



CHANGING BUSINESS PROCESSES

“Changing the business process of renting out and reselling of accommodation units at De Meeuw Bouwsystemen B.V.”



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Preface:

This master thesis is a result of a graduation project undertaken within the renting out and resale department of De Meeuw Bouwsystemen. It is the final step of the Master Program of Business Administration that I have been pursuing at the University of Twente. I would like to take this opportunity to express my gratitude to all the people who have supported me through my graduation project.

First and for all I would like to thank my company supervisors Lenneart Visser and Aad van Dijk for offering me the opportunity to graduate at De Meeuw Bouwsystemen. They gave me plenty of freedom and support to implement my study within the organization. On top of their normal workload, it must not have been easy to be so flexible and supportive. Next to being great supervisors they also provided a great working atmosphere with room for a good laugh.

I would like to thank my supervisor of the University of Twente, Rick Middel, for his guidance through the project. His ability to motivate and to challenge has helped me a lot during the implementation of the thesis. Despite of his full schedule communication with Rick was always easy and direct, a quick call or an e-mail message was always possible. I also would like to thank Klaasjan Visscher, my second supervisor of the University of Twente, who helped me by his experience and clear overview of the project preventing pitfalls and me losing focus of the theoretical background of the project.

I also want to thank my direct colleagues at De Meeuw Bouwsystemen. Despite of not being direct stakeholders in this project they helped me out with a lot of useful information and assistance on many occasions. I had a lot of fun with my direct colleagues who occasionally pulled a good joke on me.

I owe a large dept of gratitude to my parents who have enabled me to come this far. They kept supporting me and tried to motivate me not only during this project but through my entire study. Last but certainly not least, Diêp, you know that I save the best for last.

Management summary

Introduction:

During the past decades De Meeuw Bouwsystemen experienced a significant growth which resulted in an ongoing expansion of the activities. Because of this growth it gradually became harder to maintain control on all the business processes. The renting out and resale department also experienced a loss of control and next to this there is an increasing variety of products (there are far more options to adapt the units to the customer requirements). The design of the current process does not compile with the demand for it. This is certainly the case with the business process managing the units at De Meeuw Bouwsystemen.

Research objective en methods:

In order to create a higher performance on selected KPI's the objective of this research is to redesign the business process of reselling and renting out accommodation units. The business process redesign (BPR) method is used to reach a higher performance. The change by BPR is considered to be too radical by some organizations, resulting in resistance and ineffectiveness in the organizations. Knowing the weaknesses of the theory gives room to prevent or alternate the weaknesses. On the other hand best practices of the theory can give an overview of the strengths of the theory. Enhancing the strengths and alternate or replace the weaknesses by other theories gives a firm basis to still use the BPR theory for this study. With each step in the process of BPR more specified theories are used for example: envision → SWOT, initiate → KPI selection, diagnosing → best practices, redesign → brain writing, etc. The combination of theories proofed to be a very useful tool in analyzing the process. The main dimensions where De Meeuw will be judged on are time, quality, flexibility and costs.

Results of the 4 main steps in research

An extensive analysis of the business process of the renting out and resale department has been preformed to obtain the detailed information which is needed to perform the BPR process. Quantitative and qualitative methods are used to gather the information. To come to the end conclusions 4 main steps where undertaken namely:

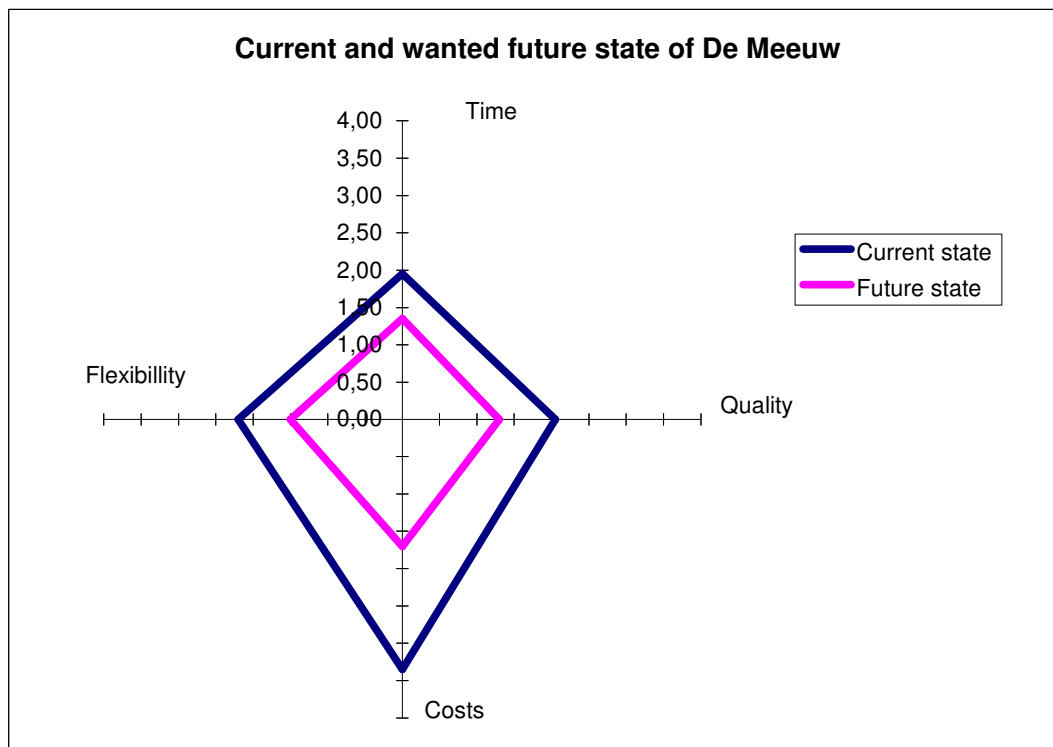
1. Envisioning

The first part of the BPR method is envisioning. The analysis revealed that the key factors in the organizations are:

- Expanding internationally

- De Meeuw is aiming to become more active on the (semi) permanent accommodation market and wants to grow internationally. Because the opportunities for sustainability in the area of unit building are promising (reuse, recycling), De Meeuw wants to focus on sustainable buildings. In order to realize this goal, product innovations are needed. Next to the profile of sustainability, de Meeuw wants to expand its services to generating turn-key solutions for customers (course).
- Incremental innovation of the products
 - De Meeuw wants to excel in increasing product innovations and in quality improvement. After quality improvement and product innovation the time factor scores highest. As it can be derived from the interviews all stakeholders agree upon this order (innovation → quality → time to market).
- Expanding the number of services
 - de Meeuw wants to expand its services to generate turn-key solutions for customers (course). This means not only providing accommodation for customers but arrange everything involved with accommodation for example: governmental licenses, environmental adaption, expanding and shrinking the accommodation to the customers wishes, etc.

On the 4 main dimensions from the BPR De Meeuw wants to improve most in the field of cost reductions. The next figure shows the current state and the wanted state of the company. The lowest score possible is 4 and the highest 1. De Meeuw wants to improve in all factors.



2. Initiate

In the initial phase this study is based on selecting the KPI's and to set goals for improvement. There has been a frequency analysis on the closed part of the interview to determine the right KPI's and goals of the redesign. The main results are:

1. Reduce the process time from sales to delivery (1,27)
2. Improve the information reliability in the process (1,27)
3. Improve the controllability of the process (1,94)
4. Reduce the number of mistakes made in the process of renting out and resale (1,45)
5. Reduce the costs of renting out and resale (1,45)

The scores behind the numbering are the average scores, the closer to 1 the more important. Further more investments are needed in the ERP system to bring it to a desirable level (1,55 score in the interview, so most people of the management agree that investments are needed). Further the transparency of the renting out and resale department must improve (3,45, so most people of the management team agree that the process is not transparent).

3. Diagnosis

Best practices are used to diagnose in which field de Meeuw should improve. The results of the initiating step are compared with best practices from the literature. The most important improvements regarding the selected KPI's in the previous step focus on:

1. Technology based on task automation and integral technology. De Meeuw Bouwsystemen B.V. could elevate physical constraints from tracking and tracing units by using technology. This will reduce the numbers of mistakes in the process, improve the controllability and reduce personnel costs.
2. Information control addition. Improving the quality of the information can improve the controllability enormously. Check the completeness and correctness of incoming materials and check the output before it is sent to the customers.

4. Redesign

Redesigning is a creative process and in this study is opted for organizing a brain writing session with people from all levels in the organization of De Meeuw Bouwsystemen. This technique is selected from several creative techniques and is proven to be useful. The results of the brain writing sessions were selected and further investigated to create opportunities for the redesign. Key results were:

- **Technology:** In all 5 selected problems, solutions involving technology were mentioned. All respondents agreed that using track and control systems can solve multiple problems in the process. Using RFID (radio frequency identification) chips in the units was discussed.
- **Behavioural view:** Another important issue discussed during the brainstorm sessions was the re-sequencing of tasks. This means moving tasks to a more appropriate time in the process. In this case mandatory decision moments should take place. As soon as De Meeuw knows that building units will be returned, the current state has to be checked and a decision about the future of the building must be taken.
- **Information:** More and better control on the information is needed. Input of and access to information about the units in the system should be restricted to the responsible people only. Too many mistakes are possible in the current layout of the system. A good solution would be to introduce some extra KPI's to give a more clear view on the results and dynamics between departments. If the manager has the right KPI's, a process is easier to manage.
- **Organization population:** In the renting out and resale department the workforce of De Meeuw is very experienced. This is certainly beneficial for the knowledge about the

accommodation units, but the process relies too much on this individual know-how. The sales department should be trained and acquire technical knowledge of the units. It also should communicate better with the renovations department. In order to get a better control on the process, experienced people should work in a better structured and documented way.

Strategic focus in improving the business process

The redesign essentials for the wanted higher performance consist of the introduction of advanced technologies like RFID to eliminate tasks (less mistakes and lower costs caused by mistakes.), increase the information reliability, and increase the tracking and control for a better overview of the process time. A higher performance can be achieved on the selected KPI's (number of mistakes in the process, process time, costs of mistakes and information reliability) by actually measuring these KPI's and use the data in the redesign.

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Chapter 1 Description and positioning of De Meeuw Bouwsystemen

This chapter covers the description of de Meeuw Bouwsystemen. It is important for the rest of the research to present a clear overview of the current position of De Meeuw because it is indicative for the starting point and framework of the research. First the history and the organization structure is presented. Next the relevant figures are shown, together with the possible influence of these figures on the investigations. The key performance indicators currently used, give a good view on what is considered to be important in a company.

1.1 De Meeuw Bouwsystemen

The Meeuw Bouwsystemen is founded in 1929 and has grown from a small company, which produced temporary accommodation for small-scale projects, to an international oriented and leading company in the construction of permanent and semi permanent IFD (Industrial, Flexible and Dismountable) accommodation. Current customers are: banks, schools, healthcare organizations, construction companies, etc.

De Meeuw employs over 500 people at 5 different locations in Europe. The head office is located in Oirschot, while there are branches in Belgium, Switzerland and Germany to serve European market for IFD accommodations. The turnover has developed to €115.000.000- in 2006.

De Meeuw has its own production facilities and can produce a wide variety of accommodation units. In paragraph 1.3 there will be a short description of the technical possibilities in manufacturing accommodation units.

1.2 Mission and strategy

The mission of De Meeuw Bouwsystemen is:

"To be a leading accommodation unit constructor in Western Europe for maximal customer satisfaction by offering creative, contemporary and innovative solutions for temporary and (semi) permanent accommodation problems; based on high quality IFD products; produced in an stimulating and learning environment with an excellent yield."

At this moment the exact formulation of the strategy is under construction by the management team. The strategy development is currently an issue of discussion at

De Meeuw. There are many possibilities in the market to focus on and very different business lines in the company. Finding the right strategy is a complicated and continuous process at De Meeuw Bouwsystemen. It gradually develops from a quality based national organization to a more innovative international organization.

1.3 Products of de Meeuw Bouwsystemen

The products can roughly be divided in 4 groups depending on the time they are meant to be used, namely:

- < 1 year → Flexicom, Kombi-Unit or the Unikom
- 1 to 5 year → Max 21 – basis or adapted versions of the previous units
- 5 to 15 year → Max 21
- 15 < year → Max 21 – plus

The units can be adapted in accordance with the customers requirements. The standard frame is usually the same and can be re-used. The general rule is that the more standard the unit is, the easier it is to resale or rent out the unit again. Taking into consideration that there are only 4 types of units, the possibilities in different layouts of constructions with these units are great. Because all the different possibilities of accommodations de Meeuw has separated the overall products into 4 product lines for healthcare, rental and renovation, business and government. This is shown in figure 2. In the different layouts there are numerous possibilities for incremental innovation for the specific markets they are serving. For example the BSO-Box has won the Facility Innovation Price 2007. The BSO box is a flexible temporary classroom accommodation that can serve for multiple purposes like solving temporary under capacity problems of a school or day care facilities for after school hours.

1.5 The market of de Meeuw Bouwsystemen

De Meeuw is active in a wide range of the temporary accommodation market. In the market can be distinguished into the following segments can be distinguished: education (schools, etc), day-care healthcare, offices, banking buildings, construction worker facilities, recreation, temporary housing and student housing.

The market is moving from the term temporary to sustainable. For many organisations the total costs of ownership becomes of growing importance. The investments are not only focussed on the procurement of a building, but on the total lifecycle of the building. De Meeuw is focussing on reducing the indirect costs instead of only the direct costs of a building. A good comparison is the choice between a regular light bulb and an energy saving light bulb. The initial costs of the light saving bulb are higher but the costs of the total lifecycle are lower.

De Meeuw is moving from temporary accommodations to (semi)permanent. However there still is a big difference with traditional buildings. The main differences are:

- The buildings are easy to expand or shrink. So they are adaptable to changing customer needs.
- Because of its strategic partners and the in-house knowledge of accommodation, the total costs of ownership can be managed by De Meeuw.
- The accommodation units of De Meeuw are reusable and therefore an example of sustainability.
-

To meet the customer's requirements, De Meeuw wants to create very flexible internal processes. Standardization of the product can be one of the instruments to reach this goal. De Meeuw aims at improving the information system about the market, so that better can be focused on the areas where the benefits come from.

The main focus is to move further towards the market requirements and deliver more and better services. Not only the accommodation as such, but every related housing aspect should become the end product.

Chapter 2 Research Design

2.1 Characterization of the problem

De Meeuw Bouwsystemen is a company producing temporarily and (semi) permanent accommodation units. These units are building elements for creating buildings like temporary schools, banks, offices, healthcare accommodation, etc. For some 80% the units are produced in a production line and for some 20% on location. The units can be built in a wide variety of options (air-conditioning, central/floor heating, lavatory options, etc). De Meeuw exploits its products on following 3 ways: To rent out units, to sell the units with a possibility for resale or to sell the units without a resale contract. Especially in the rental process and the resale process it is important to "keep track" of all the different units because an important performance indicator is the degree of utilization of the units. With utilisation the degree of occupancy of the accommodation units is meant. With keeping track, the current condition of the unit, administrative status and the physical location are meant.

The company has grown fast during the past years. The turnover increased from €80.000.000- in 2004 to €115.000.000- in 2006. This has resulted in an ongoing expansion of the activities for all the departments of the company. Next to this there is an increase in the variety of products (there are far more options to adapt the units to the customer requirements). There are buildings suitable for schools, social care, offices building sites, etc. As a result the complexity of the business process increased. The complexity manifests in more and different tasks which are not organised in the current system. This situation results in many ad-hoc reactions on structural problems. These ad-hoc reactions occur because the original planned structure or processes are not implemented. The design of the current process does not compile with the demand for it. This is certainly the case with the business process that has to manage the units at De Meeuw Bouwsystemen. To keep control and integrate the business processes in an automated system it was decided to introduce an ERP system named Isah7. The rental and resale department should use this system to gather, store and communicate data needed for reusing the accommodation units. To synchronize the activities in the company, all departments should use the Isah7 system.

Because Isah7 does not meet all requirements currently the rental and resale department uses an own administration as an additional tool. The key performance indicators like the degree of utilization, solvability and liquidity are calculated by Isah7 system. But there are many information filters used to calculate this with ISAH-7. The filters are necessary because of frequent data pollution in ISAH-7. This data pollution exists because wrong information was copied from the old system. Another important reason is that people use the system wrongly. People in this department are of the

opinion that the Isah7 system is not complete and complicated to use. The current business process and the responsibilities linked to it are unsystematic. It is easy to make mistakes in the current business process and the tracking of the units is now complex. The basis of this problem is not directly the ERP-system but the design of the business process. If the Isah7 –system will be modified and the use of it better designed and organised the problems can considerably be reduced.

Because of the lack of tracking the flow of the accommodation units through the process is hard to follow. The units are hard to track because they are stored at random places on the company’s premises. Another problem is that when wrong units are reused in a project the information in the ERP system does not result in the actual stock. The department of renting out and resale runs on the experience of the personnel and is hard for outsiders to understand. As a result of these problems over 500 units are simply lost. This means that the units are in the system but the physical location is not known or that the units simply do not exist anymore. There are also units that are standing in stock for years and have a very low degree of utilization. This is because these units deviate a lot from the standard units and are custom made. These units are hard to resell to new customers. So here there is a discrepancy between the utilisation and service.

To rent out or resell units, specific information is needed e.g. the quality of the unit, the exact location, the technical specifications and the current value of the unit. To optimise the utilization it should be easy for everybody who works with the system to retrieve this kind of data. To control the unit flows after the production and to track the units and keep the required data up to date, a simple and transparent organized business process is needed.

2.2 Research objective

This study is based on design-oriented practical research. This approach is selected because of the adequate signalisation of the problem namely: an inadequate business process to manage the unit flows after production. In this case a redesign of the process is needed (Verschuren en Doorewaard, 2000).

Now the characterisation of the problem and the type of research are known the research objective is formulated as:

"In order to create a higher performance on selected KPI's the objective of this research is to redesign the business process of reselling and renting out accommodation units."

2.3 Research model

Based on the theory of Verschuren en Doorewaard (2000, p45-64) the research model will be designed.

- The first step consists of formulating the research objective in a few words. This results in: *"Improving the business process of the utilisation and the control of the units"*.
- The second step in the design of the research model is to determine the research object. In order to come to conclusions, this is the phenomenon that is to be researched. In this case the business process of renting out and reselling is the research object. This business process is to be analysed and improved.
- The third step is to develop a view to look at the research object. Because this research is based on the renting out and marketing department of De Meeuw Bouwsystemen, the view on the research object is going to be a process improvement view. With process improvement is meant that the view is to improve factors and the trade-off between factors in the process like time, flexibility, quality or costs. Which dimension is improved depends on the analysis of the business process. Key factors in the research objective are: utilization, business process control, business process redesign and planning and control. The theoretical background to be used will be focused on these keywords.

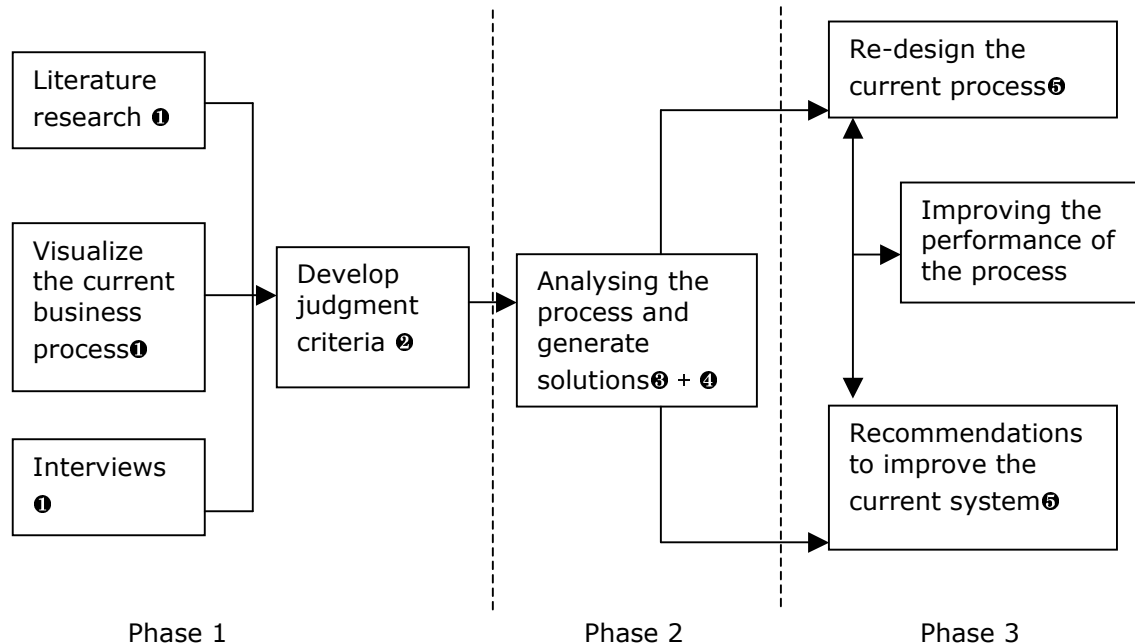
In figure 1 the numbers are linked to the 4 research questions in the next paragraph. The main line in this research is based on the model of Fayol (1956) who has structured the way to change an existing process in 3 phases namely:

Phase 1: Research of the current situation (diagnosis of the problems)

Phase 2: Design of the wanted situation (planning of alternatives to improve the business process)

Phase 3: Develop policy in the form of recommendations (implementation of the alternative means to change from theory to concrete actions).

Figure 1: The research model divided into the 3 phases (Fayol 1956)



2.4 The research questions

There are 3 main phases in the research model. Each phase contains a central research question. In this paragraph the research questions will be defined on the basis of the research model. The first two questions are part of the first phase of the research. The third question is related to the second phase and the last question belongs to the third phase of the research.

1. *What methods and approaches can be used to redesign the process of renting out and resale?*
2. *What is the design of the current business process of the rental en resale of the units and how is it planned and controlled?*
3. *What is the wanted performance of the rental and resale process?*
4. *What are the differences between the wanted performance and the current performance and what causes the differences?*
5. *Which changes to the business process should be made to improve the selected performance of the rental and resale process?*

2.5 Use of research material

In this paragraph the sources of information for the research are discussed. What methods are used and how the information can lead to reaching the goals.

In the research questions there is a specific order and type of questions. The order of the questions is important because a lower order question can serve the higher order question and not the other way round. For a design type of research like this, it is important that the lower order research question supports the prescriptive question (*question 5*).

1. First the theoretical insights are needed to structure the research and find relevant approaches for this kind of research. This question is a declaring and theoretical question. It declares what methods and approaches are used to redesign the process. A declaring question is from the lowest order and the answer can serve the next questions.

To find the relevant literature several databases are used like Web of Science and Picarta. The search terms in the databases where: Business Process Redesign (BPR), Key performance Indicators (KPI), workflow management, Business Process Control, operation management and information systems. The first steps in the literature research like Picarta where followed later on in the process by more detailed search based on the determined structure. Next to the data bases, libraries where used to gather information about the BPR subject and about research methods to conduct a scientific research. These books helped to create a guideline for conducting the research.

To develop criteria for judging the business process and detect the problems in this process the theory will be studied into further detail. In the previous text it is made clear which steps should be taken. Based on these steps the more detailed literature search is conducted. Search words where: Strategy and BPR, best practices with BPR, track and trace, BPR case study, KPI's at business processes.

2. The second question is a descriptive question. It describes the current Unit Management process. In this second step it should become clear how the business process of rental and resale works at the Meeuw. The first source of information about the current business process is the already existing documentation. Different sources of documentation will be used namely: financial report for the KPI's, the ERP system for data about the units, block schedules of the total process and the administration of the rental and resale department. The next step is conducting in-depth interviews with the experts on the different steps of the business process. These people are: the resale

and rental department manager, the Isah-7 responsible administrator, the commercial director, the financial director, the sales manager and the responsible person for used buildings. With this information the current business process can be described and situated

3. The third question is a descriptive question. It describes the wanted performance of the rental and resale process. The third step is to determine the wanted situation. There will be a second interview with the complete management team to further specify the judgement criteria. These interviews are semi structured interviews consisting of two parts. The first part is to determine the general course of De Meeuw and its goals. SWOT-elements are used in the interview to determine the course. The first part of the interview is also conducted to develop the right view for starting the redesign. With the right view is meant that the strategy is of big influence on a redesign. A different strategy often means a different view on what the results should be. The second part of the interview is more specific aiming at the business process of resale and renting out.
4. The fourth question is an evaluation question. The current and wanted situations are compared. The evaluation results in the discrepancy between the current and the wanted situation and what the causes are for these differences. Once this is known, it is possible to describe the steps to be taken to improve the performance. In this part the detection of the bottlenecks in the business process of rental and resale of the accommodation units is needed. The interviews will be analysed by means of a frequency distribution because of the data is nominal scale.
5. The last question is a prescriptive question. The question prescribes what should be done to implement the changes and to improve the performance of the selected KPI's. On the basis of the previous findings there will be a redesign of current processes. This redesign will be done on the basis of creative and rational sessions with people who make managerial decisions and work with the system. The creative session is based on the brain writing techniques.

Chapter 3. Theoretical approaches for Business Process Redesign

In this chapter the literature will be investigated on business process redesign approaches for solving the problem. The structure is a top down structure. First the general approach will be described and next the several aspects of the general approach will be focused on and how these aspects can be useful for this study. After the description of what business process redesign actually is, a theoretical framework about the scope and structure of the research is presented. After the theoretical framework to structure the research methods for the actual implementation of the business process redesign are described

3.1 Business process redesign (BPR)

Business process redesign is designed to radically change processes and not to look to departments. It is suitable for primary business processes (primary processes are those processes which generate income for an organization). According to van der Aalst and van Hee (2004), BPR is well suitable for primary business processes. Usually BPR is most applied in information technology. Because the ERP system plays an important role the process of reusing the accommodation units, BPR is applied in this study. The name BPR is used in different ways and it is certainly not the only method for radically change business processes. According to Reijers (2003) however, the essential aspects in the differing terminology remains about the same.

The business process is influenced by several factors in the company. The 4 main dimensions in the effects of redesign measures as distinguished in the BPR literature are:

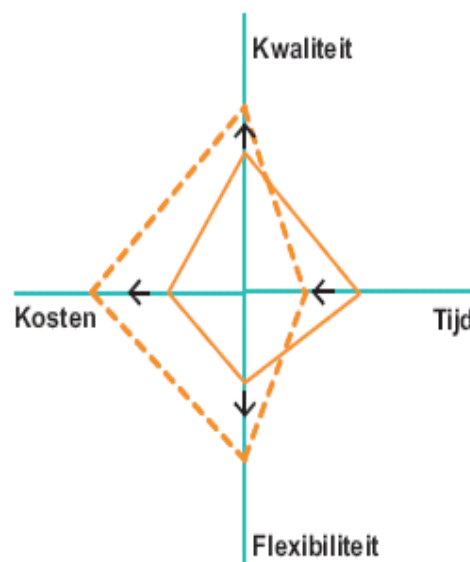
- Quality
- Cost
- Time
- Flexibility

In an organization there usually is a trade-off between these 4 factors. A business model that gives a possibility to see the trade-off between these factors is the Devil's quadrangle developed by Brand and van der Kolk (1995). Figure 2 shows an example of how a positive influence on costs, quality and flexibility may have a negative influence on the factor time. Brand and van der Kolk state that it is not possible to maximize all the dimensions of the model. The goals and the strategy of the organisation determine which dimension should be maximised and what consequences these decisions have on the other dimensions.

An important item of attention in this study is that the 4 main dimensions will be translated to the key performance indicators or other performance measurements.

Ideally the performance targets should be formulated as much more precise applications of the four mentioned dimensions (H.A. Reijers, 2003). First the main dimensions are defined in the next section (§ 3.1.1). Later on in the research the key performance indicators of the process of renting out and resale will be determined on the basis of preliminary research (financial reports, the ERP system for data about the units, block schedules of the total process, the administration of the rental and resale department, in-depth interviews with the experts on the different steps of the business process and more specific literature). The key performance indicators will be grouped under the four main dimensions in the BPR. By doing so, the 4 dimensions will be specified into performance indicators. How the performance indicators will be determined is explained in paragraph 3.3.2.

Figure 2: The devil's quadrangle by Brand and van der Kolk (1995)



3.1.1 Defining the four main dimensions of the BPR framework

The dimensions time, flexibility, costs and quality are described separately in this study, so that the definitions will become clear.

- **Time:** The dimension time can be interpreted in several ways. For example time can be: time to market, production time, transport time, etc. According to Brand and van der Kolk (1995) time can be divided in 3 main categories namely: service time, queue time and wait time.
- **Quality:** Brand and van der Kolk distinguish quality in internal quality and external quality. Internal quality is considered as the social and psychological

factors related to work. Examples are: the education level, variety in tasks, hierarchical differences, etc. The external quality consist of the degree of how the products meet the requirements of the customers. For example delivery time, service to the customer and the time the customer can use the product.

- **Flexibility:** Is the degree organisations can adapt to changes in the environment. This can be change to the internal environment as well as the external environment. The changes in the internal environment are the changes like the increase of activities or the expansion of activities, the change in information systems, the change from standard production of units to customer specific production. The external changes are the changes of the market demand like changes to the demand in temporary accommodation (from only construction worker facilities to social care facilities).
- **Costs:** Costs can consist out of several different types of costs like: transport costs, production costs, costs of stock, etc. It is also possible to put the emphasis on yield, turnover and revenue. It is possible to distinguish costs in fixed and variable costs. These types of costs can differ in nature and have usually different ways to alter them.

3.2 Developing the BPR framework

Before developing actual steps to change a business process, the scope and structure of the research should be clear. This structuring and setting boundaries to conduct the research using BPR has to be based on a theoretical framework. This framework makes it easier to analyse and understand the results. To create a framework to analyse and to order the results it is opted for consulting the best practices of other studies. Grouping results under an existing model and comparing the results with best practices, makes it easier to analyse where the problems in the process are and even give an indication to what can be done to solve them. Best practices are also a link between theory and practice and at the same time create the possibility to benchmark.

It is opted for using the theoretical framework as developed by S. Limam Mansar and H.A. Reijers (2005). The framework is developed on the basis of several existing models, related to BPR. This combination of literature gives a solid base for ordering and analysing in this study. During the literature search several good models where identified, but the article of S. Limam Mansar and H.A. Reijers (2005), a synthesis made of the framework by Alter, the MOBILE workflow model by Jablonski and Busseler, the CIMOSA enterprise modelling views of Berio and Vernadat and the process description classes of Seidmann and Sundarajan, is the most suitable for this study. In order to make the framework usable for active practitioners and academics

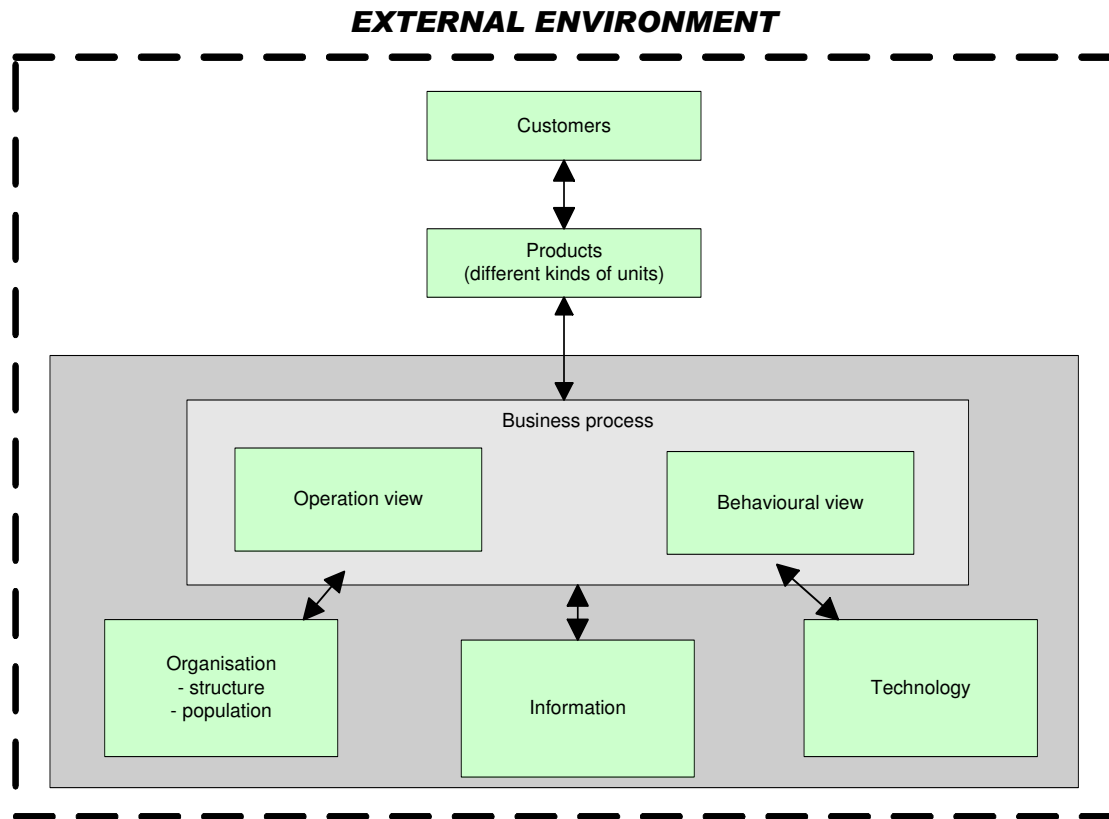
to practice the BPR theory, in the article of S. Limam Mansar and H.A. Reijers (2005) also the best practices are described. The results of this synthesis are expressed in six different elements which can be used to put the BPR into practice:

1. **Customers:** Are the end users of the products.
2. **Products:** The products or services generated by the business process.
3. **Business process:** The business process is divided into 2 parts; the operations view and the behaviour view. The operations view is concentrated on how the business process is implemented (number of tasks, size of tasks and nature of the tasks). The behavioural view concentrates on when the tasks are executed (scheduling, sequencing, etc.). This is a very important aspect in this study. This is the area in which the diagnosed problem occurs.

The next 3 elements are of influence on and interact with the business process. These elements are considered as being modules, which can tune the business process.

4. **The organisation** consists of two main areas namely: the structure (elements, departments, users, etc) and the population (the people responsible for the several tasks within the system). Since this area can become a source of problems, it will carefully be analysed. Modifications in this part can have a positive or negative influence on the devil's quadrangle.
5. In the business process of rental and resale, **information** is like the oil in an engine. This is not only about the available information but also how it is retrieved or visualised in the system. Information gathering and the information flow will be analysed in this report.
6. The use of **technology** can upgrade a process but also slow it down or disturb a process.

Figure 3: BPR framework



This figure shows the mainframe for the analysis in this study. Since the focus of the research problem is on the gray part, the elements in the gray frame will be analyzed. Also the internal processes are to be analyzed and improved; the problems in the process are not related to the products and customers. Their influence is well understood, but they are not in the focus area. The marketing department has already examined the information about the customers. Although possibilities for innovative changes may be challenging, the basic philosophy on the products (prefab units to build accommodation) for the time being remains the same.

3.3 Methods to change the business process

The framework does not provide information about the steps to be taken to reach an actual redesign of a business problem. In this paragraph the method for the implementation of the BPR is presented. There are many methods used in the BPR theory. Kettinger et. al (1997) describes in an overview of the methods, the steps which are usually taken. The S-A framework (strategy activity) shows an overview of steps and techniques. In this study these techniques are taken into consideration. There are many similarities in the design of this study. This also applies for the steps

in the S-A framework. Each of the six steps is described in a sub paragraph. The next paragraphs focus on how these steps are implemented.

3.3.1 Phase 1: Envision

Senior management usually initiates this step for changing the current business processes. By doing so, it makes a maximal use of the IT possibilities. To synchronize the goals of the BPR with organization's policy, the envision part should be based on the strategy and vision of the company. Many large companies already have a vision and strategy. In case the vision and strategy of a company is not clear or not yet formulated, a SWOT analysis is a proved method to assist an organization. Pinpointing the essentials of a strategy is crucial for a business process redesign. Because it contains the view and the long term goals of the redesign, pinpointing at the essentials of a strategy is crucial for a business process redesign,.

3.3.2 Phase 2: Initiate

This phase contains the step to initiate a project team setting the goals for the redesign. In this case the literature will be a basis for the initiation of the BPR. The goals will be translated into Key Performance Indicators (KPI's). They give a clear view on the performance of business processes. It is very important to measure the right KPI's carefully. If not, there is the risk that the management will make wrong decisions based on wrong KPI's. In order to achieve continuous improvements, best-in-class organizations use KPI's to improve poor performance as well as to enhance positive results on an ongoing basis (J. Kaskinen, 2007). In this article a roadmap is designed to create effective KPI's. The roadmap consists of 6 steps:

- *Set program goals:* It is essential that the program goals are in line with the strategy. So the question is what KPI's will give the most strategic benefits.
- *Select balanced and realistic KPI's:* About KPI's the general opinion in the literature is that there should be several KPI's which should be measured to judge and manage the business processes.
- *Align the KPI's with the strategy:* The right KPI's are in line with the strategy and the goals of the organization; once this is done the choice of measures leading to success is often an obvious one (G.Cronin 2007).
- *Establish benchmarks:* The benchmarks are established by the research of S.L.Mansar and H.A. Reijers described in the context of this study in paragraph 3.4.

- *Determine the baseline:* Determine where the organisation stands on each indicator. Some of the indicators are known but several are not yet measured in the current process.
- *Determine what is needed to look at:* Compared with a dashboard, the article provides what is needed to take into consideration. This means that it is necessary not only to look at the KPI's but also to look at where the information comes from.
- *Establish reporting systems:* Different levels of management require different KPI's. Because the process of redesign is on the rental and resale department, in this study the focus is on the middle management KPI's.

By selecting the right KPI's following these steps, the redesign goals can be formulated and diagnosing the problem can start.

3.3.3 Phase 3: Diagnose

The next step in the BPR is to diagnose the current situation. At this phase the current situation is analyzed and the bottlenecks are determined. The diagnosing will be done by describing the current situation of the process on the basis of the BPR-framework and by comparing this with the best practices. Best practices in the BPR are an important tool to judge the business process at De Meeuw Bouwsystemen. For developing the framework, in the article of S.L. Mansar and H.A. Reijers best practices are investigated. The list of best practices shows practical examples of BPR's. This list is presented in the next chapter because it closely related with research method.

3.3.4 Phase 4: Redesign

This part is the most creative part of the research. The process will be redesigned based on the diagnosis as obtained in phase3. Creative techniques are used to improve the process or to find alternatives. The redesign should meet the requirements as defined in the strategy or the previously set goals. This is the last phase of this study linked with phase 3 in the research method (paragraph 1.3). For the creative part of the study brain writing is used for generating ideas. The choice for brain writing instead of other creative techniques is based on the publication of Thompson (2003) about different creative techniques. Empirical research showed that brain writing is a technique that generates many ideas. Quantity breeds Quality. The team used for the redesign sessions was composed of people from different departments namely;

- Manager of the renting out and resale department
- Process controller
- Experienced employee of resale

- System engineer
- Marketing manager
- Author of this report

The general rules of brainstorming (A.F. Osbor, 1957) were used in the brain writing sessions. The rules for brain writing are about the same with the only difference that instead of verbally expressing the ideas in public, the participants write them down. The advantage is that the ideas are not influenced by other participants. People tend to generate more ideas this way and the session will less likely to be dominated by one or two persons.

Rules for Brainstorming

No Criticism:	Do not criticize ideas. Group members should not evaluate ideas in any way during the generation phase; all ideas should be considered valuable.
Freewheeling Welcome:	Group members should express any idea that comes to mind, no matter how strange, weird, or fanciful. Group members are encouraged not to be constrained nor timid. They should freewheel whenever possible.
Quantity Desired:	Group members should generate as many ideas as possible. Groups should strive for quantity, as the more ideas, the better. A high quantity of ideas increases the probability of finding excellent solutions.
Combining/Improving Ideas Encouraged:	Because all of the ideas belong to the group, members should try to modify and extend the ideas suggested by other members whenever possible.

Source: Adapted from A. F. Osborn. 1957. Applied imagination (revised edition). New York: Scribner.

The brain writing sessions are based on the results of the interviews. The performance indicators with the highest scores in the interviews will be the subjects in the brain writing session.

3.3.5 Phase 5: Reconstruct

This is the actual implementation of the BPR. In this phase the management skills are needed for smooth integration of the BPR.

This is the step to be taken by the managers of De Meeuw Bouwsystemen. This step should enable to implement the reconstruction after this study is completed. The conclusions and recommendations should advice the management about which steps to be taken to improve the process of renting out and resale.

3.3.6 Phase 6: Evaluate

This is the last step of the BPR. It is used for reflecting on the results and for continues improvement of the implemented system. The key issue is to maintain and to check the BPR meeting its goals. This should be a continuous process.

3.4 Conclusion about methods and approaches to redesign the business process

The Devil's Quadrangle is an often used theory to describe the trade off between different main forces in a company. The Devils Quadrangle in this study is used to select the main dimensions. The main criteria to judge on the business process of renting out and resale are Time, Quality, Flexibility and Costs. Since other dimensions like innovation can easily be arranged under these main dimensions, these criteria can well be projected on the activities at De Meeuw. The theory about the quadrangle describes the model and its factors but does not contain a suitable method to actually create a redesign. It is theoretical model and not suitable for operational use. To make the redesign operational it is opted for a BPR framework developed by S. Limam Mansar and H.A. Reijers (2005). The framework is a synthesis of different methods and techniques and will be used to group and analyse the results in this study. This framework distinguishes the behavioral and the operational view. These two views will be influenced and interact with the factors: organization (structure and population), information and technology. The structure of this framework will also be used to describe the current business process in chapter 4. The advantage of this approach is that the description of the current process will be structured and made comparable with the best practices from the theory. Although the framework is an excellent way to structure and analyze the study, it is not a method for redesign.

There are several approaches and methods to actually redesign a business process. In the study of Kettinger et. al (1997) there is an analysis of these different methods. The analysis results in 6 main steps to redesign a process. The first 4 steps are concurrent with the research design and the last two are taken after this study. To fulfil these steps more specified techniques from the literature will be used. The first four steps are:

1. **Envision:** elements of the SWOT analysis are used for the envision step.
2. **Initiate:** setting the program goals is essential here. The goals will be set by selecting performance indicators. These performance indicators are determined on the basis of a roadmap to create effective KPI's. This roadmap is developed in a study by J. Kaskinen (2007). When the performance indicators are selected they are grouped under the 4 main dimensions from the Devil's Quadrangle and from the BPR framework.
3. **Diagnose:** For diagnosing the bottlenecks in the current situation the BPR framework is used to describe the current process. Once the current situation is determined it will be compared with the program goals of step 2. For further analysis of the grouped results the best practices from S. Limam Mansar and

H.A. Reijers (2005) are used for comparing the results. The best practices are used to assist with diagnosing the problem. This analysis forms the basis of the creative part of the research.

4. **Redesign:** Redesigning the process is the most creative part of the BPR steps. Brain writing is used to take this step. The choice for brain writing instead of other creative techniques is based on the article of Thompson (2003) about different creative techniques. Empirical research showed that brain writing is a technique that generates many ideas. Quantity breeds Quality.

In this chapter a theoretical framework is developed for conducting this research. In the next chapter the method of research will be discussed. The Method of research should give a scientific base for the thesis. The method to collect and analyze the data is the focus point in the next chapter.

Chapter 4. Research Method

In this chapter the research method is described. The research method explains why and how research techniques are used in this thesis. The scientific basis and reasoning for this thesis will be discussed in order to create a method that will be useful for similar studies or problem definitions. Next to this overview of the research method is in every chapter referred to the relevant theories.

4.1 Why BPR is used for the redesign of this business process

There are several methods to change a business process in the literature of change management. BPR was maybe a hype in the late nineties and the beginning of this century. After some years of experience with the BPR also negative studies about the theory where publicized. An important reason for this was that the costs where higher then the revenues at some example organizations. The change by BPR is considered to radical by some organizations resulting in a lot of resistance and ineffectiveness in the organizations. Nevertheless there were also companies which gained a lot of benefits and revenues from the theory. Knowing this gives an indication that the theory of BPR was not only a hype but that it has some strong values to change a business process. Knowing the weaknesses of the theory gives room to prevent or alternate the weaknesses. On the other hand best practices can give an overview of the strengths of the theory. Enhancing the strengths and alternate or replace the weaknesses by other theories could give a firm basis to still use the BPR theory for this study.

4.2 How to collect the data

The information about the strategy (SWOT) and the information about the scores of the renting out and resale department on the selected BPR dimension is not simply measured or looked up. This information should come from the people within the organisation of De Meeuw Bouwsystemen. A survey is suited to gather information about experiences, attitudes or knowledge of people. In order to conduct a good survey according to A.M. Graziano and M.L. Raulin (2004) the next steps should be take:

1. Determine what area of information is to be sought
2. Define the population to be studied
3. Decide how the survey is to be administered
4. construct the first draft of the survey instrument; edit and refine the draft.

5. Pre-test the survey with a subsample; refine it further
6. Develop a sampling frame and draw a representative sample
7. Administer the final form of the instrument to the sample
8. Analyze, interpret, and communicate the results

The information (step 1.) needed is divided into two subjects namely:

- Envision (The envision part should be based on the strategy and vision of the company to align the goals of the BPR with the course of the organization)
- Initiate (the step to initiate a project group who will set the goals for the redesign, KPI's).

4.2.1 Subject 1: General information

The strategy for De Meeuw was not entirely clear so the elements of the SWOT analysis are taken into account in the interview. The entire board of directors and the management team of each department was interviewed (step 2.). The selected research method requires two types of data. The first type of data is related to the strategy and requires an unstructured interview with the board of directors and the management team. The second type of data is specific for the renting out en resale department and will be discussed in the next paragraph. In the first part of the analysis there will be a focus on current direction of De Meeuw and the wanted direction. Other points of interest are the requirements that De Meeuw wants from the process and what points are important for the redesign. This part of the interview is in line with the envisioning part and setting the programme goals as described in chapter 3. Also important KPI's can be determined on this part. The redesign should be based on the strategy. On the basis of the general part and literature research different KPI's are selected. The KPI's are grouped under the 4 main dimensions of the Devil's quadrangle.

4.2.2 Subject 2: Specific information about the renting out and resale

The specific part is more focussed on the specific renting out and resale process. The grouped KPI's and other interesting results from the first part will be the basis for the interview in the specific parts. The priority of the key performance indicators will be measured by conducting interviews with the entire management

team. The interviewees can give priority scores to the KPI's from 1 to 4 so that the KPI's can be indexed. The scores are in relation with each other and not absolute e.g.:

The time in stock of the units: 1 2 3 4

The costs of stock: 1 2 3 4

In this case the time in stock is more important than the costs of stock

The results of these interviews will be analyzed on the basis of the BPR framework explained in paragraph 3.2. (step 3.). This step in the research is the diagnosing phase described in paragraph 3.3. The analysis will form the basis for the redesign. The interesting points that derived from the interview will be shown in a Likert-scale. the interviewees can respond in 5 categories from strongly agree to strongly disagree e.g.

The current process of rental and resale is transparent:

[strongly agree agree neutral disagree strongly disagree]

In this case the respondent disagrees that the process of renting out and resale is transparent.

4.3 How to analyse the results

At first frequency methods are used to analyze the data. This is very suited for analyzing the nominal and ordinal data like the information from the interviews.

4.3.1. Central tendency:

It is also very interesting in this research to show the central tendency. This is done by the mean, the median and the mode.

- *The mode* is the answer that is mostly given in the interview. This is valuable in this research because all the answers are weighted equally. The extreme answers can be neutralized if you look at the mode of the scores.
- *The median* is the middle score of a distribution. This can show how the answered are distributed like the answers on the likert-scale.
- *The mean* is used in this research to show the average score. This is an important result from the interviews. On the basis of the mean the next step in research is taken (finding solutions).

4.3.2 Measures of variability:

Next to knowing the central tendency it is also important to compute the measures of variability. The mean can be exactly the same but the scores can be very different. The variability in the scores can be important with controversy answers in the interview.

- *The range* is the distance from the highest to the lowest score. The highest score at the 4 dimension model was 4 and the lowest 1. In the used Likert scale model is the range from 1 to 5. The disadvantage from the range is that it is only based on two scores.
- *The average deviation* is the average distance each score is from the mean. This is only interesting in this research if answers are very different in high scoring answers. This isn't used in this research.
- *The variance* shows the average squared distance from the mean. It is a good tool to show the variability from the mean. It is expressed in squared units, transforming the units back to the original ones can be done by calculation the standard deviation.
- *The standard deviation* is used for transforming the variance scores to the original ones. This is a very good way to show the variance in this research.

It is possible to give more weight to answers from certain interviewees (e.g. the general manager on strategy) but there is chosen that all respondents are equal in weight. This is because the management team and the board of directors usually make decisions together in the management meetings. Consensus in these decision is important this also is a reason to not give extra weight to opinions.

4.3.3 Selection of the interesting subjects:

There is a lot of consensus in a score if it scores high in importance and the variance is very low. For example: *Reliability of the information in the process* scores very high (1,27 on a maximum score of 1) and the range of the scores is only 2. If the score is better then 2 the subject is selected for the next step in the research. If a score is better then 2 it show that most respondents ranked the subject as most important (a score of 1).

Also the mean scores of the 4 main dimensions (time, quality, costs, flexibility) are computed. These scores can give more weight to selected answers. For example:

1. Quality scores a mean of 1,74
2. Costs scores a mean of 2,29

Quality gives in this case more weight to the scores then costs. In this methods the most important issues can be selected from the interviews. The selected subjects are

now compared with the best practices. In the next paragraph there will be an explanation of this.

4.4 Best practices

These best practices can give useful insights in finding solutions for a BPR. What will be a useful best practice will be determined by comparing it with the selected KPI's. In the analysis the results from the interviews will be categorized under the BPR framework and compared with the best practices using the selected KPI's. The best practices can also help in selecting actionable KPI's in the previous step.

The list of best practices shows practical examples of BPR's. This list is presented below. The blue text is not within the scope of this study.

Table 1: BPR practices classified according to the BPR implementation framework by S.L.Mansar and H.A. Reijers

Framework elements	Best practices	Definition
Customers	Control relocation Contact reduction Integration	Move towards the customers Reduce the number of contacts with customers and third parties. Consider the integration with a business process of the customer or a supplier.
Products	None	
Operation view	Order types Task elimination Triage Task compensation	Determine whether tasks are related to the same type of order and, if necessary, distinguish new business processes. Eliminate unnecessary tasks from a business. Consider the division of a general task into two or more alternative tasks. Or consider the integration of two alternative tasks into one general. Combine small tasks into composite and divide large tasks into workable smaller tasks.
Behavioural view	Re-sequencing Knockout	Move more tasks to more appropriate places. Order knock out decisions is a decreasing order of effort and in an

		<p>increasing order of termination probability.</p> <p>Parallelism Exception</p> <p>Consider if tasks can be done in parallel</p> <p>Design business processes for typical orders and isolate exceptional orders from normal flow.</p>
External environment	Trusted party	Instead of determining information oneself, use results of a trusted party
	Outsourcing interfacing	Consider outsourcing a business process in whole or parts of it.
	Interfacing	Consider a standardized interface with customers and partners.
Organisation: structure	Order assignment	Let workers perform as many steps as possible for single orders.
	Flexible assignment	Assign resources in such a way that maximal flexibility is preserved for the near future.
	Centralisation	Treat geographically dispersed resources as if they are centralised.
	Split responsibilities	Avoid assignment of task responsibilities to people from different functional units.
	Customer teams	Consider assigning teams out of different departmental workers that will take care of complete handling of specific sorts of orders.
	Numerical involvement	Minimise the number of departments, groups and persons involved in a business process.
	Case manager	Appoint one person as responsible for the handling of each type of order, the case manager.
Organisation: population	Extra resources	If capacity is not sufficient, consider increasing the number of resources.
	Specialist/generalist	Consider making resources more specialised or more general.
	Empower	Give workers most of the decision-making authority and reduce middle management.
Information	Control addition	Check the completeness and correctness of incoming materials and check the output before it is sent to the customers.
	Buffering	Instead of requesting information from external sources, buffer it by subscribing to updates.

Technology	Task automation	Consider automating tasks.
	Integral technology	Try to elevate physical constraints in a business process by applying new technology.

All answers were grouped under the categories to define areas for improving the business process of renting out and resale. For example, task automation scored relatively high in the answers from the management team. Task automation is therefore an area of interest to find solutions to the initial problem. Creative methods are used to find solutions to these areas of interest.

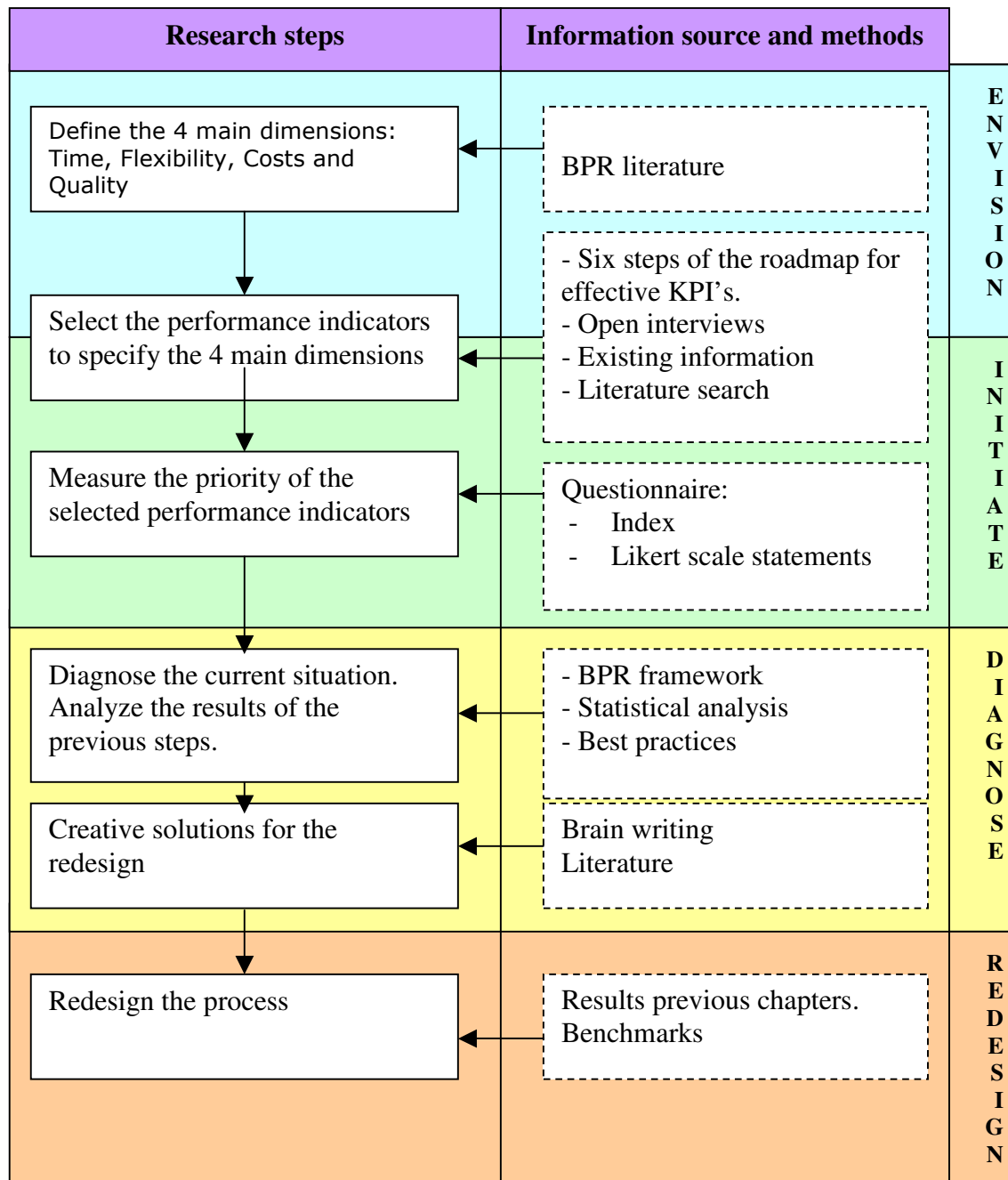
4.5 Finding solutions using creative methods

Finding solutions to the selected subjects is a creative part of the research. There is chosen to use the expertise from skilled employees within de Meeuw from different layers of the organization. Several creative methods were scanned as possible methods to come to solutions to the selected subjects. Brain writing matched all the requirements the research needed. In Chapter 6 the method is and the results of the brain writing session are explained.

4.6 Overview of the research method

In the next figure 3 there is an overview of the research method that is used. The main steps in the research all have a different color. In the left column the research steps are situated in the right column the methods and resources are shown. The paragraphs that are related to the specific research step is also situated in figure 3.

Figure 3: Overview of the research steps



4.7 Conclusion about the used method

Several theoretical methods are combined to work to the end solutions. The BPR theory is selected to change the process of renting out and resale and modified to intercept the weaknesses of the theory. Other theories for change management didn't fit as well as the theory of BPR to change the business process. A radical change can be beneficial for the process because a lot of Units get lost and the costs are to high.

Collecting data can be separated into two main parts.

- 1) The first part is defining the strategy and finding the most important values for De Meeuw Bouwsystemen in the 4 main dimensions of the BPR-model. This is part of the envision phase. Collecting the data here is done by open interviews. The data is analyzed by measuring the amount of answers on the same subject (results are in appendix I).
- 2) The second part consist mostly of closed questions and is used get specific information about the performance and the current status of the process of renting out and resale. The results will be analyzed using frequency methods. This includes the central tendency and the measures of variability.

Best practices from the BPR method are used to analyze the results and distribute the answers over area's of interest. The answers are now categorized (best practices) and the weight is determined (statistical analysis of part 1 and 2). The area's of interests should be improved. Finding solutions and improvements on the selected area's is done by using creative techniques with skilled and mixed employees from De Meeuw Bouwsystemen. The expertise is important in finding solutions and improvements. The result of the techniques will be worked out in a plan to redesign the process of renting out and resale.

Chapter 5: The business process of renting out and resale

In this chapter part of diagnosing the process is discussed. This is corresponding with phase 3 (diagnosing) from the S-A framework by Kettinger et al (1997) as discussed in paragraph 3.1. To describe the process of renting out and resale, existing documentation and preliminary interviews are used. Other documentation used is: annual reports, previous research at De Meeuw Bouwsystemen, documentation on the internal network about the process and the ERP system.

The theoretical framework in paragraph 4.1 will be used for structuring the diagnosis of the current process. First the business process is described in the operational and behavioural views. Secondly, the 3 elements having influence on the process are discussed; these elements are: organisation, information and technology.

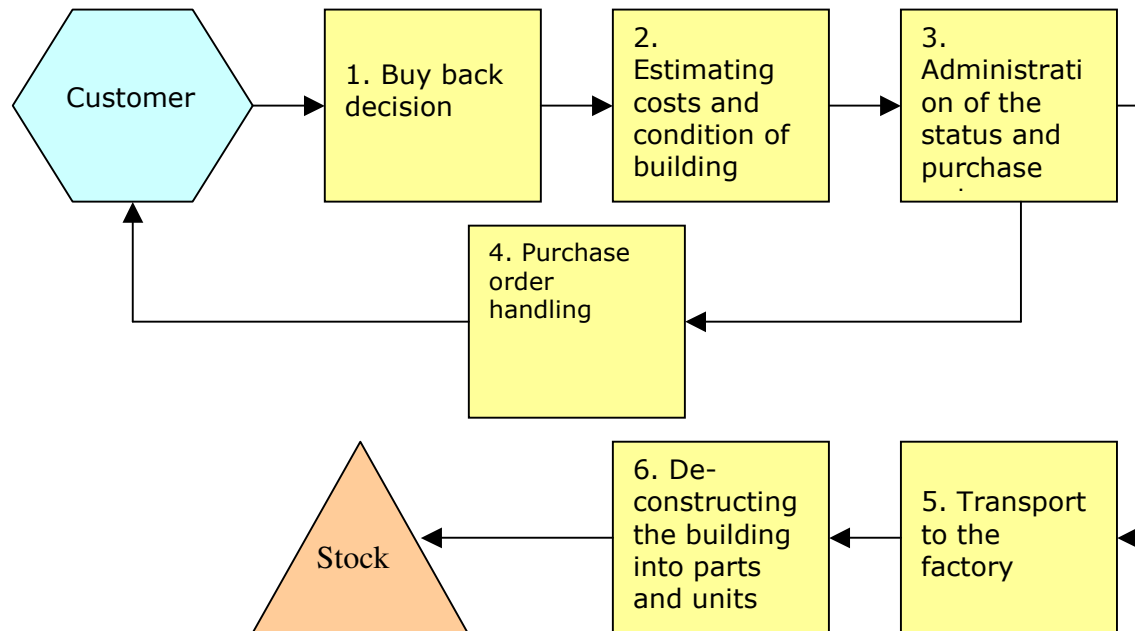
5.1 The business process operational and behavioral view

Because renting out and resale are two different processes under the same department, these are separately discussed in the next two paragraphs. The workflow of both processes is presented in a flowchart. Preceding the flowcharts the steps in the diagrams are explained. These workflow schedules give a good overview of the tasks conducted in the process.

5.1.1 The resale process

The business process of resale is presented in Appendix III. The schematic overview of the process is made by a very experienced employee who works in the resale process and is translated from the Dutch language. There are many steps in the process, resulting in many changes in responsibilities. The administration of the sales and the resale department operates in the different steps in the entire process. The average time of the units in the process is approximately a month, about 1/3 of this time is waiting time. The process is not designed as an optimal method for resale, but has gradually evolved into its current state. The process is considered as complicated and mainly based on practical experience. To simplify the process the next figure uses black boxes to show the main steps taken. Each yellow field in the next figure is considered as a black box of which details are presented in Appendix III.

Figure 4: Main steps in the resale process



1. The buy back decision depends on De Meeuw's contractual obligation to buy the building back. In case De Meeuw is not obligated to buy back a unit, the condition of the building is first checked upon. Next a decision is taken whether De Meeuw wants to buy the building back or not. The responsibility for the judgment about the condition of the building is with the resale department. The remaining the steps are the responsibility of the sales department. So if there is a contract with a mandatory buy back option, the resale department is not involved with this step. In both cases the sales department arranges for the documentation and communication for the next steps in the process.
2. In the second step of the process is to the building is judged on its current status and condition. The project leader from the resale department gets the documentation about the building from sales. Together with the customer or other partners the accommodation is checked and the state and the current value are determined. The current price and renovating work is determined and a purchasing order is made. The responsibility for determining the price is with the resale department. The customer contact and the creation of a purchase order are the responsibility of sales.

3. In the 3rd step consists of the financial administration of the order. All decisions made are registered in the ERP and accountant system. The administration there generates an order to the project leader to arrange for the next step. A granted purchase order goes to the purchaser. The responsibility is with the administration department.
4. If the purchase department gets a purchase order for a building, it arranges for the right documents and communicates with the customer. If all parties agree, the money is transferred to the customer and De Meeuw becomes owner of the accommodation again. The purchaser is responsible for the documentation and the project leader for the approval.
5. The building is deconstructed into units and is brought back to the factory of De Meeuw. De project leader is responsible for the transportation.
6. Upon arrival the units are further deconstructed. Parts like decorating ceilings, carpets and spare construction parts are removed and put in containers as waste materials. The construction of the units stays intact. Also the central heating system stays inside the unit. The resale department is responsible for this part of the process. The units are stocked in the stock area and are ready for resale. The status of the units is updated in the ERP system.

5.1.2 The renting out process

The first step in the renting out department is the market demand. The customer wants a solution for an accommodation problem. The first contact is often made by someone from the sales department, but also by other communication means like telephone and e-mail. The first step is to make a rudimental estimation about what the customer's demand is. The general guideline is that if a customer needs a building for a period of less than 1,5 year, the order goes to the renting out department. When a customer wants to use a building for more than 2,5 years it is usually more beneficial for a customer to buy the accommodation with a resale option. Who will be the contact person for the customer depends on the customer type (B2B, government, social care, schools).

The next step is to specify the customer's needs. The customer will get a form in which the detailed requirements are specified. This form is accompanied by a global drawing of the project. If the prospects for a customer to approve the project are promising, more time is invested in the drawings. The prospects for approval are determined by the sales person who is assigned to be the contact for

the customer. After approval of the drawings by the customer a quotation is sent to the customer.

The quotation is based on the specific design of the accommodation. This design is made after the customer approved the general drawing of the accommodation. In this specific design also the costs are calculated. De Meeuw often offers a rental price and a sales price in the quotation. Usually the following 4 steps are taken for making a quotation:

- Determine the current price of renting out units
- Determine the current sales price of the units in stock
- Determine transport and crane costs
- Determine the unique costs (special wishes customer about interior e.g.)

The prices are related to the different types of units and the facilities they have. Customer specific wishes will be calculated for the entire renting period. For small customer wishes, regularly required by customers, standard prices apply. For the irregular wishes (which usually involve higher prices) a separate quotation is made.

If the customer agrees with the quotation, the quotation will become a real order. The customer decides whether he will buy or rent the building. If the quotation is not transferred into an order, the ERP system requires a reason for the cancellation of the transaction. The costs made in the process so far are fully for De Meeuw's account and are considered as being acquisition costs.

Now the order is final, De Meeuw reserves the units in the stock administration. This is administratively done in the ERP system but also physically by a sticker on the units concerned. De Meeuw always wants to have a certain number of units in stock. When the amount of units in stock drops under a certain level, new units are ordered from the production department. Financially the units are managed as passive assets and are bought by the renting out department from the production department. The units which are bought in this way are considered as investments and have an own depreciation period.

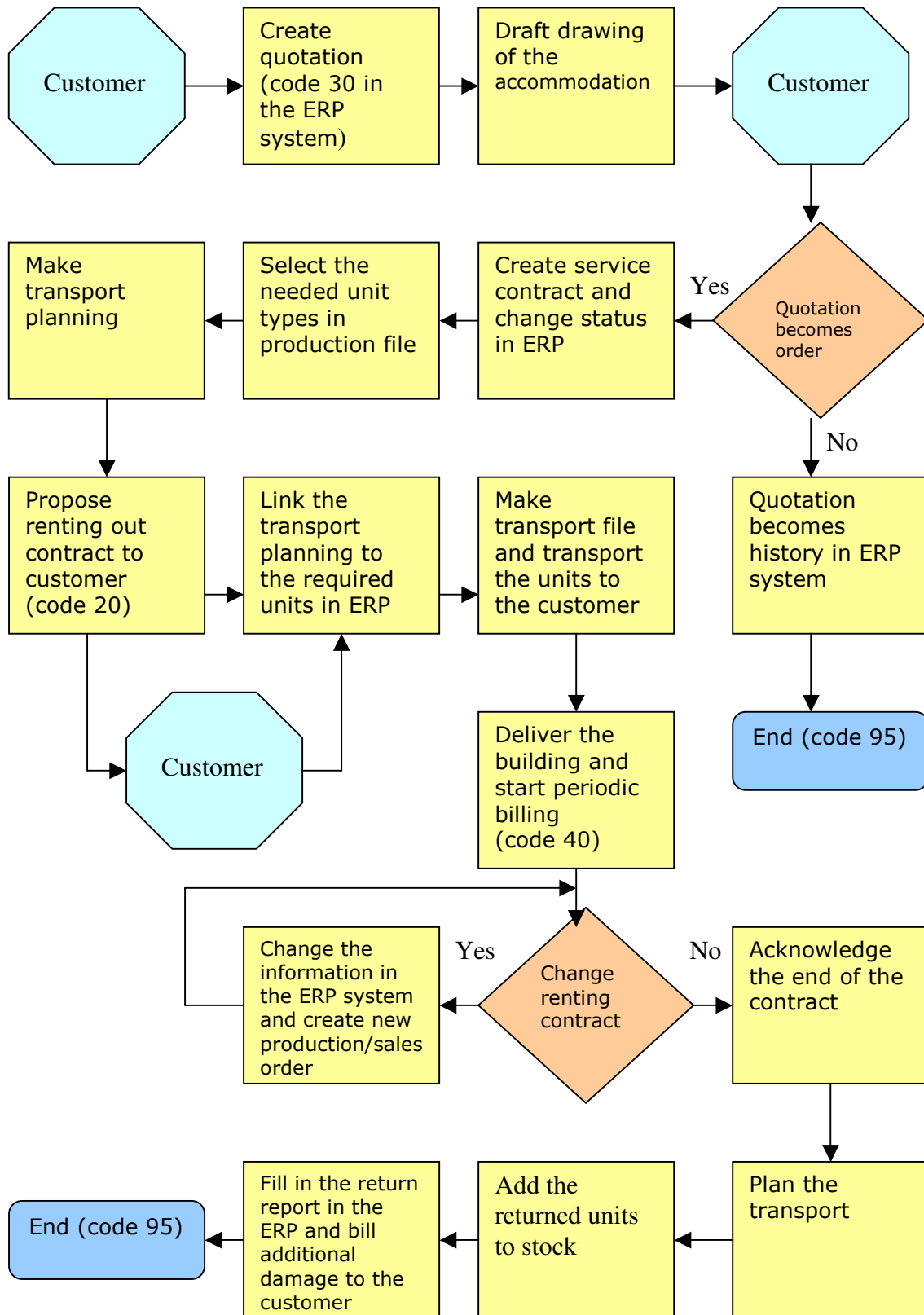
The actual transport of the units to the customer's location is planned for. Next to the planning of the transport also the construction time is calculated. This is extensively communicated with the customer.

After the units are installed a service contract is made. In the contract different services are distinguished: the construction of the units, the inventory of the units and the external costs like transport, construction cost, etc. The billing of the rent and service costs is automatically done by the ERP system by making use of the data from the contracts. If both parties agree it sometimes is possible to change

the terms during the agreed contract period. Usually this means that the term of the contract will be extended which is beneficial for De Meeuw. At the end of the renting period De Meeuw will check the building for any damage and takes the units back in stock after renovation. The data in the ERP system are changed and the project is phased out.

In the next flowchart there is a global overview of the steps taken in the renting out process. The diagram corresponds with the description in this paragraph.

Figure 5: General steps of the renting out process



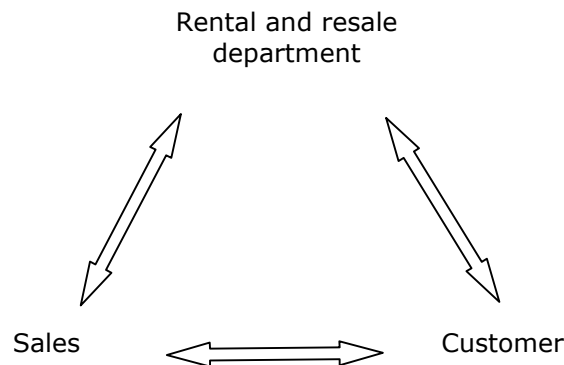
5.2 The organization, population and structure

In this paragraph the organization and the structure of the renting out and resale department is discussed on 3 specific points. In the previous paragraph the structure in general terms became clear but it does not say much about who is responsible and how the process is controlled. Also the population of employees in the process is not yet specified.

5.2.1 Responsibilities in the process of renting out and resale

The main responsibilities to administer the units are with the rental and resale department. Also the determination of rental or resale prices is the responsibility of this department. The rental and resale department communicates with the sales department. Cooperation between different persons of different departments is essential for an optimal re-use of the accommodation units. In the appendices V and VI a graphical overview of the re-using process is presented. Each step represents an action that must be taken by an individual. There is a total number of 55 steps to be taken to resell an accommodation unit. This process is experienced as being too long-winded. There is a plan to reduce the number of actions to a maximum of 28 in the future. The future process is presented in Appendix III. This process is still under development and yet it already gives a valuable input for the redesign and the comparison with the best practices. The principals of the interaction between the departments remain the same because it is a dynamic process between the rental and resale department, the sales department and the customer. The start of the resale of a unit can be initiated by the sales department but also by the rental and resale department. However in the overall project structure the responsibilities are with the rental and resale department. The sales and the rental and resale departments are also responsible for the information transferred to the administration and to the financial system.

Figure 6: Interaction between 3 different parties



There is also a difference between the small projects and the more substantial projects. A small project consist of only 1 to 5 units. For the co-ordination of the activities related to the actual renovating and preparing the units for the customer, a bigger project gets a projectleader. The projectleader is responsible for the execution of the project.

5.2.2. Controlling the business process of resale and rental of the accommodation units

The control of the process is based on a hierarchical structure. Several types of control are possible. There is the physical control of the units in line, administrative control and financial control.

The operators do the first physical check upon a request for a certain unit from the sales or rental department. This is done by checking the unique unit number and the availability of a certain type of unit. The project leader communicates the right number to the operator. This number should secure that the right unit is renovated or made ready for transport. The status should be communicated back to the administration of the rental and resale department. The second physical check has to be done by the driver of the truck before transportation. This is to prevent the wrong unit being taken to the customers. Wrong can also mean the exact same unit with another unit number.

The administrative control is the control in the ERP system of the units. There are various record fields in ISAH-7 to administratively control the units. The most important control items in ISAH-7 are the availability, the location, the current contract and the quality of the accommodation units. This is specific unit based control, which forms the basis of the KPI degree of utilization. It is a more general based control.

The financial control concentrates on the general level of control. It is not unit based anymore but unit type based. The financial results, for example, show the turnover of the rental of Flexicom units. Next to this unit type based financial control, there are the departmental based control figures like the profit, the cash flow and the turnover.

5.2.3 Population in the process

The sales team at De Meeuw Oirschot consists of 27 people, while the renting out and resale department consists of 10 people who co-ordinate the process. The renting out and resale department consists of an experienced team, working with extensive knowledge of the process. Because of the unstable and unpredictable demand, the team feels that a maximum of freedom is needed to work. The disadvantage of the required freedom is that the process is not structured and hard for outsiders to understand. Because of this freedom in working, the risk of making mistakes is high. These experienced people in the process have a heavy workload and expansion of the team maybe necessary.

Unlike the renting out and resale team, the sales team is a little inexperienced. This results in some customers getting the wrong expectations of certain possibilities of the product. It can have a major influence on the costs or on the quotations of units. The renting out and resale department is pleading for more technical and product knowledge in the sales team. This might result in a much better yielding.

5.2 Information

In this paragraph the information of influence to the process is discussed. It is about the information the business process uses or creates. A major factor in the information distribution is the ERP system. Next to ERP there is another information system created by the rental and resale department because the ERP system is not satisfying the demand. These two information systems are described now. A good example of the discrepancy between the two systems is the calculation of the degree of utilization which is an important KPI for the process. The calculation uses both systems and several data filters to actually come to the right figures. The steps to be taken for calculations are also discussed because it will result in an example of problems in the information systems.

5.2.1 The software system

The ERP system in use is ISAH-7. This is a relatively new system at De Meeuw Bouwsystemen. The launch was in March 2007. Virtual all information is located in this program but there are restrictions per user depending on the function of the user. Every department has its own workspace in Isah7.

All produced units are getting a unique number in ISAH-7. Linked with these records all information per unit is stored. The amount of information that can be stored is more than sufficient to cover the requirements. All information about the lifecycle can be stored (maintenance, previous owner, former project, etc) in the record fields. In additional record fields the amount of information becomes even larger due to the great variety in units (color of the carpet, air-conditioning, roll down shutter, etc). Because of a bad transfer of information from the old system, a great lot of information is missing in the current system. As a result the rental and resale department has developed its own administrative system. In the next paragraph the additional administration used to keep control is described.

5.2.2 Additional administration next to ISAH-7

ISAH-7 doesn't give a clear overview of the stock. That is why the relevant records of ISAH-7 are copied to Excel. In Excel a document is made from which the planning of the Flexicomms can be consulted. In the next figure, an example of this planning is shown. In case a location is marked as yellow the units are coming back to stock. If the location is marked as red the unit will be delivered to the customer. In the example it becomes clear how many (148) Flexicomms there are in stock and how many of what type there are available. Only the Flexicom units are controlled in this way. The other types of units are controlled on demand. If a customer needs one of these units a physical check of the stock becomes necessary. In general it is known how many units of what type there are on the premises (in stock).

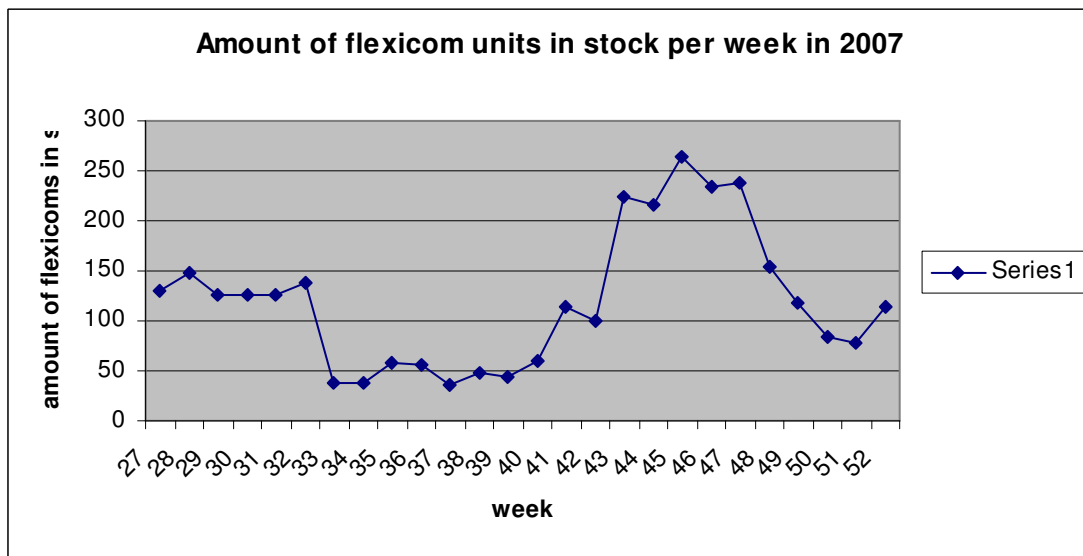
An example of an Excel planning is presented in the table on the next page.

Figure 7: example of an excel planning of different kind of Flexicom units

Project:	Bisschoppelijk College	Bovenrij	Blaauw	Pigture Group	Geofox		Libema	New Scene	Dejo	Gem. Tilburg	Support Plus	Railinfra	Stadsvervoer Nederland	week 28
							R	R	R	R	R	R	R	
TYPE	week 27													vr
FX1											-1			6
FX2	1	1	1	1	1			-1	-2	-1			-1	17
FX2A				2	1									16
FX3	4		1							-2	-4	-2		22
FX3A											-1			8
FX3ZK														3
FX4	4		1							-2	-4	-2		23
FX4A											-1			7
FX4ZK														3
FX5	4		1							-2		-1		10
FX5A														1
FX5ZK														12
FX6A														6
FX7A														1
FX8														2
FX10	1									-1				5
FX11														1
FX12														1
FX13														1
FX14										-1				1
FX15														1
FX16							-1							1
FX17														0
FX18														0
FX19														0
Total	14	1	4	3	2	0	-1	-1	-2	-9	-11	-5	-1	148

Through the year the number of units in stock fluctuates. In the next figure the stock of the Flexicom units is shown in the last semester of 2007. In week 45 there are over 250 units in stock which means that the total volume of the stock is **XXX**. Eight weeks earlier the stock is only about 40 units. This gives an indication about the difficulties in controlling the number of units in the renting out fleet.

Figure 8: Number of Flexicom units in stock in 2007 from week 27 onwards



5.2.3 How the KPI's by are determined at De Meeuw Bouwsystemen

Developing the strategy and setting goals is a process that is not yet completed at De Meeuw. In this study the experts (managers of the departments) on the specific areas of this research will determine the goals of the organization. Because of the importance of the strategy for the research there is chosen to conduct an open interview with the members of the board of directors and the entire management team. The main advantage of interviewing people is that a researcher can get information about what people are doing and moreover why they are acting in this way. These are the main goals of any case study. The most information and best results are usually obtained by face-to-face interviews (Graziano and Raulin, 2004). In the interviews the elements of a SWOT analysis are used to pinpoint at the key words for the course and the strategy of De Meeuw. This study is not meant to determine the entire strategy, but only some aspects of the strategy, needed for selecting KPI's.

At this moment the relevant KPI for renting out and resale is the degree of utilization. De Meeuw measures the degree of utilisation but it is important what this information represents. Are the sources of the KPI's the right ones and are all sources included, are important questions. As mentioned before there should be several KPI's which are measured to judge and manage the business processes.

After the program goals are set by the open interviews, the selection of performance indicators can start. This is done on the basis of preliminary interviews, financial reports, Chamber of Commerce information, internet research and benchmarks from other companies. The list of possible KPI's is extensive and many are not suitable for the renting out and resale department at De Meeuw. A selection of the most suitable KPI's is based on the program goals of De Meeuw.

The selected performance indicators are categorized under the 4 main dimensions discussed in the previous paragraph. The priority the performance indicators will get is determined by the results of a questionnaire filled in by the board of directors and the management team. A score from 1 to 4 is given to each performance indicator. The scores are an index for the determination of priorities of the selected performance indicators. Next to giving priority scores to the performance indicators there will also be 10 statements where the interviewee can react on in a Likert-scale. These statements give weight to the outcome.

5.2.4 Calculating the degree of utilization

To calculate the degree of utilization of the accommodation units a couple of steps are necessary to come close to the actual degree of utilization. These steps are necessary to filter wrong or old information about the units. Data pollution is the main reason for this wrong information.

To give an idea about the data pollution the process to calculate the degree of utilization is described as follows:

The first step is to extract all the record fields of the administered units to an Excel sheet. Because there is a considerable degree of data pollution in ISAH-7, this Excel sheet cannot be used directly to determine the degree of utilization. For filtering the information, the data of Accountview (this is the financial program which is linked with ISAH-7) is needed. The fixed assets document of Accountview is copied to Excel. This document works with the same unique unit numbers as the document extracted from ISAH-7. Now the two documents will be compared by the unique unit numbers. The numbers without a match will be filtered from the document. Now the data from ISAH-7 is synchronized with the data from Accountview. They are filtered on type of accommodation unit. Next the occupancy per type will be calculated.

The difference between the unfiltered and filtered availability of the units is shown in the next table. This shows an insight in the data pollution in ISAH-7.

Table 2: some figures about availability of the units from ISAH-7 compared with the information from the resale and rental department (20-11-2007).

Type Unit	Total amount of units. According to administration figures		Total amount of units according to ISAH-7	
	Amount of units under property	Units in Stock	Amount of units under property	Units in stock/available
Bouwwagen	6	0	101	95
Unikom	119	19	376	287
Kombi unit	912	251	No information	No information
Flexicom	1900	147	2149	526
Kombi -21/25/30	648	231	No information	No information
K 35 M21 M60	1919	528	3259	2037
Container	118	51	135	63

5.3 Technology

Apart from working with the ERP system to manage the system, hardly any additional technology is used. The technology used to renovate the used units is labor intensive. The mainframe of the units usually stays intact but in the interior and layout often require major changes. Renovations, major changes, repair and maintenance of the electric systems in the units, like the climate control, are outsourced to the GTI company. The plumbing systems are usually repaired and maintained by the technicians of De Meeuw. Also the walls and layout can be changed by the internal renovation team.

In particular when it comes to a better control of the process and reduce the workload in the process, De Meeuw is interested in using new technologies. Although the interest is there, no real steps are taken to investigate the possibilities for improving the process.

5.4 Conclusion about the current design and how it is planned and controlled

In this chapter the renting out and resale department is described, including its planning and control. This is done on the basis of the BPR framework described in paragraph 3.2. In the next issues there are sub conclusions which give an overview of the highlights of this chapter. These sub conclusions are related to the influencing factors on the behavioral and operational view of the BPR framework.

- The process is currently planned and controlled by the experience of the employees, resulting in a very flexible but unstructured way of working. This flexible and unstructured way of working is only partly desirable by the employees and the management team. On the one side it is possible to adapt to the changing customer wishes during the processes, but on the other side it is easy to make mistakes and the costs are not always under control.
- The information system does not work in an optimal way. There is a lot of data pollution in the system. To anticipate on these flaws an extra information system is created next to the ERP system. This is not desirable and results in an extra workload for planning and control.
- During the process the responsibilities often shift from one department to another. According to the best practices, order assignment can provide solutions by giving one person more responsibilities.
- The possibilities of using technology to decrease the workload and to get better control on the units are not seriously investigated.

In the next chapter the process is analyzed. The findings from this chapter together with the literature from chapter 3 will help to identify the areas of interest. The bottlenecks in the process will be determined for the redesign. Also the alignment with the strategy and the goals of the company will be analyzed.

Chapter 6: What is the wanted and the current performance of the renting out and resale process

The main goal of this chapter is to analyse the results of the interviews based on the theoretical framework as developed in chapter 3 and to find out what the wanted performance of the business process is.

In this chapter contains a closer look into the total organisation and in particular into the process of renting out and resale. The analysis is divided into two parts namely the more general part and a more specific part of the process.

- In the general part of the analysis is focussed on current the direction of De Meeuw and the wanted direction. The requirements that De Meeuw wants from the process and what points are important for the redesign. This part of the interviews is in line with the envisioning part and setting the programme goals as described in chapter 3. Also important KPI's can be determined in this part. Elements of the SWOT-analysis are used in the interviews for the general part. This is done to pinpoint the factors which determine the course of De Meeuw. The redesign is based on the strategy. On the basis of the general part and literature research, different KPI's are selected. The KPI's are grouped under the 4 main dimensions of the Devil's quadrangle.
- The specific part is more focussed on the specific renting out and resale process. The grouped KPI's and other interesting results from the general part will be the basis for the interviews in the specific parts. The priority of the key performance indicators will be measured by conducting interviews amongst the entire management team. The interviewees can give priority scores to the KPI's from 1 to 4 so that the KPI's can be indexed. The results of these interviews will be analyzed on the basis of the BPR framework explained in paragraph 3.2. This step in the research is the diagnosing phase as described in paragraph 3.3. The analysis will form the basis for the redesign. The interesting points derived from the interviews will be shown in a Likert-scale. The interviewees can respond in 5 categories from strongly agree to strongly disagree.

After the results are shown they will be analysed. The analysis will be used to look where the current process doesn't meet the company's goals and where the bottlenecks are.

6.1 General and specific analysis

The analysis is based on interviews with the board of directors (strategic level) and the managers of the departments of de Meeuw Oirschot (tactical level). Next to this also people who work on the operational level will be interviewed for the more specific part of the analysis.

- The general part of the interviews fulfills the initiating step and is part of the third step diagnosing as per the model described in paragraph 3.2. The interviewed people give their opinion and views on the questions in the interview. The questions in the interviews are selected on the basis of the selected literature and the problem statements. The main purpose of the general part is to find out what De Meeuw expects for the future and where the company will focus on. It is also important to find out what the strengths, weaknesses, opportunities and threats are. The respondents for the general part are the board of directors (4) and the relevant managers of the departments (5). The controlling department didn't feel they could answer the general part due to a lack of knowledge on strategy level so they only participated in the specific part of the interview
- The specific part is based on the general part and its purpose is to diagnose what the focus points in the redesign must be. This is aligned with the diagnosing part in paragraph 3.1. In the interview four dimensions are selected based on the Devil's quadrangle as developed by Brand and van der Kolk (1995).

6.2 General part results

The first part of the interview consists of open questions on the specific as well as the more general part. Due to the open questions a large variety of answers is possible. The answers will be grouped by a number indicated behind the answer. The number shows how many respondents gave the same answer. For most nominal and ordinal data, statistical simplification involves computing frequencies, that is, the number of participants that fall in each category (A.M. Garziano and M.L.Raulin 2004). Because the answers are nominal it is chosen to use frequencies under determined categories. The categories are determined on the basis of the theory of Schorn (2000). The interviews were taped and a short synoptically retelling of the interview was made. This results in an overview of the content that played a central role during the interview. In the next step the text on hand is carefully examined for remarks and conversation sequences that are

relevant to the research topic. The purpose of this step is to mark all the important sequences of the text and subsequently form a new text of all gathered relevant perceived remarks of the conversation. Thirdly the text is further subdivided. For this purpose, passages are arranged which can be assigned to a certain topic by the interview guide and content.

The exact answers of the persons can be found in appendix VII. For this general part of the interview 10 people participated namely: General Manager, financial managing director, commercial managing director, technical managing director, marketing manager, sales manager, renting out and resale manager, information system manager, administration manager and the technique and development manager.

Course of De Meeuw: De Meeuw will focus on several core issues. The most mentioned points are: product innovation (5), expanding internationally (5) and expanding of services (5). With expanding of services is meant that De Meeuw is going to take care of not only making the building but also to offer additional financial and administrative services. Terms like Total Cost of Ownership and working with strategic partners to give full service are used in this context. Sustainability will be a focus point in the policy of De Meeuw(4). Since the materials can be recycled and reused, building accommodation by means of units can have a sustainability advantage. Working CO2 neutral and using wind and solar energy are also options. Another frequent response is to focus on more permanent buildings (4). There is the expectation that customers will use the buildings for longer periods and as a consequence the buildings so should meet higher standards. Other points of interest mentioned are: higher degree of standardization (2), better separation of the departments and processes (1), and working with key accounts (1).

On what points does De Meeuw wants to excel: The most frequent answer is on product innovation (6). The innovations should be focused on incremental innovations. Especially innovations on sustainability are needed and wanted is the general opinion. Another point where De Meeuw wants to excel is on quality of the products (6). The most interviewees say that De Meeuw is doing well at quality and that quality is a core value of the company. Delivery time (5) is the 3rd most mentioned point; this point is based on fast solutions for accommodation problems. Other points of interest are: knowledge (2), sustainability (2), price /quality ratio (2), flexibility (2) extra services (1), brand

awareness (1), reducing the costs of developing mistakes (1), product alignment (1), focus budgets on PMC (product market combinations) (1) and being a partner with the customers (1).

What are the strengths of De Meeuw: De most frequently answers are on the production capacity (4). The production capacity of De Meeuw is the largest on the Dutch market. So for the bigger projects De Meeuw is better equipped than its competitors. De Meeuw can produce over 21 accommodation units per day. The second most frequent answers are in the field of financial independence (3), and meeting the customer's requirements and knowledge about building projects (3). Compared with direct competitors De Meeuw is a relatively large organization, also financially. Investments in new techniques or projects are therefore easier for De Meeuw to realize than for most of its direct competitors. The knowledge of De Meeuw about building projects is great. They have their own architects and engineers who can implement projects in a way which most the competitors cannot meet. For example De Meeuw was the only unit builder who could implement the temporary railway station project in Rotterdam. Almost always De Meeuw reacts positive on the customer's wishes and that is why there is high degree in meeting the customer's requirements. There are several answers with the score of 2 namely: good networking with other companies, quality, brand awareness, delivery time and turnkey solutions. The answers in which only ones are mentioned are in the fields of international operations and the price/quality relation.

What are the weaknesses of De Meeuw: The most frequent answers given are related to the weak internal processes (5). The second frequent answers are on the company's policy, there is no clear course (strategy) (3) and on the lack of knowledge and experience in sales (3). The internal processes are unstructured and very ad-hoc. Some interviewees say that De Meeuw can meet almost all of the customer requirements, but don't ask how. Much time is wasted by generating solutions for problems instead of following normal standard procedures. The problem with the strategy is that there is no strategy or only vaguely formulated. Everybody should know the strategy and align the departments' goals with it. Without a clear policy everybody just keeps doing what they are used to do and change is hard to introduce. Quite a lot of young people joined De Meeuw in several departments. This results in a lack of specific knowledge and experience. The remaining part of the answers on this interview

question was unique per respondent. Other points of interest are: inconsequent policy (this can possibly be grouped under strategy) (1), market reputation (many people only know De Meeuw from building site accommodations) (2), team work (2), overhead (1), telling the customers what to do (trying to influence the customer too much) (1), no good CRM policy (1) and the costs of production (1).

What innovations are planned for the near future: The most mentioned answer is sustainable units (4). With sustainable is meant that there are innovations on the use of natural energy sources (sun, wind, bio roof, etc) and the use of materials suitable for recycling and reuse. The second most answered question was international expansion (3). This international expansion can have a big impact on the business processes. Working with strategic partners (2), profit centers or mores separate SBU's (2) and faster adoption of trends in the market (2) where mentioned two times. With strategic partners is meant that De Meeuw works with other companies to give full service to customers. With international expansion is meant the expansion of the market and even to produce units in other countries. Answers that are mentioned once are: shortening process time, flexibility of the units, creating profit centers from the SBU's, innovation due to stricter governmental rules, different financial services and a focus on the (semi) - permanent market.

What are the strengths of the competitors: Strength of competitors is that they focus on a specific part of the market (3). This is not applicable for all competitors but for a few who are direct competitors (direct competitors are other unit builders, indirect competitors are e.g. the permanent builders or tent builders). The supply of budget units (3) is strength of some competitors. Some competitors deliver very cheap and low quality units. Customers who don't care about quality and want the lowest price as possible will opt for these competitors. Other points where mentioned by only one respondent namely: speed (delivery time), costs (some competitors are expected to produce much cheaper), aggressive sales, some have the benefit of a large mother organization supporting them, some competitors can build very custom made buildings and are not restricted to standard sizes and some patents slow developments down.

What are the weaknesses of the competitors: The most frequent answer is that competitors have far worse production capacities (4). Some competitors have trouble to fulfill wishes from customers who want larger buildings. The financial

capacity of many of the direct competitors is weak (3). Compared with most of the direct competitors De Meeuw is a relatively large organization. They are financially more independent. Meeting the governmental requirements becomes harder for most competitors (4). Safety and environmental requirements made compulsive by the government are harder to meet. The competitors specialized in low quality/price suffer most from these new regulations. Another weakness of the most direct competitors is delivering quality in the low end market (3). The quality demands of the customers are rising according to some interviewees and the customers are not satisfied with moist and dirty accommodation. The lower end of the market also wants a certain level of quality which is hard to reach for some low end competitors. Fulfilling a turnkey solution for customers is mentioned twice as a weakness. Unique answers are: the technical knowledge of most competitors is a weakness and the brand awareness is low for some competitors.

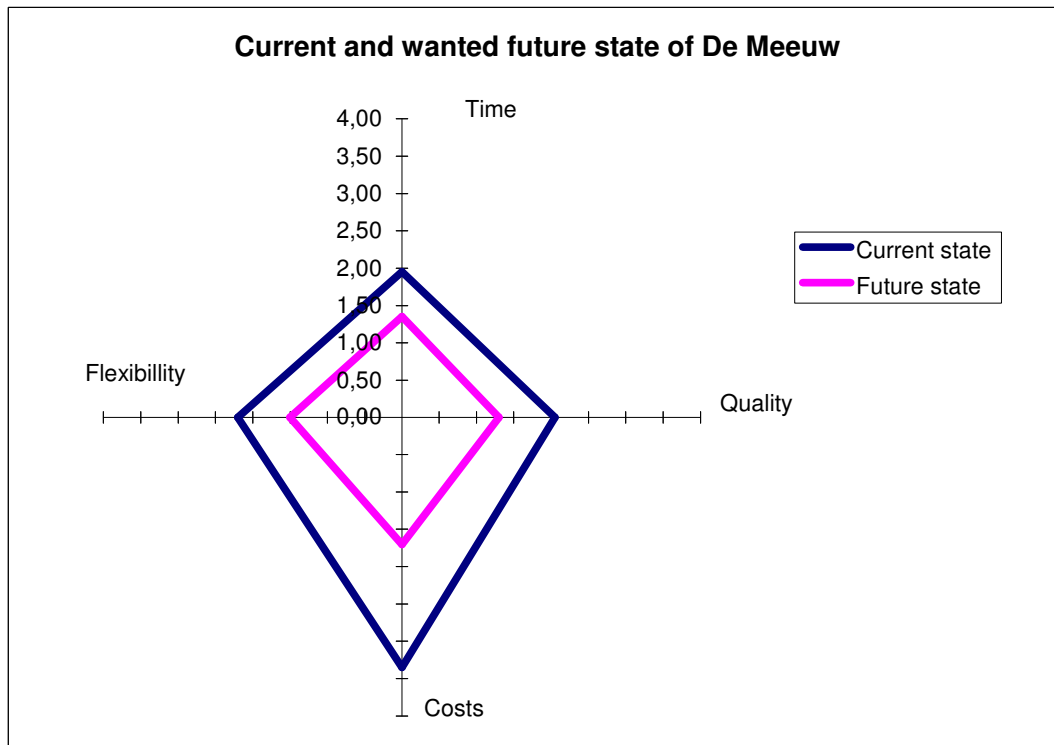
In what way the customers influence the internal processes of De Meeuw: The most frequent mentioned answer is that big customers have a large impact. A big order or resale can disturb the processes significantly (6). Better monitoring and making the processes better suited for large orders should be introduced. The customer's demand is sometimes too influential as wanted. Three interviewees said that standardization can reduce the influence (3). This can be achieved by looking at the automobile industry where much is standardized. Another remarkable answer was that customers do not have any influence at all (2). The internal processes should not be influenced by the customers, only the outcome should. On the other side De Meeuw is moving from market push to market pull oriented products (2). The next aspects are only answered once: the expected higher standard influences the quality, the business process is of influence to the customers (other way around) and the decisions about products are made together with the customers.

Has the customers' demand changed: The customer is getting more demanding (4) is answered 4 times, the demand did not change (4) was answered just as many times. Two times it is mentioned that governmental requirements became more strict (2).

In the last question is asked what the trade off is between the four main dimensions at De Meeuw and what the future trade off will be. The exact result

per respondent can be found in appendix II. The average result is shown in the next figure:

Figure 9: current and future trade of between the four dimensions.



The blue line indicates the average of the scores given by all the respondents on the current state of the process. The scale from 1 to 4 is a priority score, the closer to 1 the higher the priority. From the figure it can be derived that the lowest priority at the moment is the one of costs. The purple line shows the average score on how the respondent thinks the trade off will be in the future. The most remarkable improvement between the current and the future priority is on costs.

6.3 General part findings

In this paragraph the areas of interests from the previous paragraph are discussed. An indication about what KPI's should be used and the main course of De Meeuw is presented. The findings are not absolute but linked with the different opinions within the different management levels of de Meeuw. If there is discrepancy between the board of directors and the departmental management this is discussed. Other remarkable results are also highlighted.

1. De Meeuw is aiming to become more active on the (semi) permanent accommodation market and wants to grow internationally. Because the opportunities for sustainability in the area of unit building are promising (reuse, recycling), De Meeuw wants to focus on sustainable buildings. In order to realise this goal, product innovations are needed. Next to the profile of sustainability, de Meeuw wants to expand its services to generating turn-key solutions for customers (course).
2. De Meeuw wants to excel in increasing product innovations and in quality improvement. After quality improvement and product innovation the time factor scores highest. As it can be derived from the interviews all stakeholders agree upon this order.
3. The first strength aspect of De Meeuw is the production capacity and the financial independence. However financial independence is indicated by the managing directors only. Both aspects are related with the size of the company. Another strength aspect is the technical knowledge about building projects.
4. The main weaknesses are the organisation of the internal processes and what future course De Meeuw is going (strategy). The managing directors agree on poor organisational processes while this aspect is not mentioned by the department managers. The managing directors agree that the strategy and the course should be made more clear, but the owner states that it already is totally clear.
5. There is lot of diversity in the answers about what innovations are needed to be planned for. Only innovations in the field of sustainable units were mentioned more than 3 times.
6. About the strengths of the competitors the only comment is that some competitors are much more specialised. They can benefit from this aspect, because De Meeuw is operates on a large part of the temporary unit market.
7. On the weaknesses of the competitors was more unity than there was on the strengths. The weakness is, as expected, in line with the strength of De Meeuw, namely the production and financial capacity. Also a weakness is related to the quality of the units. Apparently competitors find it hard to meet the governmental requirements and the customer's wishes in the lower part of the market.
8. As it is stated by 4 interviewees, the influence of big customers on the processes is significant. It is quite remarkable that there two answers

implying that there is no influence at all and two answers implying that there should not be an influence by customers. A solution for too much customer's influence can consist of standardisation of the process.

9. There is no unanimity on the changing customer's demand. Mostly technical people are of the opinion that it did not change much while the commercial people stated that it did change. This is also a remarkable result.

6.4 Specific part findings

6.4.1 Priorities within the BPR dimensions

The results from the questions about the BPR model are presented in table X on the next page. In accordance with the general part quality is the most important factor for the rental and resale department with an average score of 1,73. The lower the score the higher the priority is. The factor time gets the second highest average score (2,38). The third score is for costs while the lowest priority is in flexibility. However, this does not mean that every specific factor is not of importance. It only indicates that quality is the most important in average. Each main dimension for the BPR model is be discussed separately. The range says something about the unity of the answers. Respondents could give a minimum score of 4 and a maximum of 1 so the maximum range is 1-4. The exact answer per interview can be found in appendix II.

Quality: The most important aspect is the quality and reliability of the information in the process. Also the range is very small so all the interviewees agree on this priority. Another high scoring priority is the high number of mistakes in the process. The range is slightly wider but it certainly is a focus point in the process.

Time: The most important issue in the time dimension of the BPR model is the process time from sales to delivery. It has a score of 14 with a range of only 1 point. So the general opinion about the high priority of this issue is almost the same in with the entire management team. The time in stock is of second most importance in the "time" dimension. But the range is on a maximum. This point is relatively less important than the previous mentioned point.

Costs: The far most important issue in the cost dimension is the costs caused by mistakes. Almost all respondents give very high priority to this aspect. The range

is only 1- 2. Cost reduction within the process should be focussed on preventing mistakes. Other issues that scored relatively high where the costs of stock and the costs of controlling the business process, but the unity in the answers is far lower.

Flexibility: Although the opinions are strongly divided, the least important dimension did not have any high average scores. The general manager (owner of De Meeuw) is of the opinion that the flexibility of the process should be very important, while the technical managing director states that flexibility is a result of a poor organised business process. More of these examples can be noticed in this dimension. Flexibility remains a subject of discussion.

The general results of the specific BPR question are presented in the table on the next page.

Table 3: Scores from the specific part of the interview.

	Statement	Sum of scores	Average scores	Range
Time	The time in stock of the units	23	2,09	1 - 4
	The administration time of the units	31	2,82	1 - 4
	The process time from sales to delivery	14	1,27	1 - 2
	The time to adopt a technology	27	2,45	2 - 3
	Introduction time of innovations in the processes	26	2,36	1 - 4
average priority		24,2	2,20	1,6 - 3,0
Quality	The amount of mistakes made in the process	17	1,55	1 - 3
	Controllability of the process			
	Financial	18	1,64	1 - 3
	Administrative	23	2,09	1 - 4
	Physical control	23	2,09	1 - 4
	Reliability of the information in the process	14	1,27	1 - 2
	The physical quality of the units	20	1,82	1 - 3
average priority		19,2	1,74	1,2 - 2,7
Costs	The costs of controlling the business process of renting out and resale	23	2,09	1 - 3
	The costs of stock	23	2,09	1 - 4
	Administrative costs of the process	31	2,82	2 - 4
	The costs of repair	23	2,09	1 - 4
	Transport costs of the units	32	2,91	1 - 4
	The costs of mistakes in the process	16	1,45	1 - 3
	The innovation costs (implementing new system, etc.)	28	2,55	2 - 4
average priority		25,1	2,29	1,7 - 2,7
Flexibility	Process flexibility	23	2,09	1 - 4
	Information system flexibility	28	2,55	1 - 4
	Unit flexibility (standardization – custom made)	25	2,27	1 - 4
average priority		25,3	2,30	1,7 - 4,0
Total Priority			2,13	1,9 - 2,6

6.5 Specific part findings; opinions about the 10 statements

In the specific part of the study where 10 statements from which the interviewees could choose between the following levels of their opinion: strongly agree (1), agree (2), neutral (3), disagree (4) and strongly disagree (5). The statements were included to know the opinion of the interviewees on possible relevant changes in the business process. The questions were generated on the basis of the BPR benchmarking as created by S.L.Mansar and H.A. Reijers as discussed in the previous chapter. The general results of this part of the interview is summarised in the next table, while the detailed results are presented in appendix II.

- Most interviewees expect De Meeuw to grow in the future (1,45 average (between strongly agree and agree). This can lead to more units in the field and more mistakes. The problem statement (chapter 1) is likely to become worse if nothing is changed.
- In line with the previous answers the most respondents think that more investments in the ERP system are needed to fully benefit from it. Especially with the expansion of De Meeuw in mind.
- On the other side there is also a relatively strong feeling to physically improve the process (a score of 2,55). An example of a physical process improvement is the Kan Ban system. There is some discrepancy in the average answers because people also agree on that all future documentation has to be digitalised (2,63). However, this answer is almost neutral.
- Most respondents agree that there has to be more control on the business process of renting out and resale.
- Under the condition that the control on the business process is improved and less ad-hoc, there is a general feeling that cost reduction can be obtained. The range of the answers varies between one and four.
- Next to agreeing with the statements there were also some subjects on which the average of the interviewees disagreed. Respondents didn't agree that the renting out and resale process is transparent (3,50).
- There is also disagreement on the influence of the customers on the design of the business process.

Table 4: Results of the agree/disagree questions

Reaction on statements	Average	Range	Median	Modus
In future all documentation will be digital	2,45	1 - 5	2	2
Flexibility will increase in future at the account of costs	2,55	1 - 4	2	2
Time benefits will increase at the account of flexibility	2,64	1 - 4	3	3
The customer will increasingly determine the design of the business processes	3,36	1 - 5	4	4
Investments are needed to fully benefit from the ERP system	1,55	1 - 3	1	1
De Meeuw Bouwsystemen will grow in the future	1,45	1 - 3	1	1
Control of the business processes needs improvement	1,64	1 - 4	1	1
The current process of rental and resale is transparent	3,45	2 - 5	4	4
Technological investments are needed to control the process better	2,55	2 - 4	2	2
Physical instead of digital improvements of the process are needed to improve the process	2,55	1 - 4	3	1
Total	2,42	2,1 - 3,0	2,4	2,5

6.6 Conclusion

The general and the specific parts of the interview show that it is expected the activities of De Meeuw to grow and that the workload on the renting out and resale process will grow with it. The innovations are expected to be incremental. The strategy is still under development but the key subjects are sustainability, innovation and international expanding. De Meeuw can realize this because it is financially strong and has a large production capacity. An important weakness is the internal organization. The processes are not organized enough to take the growth to a next level. From the 4 general dimensions of the BPR model is quality the most important. De Meeuw however, wants to advance the most in cost reduction from 3,36 → 1,70 (priorities given in the interviews maximum 4 and minimum 1).

Regarding the old situation, the specific part shows five points which deserve a high priority for improvement. The five points are mentioned below. The numbers behind the five points are the average scores in the priorities from the table.

1. Reduce the process time from sales to delivery (1,27)
2. Improve the information reliability in the process (1,27)
3. Improve the controllability of the process (1,94)
4. Reduce the number of mistakes made in the process of renting out and resale (1,45)
5. Reduce the costs of renting out and resale (1,45)

Further investments are needed in the ERP system to bring it to a desirable level (1,55 score in the interview, so most people of the management agree that investments are needed). Next the transparency from the renting out and resale department must increase (3,45, so most people from the management team agree that the process is not transparent).

Chapter 7: Redesign of the process

In this chapter the redesign of the process will take place. First of all solutions for the selected subjects will be found using creative techniques. Afterwards the creative technique the possible solutions will be zoomed in to.

7.1 Brain writing

In this chapter the first step to be taken is the creative part. Brain writing is used to generate solutions for the identified problems in the analysis. Kettinger et al (1997) describes the main steps to be taken to implement RFID. Another step is to make use of creative methods to come to the redesign. Since it is proven to be a good way to generate multiple ideas (L. Tompson, 2003) the brain writing technique is chosen.

The solutions will be grouped and an analysis of a possible overlap in the solutions on several problems is made. The solutions will be grouped Based on the benchmarks in the BPR the solutions will be grouped. Solutions which cannot be grouped in this context are discussed separately. The redesign will be done on the basis of the results from chapter 5 and on the solutions generated from the brain writing.

All results having a higher priority then 2 on question 14 of the interview on average are discussed in the brain writing session. 5 focus points have a higher priority than 2. On each of these 5 points respondents got time to write solutions for the statement and where asked to think in a creative way. After this step the de results where grouped and discussed in a round-robin.

The 5 points with the mentioned solutions are described in chapter 5.6.

7.1.1 Brain writing results compared with the best practices in the BPR frame work

The answers were grouped in accordance with the best practices by *S.L.Mansar and H.A. Reijersand*. These best practices can give a valuable insight in where De Meeuw can improve in the process. Some of the given solutions do not fall under the best practice categories. These solutions are often product related instead of process related. Some answers which were considered as being very interesting, but not often mentioned, are also used for the redesign.

Technology: In all 5 selected problems, solutions were mentioned which involved technology. All respondents agreed that using track and control systems can solve multiple problems in the process. Using RFID (radio frequency identification) chips in the units was discussed. There was a plan of two years ago to do this, but it never matured. Using technology implies task elimination and reduces human errors. Using technology to redesign the process could result in great improvements. This idea will

be taken into account with the redesign. After the brainstorm session it was concluded that technology would improve the following:

- Because the information in the system will be more reliable with the technology of RFID, the information handling will become more reliable. The chips can automatically be scanned so that no human interference will take place.
- Reduce the number of mistakes made because of task automation. Because of human mistakes in transportation, at this moment the wrong units can be transported without anyone being aware of what happens.
- Because information can be sent directly into the ERP system, the units can easier be controlled. Information about location, history and the economic value of the units will now correctly be processed.
- The costs of stock can be reduced because errors will faster be detected. In case wrong units are used in the process the error can easily be tracked.
- Because it reduces the communication to the needed minimum, RFID can bring a solution to communication problems. If scanning of the units leaving De Meeuw's premises takes automatically place, the driver does not have to report anything.

Behavioural view: Another important issue discussed during the brainstorm session was the re-sequencing of tasks. This means moving tasks to a more appropriate time in the process. In this case mandatory decision moments should take place.

- As soon as De Meeuw knows that building units will be returned, the current state has to be checked and a decision about the future of the building must be taken. Identifying these decision moments can be supported by the ERP system by alarming the responsible user. After their return renovation or storage of the units within a week is an appropriate time.

Organization structure: In the organizational structures are some flaws. Employees of different departments do not communicate well and too many people are involved in one project. Mistakes in information transfer are often reported. The sales team needs more experience.

- De Meeuw can work with project teams with only one responsible project leader, in particular for the bigger projects. While doing this De Meeuw must be aware of preventing the assignment of tasks and responsibilities to people from different functional units.
- Let individual people get as many tasks as possible in one single project. Shifting of people in a project makes it more likely to make mistakes.

Organization population: In the renting out and resale department the workforce of De Meeuw is very experienced. This is certainly beneficial for the knowledge about the accommodation units, but the process relies too much on this individual know-how. If people will leave the organization, this can easily cause problems in the field of inventory and availability. It will also be hard for newcomers to get familiar with the process. Contrary to the renting out and resale department, the sales department lacks the experience.

- The sales department should be trained and acquire technical knowledge of the units. It also should communicate better with the renovations department.
- In order to get a better control on the process, experienced people should work in a better structured and documented way. This can be stimulated or even made mandatory by the ERP system. It is important that not all employees have access to change records in ISAH, because this reduces the reliability of the information. So only the responsible and experienced people should have full access to the system. People working with it, should use the information but not change it.

Information: A core problem is the information in the process. Serious data pollution in the system influences all the subjects discussed during the brainstorming.

- More and better control on the information is needed. Input of and access to information about the units in the system should be restricted to the responsible people only. Too many mistakes are possible in the current layout of the system. The previously mentioned technology can improve the quality of the information in the ERP-system.
- Instead of improving the overall benefit for De Meeuw, the KPI's measured are only on department level. A good solution would be to introduce some extra KPI's to give a more clear view on the results and dynamics between departments. If the manager has the right KPI's, a process is easier to manage.

Products: Very interesting solutions were mentioned during the brain writing session. These solutions were related to the products. These improvements are beyond the scope of this research but are certainly worth to be mentioned.

- Standardization of the building materials can make it far easier to reuse the products. Storage of the units can be done on material level instead of unit level. Standardization must be on such a level that it does not influence the flexibility in a negative way.

- The reuse of the units can be taken more into account with the design of the units. Easier and more flexible ways to deconstruct and reuse the materials are some options of interest.
- The materials used should not only be beneficial for the production, but should also be beneficial for the total lifecycle of a unit.

7.1.2. Conclusion brain writing

For the redesign is opted for using the technology of radio frequency identity. Radio frequency could potentially bring solutions for all 5 areas of interest.

1. Because of task elimination the process time from sales to delivery can go down. In particular in locating the right units and communication can reduce time.
2. Information handling can be improved, resulting in less mistakes because part of it can be automated by RFID. If no one overrules it, the information in the system will be correct.
3. The controllability will increase with radio frequency identity. The information in the system becomes more accurate. When the units leave and when they will come back can exactly be recorded by the system. The times in stock and the process time can exactly be tracked by the system.
4. Because tasks are eliminated by the system, the number of mistakes can be reduced. If employees do not have to check the units physically and if they do not have to put information in the ERP system, they simply cannot make mistakes. Both physical and administrative mistakes will be reduced.
5. Results in the last point of reducing costs may not be reached at the launch of the system. First investments are needed for the implementation of the system. After launching however, the costs can be reduced by making less mistakes and consequently spending less time in solving problems. There will become more time available to focus on the core business of actually renting out and resale the used building units.

In the next paragraphs the focus will be on the redesign of the process by using RFID. First there is an explanation about the technique in general and about the suitability aspects for De Meeuw Bouwsystemen.

7.2 Redesigning the process

In the previous paragraph possible solutions are generated for the problems identified. In this paragraph the transfer of these solutions into a practical redesign is

described. In the redesign it is important to show where in the existing process will be interfered and what the expected results are. First the redesign will be discussed in the next paragraph while the influence on the existing process will be discussed in paragraph 6.2.2.

7.2.1 Steps to take for implementation of the redesign

1. The first step is to make management decisions on what is going to be implemented and measured. This report can give a valuable insight for making these decisions.
2. The second step consists of composing a project team responsible for implementing the new technologies and the measurement of KPI's. The team must consist of people from different departments.
3. The third action to be taken is to start measuring more KPI's. This is done for better measuring the performance of the process. The important needed KPI's are derived from the analysis of the results.
 - Measure the number of mistakes made. Each time a mistake is made try to find where it is made, why it is made and archive it. At the start of the project the units should both match with the system and physically. This is the first control point in the process, check whether the data in the system match with the real time units in stock. If there is something wrong track the mistake and report it. The second check point is just before transportation.
 - The process time from sales to delivery should be measured as a valuable KPI. Differences between planning and real time results in valuable information about the bottlenecks in the entire process. Because improving the process is a continuous process, the measuring of time really contributes to continuous improvement.
 - The reliability of information is of crucial importance in the redesign of the process. Extra time and effort is often spent on wrong information. If there is wrong information in the system this should be checked and reported. Percentages of wrong information can be the actual KPI. Especially for starting up the redesign this is a valuable check about the performance of the system.
4. The fourth step consists of implementing the technology to automate tasks. Best practices from BPR compared with the current process, the results from the analysis and the brain writing predict create prospects for improving the process. The introduction of RFID technology will solve many problems. Detailed information is provided in appendix VII. Some essential conditions will be discussed in the next paragraph.

5. Educate and train the employees about the new system and how to work with it. Make a small, selected group of people responsible for the maintenance of the system. Too much freedom in using essential parts of the system may cause human errors in the system again.
6. Measure the performance of the redesign on temporary and permanent KPI's. Improve the system continuously.

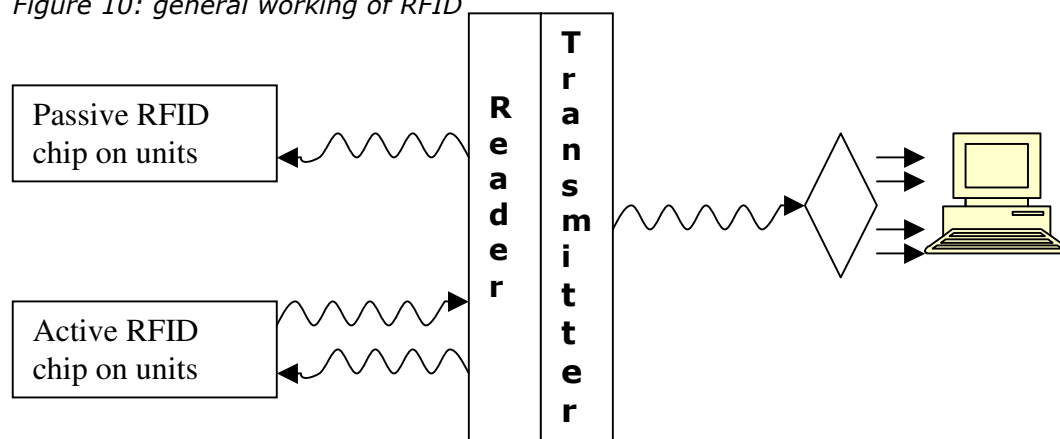
7.2.2 What is RFID

RFID is a generic term for technologies using radio waves to automatically identify individual items or artifacts (C.Poirier, D. McCollum 2006). RFID usually works with a chip (tag) which signals can be received by RFID antennas. Each object, which is tagged with a RFID chip, is getting a unique electronic identity also called Electronic Product Code (EPC). Serial number, object information and any other relevant information can be stored in the chip. RFID has the following characteristics:

- Standard nomenclature for identifying items via a unique identification broadcast and appropriate radio frequency (C.Poirier, D.McCollum 2006).
- EPC and/or other information stored on a microchip which is connected with an antenna; the chip and the antenna together are called a transponder or more commonly an RFID tag.
- Readable tags may be passive, with power supplied from the reader, or active, with a power source in a tag. Semi passive tags use an integral battery to run the chip's circuitry but draw power from the reader to communicate.
- Tags that can be read while in motion without a line of sight.
- Tags which are small enough to be applied as a label on most items.

In general there are two types of chips used namely passive and active chips. The difference is that the passive chips do not communicate with the reader and the transmitter. The next figure shows a global scheme of the working of the system.

Figure 10: general working of RFID



The difference between the active and passive chips is based on the definitions given by the Calsoft Labs Company, specialized in integrating new systems:

Active chip:

- Transmits signals from the microchip circuit by means of the power obtained from an internal battery.
- High signal range
- Used on large assets, such as cargo containers, rail cars, and large reusable containers
- Costly and larger in size

Passive chip:

- Contains no power source
- Obtains power from the reader
- Low signal range
- Cheaper and smaller than active tags

RFID chip systems are used for a variety of purposes. Even compared with the use of barcodes and physical numbers the technology is very promising. The RFID tag can store much more information than a barcode and the chip does not have to be in the line of sight of the reader. Some examples of the current use of RFID are:

- Big Dutch libraries use the RFID chips on the books. Annually some 2,7 million books are tagged.
- Procter & Gamble in Spain introduced the technology to increase dock loading throughput as a way of reengineering and improving site business processes.
- Wal-Mart uses RFID for its warehouse tracking. Also the vendors to Wal-Mart are obligated to tag their products. The anticipated cost reductions for Wal-Mart are: \$575 million on Shrinkage/Theft, \$6,7 billion on labour costs, \$300 million on warehouse item tracking, \$600 million on out-of-stock cost and \$180 million on inventory costs.
- Some car brands have an RFID chip in the car key that is part of the starting system
- In the Dutch student running match De Batavierenrace are RFID chips used for time registration of the participants
- Some pigeons flying long distances are tagged for the competition and identification.

There are two levels defined where RFID is used for and that is on a process level and on a product level. Both are of interest for this study because the product data cause problems in the actual process. So it is not a pure product or process related issue. The final aim of this study is to improve the process but at this stage the functioning

of the process is highly dependent on the product data. On process level the improvement can consist of: a better knowledge of the product flow through the entire process; automation of a part of the administration in the process. On product level the improvements can consist of: the unique numbers on the units will be registered automatically; better control on the stock (no physical and/or administrative losses).

The calculation of costs and more specific information about implementing RFID is specified in appendix VII. In the next paragraph the focus will be on the influence of this new technology on the existing process.

7.2.3 Re-design influence on existing process

The major advantage of the new technology is the elimination of several tasks and the reduction of a great number of mistakes currently made at De Meeuw Bouwsystemen. The RFID system will not improve the product itself but will improve the data reliability and flow. Data reliability is one of the most important issues generated by the interviews (1,27 priority which is the highest score in the interviews). The data in the current ERP system is polluted with false data from the old system and it is easy to make mistakes by updating new data to the units. This entire problem can be eliminated by using the RFID system. If a system like this is implemented it is exactly known which units are in stock and which units are not. Based on the current process (chapter 4) the influence of the redesign on the renting out and resale process will be discussed.

Renting out process:

- *Create quotation:* Creating the renting out quotations consists of 4 main steps: determine the current price of the renting out units, determine the current price of the units in stock, determine transport and crane costs and determine the unique costs (special wishes by customer about interior e.g.). RFID has influence on the second step. Under the condition the information is easier retrieved in the ERP system, the time needed for producing a quotation can be reduced. The correct history of the units can easier be tracked. The other steps remain the same.
- *Select the needed unit types in production files:* Now often an additional administration is used to browse the inventory and select the units. The additional administration is an extra task caused by an inadequate system. If the RFID shows the real time data about units, this task can be eliminated. This results in a considerable reduction of data pollution.

- *Link the transport planning to the required units in the ERP:* Also the transport planners are using an additional planning system next to the ERP system. The planning of the right units has to be connected with the right units in the ERP system. If the data of the units in ERP is right, the planning can directly be inserted into the ERP system. All the time and effort needed for an extra planning system and linking this with the ERP can be eliminated.
- *Transport file and transport the units to the customers:* Execution of the transport planning by the truck drivers becomes more automated. If the transport employees take the wrong units it will be detected at the RFID portals. RFID actually automates a task here.
- *Deliver the accommodation units and start billing:* The billing can start automatically after the readers scan the units which will be delivered.
- *Plan transport and carry the units back to stock:* If the units pass the readers of the stock area they will directly be registered in the ERP system as being back. Having exact dates and times of the units being back, makes it possible to define mandatory decision moments for the units on the premises. It should be made impossible for units to stay for a longer period than 6 months without any transactions and without any decision making about these units.

Resale:

- *The buy-back decision:* The buy back decision is often based on the contract or the current value of the unit concerned. Because of data pollution it can be complicated and take more time to make the buy back decision. The decision currently is based on the experience of the project leader and additional information from the computer systems. RFID technology produces more reliable information which makes it easier to validate the decision.
- *Estimating costs and state of building:* The history of the unit is important for making the decision about the present value. The sales department needs as much information as possible about a unit to resell it. Because this department is relatively inexperienced team, the information becomes of crucial importance. The discrepancy between the actual costs for repairing a unit and the estimated costs can be considerable. This discrepancy is the result of the units standing too long in stock (wind and water erode the structure) in combination with an inadequate information system. The system has to alarm the employees that the units remain too long in stock without any use. On that moment a mandatory decision can be made to leave the units in stock or de-construct the unit to re-use the materials. This will enhance the quality and resale possibilities for the used buildings. The role of RFID here is to upgrade

the needed information. The ERP system with reliable data can calculate the present value.

- *Administration of the status and purchase order:* The administration can be partly automated by the RFID technology. The unit moves will be registered automatically. This task eliminates and prevents wrong data caused by human mistakes in the ERP system.
- *Purchase order handling:* The purchase order can be printed automatically by the system and signed by the project leader. Currently the purchase orders are manually produced by an employee
- *Transport to the factory:* Transportation becomes less administrative. The truck driver does not have to register the actual numbers of the returned units. This will automatically be done by the RFID readers. Mistakes by filling in the wrong number are excluded in this way. Also the readability of the unique numbers is not an issue anymore.
- *De-constructing the building into parts and units:* The decision about de-constructing units can be made earlier in the process. This saves storage costs and increases the utilization of the materials. Especially the frames can be re-used for new units.

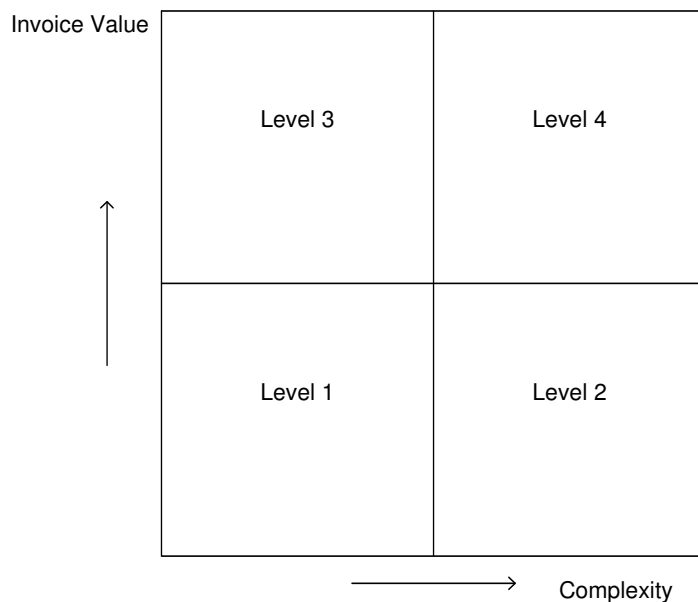
7.3 Redesign options not related with RFID

Although RFID improves the major aspects in the process, other interesting improvements in the process are also worth to consider. In this paragraph these aspects will be discussed. These options are based on the results from the brain writing and on the analysis in chapter 5.

1. In the current system the use of KPI's (key performance indicators) is not well developed. The degree of utilisation alone is not sufficient to control the entire process. KPI's can give a clear view on the performance of business processes. It is very important that the right KPI's are measured, if not, there is the risk that the management makes wrong decisions based on wrong KPI's. Best-in-class organizations use KPI's to improve poor performance as well as to enhance positive results on an ongoing basis to achieve continuous improvements (J. Kaskinen, 2007). In his article Kaskinen presents a roadmap for creating effective KPI's. The general opinion in the literature about KPI's is that several KPI's should be measured to judge and manage the business processes. The right KPI's must be aligned with the strategy and the goals of the company; once this is done the choice of measures for success is often an obvious one (G.Cronin 2007). Some valuable KPI's for the renting out and resale department are: time in stock; process time of the project; costs and number of mistakes made and used units in stock.

2. Working in project teams can be a method to reduce the shifting of responsibilities and the quantity of information transfer. A right project team can be composed in accordance with the complexity and invoice value. From the next figure a team can be selected meeting the determined level. In this way the teams can better specialize and depending on the importance the time spent per project can change.

Figure 11: Possibilities for assigning specialized teams and efforts in projects



3. Increasing the knowledge of the employees about the ERP system and the products can prevent mistakes. If sales people are not aware of the current value or possibilities of the products, they can create false expectations with the customers or even sell the products below the costing price. Courses about the products and good information transfer can prevent mistakes in the relatively inexperienced sales team. Another issue related to knowledge is the number of mistakes made in the ERP system. More training in the use of ISAH-7 and more restrictions can prevent human data errors in the system.

7.4 Conclusion about what changes should be made to the process

The business process of renting out and resale can be improved by the introduction of RFID technology. By means of task elimination this will reduce the number of human mistakes in the information system. Because of the availability of more and correct data about the units in stock also the controllability of the process will be improved.

The RFID technology will give more insight into the movement of the units in stock so it will be easier to track and trace the costs. If a manager can locate the costs he can create solutions to reduce these costs. According to a case study for the implementation of RFID technology at a comparable production company as De Meeuw is, the ROI will be 205% in 3 years time.

Next to implementing RFID technology and more KPI's in the process, the control possibilities will increase and improve. Only the end result does not give enough insight into the actual ongoing processes. Education, training and working with better specialized teams will also reduce the number of mistakes.

Chapter 8: Conclusions and recommendations

This chapter is the last chapter of this study and contains the conclusions and recommendations. The conclusions are presented together with the research questions and will give answers on those questions. The recommendations are supportive for the management in taking decisions for improving the process. Also further research possibilities are discussed in the recommendations paragraph.

8.1 Conclusions

In this paragraph the research questions will be answered by the conclusions. Each research question is answered in a separate paragraph. The conclusions are based on the results of each chapter. The main conclusion on the research objectives is presented first.

“The objective of this research is to redesign the business process of reselling and renting out accommodation units in end to create a higher performance on selected KPI’s.”

The redesign essentials for the wanted higher performance consist of the introduction of advanced technologies like RFID to eliminate tasks (less mistakes and lower costs caused by mistakes.), increase the information reliability, and increase the tracking and control for a better overview on the process time. A higher performance can be achieved on the selected KPI’s (number of mistakes in the process, process time, costs of mistakes and information reliability) by actually measuring these KPI’s and use the data in the redesign.

The complexity of the processes will increase, while the ongoing activities are too much based and depending on the experience of only few employees. The described processes and the proposed steps to take are logical and suitable for the process. So the design in this case does not focus on inventing new steps or new structures, but on how the steps are conducted. The more people working on a single task the easier mistakes are made. As far as possible the tasks should be divided and automated. Simple tasks like checking the right unit is taken to the right project can easily result in costly, confusing and embarrassing situations. Although the tasks look extremely simple, people still tend to make mistakes. Due to time pressure for example, it is easy to forget a simple task. Many tasks can be automated with RFID technology. Even if there are mistakes in the RFID technology, it becomes simple to analyse

mistakes and to correct them. Currently it is very hard to track down where and why a mistake is made.

8.1.1 Which theoretical approaches give insight into how to redesign a process?

Based on the BPR model developed by Brand and van der Kolk (1995), the main criteria to judge on the business process of renting out and resale are Time, Quality, Flexibility and Costs. The main dimensions give enough space for sub dimensions to be introduced under these main criteria. The main dimensions are further specified into a BPR framework. This framework distinguishes the behavioral and the operational view. These two views are influenced by and interact with the factors: organization (structure and population), information and technology. This framework is used to structure the description of the process of renting out and resale.

For changing the process the study Kettinger et. al (1997) is used. There are 6 steps described. The first four steps were concurrent with the research design. Interviews with the management team are used to initiate the project and to analyse the problems.

The best practices can be used to assist in diagnosing the problem. The response on the interviews shows which best practice can be used to redesign the process. The brain writing results can be benchmarked with the best practices by S.L.Mansar and H.A. Reijers.

8.1.2 What is the design of the current business process of the rental and resale of the units and how is it planned and controlled?

The design of the process is not structured and contains many shifting responsibilities during the process. The design of the process of renting out and resale is not designed for the current size of the process and is based on natural tasks evolved in the past. The ERP system ISAH-7 provides the information transfer in the process. This ERP system does not function as it originally was intended to do.

- Currently the process is planned and controlled by the experience of the employees resulting in a very flexible but unstructured way of working. This flexible and unstructured way of working is only partly desirable by the employees and the management team. On the one side it makes it possible to adapt to the changing customer wishes during the processes. On the other side however, mistakes are easily made and the costs are not always under control.

- The information system does not work in an optimal way. There is serious data pollution in the system. To anticipate on these flaws an extra information system is created next to the ERP system. This is not desirable and gives an extra workload in planning and control.
- During the process the responsibilities often shift from one department to another. According to the best practices, the assignment of more responsibilities to one person can contribute to solving the problem.
- In order to decrease the workload and to get a better control on the units, the possibilities of using technology are not seriously investigated.

8.1.3 What is the wanted performance of the rental and resale process?

The general part shows that the expectation is that the activities of De Meeuw will grow and that the workload on the renting out and resale process will grow with it. The innovations are expected to be incremental. The strategy is still under development but the key elements are sustainability, innovation and international expansion. Because of its strong financial position and its large production capacity De Meeuw can afford to further invest into these key elements. An important weakness is the internal organization. The processes are not sufficiently organized to carry the growth to the wanted level. From the 4 general dimensions of the BPR model is quality the most important one, but De Meeuw wants to advance most in cost reduction.

The specific part shows five areas deserving a high priority for improvement:

- Reduce the process time from sales to delivery
- Improve the information handling in the process
- Improve the controllability of the process
- Reduce the number of mistakes made in the process of renting out and resale
- Reduce the costs of renting out and resale

8.1.4 What are the differences between the wanted performance and the current performance?

The main problem is information transfer. This problem of information transfer results in a lack of controllability and results in many mistakes. The mistakes often cause false information in the ERP system leading to a chicken-egg-situation. Another result of the lack of control is that the costs are not under control. The control of costs is on a very general level.

The wanted situation is to get more control and less room for mistakes. To fill part of the gap between the wanted and the current situation the use of technology can be helpful in this process.

8.1.5 Which changes to the business process should be made in end to improve the selected performance of the rental and resale process?

The business process of renting out and resale can be improved by the introduction of RFID technology. Because of task elimination as a result of the technology, this will reduce the number of human mistakes in the information system. Because of the availability of more and correct data about the units in stock, also the controllability of the process will be improved. The RFID technology will give more insight into the movements of the units in stock and as a result it becomes easier to trace and track where the costs are. If a manager knows where the costs are he can develop solutions for the reduction of these costs. According to a case study of implementing RFID at a comparable production company as De Meeuw is, the ROI will be 205% in three years time.

Because of task elimination and a better information transfer, the process time from sales to delivery can be reduced by the use of RFID. Additional administration can be reduced by correct data handling in the ERP system.

Next to the implementation of RFID technology and if more KPI's are included in the process, the controllability will increase. The end result only does not give enough insight into the actual performance of the process. Education, training and working with more specialized teams will also reduce the number of mistakes made in the process.

8.2 Recommendations

In this paragraph the recommendations for De Meeuw Bouwsystemen are discussed. The recommendations are divided in two groups namely: RFID recommendations and general recommendations.

8.2.1 RFID related recommendations

1. It is possible to purchase a pilot kit for RFID technology, before RFID technology is procured and installed. The pilot kits usually contain: about 100 tags, one reader, two antennas, a power supply, data capture software and associated cabling. This will be good first step for the implementation of the new system and will cost about €4.000-

2. Make a cross functional project team responsible for the implementation of RFID and work together with an external supplier of RFID systems who can accompany the implementation trajectory. The team should be supervised or strongly supported by an influential person of De Meeuw. New technologies often show starting up problems and people tend to get skeptic against changes. With a strong project leader the organization can sooner adapt to the new technology and will not reject it when facing starting up problems.

3. The management team agrees that more investments in the ERP are needed in order to fully benefit from the system. The investments in RFID can be made part of the total improvement of the ERP system. Synchronizing the system with the RFID software is important for success. By combining the projects there is a better chance on a well performing system.

Business process reengineering success is facilitated with open communication. Successful business process change projects, in which IT frequently plays a change agent role, establish an objective and unbiased team or individual that continues to push the organization and line functions to find new innovative processes. An important ingredient is an atmosphere of open communication, participation, and cross training. In a study of business process reengineering projects, four of the top five most severe implementation problems concerned change management, such as communicating, organizational politics, and commitment to new values (Grover et al., 1995).

8.2.2 Non- RFID related recommendations

1. Make sure that all the departments are aware of the strategy and align the goals with this strategy. During the interviews there were a many different answers from the management team on strategy questions. Almost every large process improvement starts with the alignment of the strategy and company goals. In this study SWOT questions where needed to determine the general framework for the redesign.

2. Make a better use of the different KPI's to improve the control of the process. The degree of utilization and the financial results only give little control to manage the process. Measuring the time in stock and the actual process time can give valuable information to reduce costs and to prevent the loss of value of items in stock.

3. The transparency of the renting out and resale department is considered as being not satisfactory by the management team. A good improvement will be to separate

these departments. The costs, responsibilities and benefits will become more clear because of this separation. This results in much more transparency.

8.3 Possibilities for further research

This research is focussed on process improvement. In addition there are also possibilities for beneficial product improvements. During the brain writing session and the interviews valuable ideas were discussed on product level. In this field there are promising prospects for further research.

Standardization of the building materials can make it far easier to reuse the products. Storing of the units can be done on material level instead of unit level. The standardization should be of such a nature that it will not affect the company's flexibility in a negative way. The reuse of the units can better be taken into account at the design stage of the units. Easier and more flexible ways to deconstruct and reuse of the materials should be taken as starting point with the design. The materials used should not only benefit the production process, but should be beneficial for the total lifecycle of a unit. This is in line with the market developments. New research can be more product oriented. Some of the research questions can be: which standards in building materials should be used to optimize the possibilities for re-use, which design of the units gives a better chance for the re-use or on which level should standardization take place for a more profitable balance between the production department and re-use department.

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APPENDIX I: Analysis of the interview main part:

	Key words in the answer	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	Total
The main course of De Meeuw	Expanding services			1		1	1		1	1		5
	Product innovations			1		1			1	1	1	5
	Sustainability			1	1	1					1	4
	Expanding the market internationally	1	1		1				1	1		5
	Focus on key accounts			1								1
	Focus on more (semi) permanent				1	1		1			1	4
	Separate the different departments		1									1
	Standardization				1	1				1		3
In which fields does De Meeuw wants to excel?	Quality	1		1	1	1		1		1		6
	Time (delivery to customers)		1	1		1		1		1		5
	Knowledge about building projects			1			1					2
	Product innovations	1		1	1	1	1				1	6
	Sustainability	1				1						2
	Extra services	1							1			2
	Reliability to customers									1		1
	Being a partner for customers								1			1
	Focus to budgets on PMC		1									1
	Brand awareness				1							1
	Costs of mistakes in developments										1	1
	Product alignment										1	1
	Flexibility		1					1				2
	Price / quality					1	1					2
What are the strengths of De Meeuw?	Internationally operating			1								1
	Good network			1							1	2

	Financial independence/strong	1		1	1								3
	Capacity of production	1			1			1			1		4
	Key words in the answer	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	Total	
	Meeting customers requirements		1						1	1			3
	Price/quality	1											1
	Quality				1			1					2
	Brand awareness				1	1							2
	Time (delivery to customers)					1	1						2
	Knowledge about building projects					1	1				1		3
	Turn key solutions						1		1				2
What are the weaknesses of De Meeuw?	Inconsequent policy			1									1
	Internal process organisation	1	1	1	1					1			5
	No clear course			1	1		1						3
	Cost control								1	1			2
	Reputation					1				1			2
	Knowledge (experience)		1			1	1						3
	Team working								1		1		2
	Overhead										1		1
	Advice to customers							1					1
	No CRM department						1						1
	Production price						1						1
What innovations/renewal are planned for the near future?	Sustainable units		1	1	1	1							4
	International expansion	1						1	1				3
	Shortening process times				1								1
	Strategic partners				1	1							2
	Faster adaption to trends					1			1				2
	Deliver extra services and facilities								1				1
	Optimizing cost control									1			1

	Flexibility of the units					1						1
	Profit centres from the SBU's		1								1	2
	Key words in the answer	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	Total
	Stricter governmental rules (safety, environment)							1				1
	Financial constructions						1					1
	Growth on (semi)permanent market						1					1
What are the strengths of the competitors of De Meeuw?	Focussed on a specific part of the market	1		1					1			3
	Budget units (low quality)	1	1								1	3
	Speed				1							1
	Aggressive sales									1		1
	Costs				1							1
	Some have benefit from a large mother organisation					1						1
	Some can build very custom made							1				1
	Some patents										1	1
What are the weaknesses of the competitors?	Production capacity	1					1	1			1	4
	Financial capacity	1					1	1				3
	Technical knowledge										1	1
	Meeting governmental requirements			1	1				1		1	4
	Quality in the lower part of market	1					1	1				3
	Brand awareness					1						1
	Offer total solution for accommodation							1		1		2
In what way have the customers Influence on the processes of De Meeuw?	The customer is getting used to higher standards			1								1
	Big customers can influence the internal processes significantly			1			1	1	1	1	1	6

	Customers have almost no influence	1		1									2
	Moving from market push to pull			1	1								2
	Key words in the answer	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	Total	
	The customer should not have a big influence (only on the final results)				1					1			2
	Mores standardization				1	1					1		3
	The business process influences the customers							1					1
	Decisions are made in consultation with the customers		1				1						2
Have the customer requirements changed?	The customer is becoming more demanding			1		1	1	1					4
	The demand did not change much	1			1				1		1		4
	The governmental requirements became more strict		1		1								2

APPENDIX II: Results of interview question 15:

Dimension	Points of interest	AD	FD	CD	TD	H	M	HV	HVT	HAU	HA	HTO	HC	Sum of scores	Average scores	Range
Time	Time in stock of the units	4	4	2	2	2	2	1	2	1	2	1	2	23	2,09	1 - 4
	Administration time of the units	2	4	1	3	2	4	4	1	3	4	3	31	2,82	1 - 4	
	Process time from sales to delivery	1	1	1	1	1	2	2	1	1	2	1	14	1,27	1 - 2	
	Time to adopt technology	3	2	3	2	2	3	2	3	2	3	2	27	2,45	2 - 3	
	Time of introducing innovations in the processes	3	4	3	1	1	3	2	3	2	1	3	26	2,36	1 - 4	
	Average priority	2,6	3	2	1,8	1,6	2,6	2,4	1,8	2	2,2	2,2	24,2	2,20	1,6 - 3,0	
Quality	Number of mistakes made in the process	2	3	1	1	1	3	1	1	1	1	2	17	1,55	1 - 3	
	Controllability of the process															
	Financial	2	2	2	2	3	1	1	2	1	1	1	18	1,64	1 - 3	
	Administrative	2	2	2	2	3	1	1	2	3	4	1	23	2,09	1 - 4	
	Physical control	3	2	2	1	4	1	1	2	3	3	1	23	2,09	1 - 4	
	Reliability of the information in the process	2	1	1	2	2	1	1	1	1	1	1	14	1,27	1 - 2	
	Physical quality of the units	1	1	2	1	3	2	2	2	2	2	2	20	1,82	1 - 3	
	Average priority	2	1,8	1,7	1,5	2,7	1,5	1,2	1,7	1,8	2	1,3	19,2	1,74	1,2 - 2,7	
Costs	Costs of controlling the business process of renting out and resale	2	3	1	2	3	1	1	2	2	3	3	23	2,09	1 - 3	
	Costs of stock	4	1	1	2	2	2	3	3	3	1	1	23	2,09	1 - 4	
	Administrative costs of the process	4	3	2	2	3	2	3	3	2	4	3	31	2,82	2 - 4	
	Costs of repair	2	2	4	1	4	3	2	1	1	1	2	23	2,09	1 - 4	
	Transport costs of the units	4	3	3	2	4	4	3	2	4	2	1	32	2,91	1 - 4	
	Costs of mistakes in the process	2	3	2	1	1	2	1	1	1	1	1	16	1,45	1 - 3	

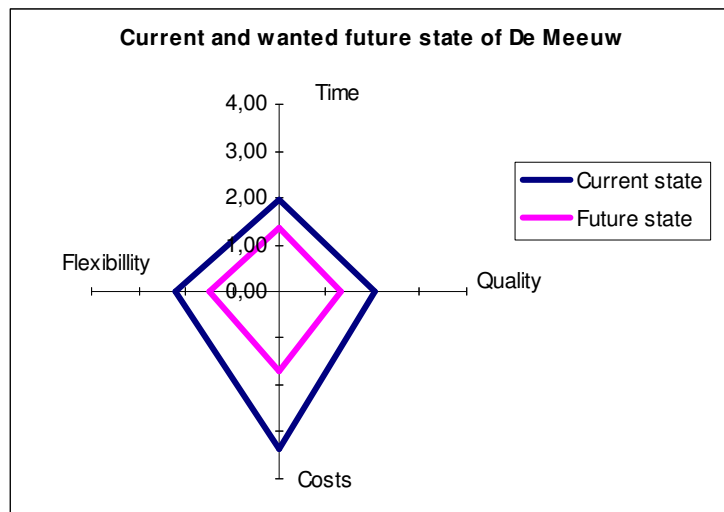
	Innovation costs (implementation of new system, etc)	3	2	2	2	2	3	4	2	4	2	2	28	2,55	2 - 4
	Average priority	3	2,4	2,1	1,7	2,7	2,4	2,4	2,0	2,4	2	1,9	25,1	2,29	1,7 - 2,7
Flexibility	Process flexibility	1	1	2	4	3	2	2	1	4	1	2	23	2,09	1 - 4
	Information system flexibility	4	4	3	4	1	3	1	2	1	3	2	28	2,55	1 - 4
	Unit flexibility (standardization-custom made)	3	1	2	4	2	1	3	3	2	1	3	25	2,27	1 - 4
	Average priority	2,7	2,0	2,3	4,0	2,0	2,0	2,0	2,0	2,3	1,7	2,3	25,3	2,30	1,7 - 4,0
Total Priority		2,6	2,3	2,0	2,3	2,2	2,1	2,0	1,7	2,1	2,0	1,9		2,13	1,9 - 2,6

APPENDIX III : Results of the interview on question 16

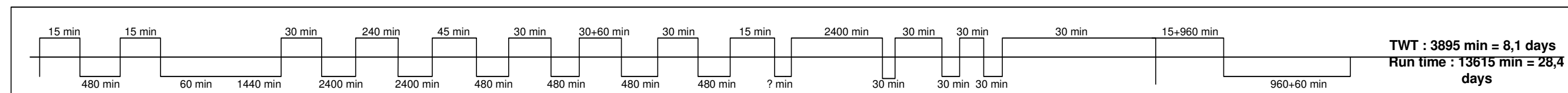
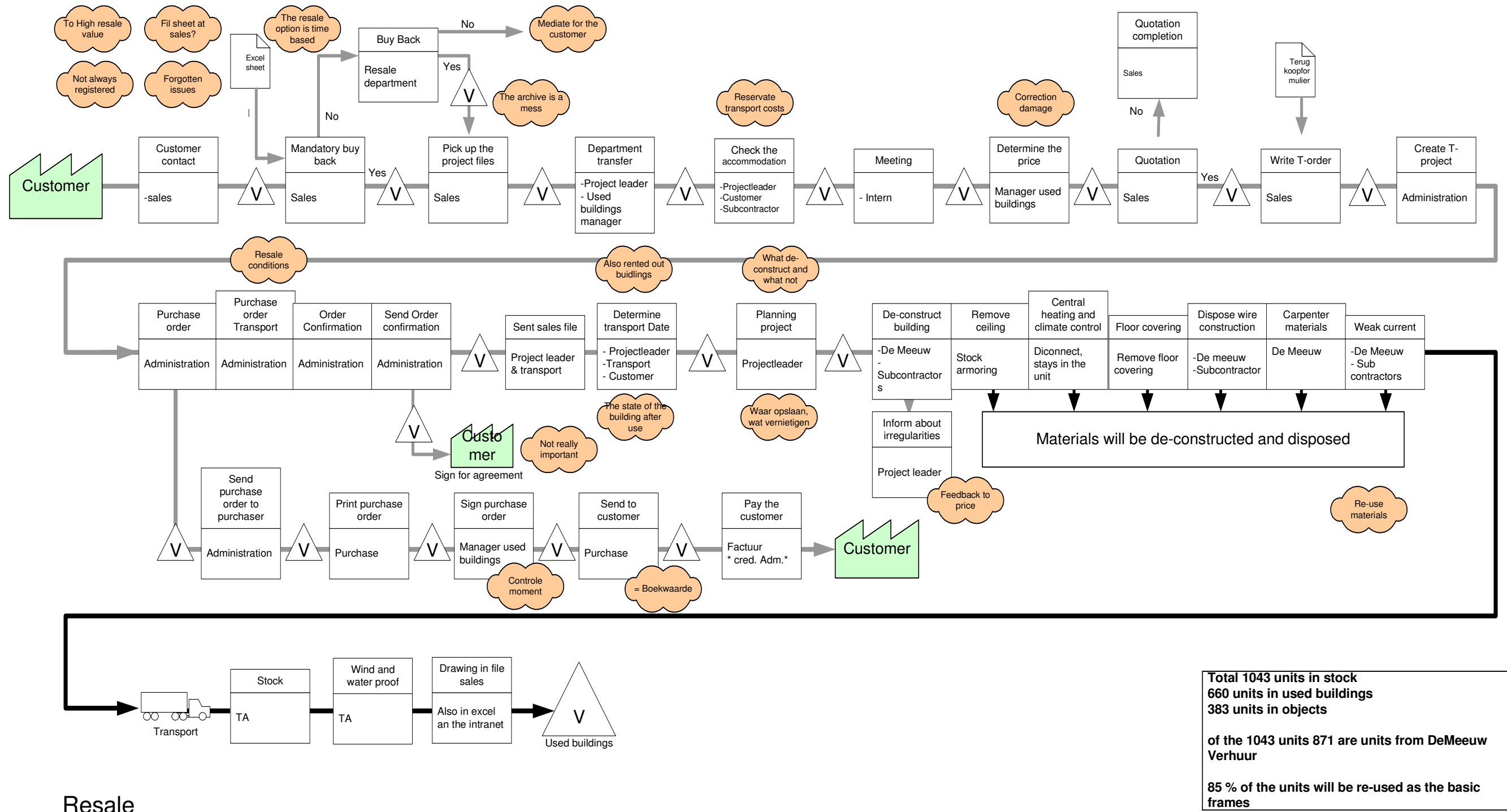
Statements	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	HC	Average	Range	Median	Modus
In future all documentation will be digital	4	2	2	1	2	5	3	2	2	2	2	2,45	1 - 5	2	2
Flexibility will increase in future at a negative influence on the costs	2	3	3	1	4	2	4	3	2	2	2	2,55	1 - 4	2	2
Time benefits will increase at the cost of flexibility	3	4	3	1	2	3	1	4	4	2	2	2,64	1 - 4	3	3
The customer will increasingly determine the design of the business processes	4	4	2	5	3	4	2	4	3	4	2	3,36	1 - 5	4	4
Investments are needed to fully benefit from the ERP system	1	1	1	3	1	2	1	1	1	3	2	1,55	1 - 3	1	1
De Meeuw Bouwsystemen will grow in the future	2	1	1	1	2	1	1	1	1	3	2	1,45	1 - 3	1	1
The control on the business processes must be stronger	1	1	1	1	2	2	4	1	1	2	2	1,64	1 - 4	1	1
The current process of rental and resale is transparent	2	3	4	5	3	4	2	3	4	4	4	3,45	2 - 5	4	4
Technological investments are needed to better control the process	2	2	2	4	2	2	2	2	3	4	3	2,55	2 - 4	2	2
Physical instead of digital improvements of the process are needed to improve the process	1	4	1	1	4	3	1	4	3	4	2	2,55	1 - 4	3	1
Total	2,2	2,5	2	2,3	2,5	2,8	2,1	2,5	2,4	3	2,3	2,42	2,1- 3	2,4	2,5

APPENDIX IV: Results of the trade-off from the 4 dimensions in the BPR (interview's last question)

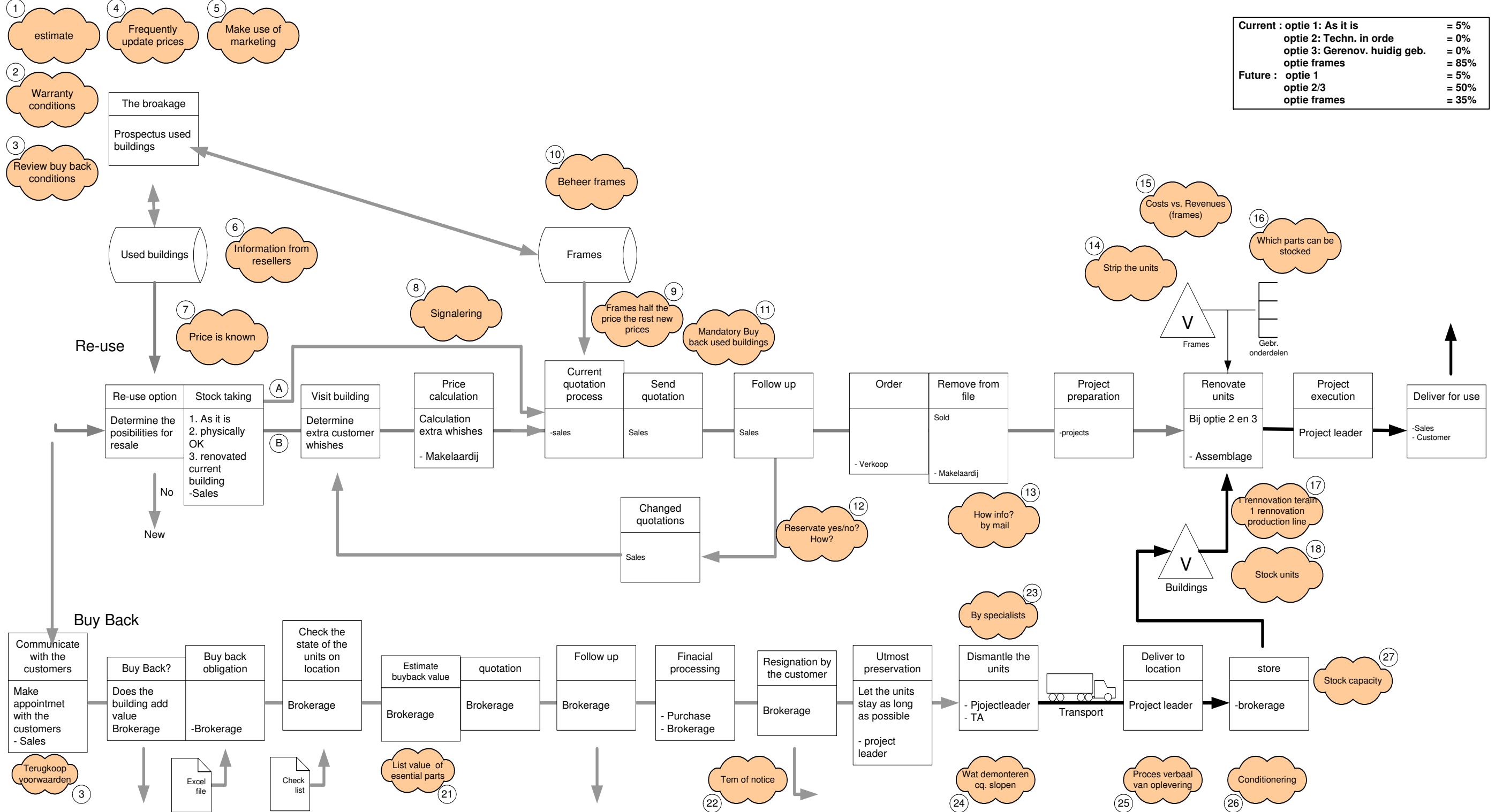
Current state	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	AC	Average	Range	Median	Mode
Time	1	2	1	3	2	2	2,5	1	2	3x		1,95	1 - 3	2	2
Quality	1,5	1	3	2	2	3	1	3	1	3x		2,05	1 - 3	2	3
Costs	3	3,5	4	4	3	3	3	3	4	3x		3,35	3 - 4	3	3
Flexibility	1	1	1	4	3	4	2	1	1	4x		2,20	1 - 4	1,5	1
Total	1,63	1,88	2,25	3,25	2,50	3,00	2,13	2,00	2,00	3,25	0,00	2,39	1,63 - 3,25	2,1875	3,25
Future state	AD	FD	CD	TD	HM	HV	HVT	HAU	HA	HTO	HC				
Time	1	1	2	1	1	2	1,5	1	1	2x		1,35	1 - 2	1	1
Quality	1	1	1	1	2	2	1	1	1	2x		1,30	1 - 2	1	1
Costs	2,5	1	3	2	1	2	1	1	1,5	2x		1,70	1 - 3,29	1,75	1
Flexibility	1	2	1	1	3	1	2	1	2	1x		1,50	1,63 - 3,30	1	1
Total	1,38	1,25	1,75	1,25	1,75	1,75	1,38	1,00	1,38	1,75	0,00	1,46	1,63 - 3,31	1,375	1,75



Appendix V: Current state resale process



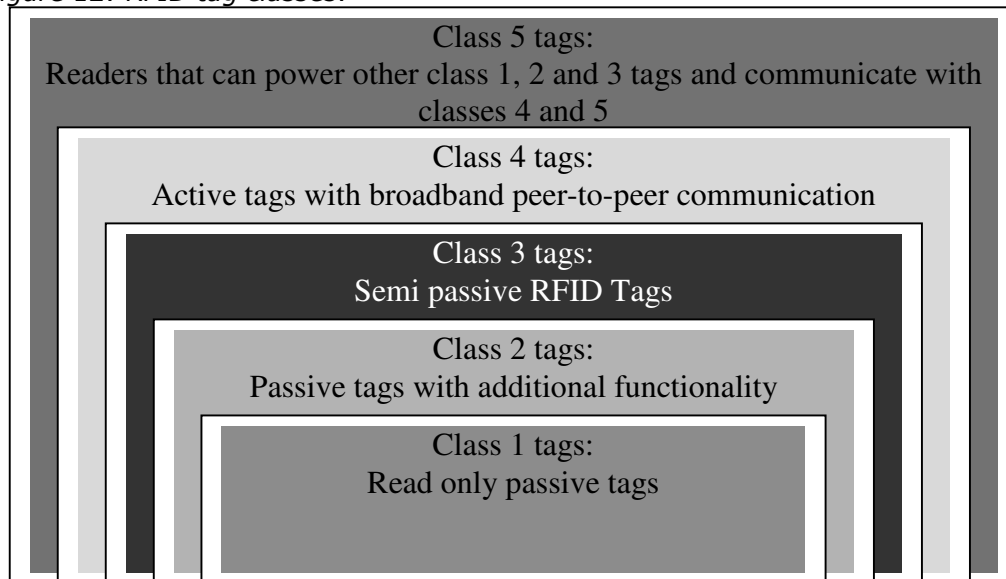
Appendix VI: Future state of the process



APPENDIX VII: RFID extra information

C.Poirier and D.McCollum (2006) define 5 classes of RFID Tags. Two of these classes are active tags as shown in the previous figure and three of them are passive. Which tags are the most suitable for De Meeuw is discussed in paragraph (X). The next figure shows the different classes (C.Poirier, D.McCollum 2006).

Figure 12: RFID tag classes:



The different types of tags also have different properties. Some important properties are:

- Class 1: The transmission reliability is low, it requires no battery, the life span is long and it has a low communication range.
- Class 2: The transmission reliability is low, it requires no battery, the life span is short, has a high communication range.
- Class 3: The transmission reliability is high; it requires a lithium/manganese battery; the life span is long; has a medium communication range.
- Class 4: The transmission reliability is high; it requires a lithium/manganese battery; the life span is long; has a high communication range.
- Class 5: The transmission reliability is high; various possible power sources are possible; the life span is long; has a high communication range.

With a low life span is meant that the chip can be active for 5 to 10 years. With a long life is meant that the tag will be in use for a period of over 10 years. The communication range is the range that a reader needs to read the tag. Short range is approximately 0,5 meter. This is the range for the class 1 type of unit. The medium reading distance is approximately 3 meters and the high distance is approximately 10

meters. These distances depend on the frequency of the tags. The next table shows the different distances with different frequencies.

Table 6: frequency relating to possible reading distance with active and passive tags

Tag frequency	Reading distance for a passive tag	Read distance for an active tag
125 KHz	40 cm	4 m
13,56 MHz	60 cm	6 m
433 MHz	3 – 4 m	100 m
2,45 GHz	> 4 m	> 100m

6.2.3 Costs and revenues

For taking the management decision to adapt a new technology, important factors are the costs and the revenues. In order to estimate the costs and revenues, examples from other companies are taken. Further indications about the costs are given by Piorier and Mcollum (2006). The costs for the implementation of an RFID system consist of 3 types:

- Buying the hardware
- Buying the software
- Implementing costs

The prices of the hardware are:

- Passive RFID tags, passive 915-MHz Electronic Product code (EPC) Gen 1 and 2 -- \$0,30 each.
- RFID label printers (EPC Gen 1 or 2) -- \$ 5000- to \$ 8000- each
- RFID High-speed label applicators -- \$ 15.000 to \$ 25.000 each
- EPC-compliant antennas -- \$250 to \$600 each
- EPC compliant readers -- \$500 to \$2500 each

De Meeuw does not need high speed label applicators which are usually used for mass products with retailers (e.g. Wal-Mart). Because of the relatively low number of products produced, only 1 printer will be sufficient. One printer can easily provide 22 units per day with tags. The antennas and readers should be located at the gates of the stock terrain. Two antennas and 1 reader per gate are sufficient. De Meeuw Oirschot has 2 main gates where units pass. This means that four antennas and two readers are needed. The hardware investments for De Meeuw Oirschot are between \$7.000 and \$15.400 that is without the \$30 cents per unit for the tags. De Meeuw has 3 other stock terrains in the Netherlands with one gate each. This means another 6 antennas and 3 readers are needed. The costs for these terrains are between \$3.500-\$7.700 each.

The estimated software costs are based on research done at AEP Home Products (2005) which has a size and turnover compared with De Meeuw. The costs of the software to communicate with the existing system are about \$ 50.000-. The implementation costs of the system will be approximately \$40.000

Next to these 3 types of one time investments there are the costs per tag \$ 0,30 and the system maintenance costs of €15.000 a year .

The total investment for De Meeuw Oirschot amounts to approximately \$130.000-. This amount is comparable with the investments for the successful implementation of RFID technology at Procter & Gamble in Spain. There the technology was introduced to increase dock loading throughput as a way of reengineering and improving the site business processes. At the current exchange rate an investment of approximately €85.000 will be needed. The maintenance costs are estimated at €30.000 per year.

Based on interviews and the previous annual financial report of De Meeuw the revenue is estimated. Benchmarks of comparable projects are also used for the estimation. The costs of the renting out department are based on the 2006 results. The revenue over 2006 was €15.383.000. Depreciation was € 7.432.000 (48,3%). The revenue is estimated at €14.442.000 and €5.743.000 of depreciation (39,8%).

For De Meeuw Nederland the annual costs of renting buildings and stock terrains are €255.530. The renting out department is charged for €23.000- for stock per month. Some units are stored for years before they are used again or dismantled.

Sometimes it happens that extra, temporary personnel are hired to count the actual stock on the terrain. Recently a control department is created to better control the entire process. The investments in the renting out stock where €12.233.197- in 2006. These investments are mainly caused by new units for renting out. The degree of utilisation of the units in 2006 was 83,3%. These figures do not include the units from mandatory buy back. Otherwise the figures would be lower. The exact figures on the degree of utilisation of the bought back building units are not known.

By using the RFID technology several improvements can be realized. The number of possible benefits is based on the case study in 2006 from Thomas Pisello, author of IT Value Chain Management, Maximizing the ROI from IT Investments (2004). The case study is based on projects at the Alinean Company, specialized in advising companies about business value. Some important benefits are:

- Improve Warehouse and Distribution Productivity from 7% to 40%. This is mainly achieved by less labor costs of tracking the right items. Wal-Mart reduced the time of pallet building from 90 seconds to 11 seconds by using the RFID technology.

- Reduction of shrinkage by 18%. Because the control system is less dependent on people, the loss or theft of products can be reduced.
- Reduce out of stock cases up to 50%. If a product is out of stock in 20% of the cases the customer either does not buy at all or buys a competitive product.
- Improve the inventory management. The use of RFID helps to minimize costly inventory errors. JIT and real time visibility of the inventory can easier be achieved resulting in lower safety stock requirements with net savings between 10% and 30%.
- Reduce supply chain errors. Manufacturers lose 2 million dollars for each 1 billion in sales due to bad data in the systems this is 2% of the sales.
- Improve capital asset tracking and management. RFID can be used efficiently to locate movable assets (units). The workflow can be optimized by 20%.
- Improve accounts receivable. With RFID invoices are produced as soon as the units are transported. This reduces the time it takes to collect receivables from customers.
- Improve customer experience. Because of better inventory management the customer will experience fewer mistakes caused by errors in the supply chain. It helps customers making choices and finally taking decisions. A customer reached a 20% to 60% increase in sales because of an increase in promotional execution by 29%.

If De Meeuw will invest in an RFID solution for the unit flow after production, these figures give an insight in the ROI. In the next table figures are presented about the expected ROI. These are based on the case study and the actual figures from De Meeuw in the 2006 annual report. The case study takes a turnover amount of €285 million. Because the focus in this study is on the rental and resale department of De Meeuw Nederland we use a turnover of 10 Million Euro. The percentages are taken from these €10.000.000-. Only the benefits relevant for De Meeuw will be included in the table and the ROI calculation. The case study used for benchmarking is a comparable manufacturing company like De Meeuw.

Table 7: Example of savings if set RFID goals are reached

Goals	Typical savings from the case study	Tangible benefits with case study.
Productivity improvement through automation	18 % productivity improvement	A benefit of 0,85 % on total revenues which is €85.000- on annual labor costs
Inventory savings	10% inventory	A benefit 0,125 % on total

	reduction	revenues which is €12.500- on annual cost of stock.
Reduce inventory scrap	45% write-off avoidance	A benefit 0,135 % on total revenues which is € 13.500- in annual savings
Lost asset recovery	40% reduction in lost assets	A benefit of 0,065 % on total revenues which is €6.500 on annual recurring savings
Improve plant asset maintenance	48% cost avoidance	A benefit of 0,020 % on total revenues which is € 2.000 on annual recurring savings
Improve customer satisfaction	1,5% improvement of customer satisfaction	Likely to improve the revenues but not measured at De Meeuw.

A total investment of €85.000- + €90.000 maintenance costs over 3 years will result in a net present value of €358.500- in cumulative net benefit. This results in a ROI (calculated as net/total costs) of 205%. This implies that for every €1 euro spent one will get €2,05 in return. The investment has a 17 months payback period.

APPENDIX VIII: Interviews Management Team

Interview with the General Director (owner)

Because on one site the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1:

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

In the last 10 years the concrete floors and the more permanent way of building had a big impact on the company. Other major influences date from a past of longer than 10 years ago. The capability of building flexible and high quality buildings by using units was an important improvement for De Meeuw.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen be and to which extend will this be of influence to the current business processes?

At this moment De Meeuw operates at the top of the market. We do not want to grow in the lower parts of the market (by the lower parts is meant the cheaper and lower quality units in the different segments). Another option would be to do more of the building out of the factory but I do not prefer this option. A logical step is to expand the market internationally. This is what we are doing at this moment. Last year 50% of our turnover was generated outside the Netherlands. Last November we decided to continue in this way. So the most important point in the strategy is expanding the market internationally. We focus on the countries fitting into the profile of and the way of working at De Meeuw. The smaller economies meet our requirements. Think of countries like Ireland, Sweden, Denmark, Austria, Norway and countries in the east of Europe. We must make choices where we will focus on. I expect that the Eastern European countries will become increasingly important.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

The main points are innovative building solutions. Quality and total service are important. These innovative solutions are not only in product innovation, but for example also in financing opportunities facilitated by De Meeuw. The internal processes must continuously be improved, but even more important is that new products are presented to the market. Some 5 or 6 innovations in the products can be observed here on the terrain. About 50% is already successful while the others do not generate money yet. Not every innovation will generate profit but it is a signal to the customer that De Meeuw is not standing still and actively develops improvements.

Sustainability will become more important and building with prefabricated units is very suitable for sustainable building. This trend in sustainability offers opportunities

to De Meeuw. The units are very suited to reuse and even the materials can be recycled if the units might not be suitable for reuse.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths in the renting out and resale process?

The production capacity of De Meeuw is a very strong point. In a very short time De Meeuw can provide large buildings. Because they do not have the capacity, many competitors cannot participate in large projects. Also the financial power is a strong point. Another strong point is that the quality is very good at a reasonable price. The strengths of the renting out and resale department are that it works fast, easy, and cheap for customers to solve temporary building problems.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses in the renting out and resale process?

The internal organization is not at the level it should be. Fortunately the customer is not aware of the internal problems. Improvements should be made to lift the organization to higher level. Because of the growth of De Meeuw tension and friction can be of influence on the organization. In my opinion tension and friction is not necessary.

A weakness of the renting out and resale department is that we sometimes are not prepared for units coming back. On the other side the department often does not remind the customers to bring back units. The longer the customers are using the building units the better it is. So this weakness is part of the process which generates profit. The process of reuse of the units can be better I think.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

Part of the process is already outsourced. More outsourcing is not the most important issue at the moment. Maybe in the future if we become more active in foreign countries. Then the question whether or not we want to produce the units ourselves in foreign countries becomes important.

In some cases De Meeuw delivers only a part of the process like the project in Norway. The fact that the customer takes part in finishing of the products is not a result of a strategy but it simply happens. We are an open company and that is why these things can happen. This means that we must be flexible in our processes. At the production department standardization is preferred, but this can also result in missing opportunities. Possibly the process has to be separated into a standard part and a very flexible part for special requests. Categorizing the customers would be a good possibility.

Question 7: Which of these points are beneficial for De Meeuw (internal)?

The answer on the previous question already contains the major beneficial innovations.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

There is wide variety of competitors, from the traditional construction companies to the low budget traditional competitors.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

Not a single competitor has such a wide variety of products. De Meeuw is active on the very temporary building market as well as on the more luxury (semi) permanent market. So they are all specialized in only a specific part of the market. De Meeuw wants to deliver a high quality product in every part of the market. Strengths of competitors are in the area of price. So customers who go for very cheap but low

quality accommodation will probably come to business with the competitors. This doesn't mean that we don't want to be active in the lower part of the market. Quality can also be important in the lower part of the market. All parts of the market are core business to us.

Question 10: Are the new market developments for the future beneficial for the competitors or more for De Meeuw (external).

In general these developments are beneficial for De Meeuw. Customers get higher standards and also governmental requirements are gradually becoming more strict.

Question 11: In what way have customers influence on De Meeuw Bouwsystemen? (external)

They do not have influence on the internal processes. The customers have influence on the development of the products. For example the concrete floor was a success from day one and the customer understands this innovation right away. Also when De Meeuw stopped making a construction place facility wagon the customers understand this and agreed on the alternative options. So before we develop new products we are in contact with the market (customers) to investigate the needs.

Question 12: Is the influence and demands of the customers changed during the last years?

The demand does not change much. For example there are currently many office buildings which are not used. That is why the demand for temporary offices has slightly declined. On average however the market segments have not changed much.

Question 13: How has the customer's influence changed during the last years and what does this mean for De Meeuw Bouwsystemen?

The only influence the customers had on the internal processes was the introduction of the VCA certification. This had an influence on the safety regulations etc. For the rest there is no influence. I expect that the customer's influence remains the same.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14: **Time**

- Time in stock of the units [1 2 3 4]
- Administration time of the units [1 2 3 4]
- Process time from sales to delivery [1 2 3 4]
- Time to adopt technology [1 2 3 4]
- Time of introducing innovation of the processes [1 2 3 4]

Quality

- Number of mistakes made in the process [1 2 3 4]
- Controllability of the process [1 2 3 4]
 - o Financial [1 2 3 4]
 - o Administrative [1 2 3 4]
 - o Physical control [1 2 3 4]
- Reliability of the information in the process [1 2 3 4]
- The physical quality of the units [1 2 3 4]

Costs

- Control of the renting out & resale business process [1 2 3 4]
- Costs of stock [1 2 3 4]
- Administrative costs of the process [1 2 3 4]
- Costs of repair [1 2 3 4]
- Transport costs of the units [1 2 3 4]
- Costs of mistakes in the process [1 2 3 4]
- Innovation costs (implementing new system, etc) [1 2 3 4]

Flexibility

- Process flexibility [1 2 3 4]
- Information system flexibility [1 2 3 4]
- Unit flexibility (standardization – custom made) [1 2 3 4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

At this moment we use a production building, which is not suited for a full production line. In a new building we can install a full modern production line. It currently is an S-line. In relation to the renting out and resale process it should be more concentrated. Now many parts out of this process are spread all over the terrain. All objects from renting out and resale should be separated from the new products. So with the relocation of all the objects the efficiency of renovating can be increased. So the stock has to be better controlled and relocated. This should also result in separated business units. To achieve a better control of the stock we can work with new technologies like the RFID Chip. Using this kind of technologies can best be introduced at the same time when we are moving to a new stock terrain. At this moment it is not organized enough to work with these technologies. Because we have quite some different stocking terrains it is hard to control.

I have not much knowledge in the field of the ERP system. That is why so it is hard for me to judge and to suggest improvements.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree.

1. In future all documentation will be digital

[strongly agree agree neutral **disagree** strongly disagree]

2. Flexibility in future will increase with a negative influence at the costs

[strongly agree **agree** neutral disagree strongly disagree]

3. Time benefits will increase at the cost of flexibility

[strongly agree agree **neutral** disagree strongly disagree]

4. The customer will increasingly determine the design of the business processes

[strongly agree agree neutral **disagree** strongly disagree]

5. Investments are needed to fully benefit from the ERP system

[strongly agree agree **neutral** disagree strongly disagree]

6. De Meeuw Bouwsystemen will grow in the future

[strongly agree **agree** neutral disagree strongly disagree]

7. The control on the business processes has to be improved

[**strongly agree** agree neutral disagree strongly disagree]

8. The current process of rental and resale is transparent

[strongly agree **agree** neutral disagree strongly disagree]

9. Technological investments are needed to better control the process

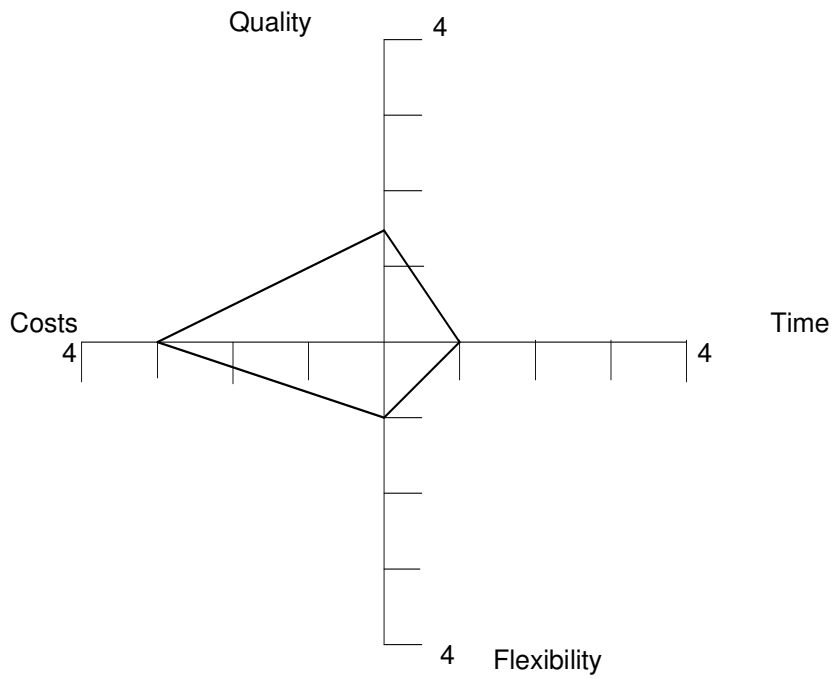
[strongly agree **agree** neutral disagree strongly disagree]

10. Physical instead of digital improvements of the process are needed to improve the process

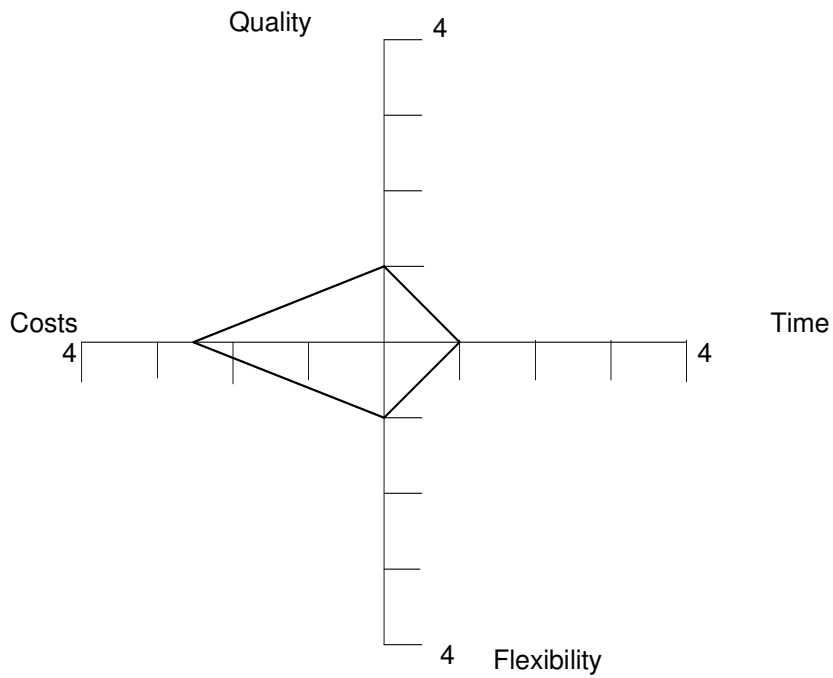
[**strongly agree** agree neutral disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with the Commercial Managing Director

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

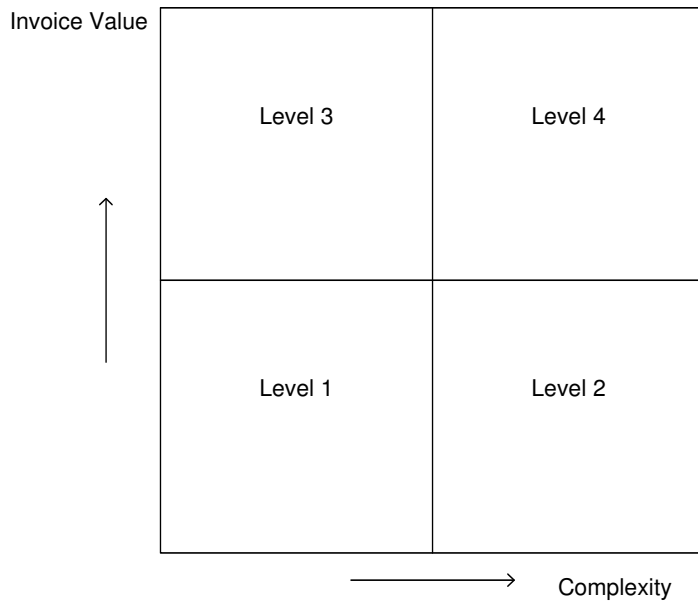
Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

Changing to concrete floors was a big change. This development made it possible to build in layers, which was advantageous for De Meeuw. Now the competitors are on the same level as De Meeuw. At this moment De Meeuw does not distinguish itself by products but by company size. The new course has to focus on product innovation. In this way the product advantage can be exploited again. Further the focus must be on sustainability, for example a self-sustaining unit in which no connections to the electricity and other networks are needed. The challenge for De Meeuw is to innovate not only in the area of products but also in services and processes. Financial constructions or services to the customers can be an example. Investment advices can be beneficial for the customers. In the past the full concentration was on technology, but nowadays services are becoming of equal importance. Terms like Total Costs of Ownerships (TCO) become more important also for de Meeuw. TCO should be introduced and implemented in close collaboration with strategic partners. Processes will become very important.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen be and to which extend will this be of influence to the current business processes?

There is too much freedom in the process. In future there must be a focus on account management for the larger customers as Shell, Unilever, Philips, Heineken. More and better process support for these customers is needed. This has an enormous impact on the internal processes, and on people who are in direct contact with those larger and important customers. De Meeuw should make a distinction between the different types of customers and adapt its services to them.

Depending on the invoice value and the complexity of the project, four categories of customers can be distinguished. The categories are shown in the next figure. The higher the level the more specific attention is needed. Reorganization of the business process will be needed. Per level a different scenario must be developed. Working with key accounts and creating a separate group within the organization for taking care of the higher-level projects, are needed.



Question 3: What are the main areas in which De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

Innovation is very important. Delivery time and the quality of the organization are of almost equal importance. Knowledge about building projects and new developments are crucial. The quality of the product and the process are also important. If De Meeuw wants to offer total service to its customers, all the aspects within the organization of De Meeuw must meet the highest quality standards. Quality will be the main focus point.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

International operating, good network and financial independence are strengths. The strength of the renting out and resale process is the speed and the very fast reaction time on a customer's request.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

One owner can determine everything. This is not necessarily bad however it can result in inconsequent policies. Good structures and processes are currently lacking. There should be a clear framework and less "grey" areas in the process. It can be compared with everybody knowing how to drive a car, but not everybody has a driving license. The company will get from A to B, but don't ask how. Also the damage caused during the ride is a source of concern. A weakness is that the process is not well organized so that much time is spent on solving ad-hoc problems.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc (internal)?

Sustainability becomes more and more important. This subject will have a dominant influence on the internal process.

Question 7: Which of these points are of benefit for De Meeuw. (internal)?

The development of sustainability brings opportunities to De Meeuw and is certainly beneficial for De Meeuw. We have the financial means and the size to fully benefit from these opportunities. Innovations are needed to exploit these opportunities. Also the governmental sustainability requirements are gradually becoming more strict and can be of benefit for De Meeuw.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

There are many different competitors active who usually focus on a specific part of the market.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

Depends on the individual competitor but usually they all focus on one particular part of the market.

Question 10: Are the new market developments for the future beneficial for these competitors or more for De Meeuw (extern).

Also the governmental sustainability requirements are gradually becoming more strict and can be of benefit for De Meeuw.

Question 11: In what way have the customers influence on De Meeuw Bouwsystemen (extern)?

The customers get more and more influence on De Meeuw. The company is working more to a market pull strategy. So the customers' wishes become more important than it used to be. This trend is of influence to De Meeuw. If currently a big customer has particular wishes all processes become active to meet the customer's demand. This results in an ad-hoc way of working. More standardization of the products can result in a better organization of the internal process while the customer should not feel the limitations.

Question 12: Has the influence and demand of the customers changed during the last years?

Yes the influence has changed, the customers become more demanding and are getting used to higher standards.

Question 13: How has the customers' influence changed during the last years and what does this mean for De Meeuw Bouwsystemen?

The customers' interest has changed from pure technical aspects to all the aspects of a temporary accommodation project. Internally at De Meeuw there is a growing awareness of these developments amongst the customers. De Meeuw is forced to adapt to these developments.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14: **Time**

- Time in stock of the units [1 2 3 4]
- Administration time of the units [1 2 3 4]
- Process time from sales to delivery [1 2 3 4]
- Time to adopt technology [1 2 3 4]
- Time of introducing innovation of the processes [1 2 3 4]

Quality

- Number of mistakes made in the process [1 2 3 4]
- Controllability of the process [1 2 3 4]
 - o Financial [1 2 3 4]
 - o Administrative [1 2 3 4]
 - o Physical control [1 2 3 4]
- Reliability of information in the process [1 2 3 4]
- Physical quality of the units [1 2 3 4]

Costs

- Control of the renting out & resale business process [1 2 3 4]
- Costs of stock [1 2 3 4]
- Administrative costs of the process [1 2 3 4]
- Costs of repair [1 2 3 4]
- Transport costs of the units [1 2 3 4]
- Costs of mistakes in the process [1 2 3 4]
- Innovation costs (implementing new system, etc) [1 2 3 4]

Flexibility

- Process flexibility [1 2 3 4]
- Information system flexibility [1 2 3 4]
- Unit flexibility (standardization – custom made) [1 2 3 4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

Structure, clear responsibilities, what will be done by whom. So now we need to document and organize the process.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree

11. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

12. Flexibility will increase in future at the cost of costs

[strongly agree agree neutral disagree strongly disagree]

13. Time benefits will increase at the cost of flexibility

[strongly agree agree neutral disagree strongly disagree]

14. The customer will determine increasingly the design of the business processes

[strongly agree **agree** neutral disagree strongly disagree]

15. Investments are needed to fully benefit from the ERP system

[**strongly agree** agree neutral disagree strongly disagree]

16. de Meeuw Bouwsystemen will grow in the future

[**strongly agree** agree neutral disagree strongly disagree]

17. The control on the business processes needs to be stronger

[**strongly agree** agree neutral disagree strongly disagree]

18. The current process of rental and resale is transparent

[strongly agree agree neutral **disagree** strongly disagree]

19. Technological investments are needed to better control the process

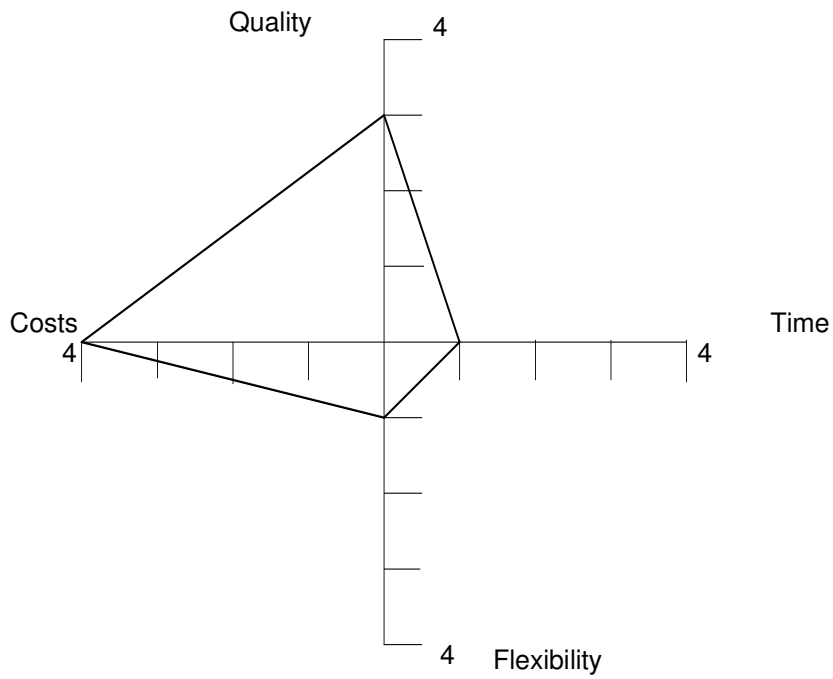
[strongly agree **agree** neutral disagree strongly disagree]

20. Physical instead of digital improvements of the process are needed to improve the process

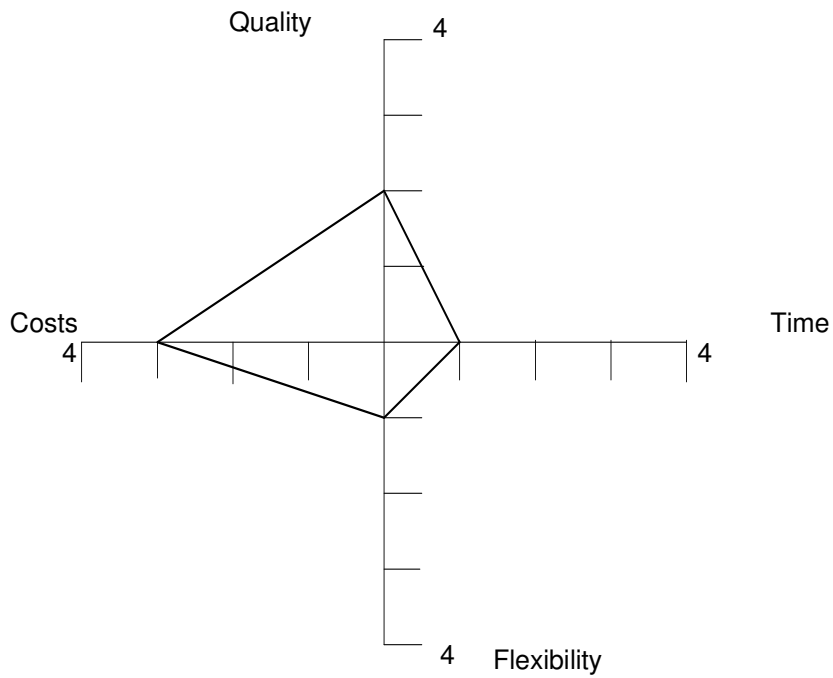
[**strongly agree** agree neutral disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with Managing Financial Director

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

The decision to operate internationally was a change. We work now in Belgium, Switzerland, Germany and have recently started in Norway. The decision and the experience will help us in future to further expand internationally. In the near future we want to separate the business processes of renting out and the process for the (semi) permanent accommodation. This is an important decision because the organization of the process will change significantly. This separation of processes will not only be for one product line but for all of them. For schools, social care projects, B2B, governmental accommodation and others will all become independent processes.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

We want to specify the budget for several product/market combinations. So the strategy is focused on the separate PMC's. The most important KPI will be the profit range.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

We want to focus on what the customer wants. We want to give full services and adapt to the demands of the market. So more market pull operating is a focus point. Another focus point is MCO (Maatschappelijk Verantwoord Ondernemen). You can think of a social and environmental friendly way of working. Making CO2 neutral buildings, recyclable products, etc are examples.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

The way we meet the customers' wishes is strength. De Meeuw goes very far in meeting the customer's requirements. Standardization will be a good instrument to determine how far this flexibility should go. There is already a certain degree of standardization in the renting out units, but on the more permanent units we want to be as flexible as possible. For periods of no longer than 2 or 3 years we must stick to the standards but for longer periods we should maintain optimal flexibility.

The concept of renting out and resale is very strong. With the 20 types of units we can build very fast a wide variety of buildings. For example if a school is destroyed by a fire we should be able to build a new school within a week. Speed and flexibility are the key words in this case

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

It happens that we are too flexible and this can be very costly. So the limits of flexibility must be determined. Especially the renting out and resale department must be extremely careful with custom made buildings. Too many persons can be involved for special customer wishes.

The problem with the rental and resale department is in the field of communication with sales department. Sales people are relatively inexperienced and are often lacking the technical knowledge to decide on what is possible and what is not. It often results in problems for the renting out and resale department.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

Innovations are needed in the environmental and ecological aspects of the building units. Some were already mentioned in the first question with the recyclable units, CO2 neutral, new ways of climate control, etc. We will implement these innovations in cooperation with our partner GTI.

The process of renting out and resale will be separated so that there will be a better focus on the individual core business.

Question 7: Which of these points are beneficial for De Meeuw (internal)?

The market demands for more attention for the total cost of ownership. This means that apart from only accommodation, much more facility management is needed. Working with strategic partners will be necessary in this field. Because of the lack of expertise in the area of facility management, De Meeuw cannot do this on its own. These developments are beneficial for De Meeuw. It is highly questionable whether the competitors can follow in these new trends in the market.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

This question should be posed to the marketing and sales departments.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

Price wise the competitors can be strong but they often lack the capacity to supply quality products. De Meeuw has to be attentive to producing a better quality than the market demands.

Because this is not my professional area, I am not aware of the weaknesses of the competitors.

Question 10: Are the future market developments beneficial for the competitors or more for De Meeuw (extern)?

These developments are beneficial for De Meeuw. It is highly questionable whether the competitors can catch up these new trends in the market.

Question 11: In what way have the customers influence on De Meeuw Bouwsystemen? (extern)?

With TCO the customers have a stronger influence on the processes.

Question 12: Has the influence and demand of the customers changed during the last years?

The demand has changed a little. There is more demand for climate control, extra services and sustainability. On the other side there have always been customer specific demands so in that sense not much will change

Question 13: How is the customer influence changed during the last years and what does this mean for De Meeuw Bouwsystemen?

The customer is more critical. This is partly caused by the fire at Schiphol. By this fire also governmental requirements changed and this is beneficial for De Meeuw. De Meeuw's building units are inspected by the fire departments and certified as safe.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14: **Time**

- Time in stock of the units [1 2 3 4]
- Administration time of the units [1 2 3 4]
- Process time from sales to delivery [1 2 3 4]
- Time to adopt technology [1 2 3 4]
- Time of introducing innovation of the processes [1 2 3 4]

Quality

- Number of mistakes made in the process [1 2 3 4]
- Controllability of the process [1 2 3 4]
 - o Financial [1 2 3 4]
 - o Administrative [1 2 3 4]
 - o Physical control [1 2 3 4]
- Reliability of information in the process [1 2 3 4]
- Physical quality of the units [1 2 3 4]

Costs

- Control of the renting out & resale business process [1 2 3 4]
- Costs of stock [1 2 3 4]
- Administrative costs of the process [1 2 3 4]
- Costs of repair [1 2 3 4]
- Transport costs of the units [1 2 3 4]
- Costs of mistakes in the process [1 2 3 4]
- Innovation costs (implementing new system, etc) [1 2 3 4]

Flexibility

- Process flexibility [1 2 3 4]
- Information system flexibility [1 2 3 4]
- Unit flexibility (standardization – custom made) [1 2 3 4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

The administration should be improved. The ERP system should be customized for renting out and resale.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree

21. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

22. Flexibility will increase in future at a negative influence on the costs

[strongly agree agree neutral disagree strongly disagree]

23. Time benefits will increase at the cost of flexibility

[strongly agree agree neutral disagree strongly disagree]

24. The customer will determine increasingly the design of the business processes

[strongly agree agree neutral disagree strongly disagree]

25. Investments are needed to fully benefit from the ERP system

[strongly agree agree neutral disagree strongly disagree]

26. de Meeuw Bouwsystemen will grow in the future

[strongly agree agree neutral disagree strongly disagree]

27. The control on the business processes needs to be stronger

[strongly agree agree neutral disagree strongly disagree]

28. The current process of rental and resale is transparent

[strongly agree agree neutral disagree strongly disagree]

29. Technological investments are needed to control the process better

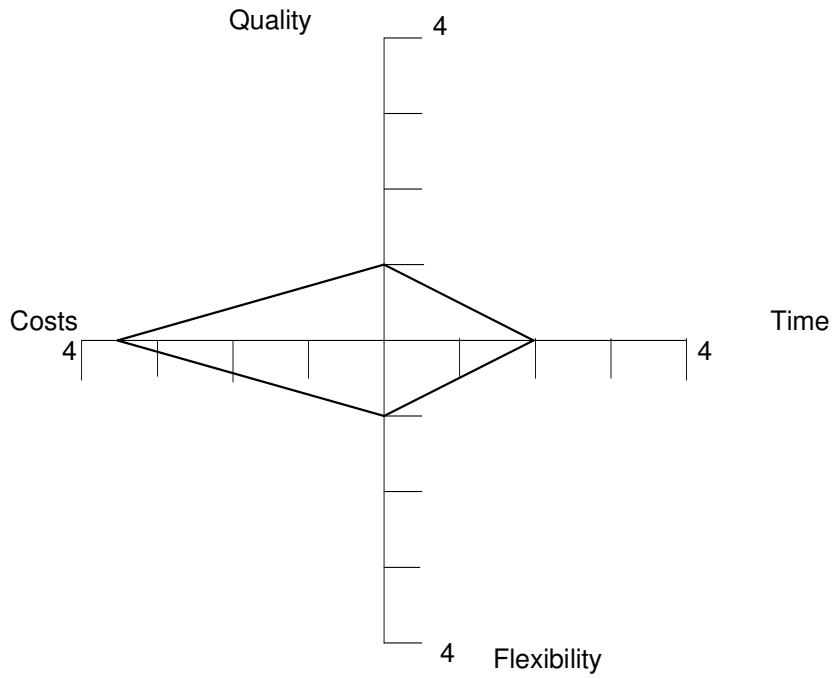
[strongly agree agree neutral disagree strongly disagree]

30. Physical instead of digital improvements of the process are needed to improve the process

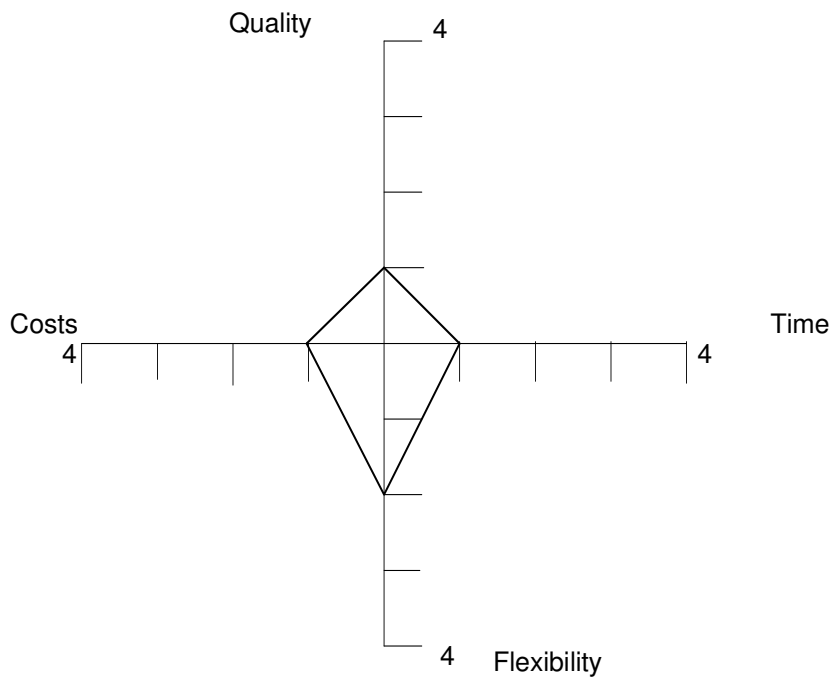
[strongly agree agree neutral disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with Technical Managing Director

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

During the last 10 to 15 years no big changes occurred in the processes. No real choices were made to go into a different direction. De Meeuw just followed the demand and was mainly reactionary. At this point it is time to make decisions for changes. In the products some changes and clear choices were made. So the path of de Meeuw was not a result of the strategy.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

The Dutch market is no longer a grow market. The permanent construction market is a big market and De Meeuw can get its share out of this market. Sustainability will become more important at De Meeuw. Using units for built accommodation have great possibilities for building in a sustainable way. Another important choice is how De Meeuw should handle the foreign markets. Currently some 50% of the total turnover comes from outside of The Netherlands.

At this point presently De Meeuw does not pay any attention on its own intern processes so that the influence of these developments is not clear. This should change and clear decisions on how we work should be made. This leading way of working should only change when the market in general asks for it and not the individual customers. At this point de Meeuw loses too much time on ad-hoc solving problems instead of developing a process in which these problems will not exist. So choices must be made on what can be done but also on what cannot be done. Because of this ad-hoc way of working many mistakes are made and a lot of energy and money is lost.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

During the last couple of years there was not enough change and competitors almost reached the same level as De Meeuw. Quality remains an extremely important aspect. In order to continue De Meeuw's position as market leader the brand awareness should be focused on. With quality is meant that we deliver at least what the customer expects us to supply and if possible even beyond the customer's expectations.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

The production capacity of De Meeuw is very good. Also the brand awareness is of great benefit to De Meeuw. The quality of the products is also an important strength. Meeting the high standards of the Dutch law on accommodations is a strong aspect. The financial position is strength and the flexibility in solutions for customers.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

The knowledge and expertise developed inside the company is protected enough. The main direction is not clear yet. Where are we going to focus on during the next 5 years must be defined. De Meeuw does not have a clear view on its own processes so improvements in the process should be the next step after structuring the process. The part of the process after a customer has used the units is a weakness. If organized in a better way, this part of the process can be turned into a strong aspect.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

Regarding process innovation De Meeuw has to look at the automotive industry. Lean production and shortening process time are focusing points. More collaboration with the partners would be a great improvement.

Product innovation can be achieved in the installation technique like: LED lighting, climate control, CO2 neutral, etc.

For now only incremental innovation is needed because there is enough to gain in the market especially in the foreign market.

Outsourcing could be a possibility certainly on certain parts of the process like wood handling.

Question 7: Which of these points are beneficial for De Meeuw (internal)

The developments pointed on the environmental issues should be something where de Meeuw can get a large part of the market. A lot of competitors follow only slowly so here are opportunities. The developments are beneficial for De Meeuw.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

Jan Snel, Fort, de Groot Vroomshoop, Ursum.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

Strengths of the competitors are speed and costs (Jan Snel). Costs are the result of the process not working well.

Question 10: Are the new market developments for the future in benefit of the competitors or more for De Meeuw (extern)?

Since De Meeuw can meet the current government requirements it can benefit from government orders. In particular for small competitors it is hard to meet these requirements.

Question 11: On what way have the customers influence on De Meeuw Bouwsystemen (extern)?

The developments should concentrate on the market demand in general and not only on the individual customer.

Question 12: Has the influence by and the demands of the customers changed during recent years?

De Meeuw is moving to the "pull" side of production. Some times de Meeuw has to make a choice out of possibilities. The customers should have influence on the output of the system not on the system as such.

If compared with the car industry you see that there are very standard production systems but the output is often meeting the customer's demand. This kind of model should also be the case for De Meeuw Bouwsystemen. The customer should not be drawn back by your standards.

Also a good comparison is a pizzeria where you can order almost any type of pizza you like but the toppings are the limits of your choice. The customers feel that they are not limited in ordering a pizza but the process is standardized.

It is also hard to standardize if you can't agree between the different departments.

Question 13: How has the customer's influence changed the last years and what does this mean for De Meeuw Bouwsystemen?

The customer's demand did not change much, but the governmental requirements did change. So there is a discrepancy between customer demand and governmental demand.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14: **Time**

- Time in stock of the units [1 2 3 4]
- Administration time of the units [1 2 3 4]
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- Time to adopt technology [1 2 3 4]
- Time of introducing innovation of the processes [1 2 3 4]

Quality

- Number of mistakes made in the process [1 2 3 4]
- Controllability of the process [1 2 3 4]
 - o Financial [1 2 3 4]
 - o Administrative [1 2 3 4]
 - o Physical control [1 2 3 4]
- Reliability information in the process [1 2 3 4]
- Physical quality of the units [1 2 3 4]

Costs

- Control of the renting out & resale business process [1 2 3 4]
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- Costs of repair [1 2 3 4]
- Transport costs of the units [1 2 3 4]
- Costs of mistakes in the process [1 2 3 4]
- Innovation costs (implementing new system, etc) [1 2 3 4]

Flexibility

- Process flexibility [1 2 3 4]
- Information system flexibility [1 2 3 4]
- Unit flexibility (standardization – custom made) [1 2 3 4]

Question 15: What do you expect to change in the current process and do u have any ideas for innovations?

Where is the added value in the process? An enormous amount of costs can be saved by mapping the process and check where the value is and where the costs are. Further the departments should be separated in SBU's. Use the number not to criticize but to improve the process.

Simplify the processes so that everybody can handle it. To make it simple is very important. Be aware as management that you can unintended flaws in the process alive can be kept alive for a long time.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree

31. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

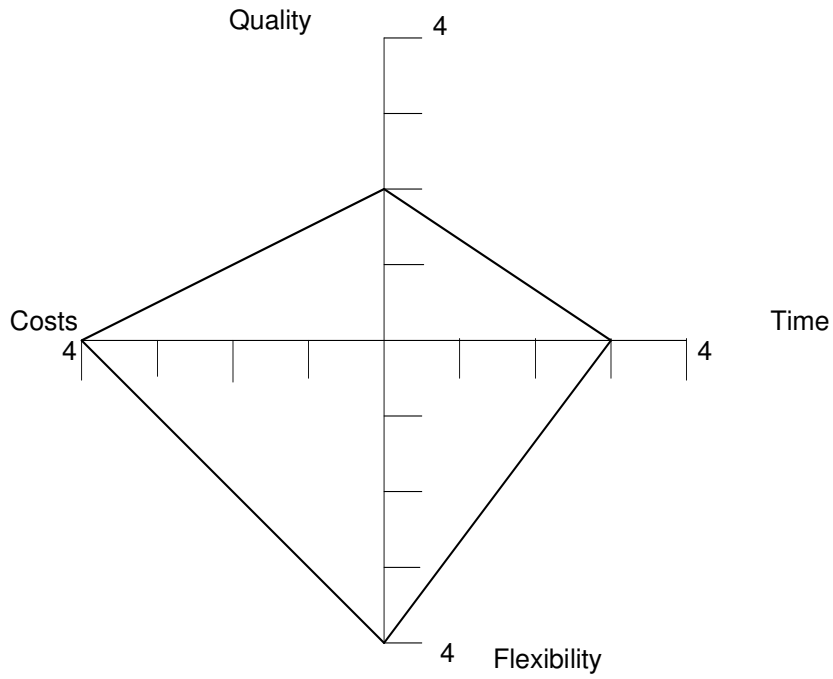
32. Flexibility will increase in future at the cost of costs

[strongly agree agree neutral disagree strongly disagree]

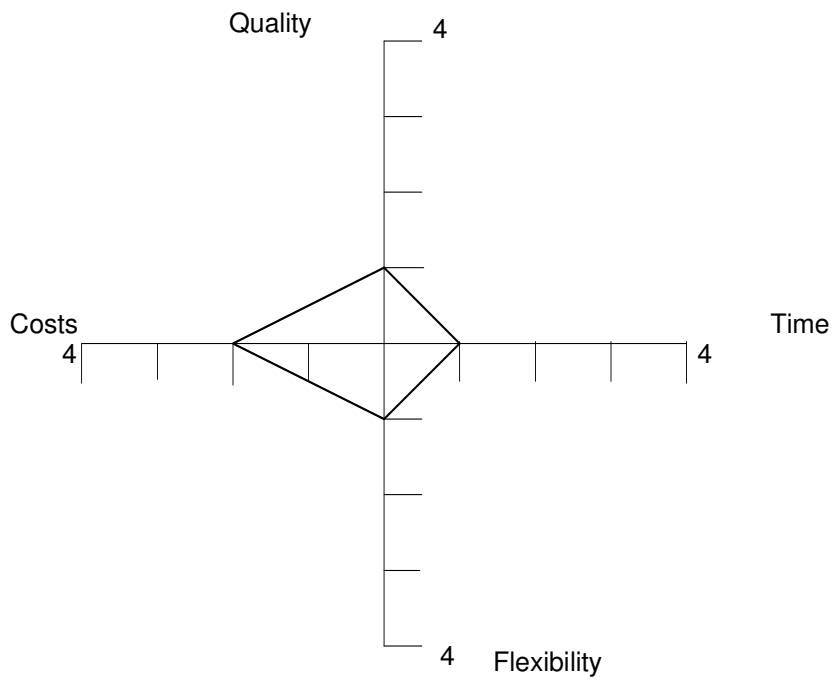
33. Time benefits will increase at the cost of flexibility
 [strongly agree agree neutral disagree strongly disagree]
34. The customer will determine increasingly the design of the business processes
 [strongly agree agree neutral disagree strongly disagree]
35. Investments are needed to fully profit from the ERP system
 [strongly agree agree neutral disagree strongly disagree]
36. de Meeuw Bouwsystemen will grow in the future
 [strongly agree agree neutral disagree strongly disagree]
37. The control on the business processes need to be stronger
 [strongly agree agree neutral disagree strongly disagree]
38. The current process of rental and resale is transparent
 [strongly agree agree neutral disagree strongly disagree]
39. Technological investments are needed to control the process better
 [strongly agree agree neutral disagree strongly disagree]
40. Physical instead of digital improvements of the process are needed to improve the process
 [strongly agree agree neutral disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with the Marketing Manager

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

The introduction of the Max-60 unit has a large impact on De Meeuw. These units are designed for permanent accommodation. The introduction of this unit also had a big impact on the professional appearance of De Meeuw. This introduction was the first step towards the semi permanent market.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

More has to be invested in the (semi) permanent buildings and total customer care. In future there will be more attention for lifecycle management by De Meeuw. More service instead of only the supply of the building will be offered. Thinking in terms of entire buildings instead of separate units will increase. The design of a certain number of units suitable for De Meeuw to build all accommodations is a suggestion. So the standardization does not necessarily mean that you flexibility is lost. Flexibility can also be acquired by innovations within standard units. In the future De Meeuw has to find the balance between flexibility and standardization. Standardization will improve the decision making process to resale and reuse the units. This will probably decrease the stock.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

Innovation is important. Try to keep up this advantage for De Meeuw. Total costs of ownership are increasingly becoming important. De Meeuw needs to acquire this innovation.

Sustainability and self-supporting is increasingly important. These aspects can be categorized under innovation.

Speed in building is always important. Also the price is relevant to excel in. However De Meeuw should not focus too much on price only, but develop a good price/quality balance, also in comparison with competitors.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

Strength is the brand name and good reputation of De Meeuw. Expertise, knowledge and short delivery times are the main strengths of the renting out and resale department.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

A weakness of de Meeuw in general is that there is a knowledge problem, mainly caused by the lack of experience. Reputation in the field of unit construction is a weakness. Because of the wide variety of markets De Meeuw can have an image problem in unit construction.

A weakness in the renting out and resale process is that there are 2 processes in 1 department resale and renting out. Another weakness is the lack of transparency of the department.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

New types of units, sustainability, total costs of ownership will be the innovation focus points in the near future. Flexibility of the units and faster adaptation of trends in the market are other innovation areas. Outsourcing and strategic partnerships are other innovation options.

Question 7: Which of these points are beneficial for De Meeuw (internal)?

All the innovations mentioned in the answers to the previous question can be beneficial for De Meeuw.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

The type of competitors strongly depends on the different De Meeuw departments. Also the nature of the projects is of importance to distinguish the competitors.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

Some competitors can benefit from a strong mother company but most of them are smaller than De Meeuw. To excel in the market is not easy and that is why many competitors look the same. The history and references of the majority of the competitors are weaker than De Meeuw's.

Question 10: Are the new market developments for the future in benefit of these competitors or more for De Meeuw (extern)?

New market developments are more or less in the same way beneficial for De Meeuw and its competitors. Traditional building contractors will come closer to the unit builders. Sustainability will be an advantage for De Meeuw. Challenges lay in acquiring the knowledge to innovate the processes.

Question 11: In what way have the customers influence on De Meeuw Bouwsystemen (extern)?

A short time of delivery is often important for the customers. Many customers do not really know what they exactly want. Standardization is an option but specific market segment must carefully kept in mind. Trends in the market are more important than the individual customer wishes. When you know the market, you can design standards and be more specific in the services instead of building only. Big customers can have influence on the flexibility.

Question 12: Has the influence and demands of the customers changed during the last couple of years?

Yes there are big changes. The customer's wishes in general went to a higher level. The different departments of De Meeuw are all influenced in a total different way. De Meeuw should set clear limits in flexibility. A kind of flexibility framework should be developed.

Question 13: How has the customer influence changed the last years and what does this mean for De Meeuw Bouwsystemen?

The customer's wishes are influenced by social and economic developments. Apart from the technical aspects, nowadays there is more emphasis on sustainability, environmental aspects and costs of total ownership.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14: **Time**

- Time in stock of the units [1 2 3 4]
- Administration time of the units [1 2 3 4]
- Process time from sales to delivery [1 2 3 4]
- Time to adopt technology [1 2 3 4]
- Time of introducing innovation of the processes [1 2 3 4]

Quality

- Number of mistakes made in the process [1 2 3 4]
- Controllability of the process [1 2 3 4]
 - o Financial [1 2 3 4]
 - o Administrative [1 2 3 4]
 - o Physical control [1 2 3 4]
- Reliability of information in the process [1 2 3 4]
- Physical quality of the units [1 2 3 4]

Costs

- Control of the renting out & resale business process [1 2 3 4]
- Costs of stock [1 2 3 4]
- Administrative costs of the process [1 2 3 4]
- Costs of repair [1 2 3 4]
- Transport costs of the units [1 2 3 4]
- Costs of mistakes in the process [1 2 3 4]
- The innovation costs (implementing new system, etc)[1 2 3 4]

Flexibility

- Process flexibility [1 2 3 4]
- Information system flexibility [1 2 3 4]
- Unit flexibility (standardization – custom made) [1 2 3 4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

The exchange of reliable data must be changed. This must result in a considerable reduction of costly mistakes.

Innovation should start in the fields of sustainability, environmental friendliness and flexibility.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree

41. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

42. Flexibility will increase in future at the cost of costs

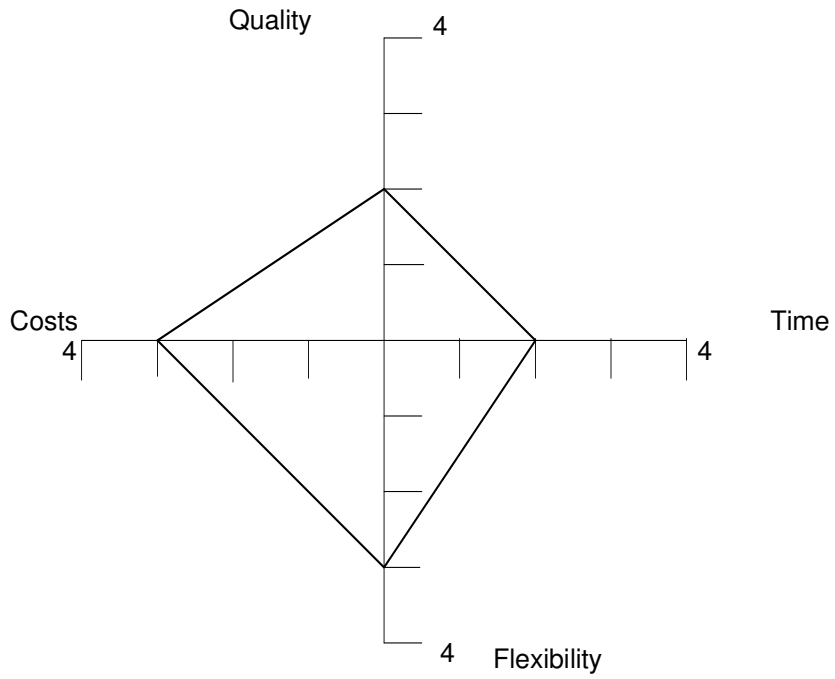
[strongly agree agree neutral disagree strongly disagree]

43. Time benefits will increase at the cost of flexibility

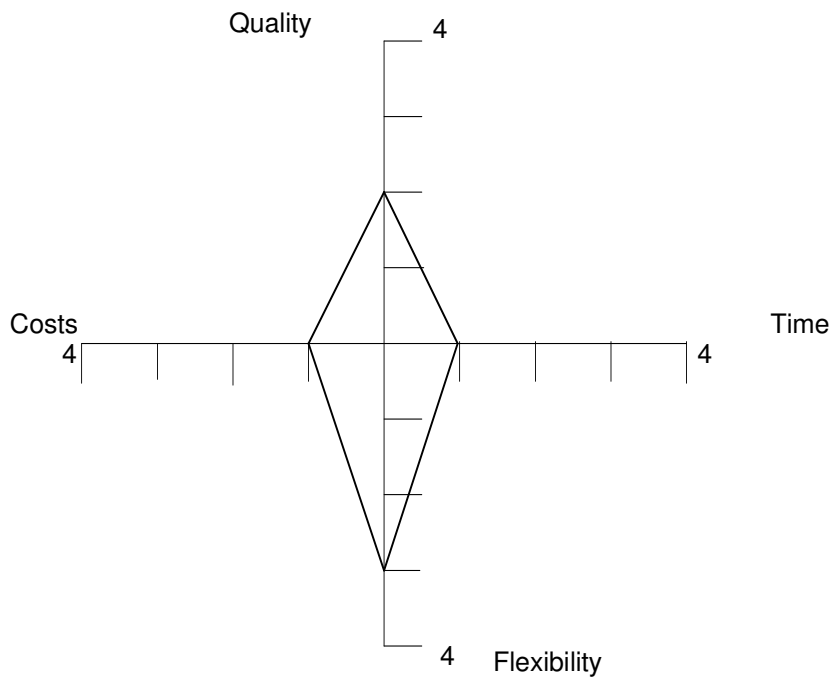
- [strongly agree **agree** neutral disagree strongly disagree]
44. The customer will determine increasingly the design of the business processes
- [strongly agree agree **neutral** disagree strongly disagree]
45. Investments are needed to fully profit from the ERP system
- [**strongly agree** agree neutral disagree strongly disagree]
46. de Meeuw Bouwsystemen will grow in the future
- [strongly agree **agree** neutral disagree strongly disagree]
47. The control on the business processes need to be stronger
- [strongly agree **agree** neutral disagree strongly disagree]
48. The current process of rental and resale is transparent
- [strongly agree agree **neutral** disagree strongly disagree]
49. Technological investments are needed to control the process better
- [strongly agree **agree** neutral disagree strongly disagree]
50. Physical instead of digital improvements of the process are needed to improve the process
- [strongly agree agree neutral **disagree** strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with the manager Techniques and Development:

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

A new technology of connecting the units to each other in 1972 made it possible to make actual buildings. Expansion with the Max-60 was a big step towards entering into the (semi) permanent market. The possibility of putting the units on top of each other made it possible to handle bigger projects.

To stop with the Combi-30 unit was another big change which probably came too soon. The introduction of a new frontage (Max-21) of the units was also of influence.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

If De Meeuw will opt for a new, wider sized unit there will be a significant change in the turnover. I hope that the future developments will focus on (semi) permanent accommodation. By doing so the costs can be located where they belong. Low budget units can be imported from cheap production countries. The salaries have a big influence on the cost price of the units.

The new strategy must concentrate on sustainability. The current techniques used at De Meeuw for (semi) permanent buildings are not suitable for sustainable production yet. The re-use of the units and disassembling is costly. That is why the strategy should aim at the use for an X number of years.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

The Combi-21 is perfect suitable for at least the coming 5 years. Also the Flexicom can come along for a while in the market. The Max-60 is at the end of its lifecycle. The broader unit will be necessary. Further the future focus must be on TCO, environment and anticipate on new market developments. Innovation is necessary but not the most important issue. Different new products should fit the old products. The costs of failing should be better controlled. This can give great benefits in future. Aligning the products is also an important step to be taken in the near future.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

In the nineties the strength was in the knowledge, expertise and skills of the personnel. Nowadays external relations with customers and partners have become far more important. Strategic partnerships will become more important in the future. An important strength is that De Meeuw has extensive developing and engineering knowledge in-house. That is why De Meeuw can adapt to the trends and wishes of the individual customer. Big projects, which competitors just could not do, are the result.

Flexibility, autonomous operating are strengths of the renting out and resale process. Further there is the Flexicom of a far higher quality than the temporary units of the competitors. More independent strategic business units will bring benefits and can even be competitive in the market. The goal is getting a larger part of the market (quality from sales, price from renting out).

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

De personnel should have more team spirit and a better feeling for accomplishing things together. Internal competition is not beneficial for the company as a whole. If the competitors will get the same group feeling of De Meeuw as it had in the nineties, they can pass De Meeuw in its current market position. A solution can consist of the different departments working more autonomous in SBU's or even different B.V.'s. In my opinion overhead costs are also a weakness. That is why we should get less overhead costs like it is the case with our GTI partners.

The renting out and resale department fears innovations and new developments. They want to change fast in materials, but the way of working has to remain the same. This mentality hampers the renewals and innovations in the process. Slow developments in the processes are the main weakness of this department.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

I hope that separate business units will be introduced soon. Profit centers, directly answerable to the higher management are badly needed.

Question 7: Which of these points are beneficial for De Meeuw (internal)?

Because of more governmental rules and regulations the customers have to pay more although they are not willing to do so. There is a contradiction between the governmental rules and the customers' wishes. In the domestic market the developments are too slow. Bigger concepts become more important for the developments in the market. Some patents hamper the developments in the market. These developments are beneficial for De Meeuw. However De Meeuw has to be more aggressive in the market to control the governmental rules, because many small competitors do not stick to the rules.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

The main competitors are De Groot, Jan Snel, Fort, de Groot. There are also many smaller competitors, mainly operating on the low budget market.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

Some of the competitors are strong in low budget solutions, while others excel in custom made accommodation. The competitors are all smaller than De Meeuw and they also lack the production capacity and financial independence.

Question 10: Are the new market developments for the future in benefit of these competitors or more for De Meeuw (extern)?

Since De Meeuw can deal with new trends in the market and with higher requirements by the government and customers, I am of the opinion that the new developments are more beneficial for De Meeuw than for the competitors.

Question 11: On what way have the customers influence on De Meeuw Bouwsystemen (extern)?

In case customers want custom made buildings, their influence is considerable. In such cases the organization of the business processes becomes ad-hoc and a lot of extra work has to be done.

Question 12: Have the influence and demand of the customers changed during the last years?

The demand didn't change much over the past years. Specific customer wishes are nothing new.

Question 13: How has the customer's influence changed during the last years and what does this mean for De Meeuw Bouwsystemen?

We have standardized to a certain extend and sometimes we want to force customers to adapt to our standards. This is something we do not want. So do not argue with customers to let them what you want. The finishing of the buildings should be raised to a higher level.

Standardization is not a negative aspect. It is only a way to present the products to the customers. More standardization is needed e.g. certain time determinations to sizes and luxury. Standardization gives a better view on how much items cost and on the profit they generate. Extras must be charged to the customers.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14:

Time					
-	Time in stock of the units	[1	2	3	4]
-	Administration time of the units	[1	2	3	4]
-	Process time from sales to delivery	[1	2	3	4]
-	Time to adopt technology	[1	2	3	4]
-	Time of introducing innovation of the processes	[1	2	3	4]
Quality					
-	The number of mistakes made in the process	[1	2	3	4]
-	Controllability of the process	[1	2	3	4]
	o Financial	[1	2	3	4]
	o Administrative	[1	2	3	4]
	o Physical control	[1	2	3	4]
-	Reliability of the information in the process	[1	2	3	4]
-	Physical quality of the units	[1	2	3	4]
Costs					
-	Control of the renting out & resale business process	[1	2	3	4]
-	Costs of stock	[1	2	3	4]
-	Administrative costs of the process	[1	2	3	4]
-	Costs of repair	[1	2	3	4]
-	Transport costs of the units	[1	2	3	4]
-	Costs of mistakes in the process	[1	2	3	4]
-	Innovation costs (implementing new system, etc)	[1	2	3	4]
Flexibility					
-	Process flexibility	[1	2	3	4]
-	Information system flexibility	[1	2	3	4]
-	Unit flexibility (standardization – custom made)	[1	2	3	4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

My highest priority is I the field of data reliability and flexibility in the processes. My suggestions are to introduce new software and to define the processes, including responsibilities, as soon as possible. Further the employees concerned must be trained in the use of the software and be coached in working with new processes.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree

51. In future all documentation will be digital

[strongly agree **agree** neutral disagree strongly disagree]

52. Costs will increase in future at the cost of flexibility.

[strongly agree **agree** neutral disagree strongly disagree]

53. Time benefits will increase at the cost of flexibility

[strongly agree **agree** neutral disagree strongly disagree]

54. The customer will determine increasingly the design of the business processes

[**strongly agree** agree neutral disagree strongly disagree]

55. Investments are needed to fully profit from the ERP system

[strongly agree agree **neutral** disagree strongly disagree]

56. de Meeuw Bouwsystemen will grow in the future

[**strongly agree** agree neutral disagree **strongly disagree**]
depends on the degree of innovation and on bringing new types of units on the market

57. The control on the business processes need to be stronger

[strongly agree **agree** neutral disagree strongly disagree]

58. The current process of rental and resale is transparent

[strongly agree agree neutral **disagree** strongly disagree]

59. Technological investments are needed to control the process better

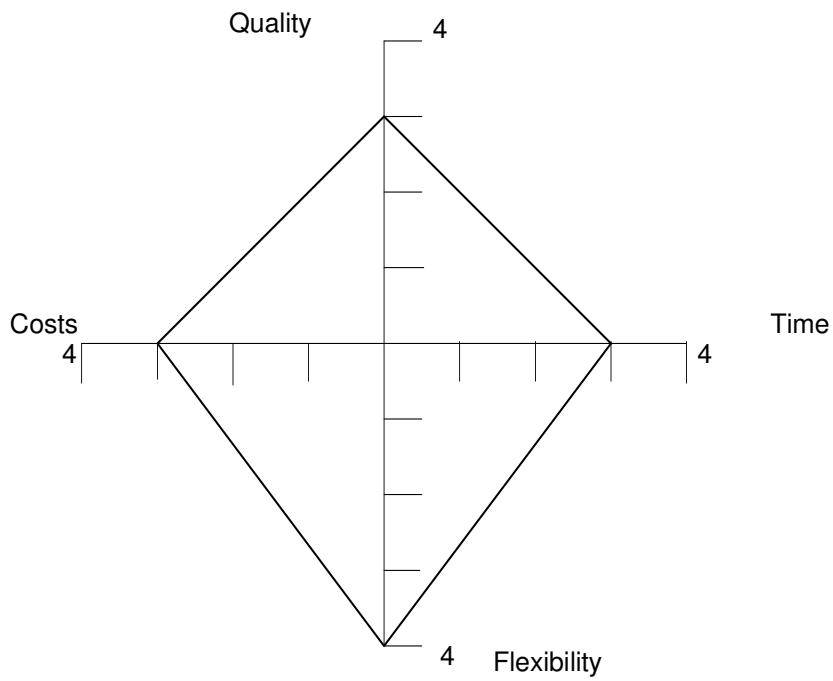
[strongly agree **agree** **neutral** disagree strongly disagree]

60. Physical instead of digital improvements of the process are needed to improve the process

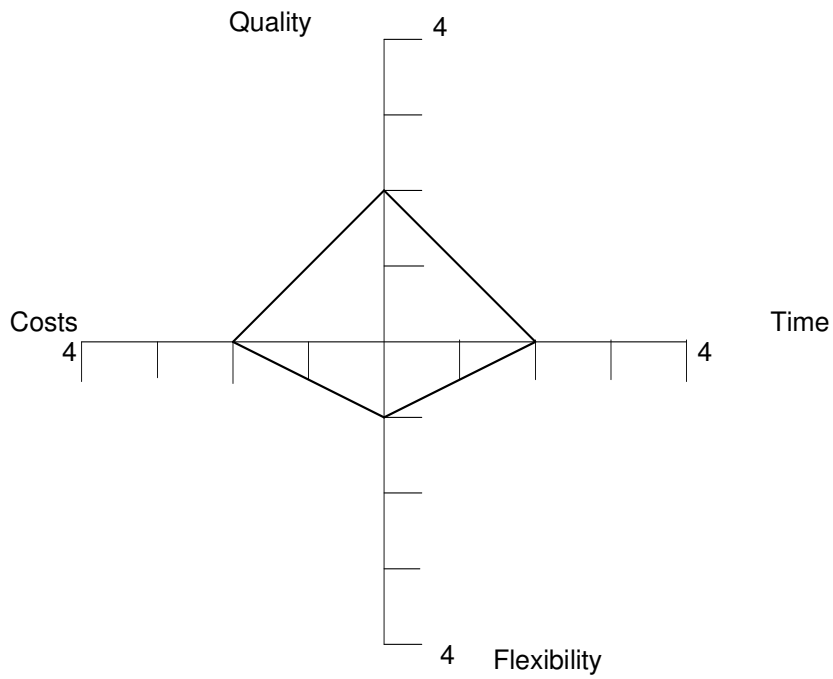
[strongly agree agree neutral **disagree** strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with the Manager Renting out and Resale

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;.
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

The management of the company has changed from a process oriented approach towards a functional approach (with this statement the use of SBU's is meant).

Question 2: What will be the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

The future focus will be on more permanent and semi permanent accommodations. Because the buildings will be longer in use by the same customer the quality is a very important factor. Because there already is a focus on quality, the influence on the process will not be drastic

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

The main point is quality. De Meeuw wants to go beyond the strict governmental rules for temporary accommodations. So the buildings should be better than the customer's expectations. Flexibility towards the customer's wishes is another important item to excel in.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

The strengths of De Meeuw are:

- De Meeuw can produce fast a big number of units. So the production facilities are better than of most competitors. Especially for large projects this is beneficial.
- The quality of the accommodation on average is very good. The units outclass most of the competitors.

The strengths of the rental and resale department are:

- By giving the opportunity to resale they show confidence in the own products.
- Flexibility in delivery and in fulfilling customer wishes on demand.
- Getting revenues from used buildings and materials in case of good management (this can become a weakness with less revenue and more cost if badly managed).
- Special customer wishes can result in extra revenue. Special wishes for buildings are expected to increase in future

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

De Meeuw in general:

- Some customers do not want to meet the high standards and do not want to be told by De Meeuw what they should do. So telling customers exactly what to do can frighten a part of the market.

The rental and resale department:

- Too much flexibility makes it hard to reuse the units (high costs of stock and low utilization).
- The ERP system seems only suitable for production and not for renting out and resale.
- Decision taking about the use of units takes too long.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

- Growing on the international market
- Innovation remains incremental in the near future.
- The goals are to double the activities in the next 10 years
- Governmental rules will be stricter (safety, environmental rules)

Question 7: Which of these points are beneficial for De Meeuw (internal)?

Actually all of these points are beneficial for De Meeuw. De Meeuw is market leader and has opportunities and financial power to grow internationally. Because De Meeuw is already focusing on quality extra governmental rules, in comparison with the competitors, will be beneficial.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

Direct competitors are for example: Buko, Fort, Jan Snel, Jarino, Algeco, Portakabin and WB accommodations.

Indirect competitors are tent accommodation providers.

Question 9: What are the strengths and weaknesses of the competitors (extern)?

Strengths:

Many competitors have specialized on one specific part of the market. These highly specialized competitors can be leader in a specific part of the market.

Some of the competitors can build customized accommodation while de Meeuw is operating with standard unit sizes.

Weaknesses:

Most competitors have small production capacities.

Some competitors have low quality standards and find it hard to meet the governmental requirements.

Most competitors are financial weaker than De Meeuw

Most competitors are smaller than De Meeuw

Question 10: Are the new market developments for the future in benefit of these competitors or more for De Meeuw (extern)?

The new developments are beneficial for the producing companies. So De Meeuw is in an advantageous position. Macro economic developments are less influential to De Meeuw as they are to highly specialized companies. If the economy goes down the revenues from rental and resale go up. If the economy goes up, the revenues from new buildings go up.

Question 11: In what way have the customers influence on De Meeuw Bouwsystemen (extern)?

Of course the customers demand has a big influence on De Meeuw, but the business processes can also influence the customers. For example the price can be one of the means to influence standardization instead of flexibility.

Question 12: Has the influence and demand of the customers changed during the last years?

The customers demand a higher quality. For instance damp and moist in accommodation units is not accepted anymore. Temporary accommodations also have a representing function for the customers. The customer's call on flexibility is growing (air-conditioning, CO2 level control, heating facilities, sanitary specialties, window sizes, isolating demands, sound reduction, etc).

Question 13: How has the customer's influence changed during the last years and what does this mean for De Meeuw Bouwsystemen?

At first sight it does not have a dramatic influence on the business processes. However the customer's influence and meeting the high demand can be used to further market the products. Incremental innovations are needed to keep up with the highest standards and to supply beyond the customers expectations.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14:

Time				
- Time in stock of the units	[1	2	3	4]
- Administration time of the units	[1	2	3	4]
- Process time from sales to delivery	[1	2	3	4]
- Time to adopt technology	[1	2	3	4]
- Time of introducing innovation of the processes	[1	2	3	4]
Quality				
- Number of mistakes made in the process	[1	2	3	4]
- Controllability of the process	[1	2	3	4]
o Financial	[1	2	3	4]
o Administrative	[1	2	3	4]
o Physical control	[1	2	3	4]
- Reliability of the information in the process	[1	2	3	4]
- Physical quality of the units				
Costs				
- Control of the renting out & resale business process	[1	2	3	4]
- Costs of stock	[1	2	3	4]
- Administrative costs of the process	[1	2	3	4]
- Costs of repair	[1	2	3	4]
- Transport costs of the units	[1	2	3	4]
- Costs of mistakes in the process	[1	2	3	4]
- Innovation costs (implementing new system, etc)	[1	2	3	4]
Flexibility				
- Process flexibility	[1	2	3	4]
- Information system flexibility	[1	2	3	4]
- Unit flexibility (standardization – custom made)	[1	2	3	4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

- Increase the knowledge of the sales personnel
 - o Improve communications
 - o More knowledge about the customers wishes
- Increase the skills and knowledge of the sales team. Let people work in a planning function and let them gradually grow into a sales function. In a planning function they learn all the ins and outs of the process. It further is a good motivation for an employee to work on the development of is/her career at De Meeuw. If this construction is implemented the creativity and drive to innovate should be supervised and coached. Long term employees tend to fall into routine and are often resisting to changes.
- There should be a reduction of human errors in the process. To achieve this technology can be used to reduce human administrative tasks.
- Improvement of the ERP system. The system does not perform as it claims. The system should be upgraded and made useful for the renting out and resale department. Also the large number of system errors should be reduced. The measures to be taken must lead to increased system reliability.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree.

61. In future all documentation will be digital

[strongly agree agree **neutral** disagree strongly disagree]

62. Flexibility will increase in future at the cost of costs

[strongly agree agree neutral **disagree** strongly disagree]

63. Time benefits will increase at the cost of flexibility

[**strongly agree** agree neutral disagree strongly disagree]

64. The customer will determine increasingly the design of the business processes

[strongly agree **agree** neutral disagree strongly disagree]

65. Investments are needed to fully profit from the ERP system

[**strongly agree** agree neutral disagree strongly disagree]

66. de Meeuw Bouwsystemen will grow in the future

[**strongly agree** agree neutral disagree strongly disagree]

67. The control on the business processes need to be stronger

[strongly agree agree neutral **disagree** strongly disagree]

68. The current process of rental and resale is transparent

[strongly agree **agree** neutral disagree strongly disagree]

69. Technological investments are needed to control the process better

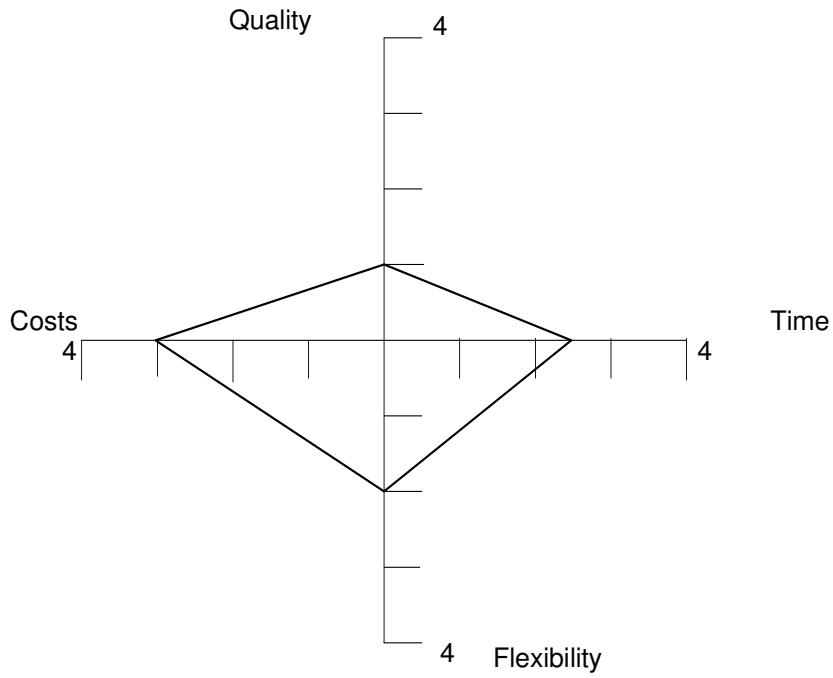
[strongly agree **agree** neutral disagree strongly disagree]

70. Physical instead of digital improvements of the process are needed to improve the process

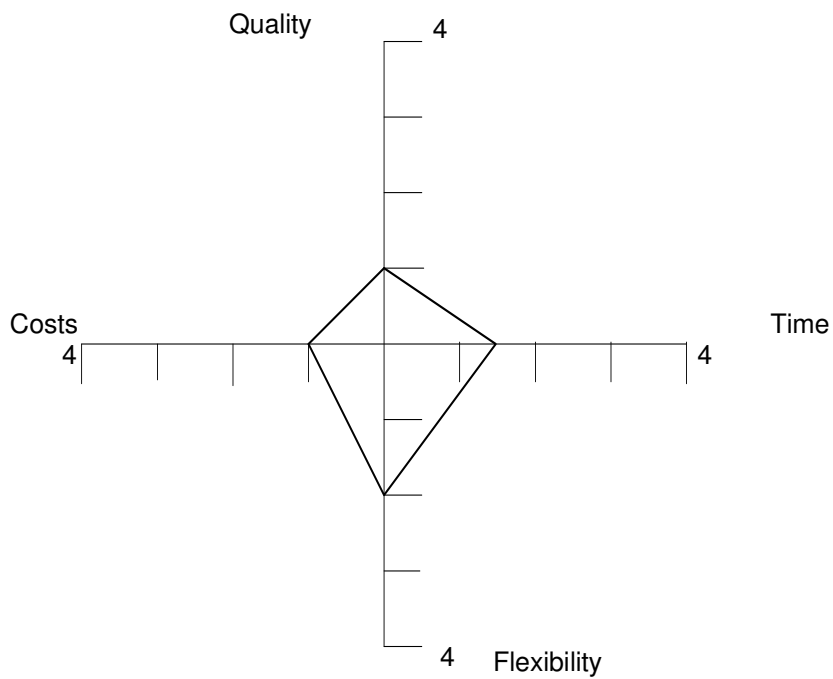
[**strongly agree** agree neutral disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with the Administration Manager

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

The introduction of the Flexicom had a positive impact on the company as a whole. The turnover gained a lot from this development. Continuous product innovation is important for the future policy of De Meeuw. The innovative image is very important. In the social care market there are currently promising innovations. In the near future we want to grow in Europe.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

Innovation and product development should get a high priority in the strategy. Standardization and not diversification should be the focus points. Turn key solutions should be one of the results of standardization. The product has to be the basis of our business and service should be second. So providing extra services can be beneficial for De Meeuw, but not at the cost of our products. 100% customer satisfaction should not be the focus anymore.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

Quality, speed and delivery reliability are the areas where De Meeuw can excel. It is very important to deliver on time. Customers want De Meeuw to deliver on the agreed date. It is better to set the initial time a little later than to deliver too late. This is all about customer satisfaction. The board of directors should focus on these points. To generate a strong brand in the market it is necessary that customer satisfaction is high ranking on De Meeuw's priorities list. Customer satisfaction is closely related with delivery reliability and quality.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

Flexibility is one of the strengths of De Meeuw while this at the same time is one of the weaknesses. Flexibility is hard to structure. Yes, you have to be flexible but within certain limits. If there are good arguments, a customer will understand that De Meeuw cannot meet extreme demands. The appearance of our product is also strength because our products are good looking.

To offer a customer an option for resale is a strong argument for the rental and resale department. But on the other hand it is hard to reuse custom made buildings.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

We do not know the exact cost price of our products. Calculating the price should get more attention. This is a big problem and this should change soon. The top management is not sufficiently aware of this weakness. Only turnover and profit are not sufficient KPI's. There is not enough structure and there are no boundaries where people should work in. Also internal communication could be improved. For example communication about what the goals are and getting everybody informed on strategy and goals.

At the rental and resale department the cost factor is a little neglected. For the rest the strengths and the weaknesses are the same as with De Meeuw in general.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc? (internal)?

Optimizing process control is an important factor and we are working on that already. There is a lot to improve in control. The ERP system should be a tool, but it also must be improved.

Question 7: Which of these points are beneficial for De Meeuw. (internal)?

Optimizing the control systems is certainly beneficial for De Meeuw.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

Competition is shifting from the traditional competitors, offering more or less the same products and services as De Meeuw, to the normal construction contractors. This trend is caused by the growing (semi) permanent preference of customers.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

In the top segment of the market there is not much competition. We only experience indirect competition from normal construction companies. A weakness is that many people still have the idea that regular building is superior to unit building. So the image in the upper segment of the market must be improved. In the lower segment we are sometimes not aggressive enough. A more aggressive sales technique could be beneficial in the lower end of the market.

Question 10: Are the new market developments for the future in benefit of these competitors or more for De Meeuw (extern)?

There are many opportunities for De Meeuw. Building with units will be far more accepted. In the social care sector considerable growth is expected. Prisons are also a big opportunity especially in countries like Belgium and England.

Question 11: On what way have the customers influence on De Meeuw Bouwsystemen (extern)?

The influence of the customers on the internal processes will become less. But the customers can give signals showing that the internal processes are not good. We should fine-tune the processes on customer's signs. Also big customers should fit within the planned processes. If you are in control as an organization then there will be not too much influence of customers.

Question 12: Is the influence and demands of the customers changed the last years?

I am not in a position to judge on the changing demands by customers.

Question 13: How is the customer influence changed the last years and what does this mean for De Meeuw Bouwsystemen?

The same answer applies as with the previous question.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14:

Time				
- Time in stock of the units	[1	2	3	4]
- Administration time of the units	[1	2	3	4]
- Process time from sales to delivery	[1	2	3	4]
- Time to adopt technology	[1	2	3	4]
- Time of introducing innovation of the processes	[1	2	3	4]
Quality				
- Number of mistakes made in the process	[1	2	3	4]
- Controllability of the process	[1	2	3	4]
o Financial	[1	2	3	4]
o Administrative	[1	2	3	4]
o Physical control	[1	2	3	4]
- Reliability of the information in the process	[1	2	3	4]
- Physical quality of the units	[1	2	3	4]
Costs				
- Control of the renting out & resale business process	[1	2	3	4]
- Costs of stock	[1	2	3	4]
- Administrative costs of the process	[1	2	3	4]
- Costs of repair	[1	2	3	4]
- Transport costs of the units	[1	2	3	4]
- Costs of mistakes in the process	[1	2	3	4]
- Innovation costs (implementing new system, etc)	[1	2	3	4]
Flexibility				
- Process flexibility	[1	2	3	4]
- Information system flexibility	[1	2	3	4]
- Unit flexibility (standardization – custom made)	[1	2	3	4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations.

A major improvement can be achieved by well functioning control systems.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree.

71. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

72. Flexibility will increase in future at the cost of costs

[strongly agree agree neutral disagree strongly disagree]

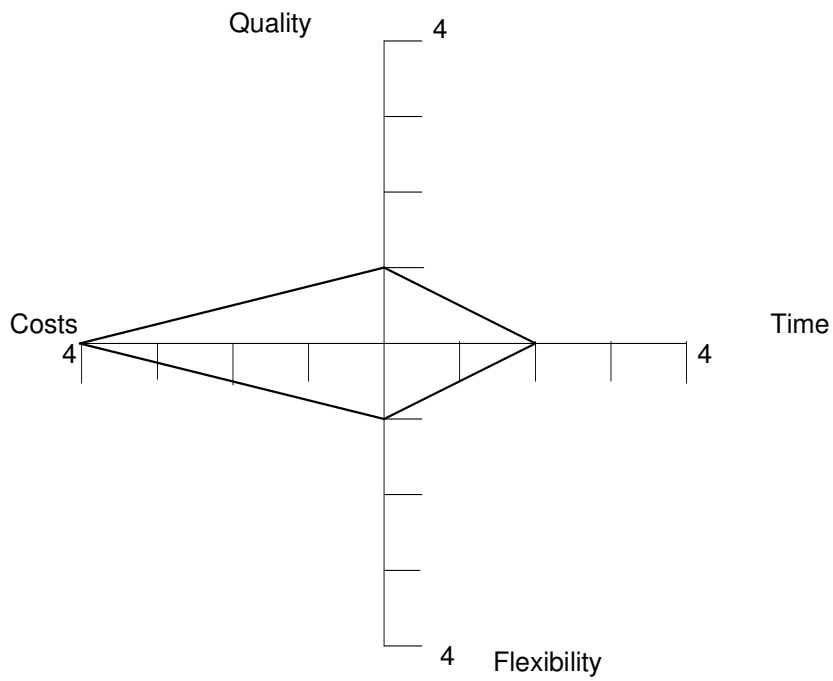
73. Time benefits will increase at the cost of flexibility

[strongly agree agree neutral disagree strongly disagree]

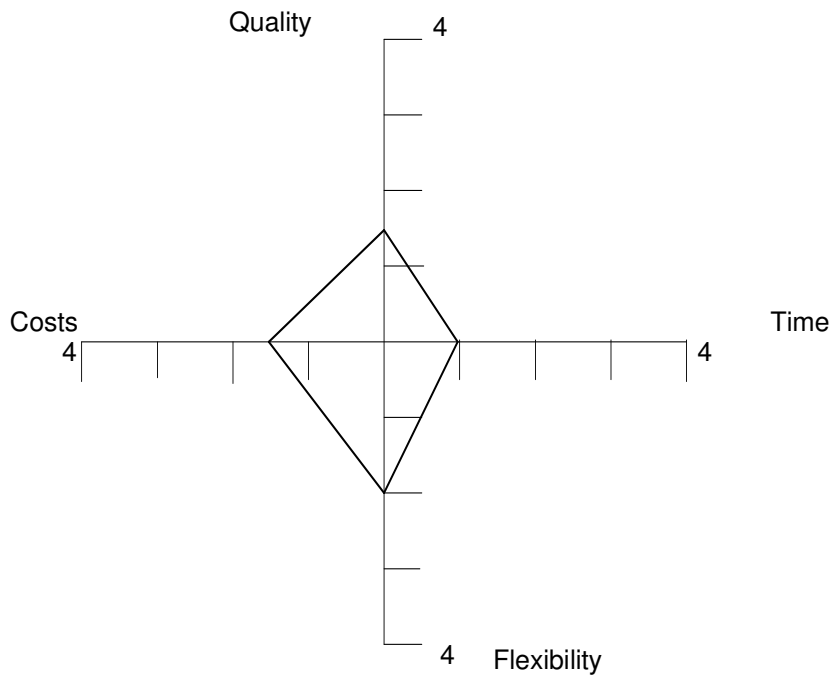
74. The customer will determine increasingly the design of the business processes
[strongly agree agree **neutral** disagree strongly disagree]
75. Investments are needed to fully profit from the ERP system
[**strongly agree** agree neutral disagree strongly disagree]
76. De Meeuw Bouwsystemen will grow in the future
[**strongly agree** agree neutral disagree strongly disagree]
77. The control on the business processes need to be stronger
[**strongly agree** agree neutral disagree strongly disagree]
78. The current process of rental and resale is transparent
[strongly agree agree neutral **disagree** strongly disagree]
79. Technological investments are needed to control the process better
[strongly agree agree **neutral** disagree strongly disagree]
80. Physical instead of digital improvements of the process are needed to improve the process
[strongly agree agree **neutral** disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation



Interview with the System Manager

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;
- to determine the wanted situation (future state).
-

The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

The development and introduction of the Max had a big impact on De Meeuw. Getting contracts for large projects has also been of influence. To focus on bigger projects was a choice deliberately made. People in the organization capable of managing big projects were needed. One of the first big projects was the setter of a trend for bigger projects such as in 1995/1996 the building of a temporary bank. From that point we were moving more to the semi permanent constructing.

In future we will better advice the customers on what will be needed for a building during a certain time span. Many customers think I only need a new building and I need it now. They often do not look for a building to over-bridge a longer time span. De Meeuw can be a partner to facilitate accommodation with changes over time in accordance with the change of the organization or persons involved. This may result in a higher initial price of the building, but the exploitation of the building can be much cheaper. Also the total cost of ownership plays an important role.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

European growth will be a main focus point in the strategy. The market share should become bigger. De Meeuw also wants to be an innovative company not only in its products but also in its services. Innovations in products and processes should be aimed at in the strategy. These innovations should pull market instead of pushing.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

Extra services in exploitation of buildings should become an area in which De Meeuw can excel. We also want to excel in being a partner of the customers in solving all problems concerning accommodations. The envisaged partnership is not only in building accommodation, but also in financial and exploitation consultation and services. Sustainability is also a field in which we want to excel.

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

The awareness and creativity to develop new accommodation possibilities for solving customers' problems is strength. Our production capacity is also strength. We can produce and deliver fast.

For the renting out and resale department strength is that they never say no to a customer. They will always deliver. This sometimes results in (too) high costs, but I consider meeting almost always the customer's demands as strength. Flexibility is very high and in addition the quality is good.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

There is much freedom in thinking and doing at De Meeuw. If the right sense for responsibility is lacking this may result in a bad synergy. People are working too much on islands instead of working together. At the moment the people look too much at the own department instead of to De Meeuw in general.

The controllability on the costs at rental and resale is currently insufficient. The process is not totally under control by De Meeuw.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

The growth in Europe will influence the standards for example for isolation. Expanding services and facilitation of customers will be a near future development. There is growth in the current domestic market and also the European and global markets are growing.

Question 7: Which of these points are beneficial for De Meeuw (internal)?

We want to be trendsetters in unit building. We must launch our innovations faster in the market. At this moment the market developments are beneficial for De Meeuw.

Question 8: What are the competitors of De Meeuw Bouwsystemen?

I do not know much about the competitors. It seems that they are a little behind De Meeuw.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

The same answer as with the previous question applies.

Question 10: Are the new market developments for the future in benefit of these competitors or more for De Meeuw (extern)?

Because of its production capacity and size, I am of the opinion that new market developments are more beneficial for De Meeuw than for its competitors.

Question 11: On what way have the customers influence on De Meeuw Bouwsystemen (extern)?

Criteria for customers to influence the business process are not clear now. This implies that the customer has a great impact on our process. This sometimes has far going consequences.

Question 12: Has the influence and demand of the customers changed during the last years?

I think it has slightly changed. We get signs that customers are of the opinion that environmental aspects are of growing importance also the social care sector is a hot issue. The customers demand changes in relation to social and economic changes in the society.

Question 13: How has the customer's influence changed the last years and what does this mean for De Meeuw Bouwsystemen?

De Meeuw often reacts too late on market developments. De Meeuw has to react faster on the customers' demand. The market demands changes much faster and De Meeuw has to anticipate.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14:

Time				
- Time in stock of the units	[1	2	3	4]
- Administration time of the units	[1	2	3	4]
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Quality				
- Number of mistakes made in the process	[1	2	3	4]
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Flexibility				
- Process flexibility	[1	2	3	4]
- Information system flexibility	[1	2	3	4]
- Unit flexibility (standardization – custom made)	[1	2	3	4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

The quality of information in the process should be much better. The ERP system must play a role in improving the information. In Belgium there is better control because there the number of units available is far less. The efficiency in Belgium is better at the moment. The information availability has also to be improved.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree.

81. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

82. Flexibility will increase in future at the cost of costs

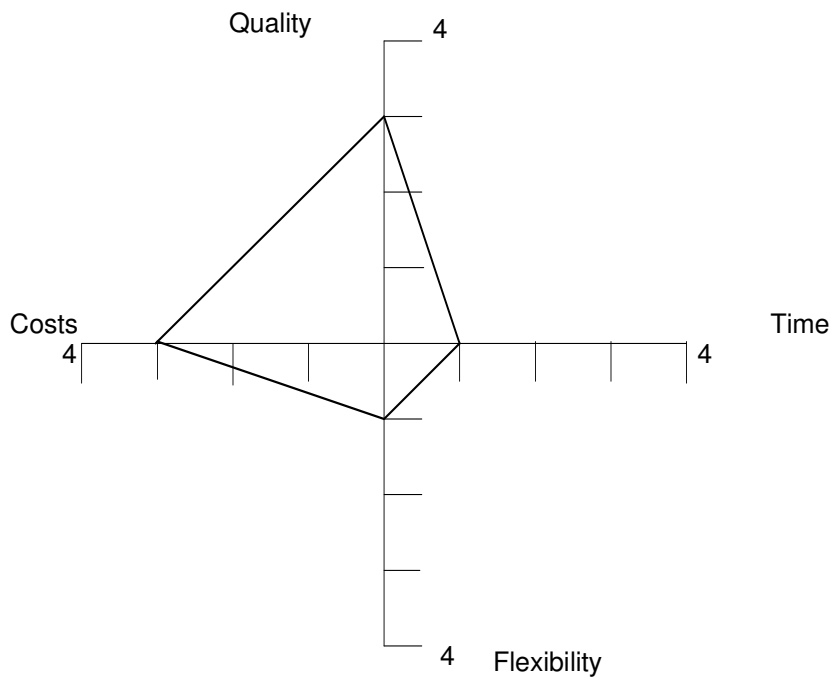
[strongly agree agree neutral disagree strongly disagree]

83. Time benefits will increase at the cost of flexibility

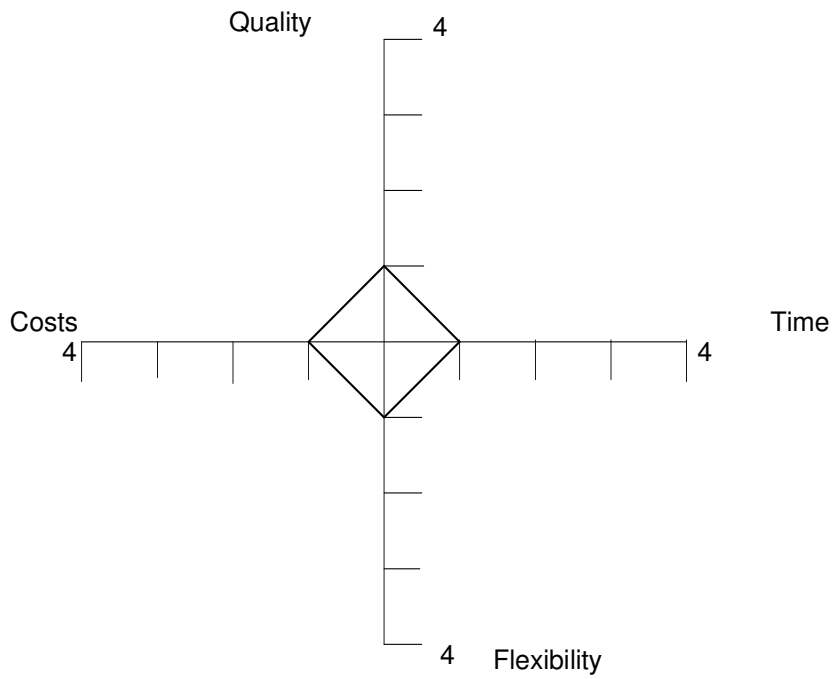
- [strongly agree agree neutral disagree **strongly disagree**]
84. The customer will determine increasingly the design of the business processes
- [strongly agree **agree** neutral disagree strongly disagree]
85. Investments are needed to fully profit from the ERP system
- [**strongly agree** agree neutral disagree strongly disagree]
86. de Meeuw Bouwsystemen will grow in the future
- [**strongly agree** agree neutral disagree strongly disagree]
87. The control on the business processes need to be stronger
- [**strongly agree** agree neutral disagree strongly disagree]
88. The current process of rental and resale is transparent
- [strongly agree **agree** neutral disagree strongly disagree]
89. Technological investments are needed to control the process better
- [**strongly agree** agree neutral disagree strongly disagree]
90. Physical instead of digital improvements of the process are needed to improve the process
- [strongly agree agree neutral **disagree** strongly disagree]

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Current situation



Future situation



Interview with the Sales Manager

Because on the one side the freedom of opinion of the interviewee is important and on the other hand the structure of the interview keeps track of the wanted direction and information of the interview, it is opted for a semi structured interview. In order to identify the problems and to make a basis for this study, before starting the interview a preliminary conversation took place. The goals of the interviews are:

- to find out the current and the future position of De Meeuw Bouwsystemen;.
- to determine the wanted situation (future state).
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The literature basis for the interview is in chapter 3. The red line is the BPR-model and the relevant KPI's. The interview consists of two parts. The first part is at a general level, while the second part is more specific for the rental and resale process.

Part 1

Question 1: Which changes in the past were of big influence on the present course of De Meeuw and what can be expected for the future course and direction of De Meeuw?

Changes in the market had a big influence and so had internal changes. De Meeuw shifted from the temporary accommodation market to the more permanent and semi permanent market.

In the future De Meeuw will deliver more total solutions for buildings. This means that we also will take care of preliminary processes like acquiring licenses for building.

Question 2: What will the main direction of the strategy of the Meeuw Bouwsystemen and how will this influence the current business processes?

De Meeuw will more focus on total building solutions (take care of the whole process). The departments will develop expertise in certain areas. The rental department for instance, will develop into a profit center.

In order to get the required expertise, De Meeuw will increasingly work with business partners. Total cost of ownership will be a new development in the business.

An increase of internal processes will appear. But also outsourcing and strategic partnerships are opportunities. De Meeuw will organize the total customer care. If processes cannot be categorized under the core business of De Meeuw, the expertise of the strategic partners will be used.

Question 3: On what main points De Meeuw wants to excel (e.g. innovation, flexibility, costs, time, quality)?

De Meeuw wants to excel in incremental innovation. Our prices are not the lowest in the market. We must create added value at an acceptable price. This added value is in the knowledge and expertise of De Meeuw (sales knowledge, product knowledge, knowledge of effective and smart building, etc.)

Question 4: What are the strengths of de Meeuw (general)?
What are the strengths of the renting out and resale process?

Strength is to provide turnkey solutions for customers. De Meeuw delivers fast solutions for accommodation problems.

Another strong aspect is the specific knowledge on market segments (social care accommodations, temporary accommodation solutions for children (schools, daycare, etc), business accommodation, etc).

The strength of the renting out department is that it is completely under own management. It can operate flexible to customer wishes.

Question 5: What are the weaknesses of the Meeuw Bouwsystemen (general)?
What are the weaknesses of the renting out and resale process?

A weakness is that De Meeuw does not fully control the production price. Another weakness is the strong fluctuation in production.

Also the change of personnel is a weakness. That is why the sales team lacks the necessary experience. Also the lack of a CRM system is a weakness.

However the most important weakness is the lack an unambiguous strategy.

A weakness of the renting out process is that they have an ERP system which is not suited for their process. Another weakness is that in this process capital has been invested that could have been used for other purposes. It is preferred to only use the resale option for standard products. We should try to avoid the resale of custom made buildings.

Question 6: What are the innovations/renewals for the near future, e.g. growth, outsourcing, new products, etc. (internal)?

Innovation will be in the area of growth in the (semi-) permanent market (+/- 15 years). There is also a need for financial innovations and process innovation. Disruptive innovation is not expected in the near future.

Question 7: Which of these points are beneficial for De Meeuw.(internal)?

Because of the strong growth in specific market segments (like temporary social care accommodation and temporary accommodation solutions for children as schools, daycare, etc), innovations in these sectors are beneficial for De Meeuw. Because of the size of De Meeuw (larger than the most direct competitors) it is easier to offer total solutions to customers. The financial power, productive power and know-how of De Meeuw enable the company to manage bigger projects (e.g. the Rotterdam central station).

Question 8: What are the competitors of De Meeuw Bouwsystemen?

Per market segment there are different competitors. For the renting out department only much smaller competitors are active in the market. In the more (semi) permanent parts of the market bigger competitors are operating. Also the location is depending on the intensity of the competition. Because the markets for temporary accommodation are growing in the market of permanent accommodation prefab builders become more direct competitors.

Question 9: What are the strengths and weaknesses of these competitors (extern)?

The majority of the competitors is far smaller and financially weaker than De Meeuw is. Also when it comes to the supply of high quality units, the competition cannot keep up with De Meeuw.

Question 10: Are the new market developments for the future beneficial for these competitors or more for De Meeuw (extern)?

In some segments of the market the developments are in benefit of De Meeuw. In other segments there is no difference. It all depends on projects where higher requirements have to be met. For smaller players in the different market segments

total customer care solutions are almost impossible fulfill. In the budget sector the advantage is for De Meeuw.

Question 11: On what way have the customers influence on De Meeuw Bouwsystemen (extern)?

A couple of years ago there was no influence by the customers at all. But now there is a big influence. Now decisions are often made in consultation with the customers and architects.

Question 12: Has the influence and demands by the customers changed during the last years?

The demand has certainly changed. Customers want that everything related to the construction of the accommodation will be done. This includes the design, acquiring licenses and making the technical systems ready for use. The customer in general does not want interference with the decorating and furnishing of the accommodation. Customers are focused on their core business and want to outsource the secondary processes.

Question 13: How is the customer influence changed the last years and what does this mean for De Meeuw Bouwsystemen?

The temporary units should be standardized. But the (semi) permanent buildings should always be designed upon the customers demand. That the influence has changed during the last years means that De Meeuw has to be innovative. The change in customers' demand can be beneficial, for it opens opportunities to grow as an organization. The flexibility will grow in the future. More professional disciplines within the organization will be needed. De Meeuw will grow into the direction of a building contractor instead of a temporary accommodation delivery company only.

Part 2

In the second part the focus is on the business process of renting out and resale. The BPR framework is used as the guideline for the interview. With the next questions it is important to give value to the answers by using a 1 to 4 grade. 1 is most important and 4 is least important. The values should be given in relation to each other.

Question 14:

Time				
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- Process flexibility	[1	2	3	4]
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- Unit flexibility (standardization – custom made)	[1	2	3	4]

Question 15: What do you expect to change in the current process and do you have any ideas for innovations?

The rental and resale process should be split in two separate processes. The complexity will increase. By splitting the processes it easier to fulfill the customers needs.

Change the ERP system into system suitable for the renting out and resale department. Less steps in the rental process and less people involved in a single assignment could be a good process innovation. A lower price should be accomplished for offering everything the permanent builders can deliver but for a lower price.

Question 16: I will give some statements. You can judge them in terms of: strongly disagree, disagree, neutral, agree and strongly agree.

91. In future all documentation will be digital

[strongly agree agree neutral disagree strongly disagree]

92. Flexibility will increase in future at the cost of costs

[strongly agree **agree** neutral disagree strongly disagree]

93. Time benefits will increase at the cost of flexibility

[strongly agree agree **neutral** disagree strongly disagree]

94. The customer will determine increasingly the design of the business processes

[**strongly agree** agree neutral disagree strongly disagree]

95. Investments are needed to fully profit from the ERP system

[strongly agree **agree** neutral disagree strongly disagree]

96. de Meeuw Bouwsystemen will grow in the future

[**strongly agree** agree neutral disagree strongly disagree]

97. The control on the business processes need to be stronger

[strongly agree **agree** neutral disagree strongly disagree]

98. The current process of rental and resale is transparent

[strongly agree agree neutral **disagree** strongly disagree]

99. Technological investments are needed to control the process better

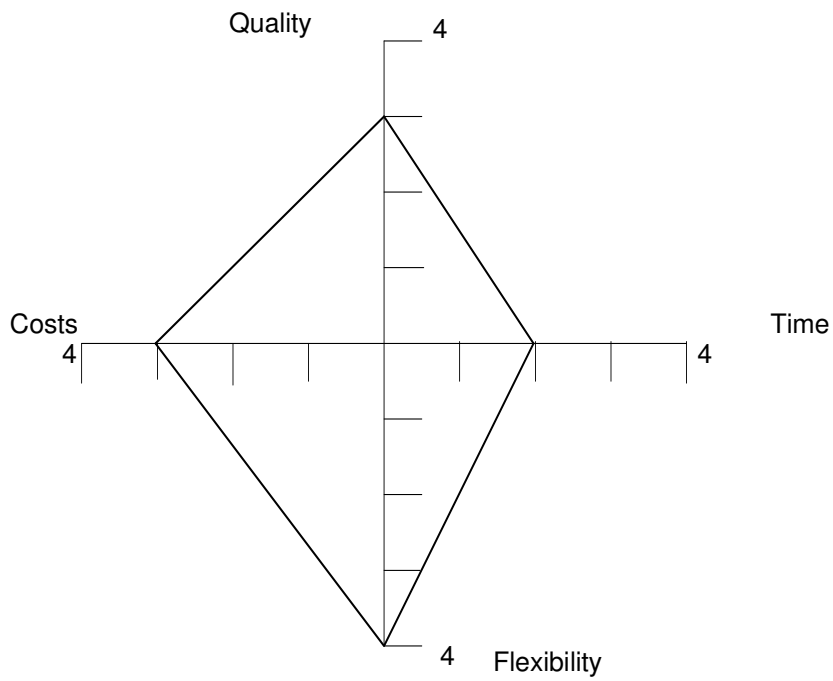
[strongly agree **agree** neutral disagree strongly disagree]

100. Physical instead of digital improvements of the process are needed to improve the process

[strongly agree agree **neutral** disagree strongly disagree]

The closer to the center of the graph the better it is. So priority 1 is better than 4.

Current situation



Future situation

