd voor en je wil het ook gewoon niet.	Employee Back Office
Dat is gewoon een handleiding en dan kun je aan de hand daarvan je dekkingsschaal bepalen. Van hoeveel je gaat testen en wanneer is iets goed. Wat veel gebeurt is dan is jouw gedeelte wel goed afgedekt, maar dan is er ergens nog iets wat ook die functionaliteit raakt en dat gaat dan fout.	Employee Back Office
<b>Ease of use</b>	
Weet je misschien of er ruimte is in MVS om gebruikers hun taken op verschillende manier te laten doen? Nou, MVS is niet een helemaal piepjong system, het is ook niet zo heel oud. Maar het is destijds opgebouwd denkend vanuit de database. En als je een beetje een idee hebt van hoe een database werkt, je hebt tabellen en die tabellen zijn met elkaar gekoppeld. Wat ze vervolgens gedaan hebben, ze hebben schermen gemaakt die naar die tabellen kijken en waarmee je in die tabellen kunt wijzigen. Dat matcht natuurlijk helemaal niet met werkprocessen en proceslogica. Volgens mij is het gevolg daarvan geweest dat mensen een weg moeten zoeken in de tabellenstructuur, daar dan zelf een werkproces om heen bedenken en zelf trucjes gaan bedenken van hoe je iets voor elkaar krijgt, waardoor je op een aantal plekken iets moet wijzigen in die tabellen, om er voor te zorgen dat het eindresultaat dan hopelijk net doet wat je had gedacht dat het zou moeten doen. Naar verloop van tijd worden mensen daar verschrikkelijk creatief in en wat je ook ziet is, meterstandvalidatie is daar een voorbeeld van, dat het daardoor ook heel omslachtig kan worden om er mee te werken. Gewoon omdat de manier waarop het systeem toegankelijk is gemaakt, sluit niet aan bij wat de gebruikers nodig hebben.	Product Owner IT scrum team
<b>Gold-plating</b>	
Daar zijn we in het begin al ingetrapt, dat ze met een klein vraagje kwamen, en dat is wel te doen om dat te realiseren en als ze dan gaan testen, en dan misten ze dat nog en dat nog en dat nog, etc. Dat hebben we wel eens gehad, dat we dan dachten, dat is één sprint werk en dat we dan drie sprints mee aan het werk zijn geweest. Dus daar moeten we gewoon alerter op zijn en daarom is het ook belangrijk dat ze snel mogelijk gaat testen en dat we ook gewoon zo goed mogelijk doorvragen over wat heb je nou echt mogelijk, wat is nou het allerbelangrijkste om als eerst te doen. En dan zie je vaak dat er heel veel dingen ook onderweg afvallen, ja dat is dan toch niet meer zo hard nodig. Als je echt moet gaan kiezen, dan gaan ze wel kiezen.	Product Owner IT scrum team
Wat ik zie, is als je het aan IT overlaat, dat je dan niet de goede oplossingen krijgt. Dan krijg je, net zoals in het voorbeeld van dat we een kleine issue binnen krijgen, dat we er 6 van gemaakt hebben, omdat bij IT heel goed zien wat er allemaal mis gaat binnen de IT, hebben we de neiging om vaak de dingen er maar even bij te doen, want dan hebben dit ook meteen goed gezet	Product Owner IT scrum team
Door samen te werken op deze manier, geef je IT veel meer sturing	Product Owner IT

over wat belangrijk is en wat niet belangrijk is. Wat wel wat oplevert en wat eigenlijk nutteloos is.	scrum team
<b>Hard to predict succes</b>	
Nee, er is altijd wel iets fout.	Employee Back Office
Nee, meestal zitten ze wel in de goede richting, maar het is nooit, bijna nooit in een keer goed, daar kun je niet van uitgaan.	Employee Back Office
Ook dat is een beetje een vaag begrip, want je kan naar boven gaan naar iemand, naar Barry van IT of Patrick, en die zeggen ja dat is zo aangepast. Maar achteraf gezien valt het dan vies tegen.	Employee Back Office
Dus zij weten het zelf ook niet zo goed? Ja, voor hun is het makkelijk, maar voor degene die het dan gaat maken... Het is een beetje, soms is het makkelijk soms ook niet. Een simpele oplossing kan heel moeilijk zijn en andersom.	Employee Back Office
Kan je van tevoren goed inschatten hoeveel werk een issue is? Dat doen we met het hele team, daar hebben we een trucje voor dat heet pokeren. We hoeven niet absoluut te weten hoeveel werk het is, dat doen we altijd relatief.	Product Owner IT scrum team
Dus we hebben een paar dingen die we gedaan hebben, waarvan we ongeveer weten hoeveel werk het is geweest en hoe moeilijk dat is.	Product Owner IT scrum team
Hoe kunnen we dat in kleinere stukjes verdelen, zodat het iets is dat klein en overzichtelijk is? Zodat we dat ook echt kunnen doen en dat we het wel goed kunnen inschatten. En dat het niet al te lang duurt voor we in de gaten hebben dat het toch wel erg tegenvalt en ons plan kunnen bijstellen.	Product Owner IT scrum team
Maar het kan ook zijn dat iets gewoon gepresenteerd wordt als heel groot. Ik heb gewerkt aan een project en wat daar afhankelijk voor bedacht was, was dat half Eneco daarmee aan de slag moest en dat het heel veel geld ging kosten en heel ingewikkeld was. Dan weet je eigenlijk: dat moeten we niet gaan doen op deze manier, en hoe kunnen we daar iets voor bedenken dat klein en simpel is en dat je wel heel snel aan kunt passen. Dat heeft geleid tot uiteindelijk de change die we alleen met ons team hebben gebouwd en die change was i.p.v. heel duur toen opeens nog wel redelijk overzichtelijk en die hebben we verdeeld in vijf of zes afzonderlijke user stories en elke user story is dan weer heel klein in de orde van enkele dagen werk om dat te bouwen en te testen.	Product Owner IT scrum team
De komende tijd gaan we ons met name richten op het berichtenverkeer. Daar beginnen we nu met workshops met gebruikers, hoe zou dat eruit moeten zien? Hoe kunnen we dat beter doen? Wat is daarin handig? Wat zou je daarin willen zien? Waar gaan dingen fout? Welke fouten moeten we kwijt? Wat dat gaat opleveren, ik weet het echt nog niet, het is helemaal open.	Product Owner IT scrum team
Dat is heel moeilijk te zeggen. Ik ben vroeger in een ver verleden ontwikkelaar geweest, en van sommige dingen denk je 'dat heb ik zo gedaan' en dan blijkt het toch moeilijk te zijn, en van sommige dingen denk je 'nou' en die heb je in een fluitje van een cent klaar. Ik denk dat daar heel veel ervaring bij komt kijken, om te kunnen bepalen wat is de impact, heel lastig. Ansich moeten deze mensen dat wel weten en die key users zouden dat ook nog een beetje moeten weten. Maar dit zou je aan Jennifer kunnen vragen, maar ik denk voornamelijk ervaring.	Management FB&I
Maar daar zitten dingen tussen die heel simpel zijn, en er zijn dingen die zo ..., deze bijvoorbeeld, verbeteren automatische gebeurtenissen disputeren, dat klinkt heel simpel, alleen de praktijk blijkt als je daarmee aan de slag gaat, dat er veel meer achter zit dan degene die dat bedacht heeft, van wie die dat oppakken, overziet.	Product Owner IT scrum team



Dat klinkt niet zo ingewikkeld	Product Owner IT scrum team
Komt het vaak voor dat dingen die klein lijken toch heel groot blijken te zijn of zijn dat echt de uitzonderingen? Nee, dat komt heel vaak voor.	Product Owner IT scrum team
<b>ICT flexibility</b>	
Dat is heel complex, dat komt omdat we heel veel verschillende variaties hebben van hoe dingen door het systeem lopen. Het is niet zo makkelijk als het getekend wordt, dat is niet zomaar gerealiseerd.	Product Owner IT scrum team
<b>ICT legacy</b>	
het is een beetje een lappendeken geworden, omdat elke keer er een functionaliteit er aan vastgeknoopt wordt.	Employee Back Office
En dat maakt soms dat je heel veel overbodige melding krijgt en dat die uit het verleden komen, uit een andere tijd die er nog steeds in staan. Het betekent ook dat je heel veel functies hebt, heel veel code die eigenlijk overbodig is of niet goed meer werkt of niet meer van belang is maar er nog steeds in zit. Of eigenlijk maar een heel klein stukje van gebruikt wordt.	Employee Back Office
Ja dat maakt het af en toe wel traag en moeilijk en zeker voor daarboven, ja als ze een wijziging willen maken, ja wat is het eigenlijk, en wat doet het en wat gebeurt er als ik dit doe.	Employee Back Office
gewoon iets teveel weggegooid	Employee Back Office
Het zit een beetje raar, LKR is eigenlijk een restant van het systeem dat we voor avanti hadden	Product Owner IT scrum team
MVS is niet een helemaal piepjong system	Product Owner IT scrum team
Ja, en dan zijn er verder nog van die stomme dingen ingebouwd, van weet je het zeker, ja natuurlijk weet ik het zeker. Als je 1000 keer op weet je het zeker drukt, kan je die knop beter weglaten, want die ene keer dat je je vergist, dan druk je eerst op die knop en dan denk je daarna pas ik heb me vergist.	Product Owner IT scrum team
Er zitten best wel overbodige handelingen in en ja dat is historisch gegroeid en vervolgens worden er dingen mee aangebakken of nieuwe functies aan toegevoegd of dingen veranderd en ja dat maakt het dan niet altijd beter voor gebruikers.	Product Owner IT scrum team
Het systeem is ingewikkeld, de code is ingewikkeld, de afspraken, de werkingen in de energie markt zijn ingewikkeld het is allemaal ingewikkeld.	Product Owner IT scrum team
dat zijn coderingen die niet goed staan, op een gegeven moment heb je, het is best een ingewikkeld landschap hier bij Eneco, het zijn heel veel systemen en data wordt meegenomen van de systemen naar andere systemen.	Management FB&I
Dus in wezen is het een goed systeem, maar het is heel moeilijk voor ontwikkelaars om heel snel aanpassingen te doen, omdat het juist zo ingewikkeld is.	Management FB&I
Gewoon het hele ICT landschap is ingewikkeld, niet alleen MVS, dus ook alle randsystemen die er omheen zitten en gekoppeld zijn.	Management FB&I
Het komt gewoon omdat je een stukje historie met je meedraagt.	Management FB&I
Maar nu sleep je gewoon alles mee van 15 jaar geleden ofzo.	Management FB&I
Als je een nieuw bedrijf bent, dan kies je een ontwikkelplatform en daar ga je alles op bouwen. Dan is het veel simpeler. Maar nu sleep je gewoon alles mee van 15 jaar geleden ofzo.	Management FB&I
Het is moeilijk om aanpassingen te doen, dus met IT	Management FB&I
er zit daar dus een enterprise architect er is blijkbaar een of andere module en die willen zij gaan inpassen in het landschap en de enterpirse architecten, die beheren het IT landschap en zij proberen dat dus zo simpel mogelijk te houden, dus allemaal rechte paadjes	Management Back Office

en laantjes en heggetjes. Zij zeggen of er een vijvertje bijkomt of niet.	
we kennen onze IT onvoldoende aan de IT kant	Product Owner IT scrum team
het is een beetje als een huis waarvan iedere bewoner er elke 2 jaar een nieuw stukje aanbouwt, als je dat na 20 jaar ziet heb je zoveel bultjes, zou zien heel veel stukken van onze code er ook uit.	Product Owner IT scrum team
Dat is de onderhoudbaarheid heel slecht, dat is voor snappen wat ie doet, heel moeilijk, om te testen heel vervelend.	Product Owner IT scrum team
als wij het onderhoud goed doen, zouden de issues omlaag moeten gaan. Als we het systeem eenvoudiger maken en beter onderhouden, zouden er minder vaak problemen moeten gaan optreden en zou je daar ook minder tijd aan kwijt moeten zijn.	Product Owner IT scrum team
<i>En het zou de wijzigingen ook makkelijker moeten maken toch, omdat je code overzichtelijker is? Ja</i>	Product Owner IT scrum team
Ja ik heb er geen problemen mee. Het is alleen het nadeel dat er zoveel verbouwd is aan MVS. Waardoor sommige dingen anders functioneren.	Employee Back Office
<b>ICT policy</b>	
dan zullen ze dus ook bij ons langskomen, 'he we willen wat van jullie, ga dat voor ons regelen', en de rol van de product owner is om daar een soort evenwicht tussen te zoeken. Om te gaan bepalen oke als ik heir voor toon een opdracht krijg, hoe verhoudt zich dat tot een verzoek dat ik vanuit mijn eigen domein krijg. En dan kan je dus best wel discussies krijgen oke als ik hier nu uitval in een proces heb, wil opgelost hebben, waar 5 fte aanzitten, die we nuttiger kunnen inzetten als ze dat niet hoeven te doen, versus deze opdracht waar bij gezegd wordt ja maar toon is onze toekomst, daar moeten we nu tijd in steken. Dan moeten we dus daar als product owner gaan zoeken wat is nu de keuze die we moeten maken. En dat moeten wij organiseren, dat is een van de rollen die je als product owner zeg maar hebt.	Product Owner IT scrum team
En hoe doen je dat nu? Hoe kies je daar tussen? Is daar een beleid voor? Daar zijn we nu naar op zoek, dat is iets wat we nu aan het zoeken zijn.	Product Owner IT scrum team
En bij elk geval maak je die afweging weer opnieuw? Er is geen stappenplan? Ja. Nee, waar we nu naar aan het kijken zijn, is hoe ga je nu die dingen met elkaar vergelijken.	Product Owner IT scrum team
Maar realistisch, we zijn er nog niet uit, laat ik het zo maar zeggen.	Product Owner IT scrum team
Wat ik heb begrepen is dat ze kijken naar prioriteiten met wat ze willen oppakken en wat niet. In de nieuwsbrief stond daar laatst ook wat over, over het pokersysteem, hoe ze die issues oppakken.	Employee Back Office
<b>IT resources</b>	
Voorheen hadden we altijd heel veel hele grote projecten, zoals Oxxio die overgenomen wordt, dus dan zit de hele IT afdeling voor 70% gewoon op Oxxigen. En die andere 30%, ja die kan dan haast niks oppakken, dus wat er dan nog opgeleverd wordt ja dat is minimaal. Dus dat is, ja en nu is het eigenlijk precies andersom. Nu is iedereen wel vrij, maar volgend jaar worden ze allemaal ontslagen. Wij hebben hier net een ontslag ronde gehad, maar bij IT gaat ook 45% eruit, dus alle externen worden eruit gemikt en alles met een contract gaat eruit, dus dan blijft weer alles liggen.	Employee Back Office
Daar zit een systeem dat heet LKR, wat we daarin nog gebruiken, daar willen we wel vanaf, maar dat is nog.	Product Owner IT scrum team
daar zitten nog een aantal functies in die naar avanti gemigreerd moeten worden. Dus op den duur gaat dit eruit.	Product Owner IT scrum team
Of als het heel dringend is en wij hebben er echt geen tijd voor of er nog dingen zijn die nog veel dringender zijn, dan kan ik ook de	Product Owner IT scrum team



andere product owners vragen om mij te helpen.	
Betekent dat ik in een sprint, 2 of 3 incidenten kan oplossen, meer niet. Nou dat is niet zo heel veel. En daarnaast heb je nog wel tijd voor andere verplichtingen en dan kan ik aan één grote wijziging werken, dat is alles wat je kunt doen. Dat betekent ook dat heel veel van de dingen, waar van je eigenlijk wel met z'n allen vinden dat het moeten gebeuren, gebeurt gewoon niet.	Product Owner IT scrum team
<b>Inter-department communication</b>	
ik doe het per mail of Lync of ik loop gewoon effe langs.	Employee Back Office
En doet iedereen dat? Of doe alleen jij specifiek als tester dat? Ja degenen die ze kennen. Ik ken ze wel omdat ik al heel lang met ze werk, dat is dan een beetje het netwerk dat ik dan heb.	Employee Back Office
Er komt elke keer nieuwe bij, het is maar de vraag wanneer jouw issue eens opgepakt wordt	Employee Back Office
Nee, het is allemaal een beetje gissen	Employee Back Office
Dat is dan hun backlog, maar dat communiceert ie niet echt,	Employee Back Office
Dus aan de ene kant is er dan wel een prioriteiten lijstje, maar aan andere kant is het ook wie het hardst lobbyt, wie het hardst roept, die heeft voorrang? Ja, het is een beetje vaag gebied, het kan ook heel lang duren voor dat wij een issue nummer terug krijgen. Ja, heb ik het nou ingediend of niet, waarom krijgen we dat niet? Het lijkt af en toe alsof het willekeurig is, of dat zij ook mee willen beslissen over wat er gebeurt. Dat betekent dat je als afdeling Markt weer een extra horde moet nemen omdat je elke keer langs functioneel beheer moet. Het is heel vertragend voor ons.	Employee Back Office
Maar dat wordt niet gecommuniceerd en als het gecommuniceerd wordt, dan komt het iig niet op de afdeling terecht.	Employee Back Office
Nou, ik wil dit gewoon eigenlijk het liefst direct doen. Functioneel beheer mag wel meedoen in de discussie, maar ik wil direct met de eindgebruikers zoveel mogelijk het gesprek hebben.	Product Owner IT scrum team
Stel er wordt een issue opgepakt en het komt op de lijst, want het heeft geen hoge prioriteit. Wordt dit op een manier terug gekoppeld naar de back office? Als ik het op de lijst zet, dan vertel ik dat het op de lijst staat en waar het ongeveer op de lijst staat. Aan de gebruiker die het heeft ingediend of aan functioneel beheer? Meestal lopen die kleine dingen via functioneel beheer, de grotere dingen dat loopt dan via andere kanalen, dus dat heeft andere manier van communiceren.	Product Owner IT scrum team
Verder probeer ik in ieder geval een aantal mensen elke drie weken even te spreken, zodat ik ze ook zelf kan vertellen wat er gebeurt en wat de status is. Ik bedoel dingen die ze van me willen, bijvoorbeeld, met name functioneel beheer doe ik dat mee, maar ook Rob Porton, die spreek ik zoveel mogelijk, eigenlijk elke drie weken. Dat is natuurlijk wel belangrijk, ik probeer ook regelmatig de mensen van klantenservice even te spreken,. Om te weten wat daar gebeurt. Ik probeer ook regelmatig customer journey mensen te spreken.	Product Owner IT scrum team
Dan nog de laatste vraag, denk je zelf dat er nog andere verbeteringen hier kunnen worden gedaan hier op de back office? Ja heel veel. Ja als je nu kijkt, heb je drie afdelingen, en je merkt gewoon dat de communicatie onderling nog niet helemaal goed gaat en dat zie eigenlijk tussen markt en nota. Ze hebben elkaar nodig en ze doen allebei een bepaald stukje van de oplossing van het probleem, maar dat gaat niet helemaal soepel door die overdrachtsmomenten. Dat proberen ze nu een beetje te doen met multidisciplinaire teams of ze stoppen markt en nota bij elkaar en die gaan aan iets werken. En in die ABT teams zouden dan mensen van Markt, Nota en FB&I moeten zitten, dus dan ga je ze ook bij elkaar	Management FB&I

zetten, waardoor je ook betere communicatie en focus krijgt.	
dit is een productie afdeling en gewoon nog niet goed in IT uitleggen van wij doen het nu zo met de hand en wij hebben dit nodig om het te automatiseren, dat is wel de stap die we nu aan het maken zijn.	Management Back Office
Het is echt verschrikkelijk, we hebben geen idee wat er gebeurt.	Management Back Office
functioneel beheer hoort binnen de business te zitten, maar in de praktijk is dat niet zo. Zij zijn een eigen afdeling en leggen geen rekenschap af aan ons. Als zij in onze teams zaten, dan zouden wij veel vaker tegen ze zeggen dat ze meer vaart moeten maken.	Management Back Office
Ik zou functioneel beheer dus ook hier op de afdeling willen hebben, zodat hun lijsten identiek zijn aan onze lijsten. Zodat zij met ons en namens ons spreken i.p.v. dat wij tegen hen en zij tegen ons aanpraten. Zo voelt het, we praten niet met elkaar, maar tegen elkaar.	Management Back Office
Het is ook heel vaak 'deze case die ik hier zie, is niet goed, doe hier iets aan', ja dan zou ik ook zeggen 'ja doe!'. Dus je hebt ook mensen nodig die op de juiste manier een vraag stellen, die zelf al het vooronderzoek doen. Niet iedereen bij ons op de afdeling kan dat, dat geef ik toe.	Management Back Office
Een deel van de verspilling is dat we op FB beheer aan het wachten zijn en dan gaan we zelf maar met de product owner praten en die raakt dan ondertussen afgeleid en die overlegt dan weer met functioneel beheer dat hij is aangeschoten door ons en dan gaat functioneel beheer weer met ons praten dat wij niet rechtstreeks met de product owner mogen praten. En dan zegt de product owner 'ja maar zij mogen wel rechtstreeks met ons praten'.	Management Back Office
Wederzijds onbegrip is het hoor, laten we daar heel duidelijk over zijn.	Management Back Office
wij zijn in september gestart en we zijn nu bijna 2 maanden bezig. De andere teams, F&I en levering, die zijn al een jaar bezig, die zijn al veel beter in staat om hun stakeholders te vinden en te betrekken bij wat ze aan het doen zijn dan wij. Dus die interactie is noodzakelijk om te zorgen dat inderdaad snapt waarom we sommige dingen in kleine stukjes ophakken.	Product Owner IT scrum team
Dus wat heeft het team gezegd, dat gaan we in een keer oppakken. Alleen dat had het team nooit zelf moeten bedenken. Dat hadden we in overleg moeten doen. Het gevolg is dat dit item veel groter was, hij is 6x zo groot geworden en ja dat kost het meer tijd om het op te leveren.	Product Owner IT scrum team
Alleen wat we nog niet heel erg sterk doen, is daarover afstemmen op de business.	Product Owner IT scrum team
maar wat blijkt als we dat contact goed hadden gedaan, had dat allemaal goed gelopen. Wat je dus ziet is dat we doordat heel gespecialiseerd werken en in allemaal silootjes en dat we dus ook de uitval oplossen in die silootjes.	Product Owner IT scrum team
Zijn er nog meer kenmerken van IT waarvan jij denkt dat het verbetering op de back office kan tegen houden? Ja er is er nog een. Wat die driehoek eigenlijk hier heeft te maken met communicatie.	Product Owner IT scrum team
Door die dialoog te doen, krijgen de mensen die in dit team meedraaien, die redenen mee. Waardoor ze ook voor zich zelf inschatten van 'he is dit de effort waard om dit aan IT te vragen of moeten we hier eerst kijken of we zelf dingen kunnen gaan regelen'.	Product Owner IT scrum team
Zou je het proces kunnen tekenen hoe issues bij IT terecht komen? Ik vind persoonlijk dat er teveel schakels tussen zitten, maar dat is mijn mening. De ene keer mag ik het weer wel indienen en de volgende keer mag dat weer niet en dan wordt het weer	Employee Back Office

teruggefloten. Als je een issue hebt, dan moet hij naar een key user toe, volgens mij.	
Het format invullen is een hele hoop werk met een hoop puntjes erbij, dit en dat en zus en zo.	Employee Back Office
Daarom zeg ik, weg met die papierwikkels. Praat dan met iemand die het ingediend heeft, met iemand die het ook moet maken.	Employee Back Office
Ik denk dat het niet eens bij de IT afdeling komt. FB&I moet beslissen, we gaan het wel of niet doen. En daar gaat het eventueel pas naar boven toe. Maar ik denk dat het gewoon hier ligt en blijft liggen.	Employee Back Office
Door gelijk te schakelen met degene die het indient. Ik vind dat als jij dingen indient, want jij weet wat je wilt en niet via al die tussenpersoontjes. Dat lijkt me veel handiger en beter en veel sneller.	Employee Back Office
<b>Difficulty of IT changes unknown</b>	
Denk je dat de back office een duidelijk beeld heeft van wat gemakkelijk en moeilijk aan te passen is? Dat is heel wisselend, het verschilt nog al van persoon tot persoon en de afdeling. Er zijn mensen die gewoon één keer iets raars zien en meteen een incident ervan maken en functioneel beheer ermee lastig vallen en dat soort dingen. Er zijn anderen die dat veel minder doen.	Product Owner IT scrum team
En wat ik ook denk, is dat niet alle medewerkers bij de back office altijd weten wat ze moeten vragen.	Product Owner IT scrum team
Denk je dat mensen op de afdelingen een goed beeld hebben van wat er wel in MVS verbeterd kan worden en wat niet? Nou het is heel vaak, van kan er niet een knop komen die dit voor me doet.	Management Back Office
Maar daar zitten dingen tussen die heel simpel zijn, en er zijn dingen die zo ..., deze bijvoorbeeld, verbeteren automatische gebeurtenissen disputeren, dat klinkt heel simpel, alleen de praktijk blijkt als je daarmee aan de slag gaat, dat er veel meer achter zit dan degene die dat bedacht heeft, van wie die dat oppakken, overziet.	Product Owner IT scrum team
Wat je ziet, mensen die iets aan IT vragen, zijn altijd teleurgesteld over de tijd die iets kost. En waarom, omdat zij toch iets heel simpels vragen. Zij hebben een beeld met over hoe moeilijk iets zou zijn en dat komt niet overeen met de realiteit.	Product Owner IT scrum team
Heb je het gevoel dat dingen in MVS makkelijk aan te passen zijn? Sommige dingen denk ik dat heel simpel zijn, ja. Dat weet ik wel zeker trouwens. Wat voor dingen dan? LKR uitval, dat ze die eens aanpakken. Want bij sommige dingen krijg ik nog dat er een nota adres gewijzigd is. Maar als je gewoon maakt, dat hij daar niet meer naar kijkt, dan loopt de uitval af. Het zijn hele simpele dingen.	Employee Back Office
Heb je het gevoel dat MVS gemakkelijk aan te passen is? Ik denk het niet.	Employee Back Office
<b>Intra-department communication</b>	
Die issues komen dan binnen bij functioneel beheer, maar je weet dus niet wat andere mensen indienen, dat weten we eigenlijk niet eens van onze eigen afdeling.	Employee Back Office
Dus het kan zijn dat het komt bij Quinten, Jan-Jacob, Riddhima, wie dan ook, maar het komt in ieder geval niet hier op de vloer terecht. En dan is nog een keer de vraag, wat heb je er eigenlijk aan. Behalve dan dat ze meer weten.	Employee Back Office
Aan de andere kant, je hoort helemaal niks over wat er gaat komen of wat er speelt.	Employee Back Office
Een user story is een klantwens van IT, iets van een klant wil hebben. Het gaat vooral om wat, niet over hoe je dat doet. Wat wil je kunnen als gebruiker? En waarom wil je dat kunnen, dat is heel belangrijk. En dan ga je het vervolgens hebben over wat wil je dan kunnen, waarom wil je dat dan kunnen? En dan diep doorzeuren	Product Owner IT scrum team

over waarom die dan wil. En als dat voldoende duidelijk is dan zijn die IT'ers ook veel beter in staat om te bedenken hoe je dat dan kunt gaan doen.	
Dat is iets wat we voor hen gebouwd hebben. Daar was min of meer een idee over wat ze wilden. Dat was ook weer heel groot dus dat hebben we in kleine stukjes geknipt om dat ook realiseerbaar te maken. Wat we daar gedaan hebben, dat is toch wel een beetje nieuw, nog steeds wel een beetje uniek vrees ik. Elke keer zijn we gewoon naar de gebruikers toegegaan, is dit wat je bedoeld, is dit wat je wil hebben. Kijk het zou er zo uit kunnen zien, is dat goed op deze manier. Een klein stukje bouwen, kun je hier alvast even naar kijken, even mee spelen, ga het even testen. Kijk wat het doet, doet het wat het moet doen? Constante terugkoppeling, constant de gebruikers erbij betrekken, constant blijven vragen zijn we nog de goede dingen aan het doen?	Product Owner IT scrum team
vooral inzoomen op verspillingen. En hoe je daar mee moet stoppen. Dus herhaalverkeer, maar ook niet alleen op deze afdeling, maar ook over de mail intern, niet dingen over de schutting gooien, niet altijd beginnen met tegenhouden, frustreren, tenminste zo voelt het dan voor de andere, niet altijd je eigen input moeten geven, maar wat meer meebuigen in andermans idee.	Management Back Office
Die mensen praten niet met elkaar en dat probeer ik te bewerkstelligen.	Management Back Office
Toen ik hier binnen kwam, hadden mensen zelf hun eigen lijstjes die ze deden, ze deelden dat niet met elkaar	Management Back Office
Bijvoorbeeld als een vlot gaan wiebelen, dan gaan mensen heen en weer rennen en je moet een iemand hebben die zegt 'stop, jullie gaan iets minder ver rennen' en zo breng je het weer in balans. Dat is ook de taak van de teamleiders, om het te laten stoppen met wiebelen. 'jullie doen nu even dit en jullie doen nu even dit' en op die manier ontstaat er weer balans in het werk. Met mensen die los van elkaar bedenken wat ze moeten doen, dan slaat de balans uit. Er is altijd wel een weeshuis dat in brand staat hier, maar als je met z'n allen weet dat het goed is om dat uit te laten branden, want er zitten geen weeskindjes in, dan is dat prima. Maar niet iedereen weet dat en veel mensen gingen op eigen initiatief daar staan blussen.	Management Back Office
Een ander voorbeeld was dat er iets miste van de klantgegevens, dan werd er met een query een excel gemaakt, dat werd naar een andere afdeling gestuurd en dan ging men daarna handmatig de stamregisters opvoeren. Het bleek toen dat alle gevallen die mis gingen, kwamen doordat zij die specifieke gevallen handmatig hadden ingevoerd en een veld niet invulden. Dat waren ze vergeten, omdat het niet in hun werkinstructie zat. Niemand had bedacht dat het een op een hetzelfde was. Waarschijnlijk deden op die afdeling verschillende personen deze twee taken, omdat ze beide daar gespecialiseerd in waren. Je moet hen dus met elkaar laten praten.	Management Back Office
Wat denk je dat er naast verbeteringen in MVS nog meer verbeterd kan worden? Oh de communicatie, maar daar hebben we het al jaren over gehad. Welke communicatie dan? Van alles. Wij moeten bijvoorbeeld vragen hoe het met Melanie is, toevallig zegt Quinten het dan vanmorgen, omdat hij er toevallig bij staat. Als wij het gaan vragen aan een medewerker 4, dan weten ze niet hoe het met Melanie gaat. Issues precies hetzelfde, je hoort niets. Stel dat er dingen spelen, als er iets wordt veranderd of dit komt er aan, dit gaat er gebeuren, je hoort niks. Jacq en Annemiek vertellen nog wel eens wat, maar ook niet alles.	Employee Back Office
Dus je krijgt nooit geen informatie, niks!	Employee Back Office
En dan vragen wij of er wat te vertellen is en dan zeggen ze niks. En dat is het. Waarom heb je dan die overleggen? Dat hoor je nooit en	Employee Back Office

dat is al jaren zo. Ietsje pietsje verbetering zat erin, maar dat was minimaal.	
Denk je dat er nog meer punten van IT zijn die invloed kunnen hebben op het verbeteren? Ja, dan kom je weer op communicatie. Als er iets veranderd is, dan moeten ze dat mededelen en dan moeten ze vertellen wat er veranderd is en waarom het veranderd is. Dat krijg je nooit te horen. Eerst kwamen er nog wel eens mailtjes trouwens over wat er in productie was genomen, maar die mailtjes zie ik al weken niet meer. Ik vraag me af of er nog wel eens wat opgeleverd wordt.	Employee Back Office
Door zo'n nieuwsbrief weet je dan ook wat er op IT niveau leeft.	Employee Back Office
<b>IT language</b>	
Als je met een hele technische aanpassing bezig bent, dan is het veel moeilijker om ze erbij te betrekken, dan wanneer het heel erg aan de gebruikerskant zit.	Product Owner IT scrum team
Maar ik vond de samenwerking met IT echt super, ze praten wel in bepaald jargon he. Maar ze houden daar wel altijd rekening mee en de uitleg is altijd wel heel erg te volgen.	Employee Back Office
<b>KPI presentation</b>	
het is wel mooi om bij te houden wanneer je al die verbeteringen doet, want toch een soort van logboek houden van je verbeteringen bij houden helpt wel echt. Voor feedback en om keuzes te maken in de toekomst. Wij worden gewoon niet geloofd. Als je zegt productie is verdubbeld, eerst zaten er 20 mensen aan en nu nog maar 10, dan zeggen ze dat het door IT komt. 'nee, dat is nu niet zo want ze doen er nu 2x zoveel per dag' 'ja dat komt door IT dat ze er 2x keer zoveel per dag doen', 'nee dat komt doordat we slimmer werk zijn uit gaan zetten, beter zijn gaan segmenteren, dat we mensen die goed waren in bepaalde klusjes, die klusjes gaven en mensen die daar minder goed in ware, makkelijkere cases gaven'. We spraken af dat je niet meer de hele dag gaat ouwehoeren en kwamen er ook achter dat bepaalde taken nul toevoegde. Dat het systeem het gewoon 10 uur later oppakte en dat je er gewoon vanaf kon blijven. En dat word dus niet geloofd en daarom is het belangrijk om een logboek bij te houden, zodat je kunt onderbouwen wat de verbeteringen zijn.	Management Back Office
<i>Wordt er feedback gegeven op de verbeteringen?</i> Dit is heel moeilijk. Het is aan de ene kant goed om bij te houden wat je verandert, maar om dan telkens te gaan verklaren wat het resultaat precies is, is heel moeilijk. Dus daar moet je niet helemaal in verzanden. Wanneer stop je met detail toevoegen?	Management Back Office
Daarin wordt gewoon besproken wat de voorgang is en waar men de afgelopen week mee bezig heeft gehouden. Dat is een handige informatie bron over wat er afgelopen week is gebeurd en hoe we er voor de komende week ervoor staan	Employee Back Office
<b>Learning phase of IT</b>	
En hoe maak je die afweging dan precies? Zit daar een beleid in door heel Eneco heen of is het een beetje wat je zelf? Dat zijn we nog een beetje aan het bedenken	Product Owner IT scrum team
Ja, het gaat eigenlijk wel heel goed na een tijdje, maar je moet dat oefenen. Je moet ervaring op doen, je moet het steeds met hetzelfde team doen. Als je elke keer een wisselend team hebt, dan werkt het niet. Dus er zijn wel een aantal randvoorwaarden, maar het werkt wel.	Product Owner IT scrum team
Het is bijvoorbeeld lastiger als je niet precies weet wat je ervoor moet doen, als het nieuw is, het een onbekend iets is, als je er geen ervaring mee hebt of als het gaat over een code waar je al een tijdje niet mee gewerkt hebt of iets aan hebt veranderd. Dus dat bepaalt voor een deel of iets wel of niet lastig is. Dus het is vooral als het	Product Owner IT scrum team



nieuw is.	
Als je dan de eerste dingen hebt gebouwd, dan weet je hoe het gaat, dan weet je hoe moeilijk het is om het op te leveren naar productie. Je leert dus ook bij.	Product Owner IT scrum team
En verder de hele werkwijze zijn we nog aan het leren en dat is en dat leren gaat ook nog een tijd door. We hebben drie niveaus bedacht, dolfijn, ijsbeer en tijger. En wij moeten nog dolfijn worden en dat is het eerste niveau. Dat gaat vooral over de samenwerking, het tweede niveau gaat vooral over voorspelbaarheid en het derde niveau gaat vooral over performance, kun je meer doen, kun je extra dingen toevoegen?	Product Owner IT scrum team
Dat proberen we nu om te draaien en je merkt dat er nog steeds mensen zijn wel heel erg vanuit die cultuur denken en het is lastig om dat denken te veranderen.	Product Owner IT scrum team
Daar zijn we nog aan het zoeken hoe we dat zo efficiënt mogelijk vorm kunnen geven.	Product Owner IT scrum team
dat moet zich voor een deel nog wijzen	Product Owner IT scrum team
En hoe doen je dat nu? Hoe kies je daar tussen? Is daar een beleid voor? Daar zijn we nu naar op zoek, dat is iets wat we nu aan het zoeken zijn.	Product Owner IT scrum team
wat je ziet is dat we daarin elkaar nog moeten vinden	Product Owner IT scrum team
wij zijn in september gestart en we zijn nu bijna 2 maanden bezig. De andere teams, F&I en levering, die zijn al een jaar bezig, die zijn al veel beter in staat om hun stakeholders te vinden en te betrekken bij wat ze aan het doen zijn dan wij.	Product Owner IT scrum team
Het is een beetje iets wat we nog niet kunnen	Product Owner IT scrum team
voor een stukje zijn we dat helemaal niet gewend om dat überhaupt te vragen, dus dat we maar zelf door gaan op de weg waarvan wij denken dat hij goed is en dat we naar twee maanden erachter komen van 'ja dat was helemaal niet nodig'	Product Owner IT scrum team
<b>Neglected politics</b>	
en daar kun je wat eisen aan stellen en requirements. En dat wordt dan gebouwd door IT en dan wordt het opgeleverd en dan kijken we wat wij willen of dat ook is opgeleverd.	Employee Back Office
Wat ik zie, is als je het aan IT overlaat, dat je dan niet de goede oplossingen krijgt. Dan krijg je, net zoals in het voorbeeld van dat we een kleine issue binnen krijgen, dat we er 6 van gemaakt hebben, omdat bij IT heel goed zien wat er allemaal mis gaat binnen de IT, hebben we de neiging om vaak de dingen er maar even bij te doen, want dan hebben dit ook meteen goed gezet	Product Owner IT scrum team
voor een stukje zijn we dat helemaal niet gewend om dat überhaupt te vragen, dus dat we maar zelf door gaan op de weg waarvan wij denken dat hij goed is en dat we naar twee maanden erachter komen van 'ja dat was helemaal niet nodig'	Product Owner IT scrum team
<b>Overestimation of IT</b>	
Denk je dat er naast verbeteringen in MVS ook nog andere dingen verbeterd kunnen worden? Op de afdeling bedoel je? Ja, veel gehoorde klachten zijn dat je de teamleiders nauwelijks ziet of hoort	Employee Back Office
Verder nog verbeteren, juist niet in MVS, maar iets anders? Nee, ja die stomme schotten kunnen weg.	Employee Back Office
Het is niet altijd zo dat je IT nodig hebt om zaken te doen. Want wat ze nu doen is bijvoorbeeld handmatig ook een hele hoop rechtzetten.	Management FB&I
Enerzijds proberen we dat zelf op te lossen en anderzijds doen we dat in samenwerking met IT.	Management FB&I

En dat komt met name door heel hard roepen dat het gewoon sneller kan en wat dan ook vaak blijkt is dat de verspilling niet zit in de IT, zoals vaak wordt gedacht, maar dat je eerst echt werk zoals het gedaan wordt, dat je je daarin moet gaan verdiepen en het een beetje moet inkoken totdat je echt ziet wat de werkelijke remmen zijn als je echt handig zou gaan werken en dan kom je vaak pas bij IT uit	Management Back Office
Als je zegt productie is verdubbeld, eerst zaten er 20 mensen aan en nu nog maar 10, dan zeggen ze dat het door IT komt. 'nee, dat is nu niet zo want ze doen er nu 2x zoveel per dag' 'ja dat komt door IT dat ze er 2x keer zoveel per dag doen', 'nee dat komt doordat we slimmer werk zijn uit gaan zetten, beter zijn gaan segmenteren, dat we mensen die goed waren in bepaalde klusjes, die klusjes gaven en mensen die daar minder goed in ware, makkelijkere cases gaven'.	Management Back Office
Dus het gaat om awareness creëren bij de werknemers? Niet alleen bij de werknemers. Ook die mensen die daar bijvoorbeeld aan het overleggen zijn met capgemini, die geloven ook dat het door IT moet. Terwijl ik hier zit en gewoon heb gezien dat het ook kan door naar de werkprocessen te kijken en alle overbodige stappen eruit heb geschraapt.	Management Back Office
ik geloof ook niet dat ik en anderen klaar zijn met het inkoken van het werk en dan pas hebben we IT nodig.	Management Back Office
Ik denk het laatste, dat ze zonder IT al heel veel kunnen verbeteren.	Product Owner IT scrum team
Wat voor dingen zijn dat dan? Vooral in MVS of ook nog ernaast? In MVS.	Employee Back Office
Denk je dat er naast MVS, nog meer dingen verbeterd kunnen worden op deze afdeling? Uhm, ja ik weet niet waar het aanligt, maar soms ontbreken er gegevens en dan staat nog niet alles in MVS. Dit komt maar bij enkele aansluitingen voor. Soms staat de vorige leverancier niet in. Het is een heel goed systeem hoor, maar het zijn gewoon de kleine dingen. Ik weet niet waar het aan ligt, of het in het systeem ligt of aan een bepaalde input. Weet je verder nog andere verbeteringen, dus helemaal los van het systeem en de computer, dus dingen van de afdeling? Uh, [blijft lang stil], met IT iets technisch. Ik denk echt meer wat op het bord staat en die afgehandelde berichten, maar dat zijn meer die technische dingen, dat hebben we ook bij IT uitgevraagd. [verhaal over verbetering in MVS]. Wat heb je nog meer? [verhaal over nog een verbetering in MVS]. Het zijn echt van die kleine dingetjes.	Employee Back Office
Dan werk je aan een verbetering. Dan moet je kijken is het iets technisch of is het een beetje onmacht dat de klant het gewoon verkeerd doet.	Employee Back Office
<b>Process overview</b>	
Hoe bedoel je dat? Nou als je bij elkaar zit, dan denk je als ik dit doe, dan hebben ze daar er last van. of stel we gaan dit aanpassen, dat loopt het beter door, dat zie je nu niet echt. Omdat er geen interactie is tussen Markt en Nota.	Employee Back Office
Heb je enig idee waar het naar toe gaat na dat jij het hebt ingevoerd. Heb je dan een idee gaat het naar nota, gaat het naar front office of is het meteen opgelost? Ja, dan gaat het naar Nota. Tenminste bij verhuizingen of wat dan ook, dan valt ie uit en dan komt ie bij TeMa uit of de standen komen binnen van de klant en dan komt ie hier gewoon uit, als wij klaar zijn, dan gaat ie naar Nota en daar wordt ie gefactureerd, voorschot, jaarnota, eindnota, wat dan ook.	Employee Back Office
En is het ook duidelijk voor de meeste mensen op de afdeling hoe de meeste dingen precies gaan, hoe het gaat en naar wie het nou gaat? Denk het niet, voor de mensen die nu nog over zijn wel, voor de andere groep niet.	Employee Back Office

Wij moeten dit doen, want anders zijn die andere mensen daar niet blij mee. Wij moeten A, B en C doen, anders kunnen zij niet aan D beginnen. Maar wat dan heel vaak blijkt, is dat als je A doet, dat B en C niet nodig zijn voor het starten met D.	Management Back Office
Een ander voorbeeld was dat er iets miste van de klantgegevens, dan werd er met een query een excel gemaakt, dat werd naar een andere afdeling gestuurd en dan ging men daarna handmatig de stamregisters opvoeren. Het bleek toen dat alle gevallen die mis gingen, kwamen doordat zij die specifieke gevallen handmatig hadden ingevoerd en een veld niet invulden. Dat waren ze vergeten, omdat het niet in hun werkinstructie zat. Niemand had bedacht dat het een op een hetzelfde was. Waarschijnlijk deden op die afdeling verschillende personen deze twee taken, omdat ze beide daar gespecialiseerd in waren. Je moet hen dus met elkaar laten praten.	Management Back Office
Weten mensen wat de volgende stap is? Nee, ik denk het niet.	Management Back Office
wat we nu hebben, is voornamelijk arbeidsverdeling, iedereen doet een stukje. Ik denk als je dat zou omzetten in ketens, dat dat iets is wat je in het proces vrij eenvoudig zou kunnen realiseren, waar je helemaal geen IT voor nodig hebt.	Product Owner IT scrum team
maar wat blijkt als we dat contact goed hadden gedaan, had dat allemaal goed gelopen. Wat je dus ziet is dat we doordat heel gespecialiseerd werken en in allemaal silootjes en dat we dus ook de uitval oplossen in die silootjes.	Product Owner IT scrum team
Alleen we hebben het overzicht niet, we kennen onze eigen processen onvoldoende, aan de businesskant,	Product Owner IT scrum team
Dus dat je het stappenplan uit je hoofd kent i.p.v. dat je echt snapt wat je doet? Juist, dan weet je ook niet waar je mee bezig bent en als het dan net wat anders is, dan weet je het niet.	Employee Back Office
Is het duidelijk hoe het proces loopt, waar de fout vandaan komt en waar het naar toe gaat naar jou eigen handeling? En hoe is dit voor de meeste medewerkers? Ik denk niet dat het voor de meeste medewerkers bekend is. Dat weet ik wel zeker. Die doen gewoon hun ding.	Employee Back Office
Dan over de rest van het proces, is het duidelijk hoe het hele proces loopt? Dus als jij iets hebt, weet je dan waar het vandaan komt en waar het naartoe gaat als jij ermee klaar bent? Dat merk je nu bij de losses, dan merk je dat we in elkaars vaarwater zitten. Dat kan wel wat anders. Ik weet niet of dat IT niveau, ik weet niet hoe dan anders in elkaar kan. Daar zou wel naar gekeken kunnen worden. Dit gebeurt nu bij disputen, dat het door ons wordt opgepakt, maar ook bij Nota.	Employee Back Office
<b>Radical change of IT</b>	
Maar dat is niet gebeurd, we hebben nu gezegd het is handig om het in een keer te doen.	Product Owner IT scrum team
Wat ik zie, is als je het aan IT overlaat, dat je dan niet de goede oplossingen krijgt. Dan krijg je, net zoals in het voorbeeld van dat we een kleine issue binnen krijgen, dat we er 6 van gemaakt hebben, omdat bij IT heel goed zien wat er allemaal mis gaat binnen de IT, hebben we de neiging om vaak de dingen er maar even bij te doen, want dan hebben dit ook meteen goed gezet	Product Owner IT scrum team
voor een stukje zijn we dat helemaal niet gewend om dat überhaupt te vragen, dus dat we maar zelf door gaan op de weg waarvan wij denken dat hij goed is en dat we naar twee maanden erachter komen van 'ja dat was helemaal niet nodig'	Product Owner IT scrum team
Je zei net dat IT dan extra dingen toevoegt, zonder dat de business dat dan verlangt, waarom doet de IT dat dan toch? Omdat ze dat in het verleden ook meenamen, er zit een hele historie ook achter.	Product Owner IT scrum team
<b>Employee's IT knowledge</b>	



Vind je het leren gebruiken van MVS is dat makkelijk of moeilijk? Ja, het muteren bedoel je? Ja, dat is hartstikke makkelijk.	Employee Back Office
Ja zo'n werkstroom heb je een binnen een dag door, is vaak F7, F8, F9, F10, dan lekker door je blaadjes heen tabben, en dat is het dan eigenlijk wel.	Employee Back Office
Ik vind het op zich een makkelijk programma, ik vind het duidelijk, waar ik moet zijn, maar ik kan me voorstellen dat mensen die niet goed zijn, dat het lastig is dat je niet uit één scherm werkt bijvoorbeeld en dat je een paar schermen moet openzetten. Maar dat is gewoon je denkwijze. Je moet gewoon het proces in je hoofd hebben, je werkinstructie, die moet je kennen. Stap 1 verkeersplein, stap 2 verbruiksberichten, zo allemaal. Je moet natuurlijk een bepaalde manier van werken in je hoofd houden en je moet die schermen open houden, ik moet eerst dit doen, dan dat doen.	Employee Back Office
Ja, zo'n lijstje weg werken, ja de eerste week is het lastig, maar daarna zit het gewoon in je hoofd, dan weet je welke stappen je moet hebben en dan is het gewoon snelheid.	Employee Back Office
Hoe ervaar je het leren gebruiken van MVS, zowel bij jezelf en anderen? Dat valt wel, als je F7 en F8 kent, ben je al een heel end. Nou dat valt wel mee, daar hebben ze geen weekse cursus voor nodig, denk ik bij mezelf.	Employee Back Office
Hoeveel technische kennis moet je hebben om dit werk in MVS te doen? Nee, maar wel inzicht. Inzicht in de hele materie. Dus dat je niet klakkeloos dingen gaat zitten doen en gewoon wat trucjes leert.	Employee Back Office
<b>Resource maintenance</b>	
Management heeft het eigenlijk nooit de moeite waard gevonden om daar nou heel zwaar in te investeren, dus het is ook een management keuze geweest, een prioriteitenkeuze van het management om dat niet te doen. Daar heb je wat last van.	Product Owner IT scrum team
Laten we daar eens dieper in de IT duiken om te zien hoe die IT werkt. Of dat lekker loopt, wat de kwaliteit van de code is en of je daar een verbetering in kunt aanbrengen. En nu kunnen we dat eigenlijk nog niet zo heel erg goed, ben je heel erg afhankelijk van dingen die van buitenaf komen en eigenlijk vind ik dat we dat zelf ook moeten kunnen zien en dat we daar zelf op moeten kunnen bijsturen voor dat iemand tegen ons zegt, maar he daar gaat iets helemaal mis. En zo ver zijn we nog niet.	Product Owner IT scrum team
Tig projecten, die dus minimaal een jaar, zorgen ervoor dat er eigenlijk allerlei achterstallig onderhoud is ontstaan	Product Owner IT scrum team
We hebben al iets van 7, 8 jaar niet structureel probleempjes opgelost in MVS.	Product Owner IT scrum team
<b>Changeable settings</b>	
maar je kunt in de meeste IT systemen met instellingen aanpassen, met inrichting en dat geldt voor MVS ook. Dus heel veel inrichtingszaken komen niet bij ons terecht, maar die kan functioneel beheer zelf oplossen.	Product Owner IT scrum team
<b>Variation allowance</b>	
We hadden het er net over dat sommige mensen snel toetsen gebruiken en andere niet, is er verder nog variatie in hoe mensen de processen uitvoeren? Doet de ene het via dat scherm en de andere via dat scherm ofzo? Nee. Iedereen gewoon allemaal op dezelfde manier? Ja, nou ja misschien dat ze het uitdraaien, want je krijgt gewoon een werkljst uitgedeeld en wat ze daar mee doen, de werkzaamheden blijven hetzelfde, dus de schermen die gebruikt ook. Er is niet een ander manier om iets te doen? Ja, hele kleinere manieren, je kan opslaan door naar het kruisje te gaan, maar ook ctrl+W doen, dan ga je er ook uit en is hij ook opgeslagen. Dus dat kan ook maar dat zijn snel toetsen. Het is niet zo dat je met een heel	Employee Back Office

ander scherm het veel sneller kan doen, zo werkt het niet.	
<p>Weet je misschien of er ruimte is in MVS om gebruikers hun taken op verschillende manier te laten doen? Nou, MVS is niet een helemaal piepjong system, het is ook niet zo heel oud. Maar het is destijds opgebouwd denkend vanuit de database. En als je een beetje een idee hebt van hoe een database werkt, je hebt tabellen en die tabellen zijn met elkaar gekoppeld. Wat ze vervolgens gedaan hebben, ze hebben schermen gemaakt die naar die tabellen kijken en waarmee je in die tabellen kunt wijzigen. Dat matcht natuurlijk helemaal niet met werkprocessen en proceslogica. Volgens mij is het gevolg daarvan geweest dat mensen een weg moeten zoeken in de tabellenstructuur, daar dan zelf een werkproces om heen bedenken en zelf trucjes gaan bedenken van hoe je iets voor elkaar krijgt, waardoor je op een aantal plekken iets moet wijzigen in die tabellen, om er voor te zorgen dat het eindresultaat dan hopelijk net doet wat je had gedacht dat het zou moeten doen. Naar verloop van tijd worden mensen daar verschrikkelijk creatief in en wat je ook ziet is, meterstandvalidatie is daar een voorbeeld van, dat het daardoor ook heel omslachtig kan worden om er mee te werken. Gewoon omdat de manier waarop het systeem toegankelijk is gemaakt, sluit niet aan bij wat de gebruikers nodig hebben.</p>	Product Owner IT scrum team
<p>Is er ruimte in MVS om de gebruikers hun taken op verschillende manier te doen? Zo diep zit ik er niet in, maar ik krijg wel het idee dat je op verschillende manieren tot dezelfde oplossingen kan komen. Dat gebeurt volgens mij ook wel, dat sommige groepen het anders oplossen dan andere groepen het doen. Dan zeggen ze 'he kan dat ook?'. Ik weet niet of dat altijd duidelijker is, als je meerdere oplossing hebt, dan kan dat ook onduidelijkheid geven. Denk je dan ook dat als je de oplossingen vergelijkt, er één het snelste is? En als iedereen die dan zou leren, dat dat ook verbetering op de afdeling zou creëren? Ja, want dan gaat het sneller. Ik krijg de indruk dat ze soms naar manieren zoeken om dingen sneller te verwerken.</p>	Management FB&I
<p>Ik zag in de nieuwsbrief een stuk dat twee medewerkers hadden geruild van hier en nota en die hadden elkaars taken gedaan en toen bleek dat ze sommige dingen op een andere manier deden. Gebeurt dat vaker en hoe kan dat dan? Want aan iedereen die ik het vraag, zegt dat er maar een mogelijke manier is in MVS om je taak te doen. Dennis had een goed voorbeeld hiervan. Op het moment dat er geen levering is, maar wel een overeenkomst en dan krijg je een stamregister error. Dan stopt hij met het aanmaken van een overeenkomst, maar er is wel een klantnummer dat iets moet hebben. Als je dan die levering aanmaakt en tegen het systeem zegt dat de overeenkomst als nieuw moet worden behandeld, dan blijkt dat het 's nachts weer door het systeem wordt opgelost. Die maakt de overeenkomst dan automatisch aan. Het aanmaken van een levering kost 1 minuut en het aanmaken van een overeenkomst kost 6 minuten. Dus hij heeft het van 7 minuten naar 1 minuut weten in te korten. Want de andere manier was ook een overeenkomst aanmaken? Men wist gewoon niet dat het systeem het automatisch zou doen. Heel vaak wordt er dan ook zo nagedacht over wat andere mensen doen.</p>	Management Back Office
<p>Weet jij of er ruimte is in MVS dat gebruikers hun taken op verschillende manieren doen? Ja, dat kan</p>	Product Owner IT scrum team
<p>Er zijn taken in MVS die op denk ik wel 5 of 6 verschillende schermen kunnen worden gedaan. Er zijn ook taken die op 5 of 6 verschillende manieren op 1 scherm kunnen worden gedaan.</p>	Product Owner IT scrum team
<p>Het is een beetje hetzelfde als de taalvorming. Op mijn middelbare school hadden we nog niet de tussen n'en, die zijn van na mijn tijd en als je gaat kijken naar boeken van voor de tweede</p>	Product Owner IT scrum team

wereldoorlog dan zie je woorden met dubbel o en dubbel e, dat soort dingen. Wat jij leer in jouw eerste training dat is de manier waarop je werkt, we hebben mensen met 30 jaar ervaring, die hebben dus op een bepaalde manier met het systeem leren werken en die werken nog steeds op die manier. En er zijn mensen die dit jaar gestart zijn, en die hebben de laatste versie gekregen. Die werken allemaal met MVS en die kunnen hun eigen manier van werken nog steeds redelijk goed.	
Als voorbeeld, ik heb een project gedaan waarbij wij bepaalde functies die nog van de netbeheerder waren van MVS moesten afschermen en toen we dat deden kregen we het commentaar 'ik kan me werk niet meer doen', omdat ze dat scherm gebruikte. Ze wisten niet dat je niet op dat scherm mocht kijken, want dan kijk je naar netbeheergegevens. Ik denk dat er nog steeds mensen zijn die terwijl ze moeten kijken naar standen op een simpele meter, dat ze gaan kijken naar vastgestelde standen op een andere plek in het systeem.	Product Owner IT scrum team
Is er nog verschil in hoe mensen de processen uitvoeren? Ja, krijg je nooit gelijk. Ze hebben hier altijd geprobeerd de uitleg op een lijn te houden. Maar mensen geven toch hun eigen interpretatie eraan.	Employee Back Office
Is er verschil in hoe mensen de processen uitvoeren? Doet de ene het via het ene scherm en de ander via een ander? Ik denk wel dat mensen hun eigen foefjes en dingetjes door het systeem heen gaan. De een weet bijvoorbeeld een bepaalde combinatie en met twee tikken heb je het scherm open en de ander gaat via klikken al die velden af. In het algemeen is het wel dezelfde dingen, het is niet mega anders.	Employee Back Office
Denk je dat het zou helpen als iedereen de snelste manier zou aanleren? Nee, omdat het niet echt minuten scheelt, je zou bijna zeggen het is hetzelfde, alleen twee manieren. Uiteindelijk kom je op hetzelfde neer.	Employee Back Office

## Appendix K Observations during implementation of Outsystems

The promotor is called P, the two employees are X and Y and the product owner is PO. Also, there is a team leader, which is called TL and other employees of the team A, B, C and D.

### Formal implementation conversation 01-12-2015

X en Y hebben lijstjes meegenomen met hun verbeteringen voor Outsystems. P heeft een agenda gemaakt, hier staan de volgende punten op:

- Huidige situatie
- Wat is nog nodig? Wat zijn de belemmeringen en wat zijn de praktische stappen?
- Hoe gaan we voortaan het werk verdelen?

Hij vraagt of er nog andere opmerkingen zijn en X vertelt dat hij het nogal plotseling vond gaan dat Outsystems opeens is afgerond en overgedragen aan Functioneel Beheer zonder dat hij er bericht van heeft gekregen. Het was voor en ook Y niet duidelijk of het nou af is of niet, aangezien dit niet met hen was besproken. Ze waren wel bij alle overleggen waar ze waren uitgenodigd, maar daar was dit niet besproken. Ze hadden nog hun laatste bevindingen naar het scrum team gestuurd, maar hier ook geen reactie meer op gehad. Ze hebben dit ook niet meer nagevraagd. In mijn eerdere gesprek met P vorige week vertelde hij juist dat het af was en dat hij het daarom heel vreemd vond dat X en Y het nog niet in gebruik genomen hadden. Dit is nu wel verklaard.

P vertelt dat het belangrijk is dat PO (product owner van het scrum team) resultaten te zien krijgt, zodat hij het niet voor niks heeft gemaakt. P wil duidelijk maken dat we het wel moeten gaan gebruiken en het liefst ook snel. Hij gebruikt hier bij de argumenten dat PO 400 cases per dag per persoon opgelost wil zien worden en dat de uitzendkrachten binnenkort weg gaan, dus dat we dit ook wel snel moeten gaan doen. PO houdt wel rekening met RSI en duurzaamheid, dus dit zou de eis van 400 kunnen verlagen. Nu worden er ongeveer 240 per dag per persoon opgelost. Er moet ook rekening mee gehouden worden dat de Oxxio omwissel standen binnenkort zijn opgelost, dit betekent dat er veel makkelijk cases weg zijn en de productiviteit in dat opzicht omlaag zal gaan.

P geeft een schets van de huidige situatie, hij heeft een turflijstje gemaakt van de fouten die hij vindt. Dit zijn onder andere of hij de standen moet omwisselen, of hij keer 10 of delen door 10 moet doen en hoe vaak hij TMR of MVS erbij moet pakken. Dit heeft hij gedocumenteerd. Hij heeft van de 1000 gevallen van afgelopen week 20 keer MVS nodig, X vindt dit erg weinig, hij had er meer verwacht.

Y geeft ook aan dat ze TMR nodig heeft bij de standenwissel. In MVS kan ze de standen omwisselen en dan op 'valideren standen' drukken, dan haalt MVS de standen nog maals door de hele check. Outsystems kan dit niet, daar heb je TMR nodig (website met vorige standen). Ze werkt dus sneller in MVS dan in Outsystems.

Y en X hebben nog veel opmerkingen op Outsystems en verbeterpunten. Ze trekken P's bevindingen vaak in twijfel. Zo vraagt Y aan P of hij dan ook wel MVS checkt of alles klopt. X geeft aan dat het laden in Outsystems erg lang duurt en er vaak uitvliegt. Ook is het onduidelijk wanneer

Outsystems uit TMR haalt, soms zijn de velden in Outsystems leeg en soms staan er standen die overeenkomen met de standen uit TMR.

TMR gebruik is nog wel een punt voor Outsystems. Bij het inhuizen van een klant heeft Eneco er nog geen informatie over, dus MVS ook niet. Dan is TMR dus nodig. X en E geven aan dat ze willen dat Outsystems de informatie uit TMR gebruikt en dat ze er niet apart naar toe hoeven gaan. P wil het even duidelijk maken dat je bij inhuizingen in MVS nu ook TMR nodig hebt, dus dat het dan in feite niks uitmaakt welk systeem je gebruikt. X gaat hier in eerste instantie tegen in door over een ander geval te beginnen wat geen inhuizing is. P komt terug op inhuizing en overtuigt X van zijn punt. Stemmen zijn verheven tijdens dit gesprek en armen zijn over elkaar. Hier na is de sfeer vriendelijker.

Er zijn nog meer verbeteringen die nodig zijn in Outsystems, de datum kan niet aangepast worden, dit moet nog in MVS. Als dit niet gebeurt, heeft een ander team hier last van, daarom wil Y dit graag voorkomen en het in hun team al meteen goed doen. P ziet dit als nog een kenmerk waarom ze Outsystems niet willen gebruiken en gebruikt het argument dat het niet zoveel gevallen zijn en dat het later oplossen misschien minder moeite is dan het voorkomen. Y gaat hier echter tegen in, want zij vindt dat het beter is om te voorkomen dan te genezen. P vraagt of dit dan een reden is om Outsystems niet te gebruiken. Y zegt 'Nee, ik noem alleen verbeteringen, we gaan het sowieso gebruiken'. Hier lag eigenlijk de kern van dit onderwerp, P's angst dat ze het niet wilden gebruiken, terwijl hij er zo voor heeft gevochten en Y's angst dat de kwaliteit achteruit gaat. De conclusie is dat ze bij het andere team gaan meten hoe vaak het daar uitvalt om te kijken of het een groot probleem is. P wil niet iets ingewikkelds bouwen voor het gemak van een ander team. Y geeft aan dat er niks ingewikkeld hoeft worden gebouwd maar dat ze van het begin af aan hebben aangekomen dat ze dat erbij willen en het er nog steeds niet is. Soms zie je ze wel en soms niet, het is een soort van bug. Ze zal een voorbeeld zoeken, want hier wil ze haar hand voor in het vuur steken.

Tijdens het gesprek schrijft P notulen van de genoemde verbeteringen en leest deze ook voor aan de rest. TL zegt weinig, soms neemt ze het op voor Y en B.

X vraagt P wat hij van het interface vindt. P geeft aan dat hij het nog erg grijs vindt, er missen nog streepjes tussen de kolommen en het zou handig zijn om belangrijke dingen een opvallende, andere kleur te geven. Dit vinden Y en X ook.

Ondertussen heeft Y een voorbeeld gevonden, P noteert het probleem en zet het bij zijn lijst. Hij noemt alle verbeteringen nog eens op. Hij noemt het standen wisselen met gebruik van TMR, wat Y dus liever in MVS doet, persoonlijke voorkeur. Ik kan me voorstellen dat er juist één efficiënte manier is.

X vraagt of hij er nog één mag noemen, P antwoordt natuurlijk. Hij noemt dat de volledigheid van de lijst nog niet helemaal klopt. X zegt: 'Het is geen bug ofzo hoor!' en Y vult aan: 'Nee!'.

Het plan ontstaat om lijstjes uit te delen aan de medewerkers met de dingen die Outsystems niet kan, zodat ze hier rekening mee houden.

Het komt ook naar voren uit het gesprek dat Y&X van tevoren over de verbeteringen hebben gepraat.

Y&X hebben veel kleine verbeteringen over het systeem, ik weet niet of het duidelijk is wat IT allemaal kan realiseren. Ik vraag hoe ze hierover denken. Y geeft aan dat ze hier wel een balans in moeten vinden, de echte musts moeten er wel in. P geeft aan dat we bij elke verbetering een business case moeten hebben hoeveel het oplevert, en dat het belangrijk is om te vermelden dat we dan minder in MVS hoeven te werken. Ze zouden IT ook kunnen overtuigen door te vermelden dat Norbert (externe interaction designer) kleuren erg belangrijk vond en dat PO het hier toen mee eens was.

Tijdens het gesprek is het vaak niet duidelijk om hoeveel gevallen het precies gaat in de discussies over welke functies nog moeten worden toegevoegd aan Outsystems. P denkt telkens dat het om weinig gevallen gaat, ook omdat hij gewoon wil beginnen met Outsystems, X gelooft dit telkens niet zo. P geeft aan dat hij het niet noemt om dwars te liggen. X stelt voor om voorbeelden te vragen over de ervaringen van metingen.

Ze willen hun verbeteringen doorgeven aan het scrumteam. P maakt hiervoor een prioriteitenlijstje. X geeft aan dat gelijkheid het belangrijkste is, anders kunnen we niet over. De oplossing kan ook zonder IT, door alsnog een query met BTL te houden, zo zien we de eventuele overgebleven gevallen.

Dan is het grootste probleem voor implementatie de autorisatie. Naast P, X en Y is nog niemand van de afdeling geautoriseerd. Er wordt besloten eerst het eigen team hierin op te leiden en een week later andere die er eventueel in gaan werken. Misschien zijn de extra krachten niet eens nodig, omdat het zoveel sneller zal gaan in Outsystems.

P, Y en X beginnen morgen te werken in Outsystems. Dit kan nog wel lastig zijn omdat de rest van het team nog met lijstjes werkt en zo zou je dubbel werk gaan doen. De oplossing is dat zij PER doen en de rest van het team SVO. Zodra de autorisatie rond is, gaan de medewerkers er meteen mee aan de slag. P geeft aan dat hij wil helpen met inwerken.

#### **Informal conversation when starting with Outsystems 02-12-2015**

10.47 uur

Y: B, ik moet toch overstappen op BTL, ik krijg niet de nieuwste, niet die van de komende twee dagen. [ze praten erover]

X: Zullen we er gewoon mee kappen?

Y: Ja, ik ga lijsten maken, dit is echt een no-go voor mij om live te gaan.

Even gevraagd aan Y wat er aan de hand is. Outsystems prioriteert niet goed, de gevallen zonder opnameverzoek of zonder datum staan boven aan. E is al naar beneden gegaan om te vertellen dat de afreken- of SVO datum niet goed staat. Hij geeft niet de meest urgente gevallen, dus die de komende dagen af moeten zijn.

Ze besluiten het met P te bespreken zodra hij terug is, maar hij is al een uur weg. [Ze hadden gister afgesproken er de hele dag met z'n drieën aan te werken]

13.06

X: Ik heb net met P gesproken, hij was niet aan het valideren, ik heb hem verteld dat we toch weer met BTL werken en hij vond het goed. (tegen een medewerker: morgen krijg je weer gewoon SVO)

14.00

Ik vraag P of hij nog met Outsystems heeft kunnen werken, hij heeft er nog geen tijd voor gehad, maar gaat er nu aan beginnen.

15.00

P geeft Y en X gelijk dat ze er nog niet mee zijn gaan werken. Y + X geven aan te willen wachten tot IT het heeft opgelost. P zegt het zeker aan IT door te geven, maar dat ze dan nu met z'n allen even de gevallen zonder opname verzoek gaan verwerken, zodat ze daarna toch met Outsystems aan de slag kunnen. [ik weet niet hoe snel een nieuwe sprint van IT begint, wordt ook niet besproken][ik heb het idee dat P het meest contact heeft met IT].

#### **Informal conversation about Outsystems 03-12-2015**

Collega: Wat is dit?

X: Outsystems, is nieuw

C: Wie heeft dat gebouwd?

X: Hier boven, maar het is nog niet voldoende hoor. En ik vind het niet mooi, ik wil liever vakjes enzo

#### **Informal conversation about Outsystems 11-12-2015**

X&Y hebben gisteren een mailtje van P gehad over Outsystems verbeteringen die ze besproken hadden, maar hier hebben ze niet op gereageerd.

P wil maandag afspreken om het er over te hebben en zegt teleurgesteld te zijn dat we er nog niet in werken, ook al duurt dat parkeren maar 20 min per dag.

X geeft aan bang te zijn dat andere dingen ook worden geparkeerd.

X vraagt naar autorisatie, hoe het daar mee gaat. Volgens P is het nog niet gelukt. Ander geeft hij zijn eigen inlog gegevens gewoon aan medewerkers. Hij gaat vandaag beginnen met het aan A uitleggen. X vindt dat prima, hij vindt het alleen lastig werken met tegelijkertijd lijstjes, je moet dan zorgen dat je niet dezelfde oplost. Is wel te organiseren door ze goed te filteren. Maandag komt er een afspraak om er verder over te praten.

#### **Informal conversation about Outsystems 14-12-2015**

P meldt dat hij het vandaag nog over Outsystems wil hebben. X geeft aan er al mee begonnen te zijn deze ochtend. Hij werkt alleen niet uit het dashboard, maar uit de lijst. Hij heeft verder periodiek en Oxxio, het gaat goed, hij moet heel af en toe naar MVS. P komt kijken en geeft bij iets aan dat iets sneller kan. X zegt grappend dat hij zich dat niet kan voorstellen. Hij nodig X ook uit voor een bespreking met PO vandaag om 13.00

#### **Formal conversation about Outsystems 14-12-2015**



P had alle issues in een lijstjes gezet en naar iedereen gemaild, maar had geen reactie gehad van X en Y, hij had wel graag input van hen gehad. P had het document nog niet naar PO gestuurd, Y had hiervoor ook al issues gemaild. PO had zelf ook nog een aantal issues (9) op de backlog staan, deze staan in een ander tabblad. P heeft alvast categorieën aan de issues gekoppeld en wilde ook nog inschattingen van PO aan geven, maar dat is niet gebeurd. PO stelt voor om te gaan pokeren over welke issues echt belangrijk zijn. Hij vraagt of we voorkeur hebben voor welke issue we eerst oppakken. Hier wordt niet echt op gereageerd, dus we beginnen bij de eerste in de lijst. Y neemt het initiatief als PO vraagt om de issue uit te leggen. Y zet hoog in, maar uit het pokeren blijkt dat de issue herkenbaar is tijdens het werken, dus makkelijk handmatig te doen. Bij de issue van dat de lijsten niet gelijk zijn, zet X hem op 100, omdat hij zonder dit echt niet over kan naar Outsystems, dit wordt later bijgesteld, P heeft hier juist heel laag, omdat hij niet weet wat er precies aan de hand is en of het een probleem is.

Bij een andere issue geeft Y een 100 omdat ze een goed gevoel wil hebben bij Outsystems en deze issue werkt dat nog tegen. De medewerkers die er goed in zitten, vinden veel dingen een absolute must, terwijl ik dit nog wel te omzeilen vond. Ik ging er meer in van als het geen blokkade is voor het gebruik van Outsystems, is het niet zo belangrijk. P geeft ook aan bij deze issue dat het geen blokkade vormt, maar wel de vaart er uit haalt. Ook komt het in een ander bakje terecht als het fout gaat, wat P niet zo'n probleem vindt, maar Y wel. Punt is ook dat je zo kan meten hoe vaak het dan eigenlijk fout gaat.

Er worden veel aannames gemaakt, weinig gebaseerd op echte getallen. Dit maakt discussies over of iets wel of niet belangrijk is, erg moeilijk.

Tijdens het pokeren geeft P telkens lagere cijfers dan Y en X.

Het helpt als we de issue eerst bespreken, dan weet iedereen de nadelen en voordelen en zitten de cijfers tijdens het pokeren dicht bij elkaar.

Doordat PO er bij is, lijkt het alsof P, Y en X meer één front vormen en strijden voor de issues die ze belangrijk vinden. Het lijkt beter te werken dan als P het medium is tussen X en Y en IT. Ook is PO erg neutraal, hij zegt niets over hoe moeilijk het is in IT, hij wil alleen de mening weten van de gebruikers. Hij legt dingen uit en is vriendelijk.

Als er nog een kwartier over is, gaan ze specifieker kiezen. Y heeft nog een opmerking over omwisselen standen, ze wil hier graag een valideer knop bij, zoals in MVS ook is.

We hebben het ook nog over het opname verzoek, vorige week dit met IT'er besproken, P geeft even snel uitleg, want hij had het nog niet besproken met X en Y. Conclusie is dat dit via FB moet.

Laatste dingen gaan over lay-out, Y neemt hier het woord, PO staat hier voor open, hij stelt voor om hier een half dagje voor te zitten. Hij vindt het een goed idee, maar weet niet hoe moeilijk het is. Ik geef aan dat lay-out mij erg belangrijk lijkt, aangezien de nieuwe interface eigenlijk het kopstuk is van Outsystems.

Het gaat over de koppeling met TMR, Y hoeft niet per se iets luxes, maar wil wel een knop naar TMR, zodat je niet hoeft te kopiëren en plakken. Haar reden is dat dit van het begin af aan beloofd is.



PO geeft aan dat een nieuwe sprint volgende week begint. Hij vertelt ook dat het waarschijnlijk niet zo snel zal gaan, omdat er nog andere dingen liggen die gefikst moeten worden. Wel goed dat hij dit zegt, ik vond het al raar dat de tool 2 weken geleden live moest gaan en nog steeds niet goed werkt.

#### **Informal conversation 14-12-2015**

P snapt niet waarom X en Y niet willen, wat is het probleem? Hij wil over en gaat bij de dagstart vragen wie er mee willen werken. X en Y realiseren zich dan misschien dat als zij niet willen, ze achterblijven.

#### **Day start 15-12-2015**

Y geeft aan dat X ongeveer 250 posten gisteren Oxxio heeft gedaan en niet eens de hele dag eraan heeft gewerkt. Vandaag gaat ze er zelf in werken. P stelt voor om iemand anders er ook in te laten werken. Niemand meldt zich vrijwillig aan, er worden wel namen van anderen genoemd. A leert net SVO, B heeft heel veel dingen te doen. C wil het anders ook wel doen, maar dit is moeilijk omdat ze SVO doet. Ik vraag waarom. Er komt niet echt een duidelijk antwoord, SVO is vaak moeilijker en je moet vaak naar het TMR. B vraagt of die knop er al inzit. Het lijkt alsof het team die knop erg belangrijk vindt.

Het gesprek met PO wordt niet genoemd, totdat TL er naar vraagt. Y geeft het woord aan P, en P geeft het aan mij. Ik vertel er enthousiast over. Er worden verder geen vragen door de rest gesteld. C vraagt op het eind nog toestemming aan TL of ze met Outsystems mag werken, dit vond ik raar. TL en P horen toch één team te vormen. Sowieso houdt TL zich weinig met Outsystems bezig, terwijl het toch een grote verbetering zou moeten opleveren voor haar team. De rest van het team lijkt ook wat bang voor Outsystems, het lijkt alsof ze denken dat het langzamer zal gaan. Misschien omdat er in de opstartfase nog vaak dingen mis gaan, in verband met kinderziektes.

#### **Informal conversation 15-12-2015**

X en Y leggen uit dat C morgenochtend eerst moet parkeren, ze heeft de link misschien niet meer. Y zegt dat ze altijd nog uit BTL kan werken, dus gewoon even kijken of het lukt.

#### **Informal conversation 16-12-2015**

X: Gaat het sneller nu?

C: nee, met oxxio wel, met omwisselen standen natuurlijk, maar dit niet.

X: wat dan? Geef het aan he, dan voegen we het toe. Mis je dingen?

C: ja, ik mis het nee'tje.

X: en als je dan toch checkt in MVS, zie je dan dat je gevoel in Outsystems toch gewoon klopte?

C: Nou hier bijv. met de nee. [legt uit wat er aan de hand is]

X: ja maar hier kan je de standdatum zien.

C: Wat wel een pluspunt is, ik voel het in me armen

X: haha, ja al dat geklik in MVS

[kwartier later]

C: ik heb wel met die lijst, dat ik voldoening mis. Normaal als je die afhebt, voelt dat goed. Dat heb je nu niet, kan je dat bijhouden?

X: volgens mij niet, maar je ziet wel bij welke datum je nu bent.

C: wel voordeel dat er nu minder stress is. Je doet wat je kan doen

X: maar het is wel zo, als je ipv 200 cases 300 krijgt, werk je onbewust naar de 200, terwijl je misschien ook wel 300 kan.

### **Daystart 17-12-2015**

Het gaat goed met de nummers. TL vraagt hoe dat kan. Alleen SVO nog veel. Meer instroom? D denkt aan het nieuwe systeem, ze lijkt het langzamer te vinden of denkt dat alleen, want ze werkt er niet uit. Je kan niet zien hoeveel posten je verwerkt, dat weten we dan als we er met z'n allen uit werken. Iedereen is een beetje bang dat het langzamer zal gaan. Vooral in het begin. Ze lijken te willen dat IT eerst alles fikst (of X en Y in ieder geval).

### **Informal conversation 17-12-2015**

C heeft problemen met Outsystems, ze kan niet in de log in van P. Ze wordt er uit gegooid. Y zegt halverwege de dag dat ze toch maar over moet gaan op BTL. P is niet aanwezig, die werkt thuis. Y heeft contact met hem via Lync, hij fikst wat dingen met IT.

Ik zeg dat het wel handig is dat ze het nu al met een klein groepje proberen, voordat ze met het hele team over gaan, iemand antwoordt met dat ze nu al met te veel er in werken (met z'n drieën).

### **Daystart 18-12-2015**

TL vraagt of C nog in Outsystems werkt, ze zegt vandaag niet. Het kostte gisteren zoveel tijd, dat het daardoor niet meer sneller is.