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MASTER THESIS BUSINESS ADMINISTRATION

Nibag goes lean

A research to improve the service quality at Nibag

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Preface

In front of you lies the research which is executed as the final end of my master Business Administration at the University of Twente. The intention of this research is that I use all the knowledge I have picked up during my study and apply this knowledge to solve a practical problem. The analysis is done by order of Nibag, a housing adviser which accompanies organizations by initiating, realizing, organising and managing their real estate package. Its desire to be a profitable organization is the starting point of this study. In May 2009 the company made a second beginning and it was determined to become a successful firm. With the help of this extensive research I try to offer the solution for Nibag to become a profitable and successful company in the future.

Before you start reading this study I would like to thank some people. In the first place, Mr. ir. Löwik, who was my first supervisor of the University of Twente. I experienced Mr. ir. Löwik as a pleasant mentor. On the one hand he gave me the freedom to do the things of which I thought they contributed to the research. On the other hand he was critical and sharp in his comments. Mr. ir. Löwik clarified his criticism very clearly, but he also listened to my opinion and he respected my thoughts. After a conversation with him I knew always what to do and I was convinced that it was the right way. After that I will show my gratitude to Mr. prof. De Bruin and especially Mr. Asif, my second and third supervisor. Mr. Asif was a great help with his advices and interesting ideas, his assistance brought my thesis to a higher level.

Next to the people of the University I want to thank Mr. Endeman, my external mentor at Nibag. He is the financial manager and helped me very well. During my time at Nibag I could always visit his office to ask him for information, advice or an opinion. It was obvious ever since day one that he believed in my research and I liked the way we worked together. Furthermore, I will express my thanks to all the people at Nibag; the director Mr. Nijkamp, the employees and also to my colleague trainees. They are the reason that I visit Nibag every day with pleasure and it stimulated me to realize a thesis which will really help Nibag on its way to a successful future.

At last I hope you will read my research with amusement and fascination. I expect Nibag will use my advice to improve their company. At all events I can say this research was a great challenge for me on which I look back with a lot of contentment.

Wouter Weusthof
23rd of August 2010

Summary

The worldwide crisis strikes the construction sector, also in the Netherlands. Thousands of jobs are disappearing and the production is going down more and more (Elsevier; 11-12-2009). Housing advisers like Nibag feel the times are difficult and the competition is intensive. At this moment the company is succeeding to keep its head above the water and it is searching for ways to become a profitable, successful company.

That is also the starting point of this study; Nibag wants to be a profitable company. With the help of a preliminary research it comes true that quality is the key factor to become the desirable company. Nibag has difficulties to manage their quality and on the basis of that the complication is; Nibag has problems with maintaining the level of service quality. This leads to the research question of this thesis:
How can Nibag improve its service quality to get a profitable company?

Quality is the core concept of the research question and has many definitions. For Nibag the best definition is: 'Quality is the conformance to the requirements which the company itself has established for its products based directly on its customers' needs'. There are several methods to manage that quality, but with respect to Nibag lean service turns out to be the most suitable method. This method has various tools which are available for investigators to do research with, but 'value stream mapping' fits the best in this situation.

The field research consists of two parts. First there is the description of the general processes inside Nibag; the sales and planning process. These processes carry all the general activities within the company. It all starts with 'client wishes', then follows the 'offer', the 'acceptance', the 'planning', the 'execution' and at last the 'evaluation'. After that there is a case study of two *MJOP*'s (*Meer Jaren Onderhoud Project*). These projects consist of the general activities, but next to that the projects have their own specific activities. To make clear comparisons one of the projects is profitable and the other is unprofitable.

Lean service prescribes the researcher to search for wastes within processes and activities. During the research there are identified eight different wastes: waste of overproduction, waste of motion, waste of inventory, waste of transportation, waste of waiting, waste of underutilized people, waste of defects and waste of over processing. In the sales and planning process all the wastes are noticed and the common causes are: 'the current intern information system does not meet the requirements. The information can not be secured on a clarifying way' and 'the current planning system is not able to provide a bright overview to everybody who is involved and it can not integrate the planning and progression schemes'. Besides this, the eight wastes are also observed within the *MJOP* projects. Two important causes for these wastes are: 'there is a lack of cooperation and communication between involved parties and employees within a project' and 'there is a lack of awareness that codification and documentation are important for a successful project'. Within the *MJOP* projects many wastes are identified and the distribution is clear. The profitable project counts 16 wastes, while the unprofitable project carries 38 wastes.

The conclusion explains the results of this study. Nibag has to change several things in their way of working. The company has to focus on 'documentation', 'planning', 'cooperation' and 'standardization'. Documentation is important, because Nibag must manage its knowledge and information more accurate, so that the information that is needed is available and correct. The planning has to be arranged on a different way, because there is a lack of overview into the planning and progression of a project. The cooperation between involved parties deserves attention, because there are too many misunderstandings between Nibag, clients and third parties. Standardization is the last item, it is important for Nibag to standardize the way of working within the company.

Every project has to consist of particular activities, like a kick-off and an evaluation, and the employees have to make use of standard forms, templates and standard text blocks.
On the basis of the conclusion several recommendations are formulated. These suggestions are answering the research question of this research. The most important solutions for the company are:

- The management team should develop awareness and create discipline about the importance of codification and documentation with respect to a project.
- The management team should introduce an internal information system which contains all the project information and knowledge within Nibag.
- The management team should establish a planning system, which is integrated with the progression and which is available for all the involved parties of a project.
- The management team should develop an internet 'portal' on which the company, the client, as well as eventual third parties can log in to check the information about a project.
- The management team has to oblige a kick-off, a project evaluation and a third party evaluation at the big projects or important third parties. Next to that the employees have to make use of standard forms, templates and text blocks.

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CHAPTER 1. The problem

This chapter will be the basis of the whole research. In this introduction I develop the foundation of this investigation. With the help of Minto's (2009) pyramid principle I will describe the definition of the problem in the first paragraph. After that, in paragraph 1.2 I will tell something about Nibag as a consultancy firm.

1.1 Definition of the problem

According to Minto (2009) it is important a researcher creates structure in the presentation of the problem. Therefore a problem contains always three elements:

1. The situation
2. The complication
3. The question

This step-by-step process leads to a pyramid that helps to write and think structured. With the help of this method I formulate the definition of the problem in this chapter.

The situation

The situation is the reason of the research. With the help of the reproduction of the state of affairs there will arise one sentence that gives an obvious description of the situation (Minto, 2009). In this sub paragraph I will first describe what is happening at Nibag B.V. (from now on: Nibag) and then I will end with the certain sentence who characterize the situation.

The recession leaves his marks behind. Many companies are in big trouble during the economic crisis. Also Nibag has had his problems (see highlight 1). A short period later the company gets the permission to make a second beginning and since then several things has to change at Nibag. The main changes after the second beginning were the declining of personnel, the closing of the establishment in Den Dolder and the rearrangement of workplaces. But with these changes there is not at once a profitable company on the long term. Then there have to change more. In one sentence the situation at Nibag is:

Nibag wants to be a profitable company.

Nibag Oldenzaal wants a second beginning

OLDENZAAL – The court of Almelo has declared Nibag bankrupt. The bureau, which is specialized on technical management of office-buildings, has establishments in Den Dolder, Uden and the head office in Oldenzaal. There are 56 full-time employments.

The direction has presented a bankruptcy petition, because the company is suffering through the crisis in the building sector. Nibag is in a dialogue with the curator about a second beginning.

Highlight 1 (TC Tubantia; 20-05-2009).

The complication

Step two of the problem is the complication. It is not the complication in the everyday sense of the word. It describes an alteration to a stable situation, rather than a problem per se, although sometimes the alteration is a problem (Minto, 2009). At the end of this sub paragraph there arises again one sentence which includes the complication.

This sub paragraph describes the preliminary investigation I have done. As a researcher I was told Nibag wants to be profitable, but I had to find out which determinants of profitability are important for an organization. With the help of various theories and some interviews I found the most important determinant of profitability.

The search to the determinants of profitability starts with the PIMS (Profit Impact of Market Strategy) program. The PIMS database is a pool of information reflecting the experiences of approximately 450 companies and 3000 strategic business units (SBU's). It covers a wide analysis of the pooled business experience. The PIMS researchers,

Bradley and Buzzell (1989), found several relationships between strategy and performance, but the most important relationship they found is that that quality of products and services is the main factor for a companies' performance.
Berry, Parasuraman and Zeithaml (1988) observed also that service quality has become the great differentiator, the most powerful competitive weapon most service organizations posses. Service quality is a puzzle with many pieces, pieces that need to be assembled carefully. Service can be improved only through a systematic, step-by-step journey that enhances employees' ability and willingness to provide service by creating an organization that supports quality service in every area.
Garvin (1984) pointed his attention at the product quality too. The superior reliability of many Japanese products has sparked considerable soul-searching among American managers. In a thorough study of the business units of major North American companies, managers ranked 'producing to high quality standards' as their chief current concern.
A decade later did Metters and Rust (1996) a research to service quality impact models and they identified that given the increasing importance of service in every advanced economy, it is not surprising that increasing attention is being paid to the business impact of service quality, and how organizations should manage its service. There is a growing opportunity for service quality impact models to contribute greatly to the effective and efficient management of services so the companies can be more profitable.

After the theoretical research about profitability it is interesting to know the opinion of Nibag. The financial manager of the organization was clear about the situation: "*Before the second beginning in May 2009 we were working far from optimal. We did what we thought was the best, without thinking whether it was really the best way. There were no procedures, no process controls and we knew we had to work different if we want to be a profitable company. From then on, we start a process in which we want more standardization, efficiency and process control. Important in that process is to find the wastes in the processes. We are sure there are some wastes and if we are able to identify these, we can create a better situation. The basis of the improvement is to find ways to deliver better services, so you can be competitive*".

The director of Nibag emphasized his presentation of 12 June 2009 that things have to change: "*The organization goes further with 28 employees, closes his establishment in Den Dolder and has to rearrange their workplaces, integrate their colleagues and re-allocate jobs and clients. We have to work more standardized, communicate better and handle pro-active".* A half year later Nibag is in the middle of this process of change, according to the presentation of the annual plan of the director of 10 January 2010: "*The objectives for 2010 are more productivity, more sales and more profit. Except of these quantitative standards, Nibag has to improve its quality and standardize their processes and activities*".

The opinions of the director and the financial manager are in line with each other. Both talk about standardization, quality improvements and the wastes which have to be removed. On the basis of the theory and the opinions of the director and financial manager it looks like Nibag needs an improvement in their processes. But to be sure that the research I want to do is valuable and relevant for the organization I asked several employees about the processes at Nibag (appendix 1 and 2). Out of these interviews came a lot of information and the most of it I will describe later on in this investigation, but it was interesting that the employees talked about a lack of service quality as well as the director and financial manager did before. As causes for the lack of quality the employees mentioned among others:

- Inside Nibag there are many files with much information, but it costs sometimes a lot of time to find all the necessary information about a particular project. There is no central, digital information point where all the information about a client is suited.

- A lot of knowledge is lost or is not secured inside Nibag. Some people have a lot of knowledge in their head, but it is not put on paper. So when someone leaves the company, a lot of information takes off the company. It also cost too much time to find standard documents and client histories or to determine the competences of project leaders, project workers or external parties.
- The failure of communication between the project management and the planner results sometimes in mistakes in the planning which can be disastrous for a company like Nibag. When Nibag does not reach his planning, a big monetary penalty can follow.
- It cost a lot of time when inspectors make client reports. At day 1, when the inspector is at the location, he has to write everything down with pen and paper. And at day 2, he has to process all the information in his computer.
- Nibag can learn a lot of every single project they finished. But it is a waste that not every project has an evaluation moment in which all the learning points are identified so the company can develop their way of service providing.

The interviews with the employees and the management suggest the same set of problems concerning the service quality at Nibag. Therefore the complication is defined as:
Nibag has problems with maintaining the level of service quality

The question
In accordance with Minto (2009) the question should immediately arise after the complication is established. Looking at the complication the question or definition of the problem which has to be answered is:
How can Nibag improve its service quality to get a profitable company?

The situation, complication and question are now developed and form the basis of the research:
- Situation = Nibag wants to be a profitable company
- Complication = Nibag has problems with maintaining the level of service quality
- Question = How can Nibag improve its service quality to get a profitable company?

Building the pyramid
To build the pyramid the most important steps are taken. The situation, complication and question are formulated. The next step is to give the logic answer to the definition of the problem (Minto, 2009). The answer follows automatically out of the question:
An improvement of the service quality leads to a profitable company

After the formulation of the answer it is time ask some questions. I have to think about the answer I just gave and why it is the right answer. After the 'why'-question there comes up an answer again (Minto, 2009). By this problem I ask myself the question:
Why should an improvement of the service quality leads to a profitable company?

The question has the following answer:
Because the amount of wastes will become minimal

Then I do the same as with the definition of the problem. Again I ask myself a question; and then? This leads to a set of sub questions which will help me through the research and make it possible to find an answer on the research question.
First I have to investigate the concept of quality. This is the core concept of the research question and therefore I have to analyze it. On the one hand I want to know what the term quality exactly means and on the other hand I have to investigate how a company can act with respect to the improvement of quality. So the first two questions I will answer are:

- *What is quality?*
- *How can a company manage quality?*

After that I have to prepare my field research. I have to think about the research method which fits the best with my research situation. Besides this, it is important to find out what a proper research exactly contains. The preparation of the field research leads to the following two sub questions:

- *Which research method I will use?*
- *How can I do a proper research?*

When I investigated the concept of quality and know the structure of my field research I can start this field research. To say something about the quality of Nibag, I have to know what exactly happens inside the company. I will analyze Nibag's way of working with the help of the following sub question:

- *What are the processes inside Nibag?*

But only a description of the processes is not enough. I have to analyze the processes and try to find aspects which are not for the benefit of the company. I must locate and clarify these wastes, so the next sub question is:

- *What are the wastes and their causes within the Nibag processes?*

The last step to an improvement of the quality is to remove the wastes which are found. This will lead to a conclusion, which gives an answer on the seventh sub question:

- *How can Nibag eliminate the wastes?*

Whether I am able to find ways to eliminate the wastes I will know how Nibag can improve their quality and therefore I can answer the research question.

This all leads to the following pyramid which will be the basis of the research and shows the structure of thinking and writing (Minto, 2009).

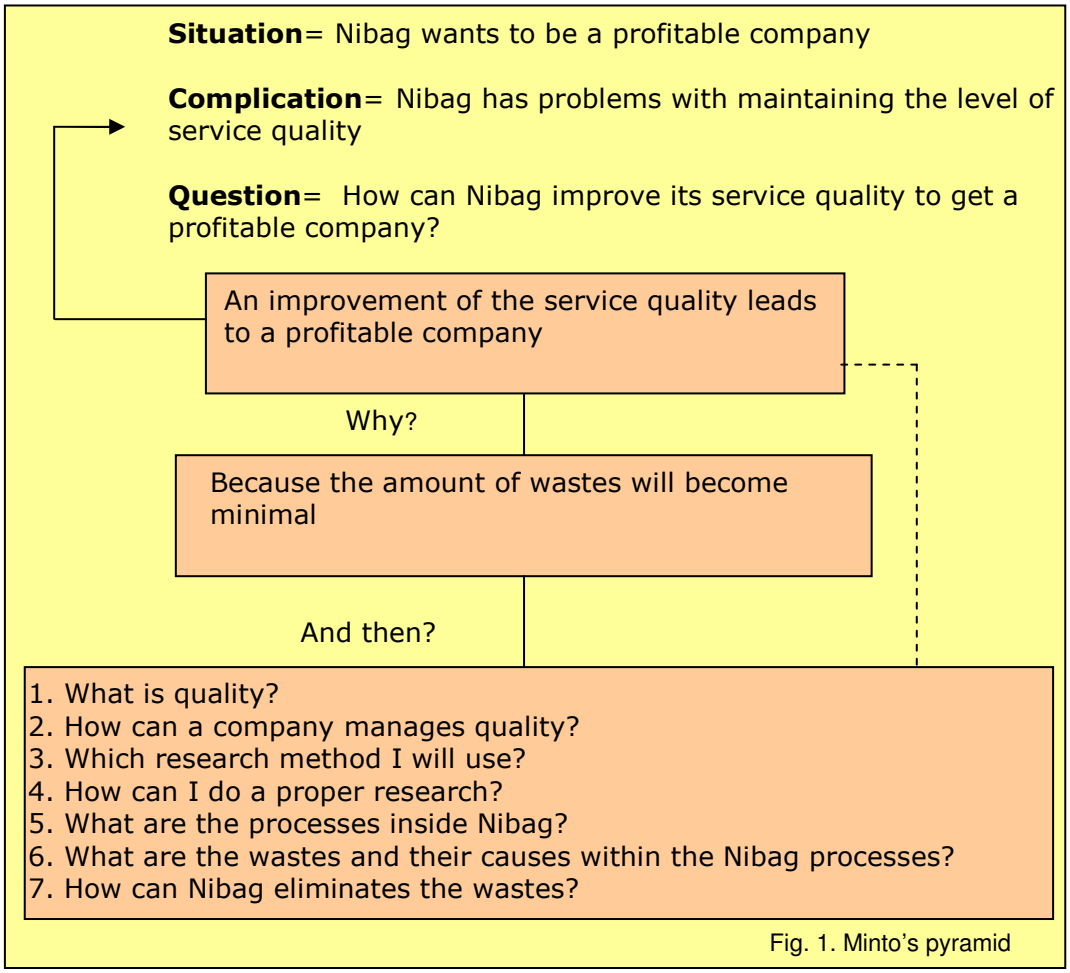

Fig. 1. Minto's pyramid

1.2 About Nibag

Before I can answer the above mentioned sub questions I have to understand what kind of organization Nibag is. Twenty-five years ago Nibag (*Nationaal Instituut Begeleiding Advisering Geluidshinder*) have its origin as a service provider for housing corporation. It provides the corporations support with the installation of sound-proofing facilities at houses that were close to (military) airports. The organization developed into an all-round bureau with a large supply of services in the housing market. (Website Nibag; history)

Nibag helps organisations with the realization of housing projects. The organization is a part of 'Nystaete participations' and has two establishments. The head office is in Oldenzaal and there is a settlement in Uden. According to their website it tries to harmonise the involved parties (architect, contractor, installation company etc.) as optimal as possible. The company typifies itself as an organisation that is specialized in the creation of sustainable and proper housing, with overview for all the problems that are involved. (Website Nibag; about Nibag). Appendix 3 shows the visualisation of the organization of Nibag.

Mission and vision

As a result of the economic recession Nibag was obliged to make a second beginning and with that it developed a new mission and vision (Website Nibag; mission and vision):

- Mission: Nibag housing advisers accompany organizations with social real estate by initiating, realizing, organising and managing their real estate package. This all happens on a proactive way and the company cooperates with preference on the basis of partnership with their clients, suppliers, as well as the other professional parties.
- Vision: Developing, putting in and managing of social real estate as optimal as possible require a multidisciplinary approach by which sustainability and cost efficiency play an important role. Nibag wants to fulfil a major role in this with their competent advice.

Markets and products

Nibag has many different clients. We can divide these clients into six markets or segments. The segments are:

- Care sector
- Education
- Local authorities
- Child care
- Housing corporation
- Government

Next to these markets there are nine products or supporting activities which can be placed at every market. The products are:

- Monuments
- Sound
- *EPA (Energie Prestatie Advies)* or Energy Performance Advice
- *EBA (Energie Binnenmilieu Advies)* or Energy Indoor Environment Advice
- Energy
- *MJOP (Meer Jaren Onderhouds Planning)* or More Years Maintenance Plan
- *BPM (Bouw Project Management)* or Building Project Management
- Advice
- Sustainability

In appendix 4 and 5 there is information about all the segments and products. In highlight 2 there is an example of an order Nibag received from Schiphol. The airline company has contracted Nibag, because it wants Nibag to reduce the noise pollution in 30 monumental buildings and 220 normal houses.

Advice Nibag for pollution at Schiphol

UDEN – Advisory bureau Nibag has welcomed an important order with respect to the reduce of noise pollution in the neighbourhood of Schiphol, Amsterdam. It is about the advice for 30 monumental buildings and 220 normal houses. It is a specialized job, given that all the monumental buildings are unique and need an individual treatment. These special building are suited in Aalsmeer, Nieuwveen, Kudelstaart and Zevenhoven. At the end of 2010 this project must be finished.

"Every piece of cultural heritage is a good made to be measure", said advisor Björn ten Broeke of the division Protection of monuments of Nibag. "Not one single piece is the same. That makes this order a real challenge". Nibag is a specialist in the protection and maintenance of monuments and historical buildings. According to Björn ten Broeke monumental buildings are not protected as good as required. "The recover-activities leave much to be desired. When there is sound pollution one extra window-glass is not enough. The effect is not contributing the sound insulation. One of the main problems for monuments and historical buildings is sound pollution". The activities of Nibag are beginning in March with a lot of measurements inside the buildings. With the help of the results it comes true what should happen to decline the sound pollution. Ten Broeke: "A possibility is to place an extra window frame at the rear side of the existing frame. In this extra frame there can be placed heavier window-glass. It is namely not allowed to replace the original window-glass by monuments". Next to this Nibag shall measure 220 normal houses in the neighbourhood of Schiphol. "Living close to an airport leads to sound pollution. The government has determined standards, about the maximum decibels which are allowed inside the houses. After the advice the houses will be fixed by various contractors, each with their own specialism".

Highlight 2 (TC Tubantia, 11-03-2010).

These markets and products lead to a product-market combination (PMC) matrix in which every service Nibag is delivering can be placed. In figure 2 we see the matrix. The organization provides a broad package of services. The goal is to sell many of these services to every single client. For example, a school director wants to start a primary school in a monumental building. This director calls Nibag because he read in the newspaper the company is an expert with monumental buildings. Subsequently, Nibag is delivering its service to the school director and protects the monumental building for the next generation. After that the school director begins the primary school. Then Nibag informs him about EBA, the Energy and *MJOP*'s. It is conceivable that he wants to do business with Nibag again. It depends among others on the first service Nibag provided him. If he was satisfied with the way Nibag protected the monumental building, there is a possibility Nibag can deliver him more services out of their service package. Next to the markets there is also a 'remaining' column in the matrix. In here are the projects placed that are done for privately-owned clients. This is not core business for Nibag, but when such a client asks for a service, Nibag is willing to provide it to the client.

	Care sector	Educa-tion	Local authorities	Child care	Housing corpora-tion	Govern-ment	Remai-ning
Monuments							
Sound							
EPA							
EBA							
Energy							
MJOP's							
BPM							
Advice							
Sustainability							

Fig. 2. PMC-matrix

1.3 Summary

Every study starts with a particular situation. In this case the situation is; Nibag wants to be a profitable company. With the help of a preliminary research it comes true that quality is the key factor to become the desirable company. Nibag has difficulties to manage their quality and on the basis of that the complication is; Nibag has problems with maintaining the level of service quality. This leads to the research question of this thesis:

How can Nibag improve its service quality to get a profitable company?

To answer the research question I have to answer several sub questions. The following chapters will answer these seven sub questions:

- *What is quality?*
- *How can a company manage quality?*
- *Which research method I will use?*
- *How can I do a proper research?*
- *What are the processes inside Nibag?*
- *What are the wastes and their causes within the Nibag processes?*
- *How can Nibag eliminate the wastes?*

CHAPTER 2. Managing performance through lean thinking

This chapter deals with the desk research and answers the sub question 1 and 2 of the pyramid of Minto (page 9). Paragraph 2.1 starts with a description of the concept quality and answers the question; *what is quality?* This sub question effects a 'sub sub question', which is; *what means quality for Nibag?*
After that, in paragraph 2.2, I work on the question; *how can a company manage quality?* This sub questions causes also a 'sub sub question' which will be answered in paragraph 2.3, namely: *how can a company like Nibag manage quality?* In this paragraph I work out a quality management philosophy which fits very good at service organizations; lean service. I describe the philosophy, criticism, key element and tools of the methodology.

2.1 Quality

The concept of quality has been contemplated throughout history and continuous to be a topic of intense interest today. Quality presently is addressed in numerous academic publications and is an important topic for managers in organizations. A search for the definition of quality has yielded inconsistent results. Quality has been defined as excellence (Tuchman, 1980), value (Feigenbaum, 1951), conformance to specifications (Shewhart, 1931), conformance to requirements (Crosby, 1979) and meeting customer expectations (Grönroos, 1983). Every time period or context has his definition.

Socrates, Plato and Aristotle were the first who discussed about quality. The ideal to the Greek was *arête*, or excellence. The definition of the word varied by its context; for a racehorse it was speed, for a cart, strength. Quality as excellence has been debated recently. Tuchman (1980) argued that quality

> "*means investment of the best skill and effort possible to produce the finest and most admirable results possible*"

Quality as excellence cannot be evaluated in anything other than abstract terms. When the Western businessmen began to target the wider market for their commercial goods, the broader view on quality was founded on the belief that the consumer was the ultimate arbiter of trade. Feigenbaum (1951) told us that quality

> "*does not have the popular meaning of best in any absolute sense. It means the best for certain costumer conditions*"

In the 1950s the researchers argued that purchasing decisions were made on the basis on price and quality. Another view on quality originates from Henry Ford's mass production. This standardized way of working reduced the costs and every single product should be conforming the specifications. Shewhart (1931) said it in the beginning of the 20th century:

> "*the quality of a product has to be defined in such a way that the numerical measure of this quality serves the following purposes:*
> *1. to make it possible to see if the quality differs among products*
> 2. *to make it possible to compare quality in different periods*"

In the standardized companies came more and more attention to the mistakes which were made. Researchers found that companies spend around 20% of their revenues doing things wrong and doing them over again. Crosby's (1979) concepts of 'do it right first time' and 'zero defects' were famous and his opinion about quality was:

> "*quality is the conformance to the requirements which the company itself has established for its products based directly on its customers' needs*"

The next definition grew out of the services marketing literature, where researchers argued that a conformance-to-specifications definition of quality failed to address the unique characteristics of services. Grönroos (1983) argued that

> "*quality is the extent to which a product or service meets and/or exceeds a customer's expectations*"

This abundance of definitions of the term quality leads to model, developed by Garvin (1984). This model (figure 3) gives an overview of the different definitions of quality.

Approach	Definition	Mentioned by
Transcendent	Quality means investment of the best skill and effort possible to produce the finest and most admirable results possible.	Tuchman (1980)
Value-based	Quality does not have the popular meaning of best in any absolute sense. It means the best for certain costumer conditions.	Feigenbaum (1950)
Product-based	The quality of a product has to be defined in such a way that the numerical measure of this quality serves the following purposes: 1. to make it possible to see if the quality differs among products 2. to make it possible to compare quality in different periods	Shewhart (1931)
Manufacturing-based	Quality is the conformance to the requirements which the company itself has established for its products based directly on its customers' needs.	Crosby (1979)
User-based	Quality is the extent to which a product or service meets and/or exceeds a customer's expectations.	Grönroos (1983)

Fig. 3. Garvin's approaches on the concept quality

Each quality definition has strengths and weaknesses and Reeves and Bednar (1994) believed that it depends on the organization goals what definition fits by the company.

In the 1990s there came a sort of agreement about the importance of quality and the definitions. The several definitions were developed and every manager could choose that 'quality' which fits the best within his company. Bolwijn and Kumpe (1990) wrote an article about the shifted attention of the managers to other market demands, namely flexibility and innovation. Nevertheless, it is quite obvious for them that quality will always be a necessary element in successful organizations. Quality is a precondition for flexibility and innovation.

With respect to Nibag it is important which of the definitions of quality is usable for the organization. According to the mission and vision of Nibag (see chapter 1) it seems that there is not one approach which fits Nibag perfectly. The mission as well as the vision aims at the importance of the clients and the efficiency. On the basis of the annual report of 2010 we see again the importance of efficiency. One of the main objectives for 2010 is more standardization of the activities. Besides that the annual report pays a lot of attention to the relationship with the clients. Nibag should strive after long term and sustainable relationships with their clients. According to the financial manager efficiency is the basis: "*First we have to look to ourselves, to the internal situation of the company. When we are able to produce efficient, fast and good, we can deliver quality products and*

we satisfy the customer. The services at Nibag have to be created following several procedures and therefore manufacturing-based quality needs a lot of attention. The people at Nibag have to think following several processes and steps. With the help of the manufacturing-based quality we can stimulate this train of thought".

In this paragraph we have seen the whole evolution of the concept quality. Famous Greek philosophers talked about it many years ago and until today many managers have a different view about the term. Although, they all agree that quality is very important for a company. Without quality, a company cannot be competitive and is doomed to fail. For Nibag the term quality is related to manufacturing-based efficiency. The mission, vision, annual report and also the financial manager are emphasizing the need of efficiency for Nibag. So the definition of quality of Crosby (1979) is the definition I will use in this thesis:

"Quality is the conformance to the requirements which the company itself has established for its products based directly on its customers' needs"

2.2 Quality management

After defining the concept quality the next step is talking about quality management. Leading experts in productivity and quality often have stated that the real reason for quality problems is poor management (Daft, 2006). In the following sub paragraph I walk through the history of quality management, while explaining the most important forerunners of the methodology I will describe in paragraph 2.3; lean service.

One of the first and most prominent researchers on the specialism of quality management was Joseph M. Juran. He developed the Juran trilogy, a very simple and complete representation of managing for quality. Managing quality makes use of three fundamental processes; planning, control and improvement. The starting point is planning. A company has to create a process that will be able to meet established goals and do so under operating conditions. Following the planning, the process is turned over to the operating forces. Their responsibility is to run the process at optimal effectiveness. Due to deficiencies in the original planning, the process runs at a high level of chronic waste. Because the waste is inherent in the process, the operating forces are unable to get rid of the chronic waste. What they do instead is to carry out quality control (keep the waste from getting worse). If it does get worse (sporadic spike), a fire fighting team is brought in to determine the cause of this abnormal variation. The chronic waste can fall to a much lower level. It results from purposeful action taken by upper management to introduce the quality improvement. It is remarkable that one of the first researchers of quality management was already focused on take away the wastes, which is the key element of lean thinking, described in the next paragraph (Juran, 1986).

Another pioneer of quality management is William E. Deming. He brought the thinking in processes and improvement after World war II into Japan and founded the Deming circle (plan-do-check-act). It is a methodology for continuous improvement. Deming suggested that this procedure should be followed for the improvement of any stage of production and as a procedure for finding a special cause of variation indicated by statistical signals. The plan-stage involves studying the current situation, gathering data, and planning for improvement. The do-stage consists of implementing the plan on a trial basis. The check-stage is designed to determine if the trial plan is working and to see if any further problems or opportunities have been discovered. The act-stage consists of implementing the final plan. This leads back to the plan-stage for further diagnosis and improvement. The Deming cycle is never ending, which is also an important aspect of lean service, because the basic principles of lean service form a vicious circle too (Swamidass, 2000).

On the basis of the insights of Juran and Deming the concept quality has developed over the years. One very popular approach based on the work of the previous researchers is Total Quality Management (TQM). TQM became attractive in the 1980s because it had

been successfully implemented by Japanese companies that were gaining market share and an international reputation for high quality. The TQM philosophy focuses on teamwork, increasing customer satisfaction and lowering costs. Organizations implement TQM by encouraging managers and employees to collaborate across functions and departments, as well as with customers and suppliers, to identify areas for improvement, no matter how small. Each quality improvement is a step toward perfection and meeting a goal of zero defects. The implementation of TQM involves the use of several techniques, like six sigma, benchmarking, reduced time cycle and continuous improvement. TQM strives for perfection, which is also the ultimate goal of lean service. It is remarkable that the theories of Juran and Deming, as well as the TQM approach have that many similarities with lean service (Daft, 2006).

In line with TQM Toyota developed the lean manufacturing philosophy, the direct forerunner of lean service. Today's organizations are trying to become more efficient, and implementing the lean philosophy is one popular approach to do so. Lean manufacturing uses highly trained employees at every stage of the production process who take a painstaking approach to details and problem solving to cut waste and improve quality and productivity. The heart of lean is not machines or technology, but employee involvement. Employees are trained to think lean and empowered to make changes to attack waste and strive for continuous improvement in all areas (Daft, 2006). In highlight 3 there is an example of a 'lean company'.

The best factory of the world

The plant manager, Mr. Fukuda, of the Matsushita (Panasonic) washing machine plant in Shizuoku welcomed me upon my arrival. My first impressions were of the cleanliness of the plant grounds, the fresh paint on the plant exterior, the outdoor athletic equipment, and the flowers and shrubs. As I entered the building every employee in the office bowed and greeted me.

In the factory, which was spotless, I could see quick die change techniques being used on the punch presses. I was shown many poka-yoke devices invented by the employees to prevent defects. Beside each poka-yoke was a card explaining its purpose and who had invented it. The assembly line produced mixed models, each different. In front of every employee was a video screen showing the operator specific instructions and quality standards for each washer. The video screens were also great for sharing news and solving problems together.

I noticed a multitude of certificates displayed on the walls and hallways. Obviously these recognized people who had taken advanced training courses. The plant was like an ongoing university, with everyone encouraged to get an advanced degree.

This super-efficient facility had one sole purpose; to serve their customers effectively. There was a drive to keep the washing machines competitively priced and offer the greatest lasting value. Continuous surveys were conducted to determine what the customer needed in an efficiently operating washing machine.

After the visit, I could understand better how it is possible to have a super-efficient manufacturing plant where people's needs for growth, respect and creativity are also met. When you focus on manufacturing excellence, on the needs of your customers, and on creating a facility that stimulates your employees, you can become what Mr. Fukuda called, "The best manufacturing plant in the world."

Highlight 3 (Bodek, 2004).

2.3 Lean service

The lean manufacturing methodology has a long history. Some main points out of this history I mentioned earlier in this paragraph. The method was originally initiated for the manufacturing production companies, which were in the majority in the 20th century. Today the service sector is the biggest sector in all the major economies of the world.

The table below shows that in the leading countries in the world the service sector is the biggest sector by far. Only China has a service sector of 42,6 percent in this scheme, but this country is developing the service sector a lot.

Country	Percentage of service sector in GDP (2009)
United States	76,9
China	42,6
United Kingdom	75,0
Japan	76,5
Germany	72,3
France	78,9
Netherlands	74,9

Table 1. The contribution of the service sector to the GDP in leading countries (Website CIA; the world fact book)

In the previous century lean thinking has influenced the manufacturing companies. In this century the service organizations like Nibag can also use lean thinking to rearrange their organization. As said in the introduction of this chapter this paragraph will describe the way to manage quality for a company like Nibag. The story will start with the philosophy of lean service. With the help of three authors I try to deliver a bright view about the thoughts behind lean service. After that I describe some comments on the lean service methodology. Then the story goes further with the wastes, which is the key element of lean service. When a company can remove this out of their organization, a company is lean. In the last sub paragraph I work out the tools of lean service and determine which tool fits the best to do the field research.

Lean service philosophy

Author Micheal L. George has written a book about lean thinking in service organizations. Lean service is linked to speed, efficiency, and elimination of waste. The goal of lean is to accelerate the velocity of any process by reducing waste in all its forms. The method fits with a service organization, because lean methods and tools apply to anyone who chases information in order to complete a task, jumps trough multiple decision loops, is constantly interrupted when trying to complete a task, or collects a batch of items requiring the same kind of work before beginning to work, according to George (George, 2003).

A second book was written by Debashis Sarkar. He says also that the implementation of lean is no longer confined to manufacturing organizations. Today lean is applied within service companies. What is required is a holistic approach, it has to become a way of doing things. Lean as an approach is relevant to all countries whose economies are dependent on services. Going forward, only the companies that provide cost advantage and work efficient will survive in the marketplace. Lean can improve organizational efficiency and business profitability. Next to this Sarkar described an important aspect of lean service; wastes. The next subparagraph will report about this aspect (Sarkar, 2008).

First we have to explain the philosophy behind lean service. Two of the most authoritative voices of lean service are Jones and Womack (2003). They have broken down the general lean procedures into five steps. With the help of their five steps they talk about the philosophy behind lean and lean service. The five steps are:

1. Value

Lean service starts with value. The customer and the producer have a different role in the determination of value. The producer creates value, because he develops the products (or services). But he doesn't define what the value of specific product is. The customer wants a specific product, which meets his needs, at a specific price and a specific time and this is the value of a product.

Pre-existing organizations and technologies, together with the outdating thinking about economies of scale are the reason that value is defined wrongly in some organizations. When a company decides to add value on a product, they change the price or put 'bells and whistles' on a product. It would be better that these companies rethink value from the perspective of the customer.
An example of the misunderstandings about the definition of value was expressed by Jones and Womack (2003) and is about the current-day airline industry. The airlines want to work as efficient as possible without thinking about the customer's needs. To compensate the waiting and other inconvenience, the airline lowers the price or adds 'bells ad whistles' to the product, for example the executive lounges in their hubs. In stead of this, the airlines should ask the customer what their definition of value is. The customer will say something like: *"I want as fast as possible from A to B, safely and for a reasonable price".* So the specification of value is the important first step of lean service. Because the company should create the products with the customer's definition of value as basic rule (Jones & Womack, 2003).

2. Value stream

The second step in lean thinking is the determination of all the specific actions required to bring a specific product or product family from start to finish. This is called the value stream. It forces companies to look beyond the firm, because sometimes there are activities executed outside the company, by third parties. It leads to more attention for the firm-to-firm relations. Besides this, organizations will call more attention to transparency, which helps the involved parties by verifying whether the other involved parties are acting in line with the agreed principles.
An example was described by Jones and Womack (2003) and illustrates the meaning of the determination of the value stream. The world largest manufacturer of aircraft yet engines, Pratt and Whitney, recently mapped the value streams of their products. The company developed three kinds of yet engines and after the exact determination of all the specific actions for every product the processes contained more wastes as expected. To make a yet engine, the product has to pass through four different firms; the melter, the forger, the machiner and the final assembler. The communication and knowledge about each other's activities was marginal, which resulted in time-consuming, expensive and needless activities. Because of the lack of transparency the isolated firms thought they worked efficient, but a view to the whole process taught them this wasn't the reality. Firms have to explain each other exactly what they do, that leads to more efficient processes and less waste (Jones & Womack, 2003).

3. Flow

After value and value stream, flow is the third principle of the lean service philosophy. The first two steps are determining the value of a product and make clear which steps are wasteful and can be removed by developing a product. The next step is to make the value-creating steps flow.
In 1913, Henry Ford was the first person who used the flow principle. He switched to continuous flow in final assembly, this leads to less wastes, and to a more efficient way of working. After world war II, some Japanese companies were introducing the continuous flow principle, and after that also some European and north-American companies were working according to the principle.
The meaning of continuous flow is about the general thought of managers that a classification of activities by type, leads to more efficiency and overview. The creation of such departments per activity is not optimal, because it is not in accordance with the 'standpoint' of the product. The product wants as fast as possible from start to finish and therefore it is better to group all the activities which are needed to create a product, in stead of grouping the activities which are of the same type. Firms have to focus on processes which create value in stead of departments which classify activities.
A simple example was brought forward by Jones and Womack (2003). They asked people for the best way to fold, address, seal, stamp and mail a newsletter. Their answer illustrates that we are living in a world of functions and departments, because according

to the people it was the best to fold all the newsletters first. After that the person should put on all the address labels, attach the seal at every newsletter, put on all the stamps and mail the newsletters. To create flow it is better to fold, seal, stamp and mail the newsletter one by one. It removes the waste of picking up and putting down every newsletter four times. So the essence of flow is to think from the products and make product teams, so that the product is created as efficient as possible (Jones & Womack, 2003).

4. Pull

The fourth step of the lean service philosophy is pull. The customer has to pull the product from the company, in stead of pushing products to the customer, often unwanted. When a company has created flow inside a process, the time which is necessary to make a product decreases. Because of this saving of time the company is more able to create products when the customers tell they need.
Jones and Womack (2003) report about an example which applies for any random book. The books which are in our bookcases are the lucky ones. These are sold and have an owner, while fifty percent of the books which are produced never reach a bookcase. This is because publishers and printing and distribution firms have not learned about flow, the customer cannot pull.
Books are a difficult product to sell. On the one hand it takes a long time to reorder books, but on the other hand the shelf life of a book is very short. Companies can sell a specific book only in a relative short time period, but it is hard for the publisher to estimate how many books the company can sell. It happens that a lot of books return to the publisher, which has to throw them away.
The solution of this problem will emerge when the technology enables the publishers to let the customer pull the books in stead of pushing them to the customer. New book-printing technologies, electronic copies and better printers will lead to possibilities for the switch from pushing books into the channel, to letting the customer pull the books out of the publisher.

5. Perfection

The last phase is perfection. I have worked out the four most important principles of lean service and now when a company has reached it until so far, it is the secret to keep the company working according to the lean philosophy. Because it is a never ending story. There are always more possibilities to reduce time, costs or wastes and the four initial principles interact with each other in a vicious circle. Because rethinking from the customer, more attention for the firm-to-firm relationship, transparency, product teams and new technologies leads to the discovery of better ways to work and become a lean company more and more. This is why perfection is the fifth element (Jones & Womack, 2003).

Criticism on lean

Claiming that the lean methodology is superior to previous forms of production systems in almost all respects in tantamount to asking for criticism. Although the greater part of the theory about lean is positive, there are some doubts about the success of the method.

The first remark on lean service comes from Haslam et al. (1992). They argue that lean is not as lean as has been claimed. Jones and Womack compared one of the best Japanese companies, Toyota, with one of the worst American companies to lay the foundations of their lean methodology. In Europe, but also in the USA, one can find plenty of companies which can match the Japanese in a number of respects; e.g. assembly times and quality.

Another point of criticism concerns how the workforce is deployed in the context of lean production. Some have claimed that lean production does not mean skills enhancement opportunities for workers on the factory floor or that if such opportunities exist, they are

modest. Berggren et al. (1991) took examples from Japanese transplants in the USA and Great Britain to demonstrate that job enrichment is merely a matter of having a system whereby people rotate between simple tasks, although admittedly within the framework of a team. They also give examples of what strong hold old Taylorist-style foremen have, along with examples of extreme short handedness in some American transplants. The authors believe that lean production should really be regarded as a new form of Taylorism, neo-Taylorism; no question of post-Taylorism as claimed by Jones and Womack.

The next points of criticism come from Nilsson (1994), who wrote a report about lean production and lean management. The first remark is about the level of demand which is used to decide the number employees needed. This is of great importance to the workforce, since the staffing level decides the number of hours worked by each employee. Company managements have a tendency to opt for a manning level which is slightly below the normal level of demand. This means a lot of overtime in boom periods. This can mean that the employees are constantly working very long hours, something that can undermine motivation and commitment. A second concern is about the outsourcing activities, which is associated with lean production. The aim of outsourcing is to lower wage costs and also to transfer production to the places where it will be most efficient and where the highest level of skills is to be found. Because this, the outsourcing activities lead to an increase of unemployment, at least in the short term. The last point of criticism is that the successes of the Japanese are due not so much to smart production, but primarily to the discipline and devotion shown by the employees. This, in fact, has led to the emergence of the 'karoshi' phenomenon, which means there are employees who literally work themselves to death.

Although we have also seen some criticism about lean, there are still many service companies that believe in lean thinking and apply the method in their organizations. Highlight 4 reports about Jefferson Pilot Financial (JPF), a full-service life insurance and annuities company, and their application of lean service. Cynthia K. Swank is vice president at JPF and tells about their manner to put lean service in practice.

"Lean is lean because it provides a way to do more with less"

JPF has successfully applied lean service in their company. Cynthia K. Swank is telling: "Service companies can see the potential benefits of a lean project after viewing its services like a product on an assembly line. They have to put their services like an automobile on the assembly line, it goes through a series of processes, from initial application to underwriting, or risk assessment, to policy issuance. With each step, value is added to the work in progress, just as a car gets doors or a coat of paint."

With the help of four phases JPF has implement lean service in their company. These phases were:

1. Building the model cell

The first step was to rollout the 'model cell', in which JPF set up, in one area of its business, a fully functioning microcosm of its entire process. This approach allowed managers to conduct experiments and smooth out the kinks while working toward optimal design.

2. Setting performance goals

To implement lean production, JPF had to measure costs, speed, and quality goals and linked these goals to the CEO's performance. This was the best way to align an organization's activities with its strategic objectives. Next to this it was significant for the company, whose production systems rely partly on third-party vendors, to look at their suppliers through a lean-service lens.

3. Rolling out the new system

Buoyed by it successes, the lean team proposed a six-month rollout of lean production to the rest of JPF. The organization undertook the essential work of documenting the procedures and standard operations that were by now in place at the model cell so that they could be transferred to the new work cells in the rest of the firm.

4. Convincing the sceptics

As the rollout progressed, the lean team worked with each business area to apply the principles of lean production. The team realized that to ensure effective knowledge transfer to operational management and frontline employees, it needed to communicate the 'why' of lean as well as the 'how'.

Highlight 4 (Swank, 2003).

Wastes

The goal of lean is to remove the wastes so it is possible to work better. Waste is a key element of the lean service methodology, but wastes are only symptoms of problems in a process. The belief that wastes are the problem is not true. We have to look for the causes of the wastes. A main thing that lean service is doing is to understand the causes of the wastes. Sarkar (2008) wrote in his book about these wastes. He was inspired by two of the most authoritative voices of lean thinking, Jones and Womack and he explained that in each process there are three types of activities (figure 4):

1. Value-added activities are those activities for which the customer wants to pay.
2. Business-value-added activities are those activities in a process for which the customer not wants to pay but that can not be avoided. They necessarily need to be present in the process and can not be eliminated from the process. These activities are typically done for regulators, organizational policy, and so on.
3. Non-value-added activities are those activities in a process for which the customers are not willing to pay and can be avoided. The focus should be to eliminate these activities.

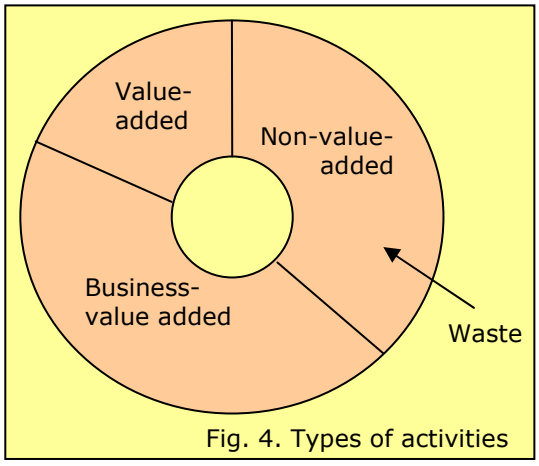

Fig. 4. Types of activities

The non-value-added activities or the wastes are divided in eight categories. A complete list with more examples of the wastes is available in appendix 6.

1. Waste of overproduction. This is processing more or sooner than required. For example: processing paperwork before the next person is ready for it.
2. Waste of motion. This is movement of individuals that is unnecessary for successfully completing a job in a process. For example: Multiple visits by salespeople to get the right information
3. Waste of inventory. This is when there are items or supplies in the process in excess or what is required for single-piece flow. For example: Filled in-boxes
4. Waste of transportation. This refers to movement of materials, which is more than just in time processing. Excessive e-mail attachments
5. Waste of waiting. This refers to individuals and items being idle between operations. For example: Files waiting for signature
6. Waste of underutilized people. This refers to the abilities of employees in a process not being utilized to the fullest. For example: Uneven work distribution
7. Waste of defects. This refers to waste that occurs due to errors and not getting an item or product right the first time out in a process. For example: Incorrect data entry.
8. Waste of over processing. This refers to efforts that add no value for the customer. For example: Multiple inspections in a process.

(Sarkar, 2008)

Lean service tools

The philosophy of lean service is described. But to apply lean service in an organization a tool is necessary. A tool helps an organization to put lean service into practice. In this

subparagraph I report about the tools which are available and about the tool which I will use in the next chapter. The lean method has bringing forth many tools and techniques. Tapping (2002) has written a book about all the tools and techniques. Out of these tools and techniques it is important to choose the right one.
Gershenson et al. (2003) wrote an article about a various tools and techniques. They investigated among others tools like six sigma, load levelling and value stream mapping. According to the researchers value stream mapping is a very good tool to find the wastes within the processes of an organization.
Tapping (2002) described value stream mapping in his book as a tool which:

- Creates a common vision for everyone connected to the targeted value stream, of both current and future state
- Provides the visual office roadmap for the researchers to allocate the appropriate resources to wastes that are identified
- Provides the foundation in which to build a lean service organization.

So I think value stream mapping is the suitable tool which will help me to find the wastes within the processes of Nibag

Value stream mapping
In the previous subparagraph we have seen that a value stream is the set of all the specific actions required to bring a specific service from start to finish. The value stream mapping tool looks at the production or service flow from start to finish. Taking a value stream perspective means working on the big picture, not just individual processes, and improving the whole, not just optimizing the parts. The purpose of value-stream mapping is to highlight wastes and eliminate, respectively manage them. (Rother and Snook, 2003).

Before the researcher start using the tool, there are two things he has to understand:

1. Material and information flow

Within the production or service flow, the movement of material through the factory is the flow that usually comes to mind. But there is another flow, of information, that tells each process what to make or do next. Material and information flow are two sides of the same coin. It is necessary to map both of them. Especially in service organizations, the information flow is the most important.

2. Selecting a product family

Another point to understand clearly is the need to focus on one product or service family. The customers care about their specific product, not all the products. Value-stream mapping means walking and drawing the processing steps (material and information) for one product or service family from door to door.

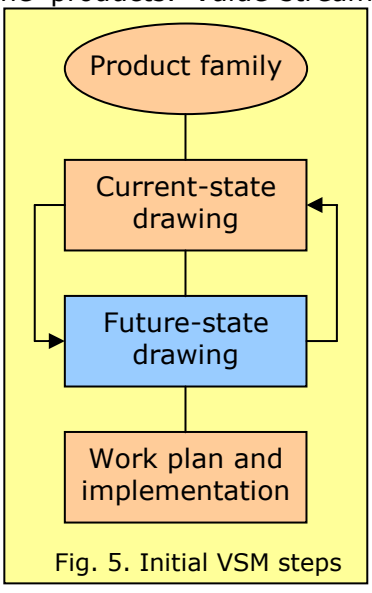

Fig. 5. Initial VSM steps

After the preparation and the product family choice it is time to use the value stream mapping tool. The tool follows the steps shown at right (figure 5). The first step is drawing the current state, which is done by gathering information from the floor. This provides the information to develop a future state. Notice that the arrows between current and future state are overlapping efforts. Future-state ideas will come up during the current state mapping. Likewise, drawing the future state will often point out important current-state information that is overlooked. Notice that 'future-state drawing' is highlighted, because the goal is to design and introduce a lean value stream. The final step is to prepare and begin actively using an implementation plan that describes the plan to achieve the future state (Rother and Snook, 2003).
Appendix 7 shows the action plan to do a value stream mapping project and to develop a future state drawing.

2.4 Summary

The second part of the study is the desk research. This chapter works on the first two sub questions about quality and two 'sub sub questions' with respect to Nibag. The first sub question; *what is quality?* has many answers, because the theory carries different definitions of the concept, but for Nibag the best definition is: 'Quality is the conformance to the requirements which the company itself has established for its products based directly on its customers' needs'. The second sub question; *How can a company manages quality?* hasn't one answer either. There are several methods to manage quality, but with respect to Nibag lean service turns out to be the most suitable method. This method has various tools which are available for investigators to do research with, and on the basis of theoretical research it seems that 'value stream mapping' fits the best with the research situation.

CHAPTER 3. Research design

This chapter describes the research design. The first paragraph will answer the third partial question of Minto's pyramid; *Which research method I will use?* After that I will make a selection of the case studies in paragraph 3.2, which thereby answers the 'sub sub question'; *Which cases I select to do research on?* To end this chapter I will point my attention to the case study protocol and work out the fourth sub question; *How can I do a proper research?*

3.1 Research method

To determine what kind of research I have to do I looked at the methodology of Yin (2009). He has made a model to define which type of research fits within the situation (appendix 8). The five possible research methods are:

1. Experiment
2. Survey
3. Archival analysis
4. History
5. Case study

The model contains of three questions and corresponding answers. It depends on the answers the researcher gives which of the five possible research methods he should execute. The questions are:

1. What is the form of the research question?
2. Requires the research control of behavioural events?
3. Focuses the research on contemporary events?

The first question is about what kind of research question the researcher has formulated. I formulated a 'how-question' and that is the answer on the first question. The second question concerns the extent of control with respect to the behavioural events. For my research I need no control, because I want to know how the people work in everyday situations with the everyday influences. The third and last question is related to the time period in which the investigated events are taking place. The events I will study are about the modern way of working of Nibag, so the last answer is yes.
The combination of answers (how-no-yes) leads me to the most suitable research method and it turns out to be a case study research. A case study is the analysis of a specific case and involves extensive research. Next to the case study the model shows that the archival analysis and the survey are also possible in my situation. These methods do not fit as well as the case study with respect to my research situation, but I have the intention to use these methods during my case study.

3.2 Case study selection

We have just seen that a case study is the research method which fits the best with the situation at Nibag. This case study can be a project which is executed by Nibag. To select a proper project I want to determine which projects are the most important for the organization and thus the most interesting to investigate.

To find the most suitable research projects I first have to select the product-market combinations which are the most important for Nibag. I will do this on the basis of a report about the projects from the first quarter of 2010 and a complementary conversation with the financial manager. The product-market combinations which are significant for Nibag are the combinations which bring the greater amounts of money.

Out of the product-market combinations I will select two cases which I will investigate. These projects will give me rich insights into the way Nibag managed these cases, but also into the way Nibag is working in general. The research of two projects fits well in the time schedule of this thesis. Next to that the projects I have chosen are *MJOP*'s, since the

value stream mapping tool requires the focus on one single product family. Besides that one of my selected projects is successful and the other is flopped, because it shows me the differences and gives me the possibility to compare. At last both projects are finished, since then I can investigate all the processes within a project. The projects I have picked out are *MJOP* BZVG and *MJOP* Aanmeer.

More than 48 million euro for renovation of schools

The outgoing State Secretary Marja van Bijsterveldt (Education) spends more than 48 million euro for the improvement of school buildings. The money is mending to do something about the indoor environment of schools, according to the representative of the department. It is about buildings of the secondary education.

Out of the research came true that the performance of children and teachers in proper ventilated classrooms is better than the achievement of children and teachers in worse ventilated classrooms. The delivering of the money does not ment that schools are getting the whole amount of money for the rebuilding. The budget for the improvement of the ventilation, the warming and the insulation is secured for 60 per cent. The remaining 40 per cent comes from the schools.

"This investment has a double effect", says Mrs. Van Bijsterveldt. "It means an impulse for the local economy of 85 million euro in 2010 and next to this it leads to sustainable school buildings"

It was possible for the school to present a petition for a rebuilding before 31 January. In the mean time the money is allocated to the various schools. With the help of these inputs 250 schools and 375 school buildings are taking advantage of the measurement.

Highlight 5 (De Pers: 02-03-2010).

3.3 Case study protocol

The case study protocol is an instrument with the procedures and general rules of the study. The protocol is a major way of increasing the reliability of case study research and is intended to guide the investigator in carrying out the data collection from a single case. The development of a correct protocol is important; because it keeps the researcher targeted on the topic of the case study and forces him to anticipate several problems. As a general matter, a case study protocol should have the following sections (Yin, 2009):

- an overview of the case study project (project objectives, case study issues)
- field procedures (access to the case study 'sites', sources of data, and procedural reminders)
- case study questions (the specific questions that the case study investigator must keep in mind in collecting data)
- a guide for the case study report (outline, use and presentation of the documentation)

Overview of the case study projects

The overview contains the background information of the projects. This background information tells the reader among others which people of Nibag were involved, when the project started and ended and what the budget was. Next to this there is some information about the activities which were executed by Nibag. This background information results in a statement which can be presented to anyone who wants to know about the project (Yin, 2009).

MJOP Aanmeer
People of Nibag who are involved: project worker A and project leader X
Starts on: March 2009
Ends on: December 2009

MJOP Aanmeer was a project for the formulation of an *MJOP* for ten primary schools. Aanmeer is a local authority, which is partly responsible for the maintenance of these schools. The other responsible party is the primary schools themselves. Nibag wants to create a clear separation for the maintenance activities which are for account of respectively the local authority and the schools. Nibag have to do the following activities (Documentation project *MJOP* Aanmeer):

- the intake conversation with responsible party
- the preparation for the inspection
- the inspection
- the elaboration of the inspection
- the delivering of the *MJOP* report

MJOP BZVG
People of Nibag who are involved: project worker B and project leader Y
Starts on: November 2009
Ends on: February 2010

MJOP BZVG was a project for the prereservation of BZVG buildings through systematic maintenance. The *Behulpzaam Zijn Voor Gehandicapten* (BZVG) foundation is a foundation which provides services for handicapped people. The agreement between Nibag and BZVG included the whole cycle of the annual report 2009 for the ten buildings of BZVG. This cycle contained of:

- the generation of an annual report out of the *MJOP*;
- the adjustment of the concept annual report with directors and managers;
- the determination of the annual report for 2009
- the accompaniment of the execution of the annual report

The last inspections before 2009 were executed in 2007 and therefore the annual report was based on the inspections of 2007 and the activities during 2008. These activities are different every year. It depends on the amount and type of work whether there is a new proposal every year (Documentation project *MJOP* BZVG).

Although both projects up here are *MJOP*'s it is obvious that they are not the same. Project Aanmeer is a unique project, which will not continue in the future. It is a project which consists of intake, inspection, elaboration and delivering of the report. On the other hand there is project BZVG, which resumes every year. In this project the project workers generate a report on the basis of the inspections of 2007. After that they make appointments with BZVG about the execution of the annual report.
So both projects are *MJOP*'s, but the projects are not the same at all. This emphasizes that the products which are delivered by Nibag are goods made to measure. Nevertheless, I will compare these projects with each other and determine why project Aanmeer was profitable and project BZVG was not. Although these projects are different, they both have to go through similar processes. The employees at both projects must collect data, elaborate this data, must communicate with each other and the client, and above all they must deliver an annual *MJOP* report which is accurate and qualitative.

Field procedures
To do a research a researcher has to collect data. This aspect of case studies needs properly designed field procedures. I will collect data from people in their everyday situations, without the control of a laboratory. In a case study the researcher has to integrate real-world events with the needs of the data collection environment.
A part of my case study will be the interviews. I have to ask key persons of the two projects I selected and hope they are available. The interviews will be open-ended and it is important to let the interviewee speak free about the project. These conversations are an important source of information, as well as the observations of the real-life activities. During these observations I am studying the subjects and I am intruding into their way of working. Therefore I have to act as an observer and shall not influence their work. As

a result, my behaviour, and not that of the subject or respondent, is the one likely to be constrained.
With the preceding orientation in mind, the field procedures need to emphasize the three major tasks in collecting data (Yin, 2009):

- gaining access to key organizations or interviewees
- having sufficient resources while in the field, such as a pc and writing instruments
- making a clear schedule of the data collection activities

During my research I have access to the organization, but I have to interview some key interviewees. These are:

- Project worker A (*MJOP* Aanmeer)
- Project worker B (*MJOP* BZVG)

Next to this I look after sufficient resources while in the field and I have to make a clear schedule of the data collection activities. For every project I must collect the same information. On the basis of the desk research (chapter 2) I know I have to:

- Identify the product requirements
- Identify the planning of the project
- Identify the basic production processes
- Collect information about every single process, such as:
    - number of people required
    - lead time[1]
    - processing time[2]
- Identify the various information flows
- Check however much the planning can be realized
- Identify the wastes or non-value-added activities of the processes
- Determine the types of wastes

Case study questions

The most important part of the protocol are a set of questions which has to be answered and reminds the researcher to the information which has to be collected. There are different types of questions and according to Yin (2009) there are five sorts of questions:

1. questions asked of specific interviewees
2. questions asked of the individual case
3. questions asked of the pattern of findings across multiple cases
4. questions asked of entire study
5. normative questions about policy recommendations and conclusions

The first category contains of some preceding questions about the role of the specific interviewee. After that, the researcher starts with the second level of questions which is the most significant for the research. When the researcher is asking these questions, there can be an undesired confusion between unit of data collection and unit of analysis. This is because the questions are asked to an individual (data collection source), while the unit of analysis is a collective, namely Nibag. The reverse problem can also be true, when the case study is about an individual and the information source includes information from the collective. The questions of level 3, 4 and 5 leads to an analysis and conclusions about the cases and the way of working inside Nibag (Yin, 2009).

For the cases I will investigate I have to develop case study questions. The questions are the reminders regarding the information I need. Next to this I will make a distinction between the different levels of questions. The questionnaire I have made is presented in appendix 9.

Guide for the case study report

According to Feagin et al. (1991), this fourth element is generally missing in most case study plans. Investigators neglect to think about the outline, format, or audience for the

[1] Lead time is the period of time between the initiation of any process of production and the initiation of the next process of production.
[2] Processing time is the period of value-adding time within any process of production

case study report until after the data have been collected. Case study reports do not have a uniformly acceptable outline.
For this reason, every researcher has to think about the design of the final case study report. Before and during the investigation the researcher should know his basic outline, therefore it is part of this protocol. It will facilitate the collection of relevant data and will reduce the possibility that a return visit to the case study is necessary. A case study plan can always change as a result of unforeseen situations. Therefore the researcher has to be flexible with relation to his case study report (Yin, 2009).

This case study will bring me the answer of the research question I have developed in the first chapter; *how can Nibag improve its service quality to get a profitable company?* With the help of value stream mapping I will find the wastes within the projects. On the basis of the collected information I can find the causes of the wastes. After that I can make an analysis about how they work and I can make conclusions and recommendations about how they should work.

3.4 Validity and reliability

The term validity refers to the approximate truth of an inference. When we say something is valid, we make a judgement about the extent to which relevant evidence supports that inference as being true or correct. Usually, that evidence comes from both empirical findings and the consistency of these findings with other sources of knowledge, including past findings and theories (Campbell et al., 2002). Next to the validity there is reliability, which is related to validity, but not the same. Reliability can be defined as consistency.

In the theory I find three important variants of validity. On the first place Campbell and Stanley (1963) defined internal validity about whether 'the experimental treatments make a difference in this specific instance?'. External validity is defined by Campbell and Stanley (1963) as the question 'to what populations, settings, treatment variables and measurement variables can this effect be generalized?'. On the third place Cook and Campbell (1979) defined construct validity as the validity of inferences about the higher order constructs that represent sampling particulars.

To secure the validity and reliability of the case study I have to do several things:

1. Gather as much data as possible. This will help to insure the accuracy of the findings. The researcher has more concrete information upon which he can formulate interpretations (Website Colorado State University); case study research) In my research about the *MJOP* projects BZVG and Aanmeer I will collect all the information which is available in the company.
2. Use a variety of data sources. This stimulates the triangulation of data to reach valid outcomes and will help the researcher to create a bright view on what happened in reality, and prevents the researcher from getting a limited picture (Website Colorado State University; case study research). During my study I will do interviews, make questionnaires, collect information from files, from the hard disc and I will get the email communication reports.
3. Talk to the subjects. It is important that the collected data is confirmed by the people who are involved in the project (Website Colorado State University; case study research). In my research I will first collect much data, after that I will do the interviews with the people who were involved and then I will constantly ask the people questions whether certain information is right or not.
4. Collect referential materials. The researcher has to complement the research with some theoretical material which explains and clarifies the research he is doing (Website Colorado State University; case study research). During my study I have made a theoretical framework (chapter 2). This desk research will support and illustrate the study I will do in the following chapters.
5. Engage in peer consultation. Prior to composing the final draft of the report, researchers should consult with colleagues in order to establish validity trough

pooled judgement (Website Colorado State University; case study research). Before I will finish this report I will show the results to the respondents to make sure that the correct inferences are being drawn from.

3.5 Summary

This chapter about the research design gives an answer on the third and fourth sub question. The third question is; *which research method I will use?* With the help of the method of Yin (2009) it comes true that this research situation demands a case study. In the next chapters two *MJOP* projects will be analyzed; *MJOP* Aanmeer and BZVG. To guarantee the quality of the investigation the answer on fifth question is important. This question sounds; *How can I do a proper research?* The case study protocol will help to secure the quality and guide the researcher through the research. The protocol is the foundation of the investigation. Next to this it is very important to think about the validity and reliability with respect to the analysis.

CHAPTER 4. Field research

This chapter tells about the field research I did at Nibag. In the first paragraph I describe the processes which go on inside Nibag. After that I will do an in depth research of two projects which are done by Nibag. With the help of this general and in depth research I will answer the fifth sub question of the pyramid of Minto; *What are the processes inside Nibag?*

4.1 Process description

With the help of the interview sessions (appendix 1 and 2) I will describe the various processes inside Nibag. First I will give a description of the sales process and after that the planning process. At the end I make an overview of the total process inside Nibag.

Sales process

The sales process is the first process at Nibag. The acquisition takes place on the basis of the situation at a segment. Every salesman is responsible for a segment and thus for his projects. When there is less work, it is important to recruit and if necessary to do a project 'for less'. When there is a lot of work it is important that a salesman will not accept everything. A salesman must always review the market and his projects.
When a salesman tries to bring in a project, he can contact existing contacts and new contacts:

- Existing contacts: Existing clients are contacted frequently, via the telephone or via the mail to investigate whether there are possible interesting projects for Nibag.
- New contacts: This is 'cold acquisition'. Nibag is looking on websites whether potential clients (e.g. local authorities) have interesting projects on the program. After that there is a first telephone call to verify if there is a possibility for a first meeting.

Except of the direct approach from Nibag to potential clients, these clients can take the initiative themselves. There are several ways for Nibag to create brand awareness and to stimulate potential clients to contact Nibag:

- visit fairs
- send mailings
- mouth to mouth advertisement
- write editorial letters
- via 'LinkedIn'

After the first client contact Nibag tries to arrange a first meeting. The salesman represents Nibag at this first meeting. With the help of that conversation the salesman maps the project and makes a proposal. To create such a proposal, there is a standard format available, but because the great variety between projects, this standard format does not work as it was mend. Together with the proposal a PIC-form (*Project Interne Calculatie)* is filled in by the salesman. A PIC-form has the purpose to explain the amounts of the proposal. When the offer and PIC-form are formulated, the contract is made by the sales man. This contract carries all the appointments and activities of the project. Every contract is checked by the financial manager, to verify if Nibag can fulfil the expectations of the customer.

On the basis of the available competences is determined who is fulfilling the project. The competences of the employees are estimated by salesmen, not on the basis of a planning- or HRM-system, but on the basis of his experience. If possible, a salesman creates some space in the project recruitment to determine the planning by him selves. When this is impossible and there is a big time pressure on a project, flexibility and overtime work is necessary to finish the project.

Except from the formal information an offer carries a method of working. This offer can be accepted or rejected by the client. When the client accept the offer the project will be accomplished, when the client reject the project there are two possibilities:

- When it is a tender, a rejection is almost always permanent. The price is, combined with the quality, the decisive factor on which a tender is accepted or rejected. Next to that the references are important. When a tender is rejected, it usually means that the client has found another company that wants to do the job for a better price. Accurate fulfilment of the offer has a great importance when we talk about a tender.
- When it is a one-for-one relationship it does not mean that a rejection is permanent. The offer can be adjusted in the third conversation, by which the sales man represents Nibag again. During this conversation the client can pass his judgement on the renewed offer. Because it is a one-for-one relationship there is not a competitive party that also has presented an offer.

Appendix 10 shows an outlined scheme of the sales process.

(Appendix 1. Interview session 'sales')

Planning process

After the sales process there is the planning process. When the contract is accepted in the sales process the planning process has already started. Before the final acceptation of a contract the salesman finds a project leader who will manage the project. On the basis of experience and the segment the salesman chooses his project leader. The project leader composes, if it is necessary, a project group.

Then the project leader goes with his order and corresponding offer to the planner. The offer carries all the appointments with the client and is the basis of the planning. In the offer it is possible to see for example how many hours the project workers of Nibag can spend to finish the project. Before the planner realises the planning there is an internal kick-off meeting. This kick-off is a consultation between the project leader, project workers and the planner, in which the whole project is discussed and explained.

When the planner is visited by the project leader, has received the offer and the kick-off meeting has made the project clear for everybody, he can start with the realisation of the planning. To do this he works with a standard document. This standard document is an Excel sheet in which he can make the planning. Hereby a planner takes into account the following:

- period of time
- appointments about the hours
- external parties
- subsequent calculation
- way of pass on (fixed pricing, subsequent calculation)
- mutual meetings

The realisation of a planning is never a routine job. Every project is different and so is every planning. A planner cannot use a previous planning to compare. Next to this, a planning is too important to consider it as a routine job. It is the 'hallstand' of every project and the project leader uses the planning to explain the project to his project workers, the client and the eventual third parties. Besides that the planning controls the project. Several activities within a project have to be finished before an estimated date. When this goes wrong, the project leader goes to the responsible party and calls him to account. The planning points out how the project will be accomplished and leads the way.

It is a regular situation that the project workers are not able to do all the activities within a project by them selves. Then the project leader connects an external party that can do a part of the activities, for example a painter who paints a building. These external parties are selected by the project leader on the basis of experience, references and price. Especially the project leader's experience about an external party is important.

However the third party does a certain activity, the client speaks to the project leader of Nibag when things are not going well. The quality of the third parties is therefore very important.

After the realisation of the planning, the planner monitors his planning every week. He looks what has happened that week and checks if it is according to the appointments. Every two weeks he has a meeting with the project workers about the several running projects. In these meeting the points of interest and possible bottlenecks are discussed. With the help of these meetings the progress of the projects is monitored by the planner. To inform the client about the progression of the project there are client reports. These reports are formulated by the project workers and controlled by the project leader. After that the report is sent to the client.

Most of the planning schedules are obtained, but it happens also that a planning is not obtained by Nibag. The planner makes a sharp planning and when there are some disappointments it occurs that a project overrun time. Then the planner anticipates through putting more capacity on that specific project. Problems arise often when there are wrong estimations and appear too late because of limited and time-consuming reports.

The final step is the delivery. Before the delivery takes place the project worker makes a concept version which will be discussed with the client and possible changes are carried through. In this last stage of the service delivering there are two aspects that are planned in (only at large projects):

- Subsequent calculation. With the help of a calculation is estimated whether and how much profit there is made. This calculation is made by a project leader.
- Evaluation. About six weeks after the delivery there is an evaluation meeting between the project leader and the client to evaluate the whole project.

A summary of the planning process is given in appendix 11.

(Appendix 2. Interview session 'planning')

Total process

In the first two subparagraphs we have described detailed the processes of sales and planning. Below there is a simplified overall scheme of the whole process. It is the general process of the organization. An exact overview of the total process of Nibag as a service provider is shown in appendix 12.

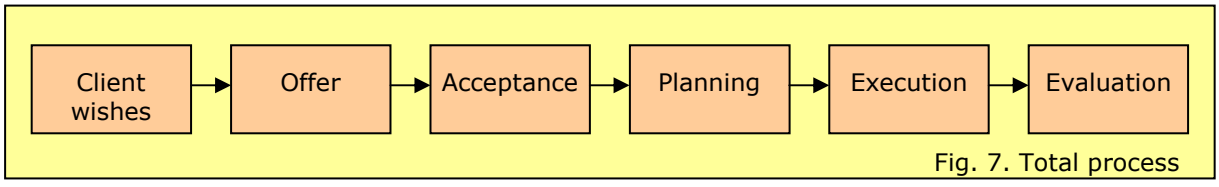

Fig. 7. Total process

4.2 In depth research

In the first paragraph I described the processes of Nibag on a relative common and general way. Now it is time to investigate the processes more detailed and thorough. With the help of two projects I will search for wastes.

To investigate these projects I use the lean service tool 'value stream mapping'. I described this tool in the second chapter. It looks at the production or service flow from start to finish. Before I start using the tool, there are two things I have to understand:

1. Material and information flow

There are two sorts of flow, namely material and information flow. In service organizations like Nibag, the information flow is more important. I think there are a lot of

information flows within the projects. Next to this I think there will not be many material flows, because the product *MJOP* is especially information in stead of materials.

2. Selecting a product family

The product family I have chosen is the *MJOP's*. According to the core businesses of Nibag the *MJOP* is the most important product, because it is very active in four segments (figure 6).

MJOP Aanmeer

Developing a future state begins with a description of the current state. This sub paragraph describes the current process in the *MJOP* project for local authority Aanmeer. I create this current state on the basis of the interview with project worker A (appendix 13) and the formulary that the people who did this project have filled in (appendix 14) on the one hand and the documentation of the project on the other hand.

Aanmeer has got ten primary schools and the maintenance of these buildings became a problem more and more. The local authorities decided in 2008 that there had to change something, because they were not satisfied with the company that was responsible for the maintenance at that time. So the local authorities decided to contact Nibag. They sent in a request to make a proposal for the maintenance of the ten primary schools.
Project leader X was the person who formulated an offer and sent it back to Aanmeer. This is different from the standard way, by which the proposal is made by the sales man. But the sales man had no time to make the offer and asked the project leader to make it. Project leader X had experience with the formulation of a proposal and therefore it was not a problem. After a couple of weeks Aanmeer decided that the proposal of Nibag was suitable and at that moment the cooperation started. With the help of project leader X and project workers, including project worker A, Nibag developed an *MJOP*-report for every single school. The way this happened is described in the following analysis.

Product requirements

The first mapping is the product requirements. For this project Nibag has to deliver eleven *MJOP's*.

Production processes

The next step is to draw the basic production processes for the *MJOP*. The different phases within this *MJOP* are:

1. **Intake** with the responsible person from Aanmeer
2. **Data collection** for every singe school:
    - *NAW*-data
    - contact man
    - architectural drawings
3. **Inspection** of every single building
4. **Elaboration** for every single school:
    - written report
    - maintenance budget
    - drawing
5. **Delivering** for every single school:
    - concept report
    - definitive report

For every phase I have to determine the following data:

- Number of people required
- Lead time
- Processing time

In the subjoined table I have collected this data for every process phase.

Process step	# of people required	Lead time	Processing time
1. Intake	1	2,5 months	4 hours
2. Data collection	1	2 months	6 hours

Process step	# of people required	Lead time	Processing time
3. Inspection	1	0,5 month	7 days
4. Elaboration	5	3 months	25 days
5. Delivering	1	1 month	12 days

Table 2. Collected data of project Aanmeer

Planning
An important part of the current state research is the planning. On the basis of the planning I can check whether the project passed the clearly defined route. But at this project, it seemed there was not a planning at all. Because of the time pressure the project leader did not make a planning, but he wanted his project workers to work as fast as possible.

Information flows
The third mapping is the information flows. The flows in the process are:

1. Between the planning/project leader and Aanmeer/primary schools. The project leader of this project was project leader X and the spokesman of Aanmeer/primary schools was spokesman M. This electronic information flow was about the progression of the project. This information flow happened frequently, sometimes more than one time a week and went over email.
2. Between the planning/project leader and the project workers. There was continual communication about the progression of the various process steps. This communication happened over email, however the project workers and project leader were in the same building.
3. Between the planning/project leader and the project workers. Although the greater part of this communication was by email, there was some face-to-face communication too.
4. Between project leader X and Aanmeer/primary schools. Project leader X visited the intake on behalf of Nibag. Aanmeer/primary schools were represented by spokesman M. This dialogue was face-to-face. The intake was a once only event.
5. Between the project workers and Aanmeer/primary schools. The project workers emailed and called a few times to the several primary schools to ask for information about the school buildings. It took some time before all the data was sent to Nibag.
6. Between the project workers, project leader X and Aanmeer/primary schools. When the concept reports were finished they were delivered at the client by project leader X. After a couple of weeks the reports returned to the project workers, because several mistakes were found. After that the project workers improved the reports and sent them to Aanmeer/primary schools again. The definitive reports were accepted.

Time line
The last step of the current state description is the time line. On the one hand there is the lead time, which is expressed in months. This is the period of time between the initiation of any process of production and start of the next process. On the other hand there is the processing time, which is expressed in hours. This is the period of value-adding time within any process of production. The gap between the two time periods has to be as small as possible, because then it means the time is used efficiently. Actually, the gap is not as small as desirable:

Lead time: 9 months
Processing time: 362 hours

(Documentation project *MJOP* Aanmeer, interview and formulary (appendix 13 and 14))

MJOP BZVG

The next project I will describe is the *MJOP* BZVG. The first one was a profitable project, in contrast with the project I will describe now. I create this current state on the basis of the formulary that the people who did this project have filled in (appendix 15) and the interview I had with project worker B (appendix 16) on the one hand and the documentation of the project on the other hand.

BZVG has several buildings and at ten of them the maintenance is for the account of Nibag. It is a recurring project, because every year Nibag makes a new annual report for the organization. Except of the formulation of the reports, Nibag helps BZVG with the selection of e.g. the painter for the painting activities and the repairman to fix the elevator. The cooperation started in 2007, when Nibag successfully sent in an offer for the maintenance of ten establishments. In the same year Nibag executed inspections in every building and on the basis of these inspections they made the annual reports for 2007, 2008 and 2009. Project leader of this project was project leader Y and slow but sure he is transferring the project to project worker B, who is developing from project worker to junior project leader at the moment. But in 2009, project leader Y, was the project leader. With the help of project workers, including project worker B, he developed an *MJOP*-report for every single building of BZVG. The way this happened is described in the following analysis.

Product requirements

Nibag has to deliver the whole cycle of the annual report of the *MJOP* for ten BZVG buildings.

Production processes

The basic production processes of this project are:

1. Generation of a **concept annual report**
2. **Review** of the concept annual report with directors and managers
3. Generation of the **definitive annual report**
4. **Execution** of annual plan of action
5. **Evaluation** of the annual plan of action

For every process phase I have to figure out again the number of people required, the lead time and the processing time. In this table I have determined these data:

Process step	# of people required	Lead time	Processing time
1. Concept annual report	1	2 months	10 days
2. Review	1	1 month	4 hours
3. Definitive annual report	1	0,5 month	2 days
4. Execution	6	12 months	56 days and 2 hours
5. Evaluation	2	0,5 month	4 hours

Table 3. Collected data of project BZVG

Planning

We have said that the planning of this project is an important aspect of the current state. For this project, project leader Y has made a general planning. Below this planning is shown, as well as the deadlines, which were reached or not:

Process step	Planning	On time?
1. Concept annual report	November 2008	Yes
2. Review	December 2008 / January 2009	Yes
3. Definitive annual report	January 2009	Yes
4. Execution	January t/m September 2009	No
5. Evaluation	October 2009	No

Table 4. Planning project BZVG

Information flows
The information flows of this project were:

1. Between the planning/project leader and third parties. During the project, the project leader Y had often contact with the several third parties about the progression of the activities. This communication happened by email.
2. Between the planning/project leader and BZVG. During the project, project leader Y had very often contact with the spokes woman of BZVG, spokes woman N. These conversations by e-mail are about the progression, the selected third parties and the project in general.
3. Between the project leader and BZVG. Project leader Y made a concept report in November 2008 and mailed it to the client, BZVG.
4. Between the project leader and BZVG. BZVG received the concept report and evaluated it internally. After that their spokes woman N arranged a conversation with project leader Y to talk about the shortcomings. This conversation was face-to-face.
5. Between the project leader and BZVG. After the conversation about the shortcomings of the concept report, project leader Y developed the definitive annual report and mailed it to BZVG.
6. Between planning/project leader and the project workers. There was continual communication about the execution of the annual report. This communication happened partly by email.
7. Between planning/project leader and the project workers. This flow was the same as the previous, but the communication was face-to-face.
8. Between the project workers and BZVG. To execute the annual plans, project workers need to communicate with their client to make appointments, ask for information, discuss the progression or talk about the third parties. This communication happened very often during the project and was by email.
9. Between the project workers, the project leader and third parties. To execute the project, project workers had to select third parties, which could do activities like painting and carpeting. The project workers, in consultation with the project leader, decided which third parties had to be selected and after that the project workers spoke to the third parties several times to evaluate their activities. These communication happened by email.
10. Between the project leader, a project worker and BZVG. After finishing the project in January 2010, the evaluation took place in February 2010. Project leader Y and project worker B went to NWAC and discussed the whole project face-to-face with spokes woman N of BZVG.

Time line
With the help of the lead time and the processing time I can determine in which extent Nibag uses their time efficient. As well as we have seen at project Aanmeer, this project has a big gap either. The difference between the lead time and processing time is even bigger this time:

Lead time: 16 months
Processing time: 484 hours

(Documentation project *MJOP* BZVG, interview and formulary (appendix 15 and 16))

4.3 Summary

The field research is an important part of this study and consists of two parts. Together these parts give an answer on the fifth sub question; *What are the processes inside Nibag?* First there is the description of the general processes inside Nibag; the sales and planning process. These processes carry all the general activities within Nibag. It all starts with 'client wishes', then follows the 'offer', the 'acceptance', the 'planning', the 'execution' and at last the 'evaluation'.

After that the analysis of two of the most important processes of the organization starts; the *MJOP's*. These projects consist of the general activities, but next to that the projects have their own specific activities like the inspection, the elaboration of the data and the development of the reports. The first project description is about project Aanmeer, which was a profitable project and the second is about project BZVG, which was unprofitable.

CHAPTER 5. Analysis

This chapter analyses the previous field research. The field research contained of two parts; the process description and the in depth research, so this chapter will also consist of two sections; the general processes and the specific processes. With the help of the analyses I want to answer the fifth and most important question of Minto's pyramid; *What are the wastes and their causes within the Nibag processes?*

According to Sarkar (2008) I had to look for non-value-added activities. These are the activities or wastes for which the customers do not want to pay. These wastes are divided into the eight lean service wastes. In this chapter I clarify the wastes with the help of this method.

5.1 General processes

On the basis of a lot of documentation about Nibag and interview sessions with some sales men and planners at Nibag I mapped the sales process and the planning process (appendix 10 and 11). While I was mapping these current general processes I analysed these processes and I discovered several wastes or non-value-added activities. These wastes I will explain here.

Waste of overproduction
The overproduction waste is described as processing more or sooner than required (Jones and Womack, 2003). Within the processes of Nibag I have found one type of waste of overproduction. It happens that one phase of a project is finished and moved up to the person who has to do the next phase, although this person is not ready for it yet: "*Another employee can not see where and when I am exactly busy with. It happens sometimes that a project lies on my desk a few days before I can start with it*". This type of waste is caused by a lack of insight and overview in the planning and progression schedules, which is a cause that will return several times within the other categories of wastes. The current planning system is not able to provide a bright overview to everybody who is involved.

Waste of motion
Earlier in this thesis we defined this waste as the movement of individuals that is unnecessary for completing a job in a process (Jones and Womack, 2003). When I take a look at the processes within Nibag I see different types of this category of waste. People visit each other very often to speak about the projects they are busy with. They need information and knowledge about a specific aspect or want to talk about the progression within a project. "*It costs less time to walk to one of my colleagues and ask him, then that I have to search in our hard disk or archive to find specific information about a client or a project*", so said one of the employees. "*Thereby there is a chance that the information is not on the hard disk, because not all the knowledge inside Nibag is secured*". At this moment the movements are useful and necessary for the employees, because the project information is not secured on a manageable and structured way. It should be better whether those movements were not required, so I have to consider this as a waste. This type of waste exists because Nibag has not got a proper internal information system. At this moment the company has an old-fashioned hard disc, on which information can not be secured on a clarifying way and therefore the information is hardly untraceable or not secured at all.
Next to these mutual visits between project workers and project leader, the employees have to visit the planner or the planner has to visit them to inform each other about the planning schedules of the coming weeks. Once in two weeks the planner organizes a meeting with the project workers to evaluate the planning of the previous weeks and to talk about the planning of the coming weeks. According to the planner, "*these meetings are necessary right now, otherwise I have not got any overview of the state of affairs.*

But when there is another way to get more insight in the planning schedules and progression of the project workers, the meeting can take place once in three weeks or even once in a month". As well as the type of waste in the overproduction category, described above, this type of waste arises from a lack of insight and overview in the planning and progression schedules, which is caused by the inadequate planning system Nibag is using at the moment.
At last there are the movements to the printer, the copier or the repro to make prints and the visits to the archive to search for information. These movements are necessary because a lot of information is not digitized. This is because the employees do not see the advantage of digitizing, because there is no proper internal information system on which the digitized data can be secured on a manageable and structured way: *"Why should I digitize my documents? Then I have to secure them somewhere on the hard disc, which is an accumulation of information, without overview"*.

Waste of inventory
In chapter 2 I explained the waste of inventory. This is when there are items or supplies in the process in excess or what is required for single-piece flow (Jones and Womack, 2003). A study to the processes within Nibag teaches me that there are some types of waste in this category. When I walked through the buildings and looked to the workplaces it strikes me that all the desks are filled with documents, files, post-its and more. In all the months I was at Nibag the desks were seldom clean and clarifying. This is because the people at Nibag are not aware of the stimulus for the work climate that is caused by a clean and orderly office. This stimulus is studied by Hirano (1996), who argues: *"The 5s approach is simple and universal. It works in companies all over the world and provides essential support for other important improvements in the company".*
Another point of attention is all the paper work inside the company. Inside each office there are filing cabinets and in the archive there are many too. It is very difficult to find what is needed. An employee confirmed this: "*To do my job, I have to search files for information. More than once I'm not sure which file carries the information I need, so my desk is regularly filled with paperwork to get what I need*". All the paper work is on the one hand caused by a lack of digitizing, but on the other hand by a lack of discipline. I just explained why the employees of Nibag do not see the advantage of digitizing. The lack of discipline is about the disorderly documentation of files onto the hard disc or in this case into files. They just put their paper work inside a random file, in stead of securing this information on a clarifying way. This is because there is not enough awareness of the advantages of securing the information on a manageable and structured way.
The third and last type of waste with respect to the inventory reflects on the empty workplaces. There is far more IT equipment than required and therefore all the capacity is not filled up. This is especially because the company went from more than hundred employees to thirty in 2009, and the majority of the equipment is still inside the company. Secondly, Nibag has workplaces for trainees and those places are not filled up every day.

Waste of transportation
Waste of transportation is the movement of materials, which is more than just in time processing (Jones and Womack, 2003). During my investigation I found some types of waste of transportation. In the first place the monitoring on the purchase volume and contract due date has to happen through several (to combine) lists. This is because there is no integration possible between the purchase volume and the contract due dates.
Another type of waste is about the control within Nibag. Before a document is leaving the company it has to be checked first. An employee about this movement of documents: "*Everyone makes mistakes sometimes. I'm glad that my documents are checked by another person before they are leaving to the client. He or she checks my work and then it is ready to be sent*". This is on the one hand caused by a lack of qualified personnel, because apparently, they keep making mistakes. On the other hand there is lack of standardization in the Nibag documents.

Besides this Nibag is a company which consists of two establishments, one in Uden and the head office in Oldenzaal. It takes place quite often that documents or materials (like bureau chairs, computers, and cars) have to be transferred from Oldenzaal to Uden or vice versa. Employees have to wait until a colleague is travelling between the two establishments and sometimes it takes a long time before the documents or materials are transferred. "*The distance between the establishments is large, when it is not necessary, I do not travel from Oldenzaal to Uden*", so said an employee once. This type of waste is caused through the large distance, but also by the lack of cooperation between the two establishments. The two Nibag's do not work as a unity. *"Product A of Oldenzaal is different from product A of Uden, although they should be exactly the same",* was the opinion of an employee.

Waste of waiting
In the methodology this waste is defined as individuals and items being idle between operations (Jones and Womack, 2003). Within the Nibag sales and planning processes there are several types of waste of waiting which I have observed. The most types of waste in this category are about the difficulties for the employees to find the information they need. A lot of information is not secured on a structured and clarifying way, for example:

- client information
- competences of employees / third parties
- planning information and schedules
- project progression
- project / third party evaluations
- capacity per segment / employee

Searching without finding is very frustrating for employees. "*When I look for something it happens that I first search on the hard disc, then I look into several files, and in the end it seems that the information I was searching does not exist. It costs a lot of time and does not increase my satisfaction*". I said it earlier in this analysis, but the difficulties to find the information which is needed, are because the current internal information system does not meet the requirements. It comes true this is not only the case with respect to project information, planning and progression, but also with respect to client information, competences of employees/third parties, project/third party evaluations and capacity per segment/employee.
Another type of waste of waiting is that many activities within projects have to take place manually in stead of automatically. The formulation of the planning schemes, the combination of the planning schedules and the financial system and the integration between the HRM system and the capacity of employees. All these activities have to take place manually. "*Fast and efficient integration is not possible right now, I think we have to do much extra work because we have to combine the various systems manually*", was the opinion of one of the employees. This type of waste occurs because the current planning system does not meet the requirements, as well as the current internal information system. Integration is not possible and the formulation of the planning schemes is time-consuming.
Furthermore, it costs a lot of time to make the ever-recurring documents, like offers, contracts, kick-offs and evaluations. This is caused by the lack of standardization with respect to these documents.
Next to these types of this waste it is also a bad situation that a project leader interrupts the project workers to check if they are working for his project. The project leader's interest is especially aimed at his projects; those have to be finished first. Although, it is better that the project workers can produce constantly, without being interrupted by the different project leaders all the time. This type of waste exists because there is no person who is responsible for the total planning of the employees and projects. When there is such a person, the project leader has to ask him about the planning of the project workers.

Waste of underutilized people
The waste of underutilized people refers to the ability of employees in a process not being utilized to the fullest (Jones and Womack, 2003). When I take look at the processes inside Nibag I see a few types of waste of underutilized people. The worst type of waste in this category is that the financial manager noticed afterwards that an employee has not been productive the previous week. The financial manager has the task to control the productivity of the employees every week. Every Tuesday he receives the overview of the declarable hours from every employee of the previous week and with the help of that information he has insight in the productivity of everyone. The perfect scenario is off course that the financial manager recognizes an eventual lack of productivity before the week and can prevent such a situation. "*But at the moment, this is not possible*", so said the financial manager. "*I can check after a particular the week what the productivity rate was of the people, but that is too late off course. Actually, I have to know this before the week, so I can inform the employees in time, so they can tell the project leaders they are running out of work. When we are able to implement a planning system by which every employee makes a planning for the coming ten or fifteen weeks, it is possible for me to recognize a waste like this before the specific week in stead of afterwards*". As well as some types of waste before, this one is caused by the current planning system, which does not meet the requirement of 'forward planning'.
Next to this it is not good that some employees are very specialized into one single product. When there is not much demand to this product, these employees have not got work. This type of waste occurs because of a lack of all-round educated employees and this makes the employees as well as the organization quite fragile.

Waste of defects
In chapter 2 of this thesis I defined the waste of defects as the waste that occurs due to errors and not getting an item or product right the first time out in a process (Jones and Womack, 2003). During my investigation I found several types of waste of defects. An important one is that when an employee drops out, it is possible that he is the only person inside Nibag who knows about the appointments which are made with the client. The error chance increases when this person drops out for a reason, because a lot of knowledge is not secured on a manageable and structured way. "*I recognize this problem*", was the opinion of an employee. "*A project leader leaves the company and takes a lot of knowledge away. For example; he was the only one who knows about a specific appointment with an important client. The result is then that his successor makes a mistake, because he did not know anything about this specific appointment*". This type of waste is caused again by the current internal information system, which does not meet the requirements, whereby the information of the leaving employee can not be secured on a clarifying way.
Another aspect is that the planning, project progression reports and project changes are not always secured on a structured way. Due to this, employees cannot find what they need and the chance that they make an error rises. Again the poor inter information system is the reason for a type of waste.
Next to these types of this waste, Nibag looses the chance to learn from the previous projects, whereby errors of the past can happen again in the future. This is because it is not obliged that the employees of Nibag do a project evaluation with the client and eventual third parties after every project, irrespective whether it is a big or a small project.
At last there are errors which occur through poor communication between on the one hand the project leader, the project workers and the planner and on the other hand between Nibag, the client and the third parties. "*Communication is important. A clear communication prevents most of the mistakes and misunderstandings. But an important aspect of communication is the documentation of your information. It results in knowing what you are talking about*", were the wise words of a Nibag-employee. The poor communication is caused by a lack of awareness that codification and documentation are important for a successful project.

Waste of over processing
I have earlier explained the waste of over processing. This refers to efforts that add no value for the customer (Jones and Womack, 2003). A study to the processes within Nibag teaches me that there are some types of waste of over processing. The job of the sales men is to call many potential or existing clients. The extent of success with respect to these calls is far from optimal. Therefore the productivity of the sales men is low, which is not a good thing for the sales men. Off course it is part of the job to call many clients and it is logic that some phone calls fail. Hence, I do not suggest the sales men have to stop with it, but at the moment the amount of failing telephone calls is too high. It happened also a few times that different sales men did multiple visits at the same potential client, without knowing. That is not a sign of professionalism. These two types of waste happen because there is no proper documentation with respect to the clients. It is unclear which clients are called or visited and specific information about the clients is not secured either.
Next to these types of waste almost every document (proposals, sales orders, and bills) has to be checked before it leaves the company. I have mentioned this type of waste before and explained that this type of waste is caused by a lack of qualified personnel and too little standardization within the Nibag documents. According to an employee Nibag can implement some standard parts: "*Every client deserves goods made to measure and every client is different. Therefore we cannot just copy another proposal or sales contract. On the other hand there are parts of those documents which are the same regularly*".

5.2 Specific processes

After the analysis of the general processes I investigated two specific projects and their specific processes. In paragraph 4.2 we have seen the *MJOP*-projects Aanmeer and BZVG, but so far I have only described what happened during those projects. In this paragraph I explain the wastes and analyze the differences with respect to the wastes of both projects.

Waste of overproduction
Processing more or sooner than required happened in both projects. *MJOP* Aanmeer carries two types of this waste which arose because some extra work was necessary. On the one hand since some important drawings were absent, on the other hand because some mistakes had to be fixed. "*Local authority Aanmeer could not send us the drawings of some of the schools, therefore we had to measure those buildings by ourselves. Next to this we made too many errors in the concept reports. Because of the time pressure it was not possible to check our products before they left the company"*, so said project worker A. These types of waste could be prevented through a better communication and cooperation between Nibag and Aanmeer.
Another type of waste was that a project worker waited to long before he started the processing of the data. This happened because he didn't know the inspections were already done. There was a lack of communication between the project workers. It is also caused by a lack of overview into the planning schedules and progression. Otherwise, the project worker was able to see the inspections were done.

Against these three types of waste in project Aanmeer, I found only one type of waste in the *MJOP* project BZVG. This was caused by a lack of overview into the planning schedules, because it happens a few times that one phase of the project was finished and it took too much time before the next phase started.

Both projects were troubling with a lack of overview of the planning schedules and progression. Besides this, the communication and cooperation between Nibag and Aanmeer and between the project workers internally, was not optimal.

Waste of motion
The movement of individuals that is unnecessary for completing a job in a process is the next type of waste. Project Aanmeer carries two types of waste which are almost the same. Project workers had to move to each other and to the project leader sometimes, because there was not an overview of the project planning and also no overview of the project progression.
The next type of waste happened when a person had to move to Aanmeer for only one activity, in stead of combining the activity with other activities. This was also caused by of a lack of overview into the planning, otherwise somebody had prevented this.

In the project BZVG were far more types of waste in this category. The three types of waste above were also discovered in this project and next to those there were six other types of waste of motion. First the advantageous location of the establishment in Uden was ignored, several simple activities could be done by a person of 'Uden', but because of the little cooperation between Uden and Oldenzaal this did not happen.
The remaining types of waste were all about the unnecessary walks to the project leader. Project worker B said about this: "*Almost all the knowledge of the project was in the head of the project leader Y. We had to visit him very often to ask him for information about the project or the planning schedules. And he was busily engaged, so sometimes you had to wait quite a long time, before you could speak to him. There was hardly any secured information about the project*". I mentioned before that these walks could be prevented whether Nibag had an internal information system and a planning system which meet the requirements. Another cause was the lack of awareness that codification and documentation are important for a successful project.

I found nine types of waste of motion in the project BZVG. These types of waste were mostly caused by the lack of suitable systems and a lack of awareness. The project workers of project Aanmeer had not to move that much, because their project information was mostly available on the hard disc or inside a file.

Waste of inventory
Items or supplies in the process in excess or what is required for single-piece flow is the definition of waste of inventory and in the project Aanmeer I did not found one type of waste in this category.

In the project BZVG I discovered one type of waste of inventory. Project worker B told me: "*However there was hardly any knowledge secured, some information was. But this information was not secured on a manageable way; the information was just put in a random file. I was so difficult to find what you needed, that I collected all the files and started to search. Because of the mess, I could not find it and I had to walk to the project leader again".* This type of waste was caused by a lack of awareness that accurate codification and documentation is important for a successful project.

Waste of transportation
The movement of materials, which is more than just in time processing, that is the meaning of the fourth waste. As well as the previous category, I could not find this waste in the project Aanmeer either.

But in the project BZVG I found some types of waste of transportation. On the first place, the different BZVG locations had different subcontractors for the same services. This was not communicated directly to Nibag. So several documents, emails and data had to be sent to multiple companies. This type of waste was because of a lack of communication and cooperation between Nibag and BZVG, otherwise Nibag could support BZVG to select more of the same subcontractors for the same activities.
On the second place, sometimes BZVG wanted a vote in the decision which third party had to deliver a service, and then the proposal of the third party had to go to BZVG before the third party was selected. This type of waste was also caused by a lack of

communication and cooperation. When BZVG had communicated their desire to have a vote in some specific decisions directly, Nibag could take it into account.
The third and last type of waste in this category was about the extensive control which was part of the project BZVG. "*Every document which had to leave the company must be controlled by another person completely. This cost a lot of time and often this supervision was done by an expensive colleague and we all knew it was not ideal. But on the other hand, we could not send our documents with a lot of mistakes to our clients",* was the opinion of project worker B. I have explained this type of waste before, it is caused by a lack of qualified personnel on the one hand, and by a lack of standardization on the other hand.

Three types of waste of transportation I found and all of them were spotted in project BZVG. This client was partly responsible for these types of waste, because the communication between BZVG and Nibag was not optimal with respect to some desires of BZVG.

Waste of waiting
Individuals and items being idle between operations happened in both projects. In project Aanmeer there were only two types of waste of waiting. As a result of the poor functioning 'search function' of the hard disc it cost a lot of time to find something. Next to this it took sometimes a long time to find specific project information. These two types of waste happened because of the internal information system, which does not meet the requirements. But overall the project workers of project Aanmeer could work without much waiting, so argued project worker A: "*The greater part of the project data was properly secured and complete, that is of great importance for a project like this. Because of that we could work fast*".

The project BZVG counted eight types of waste of waiting. First there was a third party, a house painter. This house painter wanted to paint the buildings in 2010, in stead of 2009, and because of that BZVG had to wait a couple of months before the painting activities started. Due to this, the evaluations could just take place in February 2010. This situation was caused by a lack of cooperation and communication between Nibag, BZVG and the house painter. This third party made an appointment to paint the buildings in 2009, but apparently it was possible to deviate from this appointment. It is important within a cooperation to respect and monitor the appointments which are made.
Besides of that, the fire protection activities were cancelled for a while, because the fire protection specialist was not working for Nibag anymore and nobody had enough knowledge to take it over. This was on the first place because of a lack of all-round qualified personnel, but on the second place also due to a lack of awareness that codification and documentation are important, otherwise the fire protection specialist had secured his knowledge for the case he left the company.
Another aspect was the planning overview. There was no insight into these planning schemes, so the project workers did not know what to do when. It happened also that items had to wait a while before the next phase of the project started. These types of waste happened since the planning system was not able to provide a bright overview of the planning to everybody who is involved and it could not integrate the planning and progression schemes.
Furthermore, it occurred sometimes that other projects had priority suddenly, according to a specific project leader. This project leader ordered the project workers to stop with their activities for BZVG, so that they could do something else. This happened because there was no person responsible for the total planning of employees and projects and acted as a spokesman with respect to the planning schemes and project leaders.
Next to these types of waste Nibag had to wait repeatedly for admission of BZVG, when Nibag had selected a third party. This was caused by a lack of cooperation and communication between Nibag and BZVG.
At last it cost a lot of time to find project information: "*We lost a lot of time with searching for information. I think that is one of the main reasons this project was not*

profitable", were the meaningful words of project worker B. This type of waste was on the one hand a result of the poor internal information system, and on the other hand a result of a lack of awareness that codification and documentation are important for a successful project.

It was not hard to find wastes of waiting. Ten types of waste in this category I discovered and two of them were in the project Aanmeer. Project Aanmeer was only troubled by the poor functioning information system. Project BZVG had more difficulties, among others as a result of poor communication, cooperation and a poor planning and internal information system.

Waste of underutilized people
The ability of employees in a process not being utilized to the fullest is the next waste. In project Aanmeer I found one type of waste in this category. According to project worker A, the project leader did not do much for the project: "*We did all the work, the only thing the project leader did was asking whether we could work faster because of the time pressure".* So there was a lack of cooperation and communication between the project workers and the project leader.

I discovered three types of this waste at project BZVG. It happened more than once that the project workers were not utilized to the fullest. "*There was no overview of the planning, so it could happen that a project worker was out of work and he was the only one who knew. Next to this it was also unknown which project workers had some time over to do an activity, so the project leader had to ask every project worker repeatedly whether he or she had time over"*, was the opinion of project worker B. With respect to the obscurity project worker B explained, it happened that some project workers became lax and slow; there was too little control within the project. These three types of waste are all caused by the current planning system, which was not able to provide a bright overview to everybody who was involved and it could not integrate the planning and progression schemes. The last type of waste was also because of a lack of awareness that codification and documentation were important for a successful project.

There were four types of waste of underutilized people. It seemed that the project workers of project Aanmeer did the project almost without their project leader and that project BZVG had a project leader who did not have a bright overview of the planning and progression on which he could manage the project.

Waste of defects
The waste that occurs due to errors and not getting an item or product right the first time out in a process is the definition of the waste of defects. This waste was the most discovered waste in both projects. Project Aanmeer contained five types of waste of defects. At the first place, there was not made a planning at all, because according to the project leader this was not necessary. At the second place, during the project, the project leader emphasized constantly the big time pressure, which resulted in mistakes because of inaccurate working. At the third place, the project leader did not check any of the products which were sent to the client. These first three types of waste were caused by a lack of cooperation and communication between the project workers and the project leader.
The fourth type of waste was about the missed chance to learn from this project. There is no documented evaluation about the project, because it was not obliged to do a project evaluation with the client.
The fifth type of waste was also caused by the lack of cooperation and communication between the project workers and the project leader. Project worker A said about it: "*The communication between us and the project leader was not good. Once in a while he mailed that we had to hurry, because of the time pressure and that was all. We never spoke about things with respect to the content, which resulted in some misunderstandings"*.

The project BZVG carried nine types of waste of defects. Some trainees and the fire protection specialist made some mistakes. They had to do activities which they could not fulfil faultless. These types of waste are caused by a lack of qualified personnel.
Next to this, there were documents which could not be used. Some documents were untraceable and others were unreadable. This points out the disorderly way of securing the information with respect to this project and therefore these types of waste were caused by a lack of awareness that codification and documentation are important for a successful project.
Furthermore, the project leader and project workers of BZVG underestimated important parts of a project, like the preparation and the kick-off. These parts were not executed well enough and that resulted in an unstructured project. This happened because of a lack of standardization within the project.
At last many other mistakes were made, according to project worker B: "*We made many mistakes, because we did not use or lost a lot of knowledge. We did not use the knowledge of 'Uden' and lost knowledge because of second beginning and the poor internal information system".*

It is clear that both projects made some errors. Project BZVG had almost twice as many types of waste of defects as project Aanmeer. Project Aanmeer made the most mistakes because the lack of cooperation between project workers and the project leader. The mistakes of project BZVG had many different causes and it looked like this project was troubled a lot by the many mistakes which were made.

Waste of over processing
The efforts that add no value for the customer, that is the meaning of the last waste. I discovered several types of waste in this category and one of them I found inside project Aanmeer. This type of waste was about some school buildings. These were very difficult to inspect and cost therefore more time, which was not communicated and expected. Therefore this type of waste is caused by a lack of cooperation and communication between involved parties and employees within the project.

The types of waste of over processing at project BZVG were among others about the frequent control. Project worker B had her opinion about the cause of that type of waste: "*BZVG is a project which returns every year and we use hardly any standard form or standard text block. I'd like to work with them, because they could save me a lot of work. Besides that, the permanent control can be replaced by random sampling control, because of the standard forms and text blocks. These parts of the products will not carry errors anymore"*. So there was a lack of standardization in the Nibag documents, which resulted in permanent control. This frequent control was also caused through a lack of qualified personnel.
The complex internal information system, which was very difficult to understand for a new person and the second beginning, which resulted in a lot of changes, were the other causes of the types of waste which were found inside the project BZVG.

I discovered needless activities in both projects. Project Aanmeer had only a problem with a complex school to inspect. Project BZVG contained types of the over processing waste with respect to the standard forms and blocks, the frequent control, the hard disc and the second beginning.

5.3 Overview
To make things clear and clarifying I will add an overview of the categories of waste and their causes.

<u>Sales and planning process</u>
Firstly, I give an insight in the findings of the sales and planning process. Below there are two tables, the first one describes the causes and the categories of waste and the second table is about the categories of waste and their number of different causes:

Causes	Categories of waste
The current internal information system does not meet the requirements. The information can not be secured on a clarifying way.	- Motion (2) - Inventory - Waiting (2) - Defects (2)
The current planning system is not able to provide a bright overview to everybody who is involved and it can not integrate the planning and progression schemes.	- Overproduction - Motion - Waiting (2) - Underutilized people
There is a lack of standardization in the Nibag documents.	- Transportation - Waiting - Over processing
There is a lack of (all-round) qualified personnel.	- Transportation - Underutilized people - Over processing
There is a lack of awareness that codification and documentation are important for a successful project.	- Defects - Inventory
There is no proper documentation with respect to the information about the clients.	- Over processing (2)
There is a lack of cooperation between the establishments 'Uden' and 'Oldenzaal'.	- Transportation
There are no obliged project evaluations with the client or third parties after the projects.	- Defects
There is no person who is responsible for the total planning of employees and projects and acts as a spokesman with respect to the planning schemes and project leaders.	- Waiting
There is no integration possible between the purchase volume and the contract due dates.	- Transportation
The people of Nibag are not aware of the stimulus that is caused by a clean and orderly office.	- Inventory
The company went from more than hundred employees to thirty in 2009, but the majority of the equipment is still inside the company.	- Inventory

Table 5. Causes and categories of waste in sales and planning process

We see that the poor information and planning system are the most mentioned causes of the wastes I have found inside the general processes. After these, the lack of standardized documents, the lack of qualified personnel and the lack of awareness with respect to documentation and communication are also significant.

Sales and planning proces	
Categories of waste (amount)	**Number of different causes**
Overproduction (1)	1
Motion (3)	2
Inventory (4)	4
Transportation (4)	4
Waiting (6)	4
Underutilized people (2)	2
Defects (4)	3
Over processing (4)	3

Table 6. Categories of waste and their number of different causes

This table shows there are no direct relationships between categories of waste and the causes. The categories of waste are divided over several causes. Although the waste of

overproduction has only one cause I would not consider this as a direct relationship, because I found just one waste of this type.

MJOP Aanmeer and *MJOP* BZVG
After the planning and sales process I investigated two *MJOP* projects; Aanmeer and BZVG. Project Aanmeer was a successful project, because they made a profit. Project BZVG was not profitable, they had to suffer a loss. I searched for wastes inside these projects and I found some. Below there is a table with the causes, the categories of waste and the differences with respect to the two projects.

Causes	Categories of waste	Aanmeer	BZVG
There is a lack of cooperation and communication between involved parties and employees within a project.*	- Overproduction - Transportation - Waiting - Underutilized people - Defects - Over processing	3 1 4 1	 2 2
The current planning system is not able to provide a bright overview to everybody who is involved and it can not integrate the planning and progression schemes.	- Overproduction - Motion - Waiting - Underutilized people	1 3 	1 3 1 3
There is a lack of awareness that codification and documentation are important for a successful project.	- Motion - Inventory - Waiting - Underutilized people - Defects		2 1 1 1 2
The current internal information system does not meet the requirements. The information can not be secured on a clarifying way.	- Motion - Waiting - Defects - Over processing	 2 	3 1 1
There is a lack of (all-round) qualified personnel.	- Transportation - Waiting - Defects - Over processing		1 1 2 1
There is a lack of standardization in the Nibag projects.*	- Defects		2
There is a lack of standardization in the Nibag documents.	- Transportation - Over processing		1 1
Nibag has made a second beginning in 2009.*	- Defects - Over processing		1 1
There is a lack of cooperation between the establishments 'Uden' and 'Oldenzaal'.	- Defects - Motion		1 1
There are no obliged project evaluations with the client or third parties after the projects.	- Defects	1	
There is no person who is responsible for the total planning of employees and projects and acts as a spokesman with respect to the planning schemes and project leaders.	- Waiting		1
Total		16	38
* This waste was not found in the general processes			

Table 7. Causes and categories of waste of project Aanmeer and project BZVG

The table first shows the total amount of wastes which are found in both projects. The lack of cooperation and communication between involved parties and employees is the most counted cause of the wastes. I found 13 wastes with this cause and 9 of them are identified in project Aanmeer. After this the poor planning system is the most important cause. Especially project BZVG was bothered through these cause.

Secondly the table shows the differences between project Aanmeer and BZVG. I have mentioned already the contribution of project Aanmeer concerning the first cause. More than a half of the total wastes of this project are a result of this cause. Besides this, the poor planning and information system resulted in some wastes and the absence of an evaluation has hindered the project. Although, it was mainly the lack of cooperation between the project workers and the project leader which led to the wastes. Because of the experience and self-help of the project workers they could manage the miscommunication and poor cooperation, and therefore the wastes had little influence on the end result. A view on the column of project BZVG shows many wastes with many causes. I have said the project suffered the most by the poor planning system, but besides that there are seven types of waste with respect to the lack of awareness that codification and documentation are important for a successful project. Furthermore, the internal information system and the lack of qualified personnel were bothering the project. The many wastes with a lot of different causes had their influence on the result of the project. A significant loss can be explained by all the things that went wrong.

Project Aanmeer			Project BZVG	
Categories of waste (amount)	**Number of different causes**		**Categories of waste (amount)**	**Number of different causes**
Overproduction (4)	2		Overproduction (1)	1
Motion (3)	1		Motion (7)	3
Inventory (0)	0		Inventory (1)	1
Transportation (0)	0		Transportation (4)	3
Waiting (2)	1		Waiting (6)	5
Underutilized people (1)	1		Underutilized people (4)	2
Defects (5)	2		Defects (9)	6
Over processing (1)	1		Over processing (4)	4

Table 8. Categories of waste and their number of different causes for project Aanmeer and BZVG

Table 8 helps us to determine whether there are relationships between a category of waste and a specific cause. In project Aanmeer there are four relationships:

- There is a relationship between the waste of overproduction and the lack of cooperation and communication between involved parties and employees. This restrains that the employees processed more or sooner than required because of poor communication and cooperation.
- The waste of motion is related to the poor planning system. This means that the project workers and project leader walk through the building as a result of the planning system.
- There is also a small relationship between the waste of waiting and the poor information system. It took much time for the employees to find what they needed. When Nibag had a proper information system, the waste of waiting had not existed in this project.
- The waste of defects is related to the lack of cooperation and communication between involved parties and employees. The poor communication and cooperation between project workers and project leader has led to several errors and misunderstandings.

With respect to project BZVG we see three relationships between a category of waste and a specific cause:

- There is a relationship between the waste of motion and the poor planning system. We have seen this relationship also at project Aanmeer and it means that the project workers and project leader walk through the building as a result of the planning system.
- The waste of motion is also related to the poor information system. The employees walked through the building as a result of the poor internal information system.

- There is a relationship between the waste of underutilized people and the poor planning system. Because of a lack of overview into the planning and progression schemes the ability of employees is not being utilized to the fullest.

MJOP Aanmeer versus MJOP BZVG
Until so far I described the wastes, the categories of waste and the causes of both projects. We have seen that project BZVG contains more wastes than project Aanmeer, but are their specific categories of waste which contributed most to this difference? Table 9 gives insight is this question:

Categories of waste	Number of wastes of each category in project	
	Aanmeer	BZVG
Overproduction	4	1
Motion	3	7
Inventory	0	1
Transportation	0	4
Waiting	2	6
Underutilized people	1	4
Defects	5	9
Over processing	1	4

Table 9. Categories of waste and the number of wastes of each category in both projects

On the basis of this data we can not say that one or two categories of waste contributed most to the shortcomings of project BZVG. There are four categories which counted four types of waste more at project BZVG in addition to project Aanmeer. Besides that there are two categories which counted three more type of waste at project BZVG and there is one type which counted one type of waste more at BZVG. The waste of overproduction counted three more types of waste at project Aanmeer. This category had a relationship with the lack of cooperation and communication and I have said that this cause had not influenced the result of project Aanmeer that much. Because of the experience and self-help of the project workers the problems could not affect the result.

Furthermore, the project with fewer types of waste is not automatically the better project, because the impact of the types of waste can differ. But when the difference is as big as in this case (38 to 16) I think it is clear that project Aanmeer performed better than project BZVG.
Although, in paragraph 3.3 we have mentioned that the projects and their activities are not the same. After the field research it is obvious that project BZVG was full of mistakes which had nothing to do with this difference of projects or activities. Almost all the errors are related to activities which are part of every *MJOP*, and also part of project Aanmeer. Nevertheless, there are two aspects which I have to mention because their influence is partly because of the difference in projects and activities:

- The client BZVG was a more difficult client than the client Aanmeer. BZVG would have a vote with respect to the third party selection and the care foundation had different buildings with different subcontractors which made it also more difficult for the project workers and project leader of project BZVG
- The project workers and project leaders of project BZVG had to deal with third parties. This was not a problem, except of one third party; the house painter. This painting business troubled Nibag when they decided to paint some buildings just in February 2010 in stead of somewhere in 2009.

These extenuating circumstances do not alter the fact that project Aanmeer performed better than project BZVG. According to the profit of Aanmeer and the loss of BZVG, this outcome was according to the expectation, but it was not because the projects differ from each other.

5.4 Summary

This chapter is about the analysis of the processes and projects which are investigated. The goal is to answer the sixth sub question; *What are the wastes and their causes within the Nibag processes?* During the research there are identified eight different wastes: waste of overproduction, waste of motion, waste of inventory, waste of transportation, waste of waiting, waste of underutilized people, waste of defects and waste of over processing. In the sales and planning process all the wastes are noticed and the common causes are; 'the current intern information system does not meet the requirements. The information can not be secured on a clarifying way' and 'the current planning system is not able to provide a bright overview to everybody who is involved and it can not integrate the planning and progression schemes.'

Besides this, the eight wastes are also observed within the *MJOP* projects. Two important causes for these wastes are: 'there is a lack of cooperation and communication between involved parties and employees within a project' and 'there is a lack of awareness that codification and documentation are important for a successful project'. Within the projects Aanmeer and BZVG many wastes are identified and the distribution is clear. The profitable project (Aanmeer) counts 16 wastes, while the unprofitable project (BZVG) carries 38 wastes. This gap points out that project Aanmeer is executed better than project BZVG.

CHAPTER 6. Conclusions and recommendations

In the first chapter of this research I described the situation, the complication and the question. These elements leads to the pyramid of Minto which structured my thinking and writing during this research. In this pyramid I made a list with seven sub questions which I had to answer before I could say something about the research question. The first six questions are responded in the first 5 chapters and in paragraph 6.1 I will answer the seventh question; *How can Nibag eliminate the wastes?* This all leads to the direct answer on the research question in paragraph 6.2, in which I recommend the company what to do and in what order of rank.

6.1 Conclusions

In chapter 5 I explained the wastes which I found in the Nibag processes and projects. On the basis of the desk research, many documentation and files on the hard disc, interviews, formularies and observations I will formulate the conclusion, by which the company can remove the wastes.

Documentation

It was the most counted cause of the wastes which I found in the processes and projects: 'The current internal information system does not meet the requirements. The information can not be secured on a clarifying way'. During project BZVG, we have seen that the project workers had to walk very often to their project leader to ask for information about the project. Next to this it is remarkable that a lot of project information is not digitized. Inside Nibag there are many cases with many files, but because this information is not secured on an accurate way, it can be a whole search to find what is needed. On the other hand, much information is digitized and secured, but the hard disc which the company is using is not user-friendly at all. This hard disc exists of a lot of files and documents, but there is a lack of order and regularity. Furthermore, the 'search function' does not meet the needs either. This all leads to several wastes of motion, inventory, waiting, defects, and over processing.
To remove these wastes, the management team has to create a system on which the employees can document their project knowledge on a manageable and structured way. The management team can create such a system in consultation with the employees. It should be a user-friendly, logic and simple to operate system, so that employees can easily secure their information and provide them selves with the information their needed. If this succeeds, Nibag is on its way to manage their knowledge.

Part of this internal information system will be the documentation with respect to the client information. We have seen in chapter 5 that it happens that sales men call many existing and potential clients without much success. When the sales men and project leaders secures the client information (history, *NAW*-data, products/services, etc.) on a manageable and structured way, the sales men know more about the clients and are better prepared when they call them. To become more customer directed, Nibag has to develop a database in which clients are documented. In this database Nibag has to secure client information, telephone calls, possible visits and forecasts of products in which the client is interested. Next to this there should be a link with 'new social media' like Twitter and LinkedIn, to search for potential clients at these networks.

The documentation with respect to the employees is another part of the internal information system. At the moment it takes very long before project leaders know which project workers are available in a certain period. Next to this it cost also a lot of time to find out whether an employee is capable or not. These wastes are happening, because the information about the availability and capability is not documented. The P&O manager should document this employee information. But when there is no overview of

the competences and capacity of the employees, a project leader decides on the basis of his experience, which is not as objective as desirable. Besides, when a new project leader is entering the company, he will not be able to decide on the basis of experience, because he does not have that experience.

Third part of the internal information system will be the documentation with respect to third parties. We have seen in the project BZVG that project leaders have to select third parties regularly. Sometimes this happens in consultation with the client and sometimes the project leader has the authorization to decide which third party is going to fulfil the activity. In the research I observed that it cost much time to choose the proper third party, because there is no measurable data about the quality of the potential third parties. Therefore the project leader decides again on the basis of his experience and again this is not a perfect situation. Project leaders have to create a list with third parties and their competences, shortcomings and other information. When there is cooperation with a third party the project leader has to measure the quality of the product or service which is provided. These measurements will be documented and after a while there will be a list of third parties and their quality determination.

Implementing the system and databases above is one step to a proper documentation. To reach that goal it is important for the management team to create awareness, already before the implementation of the system and databases takes place. A lack of awareness that codification and documentation are important for a successful project was the cause of many wastes. Employees within Nibag did not realize the importance of being careful with your knowledge and communicate this knowledge to colleagues who need it. Especially in project BZVG I observed much inaccurate codification and documentation, but during the interviews I had in the course of the research I noticed much more awareness that the documentation have to improve. This example confirms this: "*We have to be more careful with our knowledge. A few months ago, an employee has left the company. At such moments there disappears so much knowledge out of the firm which is not secured, it is unacceptable".* Next to awareness, discipline is also important. When Nibag has a new information system and wants their employees to digitize and secure their information, it depends on the discipline of the employees whether such a system functioned or not.

The documentation with respect to projects, clients, employees and third parties is related to two principles of lean; value and flow. With the help of the client documentation, Nibag can think from the perspective of the customer. The internal information system can increase the flow, because the needed information about the project, the employees or the third parties will be available at any time (Jones and Womack, 2003).

<u>Planning</u>
Next to the documentation, the planning is another aspect which needs improvement. 'The current planning system is not able to provide a bright overview to everybody who is involved and it can not integrate the planning and progression schemes' was a common cause of wastes during my research. Many times I noticed that things went wrong because people did not know the planning or progression of a project. I have seen that at this moment; the project workers often do not know the planning or progression; the planning is only available for the planner; project workers, project leaders and the planner move a lot through the building to ask for the planning or progression; it is not possible to integrate the planning and progression; the financial manager recognizes only after a week whether the project workers were productive or not. So overproduction, waiting, a lot of motion and underutilized people were the results of the failing planning system.
The first step to improvement is to create an overview with all the steps involved in the project and make that overview available for everyone who is involved. What Nibag needs is a system which can inform all the involved parties at every moment about the

planning and progression. This creates more overview of the project and leads to a better performance, because there is more intelligibility about all the specific actions that are required to bring a specific product from start to finish.

When the management team introduces the system, it should be managed by a coordinator. The lack of such a coordinator is also a waste in the processes and projects. During the field research I recognized two wastes of waiting because of this lack. Both wastes happened because the project leader interrupted the project workers to check whether they were working for his projects. The project leader's interest is especially aimed at his projects; those have to be finished first. Although, it is better that the project workers can produce constantly, without being interrupted by the different project leaders all the time. At the moment, Nibag is already active to implement this task. It will not be a full time task, but someone is able to do it next to his activities as a sales man. This coordinator will be responsible for the planning schedules of projects and has to anticipate when unexpected events happen. The individual planning is established by every employee itself. The employee sends this planning to the coordinator and he creates a total planning with all the employees and projects. After every single week the employees have to send also their progression to the coordinator. Then the coordinator can check whether the employees are working according to the planning or not. In this way the coordinator creates an overview of the planning and the progression of the employees and the projects. Besides, it is not anymore necessary for the coordinator to ask everybody for their planning and progression. This is a time-consuming and difficult activity, because most of the employees are not in the office every day.

The overview into the planning and progression will help Nibag to look at the whole. The company can identify the entire value stream for each product from start to finish, together wit the distribution of tasks and the progression (Jones and Womack, 2003). This all will be managed by a coordinator.

Cooperation

The cause that was counted the most inside the *MJOP* projects was the lack of cooperation and communication between involved parties and employees within a project. Involved parties are in the first place the client, secondly Nibag and its employees and thirdly, eventual third parties. When a project is running, it should be possible for the client to see the progression and be informed about everything around the project. Nowadays, the client does not know that much about a project. He can call the project leader to ask for the progression or specific problems, but the project leader is not always available. On the other hand Nibag does not know everything about the client either. It depends on the client and the size of the project how much the client wants to know about the project and how intensive the communication has to be between Nibag and the client. In chapter 5 I investigated a big project with BZVG. This client liked to be well informed about the project and had some wishes which were not familiar for the project workers of Nibag. Furthermore, the cooperation with third parties is not always good either. In project BZVG was the communication with a house painter far from optimal, which resulted in some wastes of waiting. Therefore the management team should create a platform on which Nibag, as well as the client and (important) third parties can exchange relevant information about the project. This gives all the involved parties insight in the project and it is also an advantage for Nibag, because the cooperation between the company, the client and the (important) third parties will improve. During the kick-off the project leader, the client and the (important) third parties make arrangements about the intensity of the exchange of information. In this way Nibag meets the needs of the client and rethink from the perspective of that client.

Another aspect of cooperation is the cooperation with the employees. The management team has to stimulate the training and education of their employees. In my research I saw that the employees made some mistakes. This was on the one hand a result of a lack of all-round education and on the other hand because of the inexperience of some

trainees. This last cause can be prevented by a proper accompaniment of the trainees. The first cause can be prevented through a better and more all-round education. All-round employees are good for a company, because they can do different activities and it makes Nibag more flexible.

A third variant of cooperation is the cooperation between the establishments 'Oldenzaal' and 'Uden'. Now these two settlements are working like two different companies. In the research at project Aanmeer we saw that there is not a good cooperation between the partners. Both Nibag organizations do not share much knowledge, make no use of each other's location and do not work as a unity. *"The products delivered by 'Uden' are different in comparison with our products",* according to project worker A.

An improvement of the cooperation with the establishment in Uden, but especially the cooperation with the other involved parties within a project is an example of rethinking from the perspective of the customer (Jones and Womack, 2003). The customer can determine the extent of project information he wants to see and with the help of the platform Nibag can show the information. Besides that, a better cooperation of the involved parties will lead to better products.

Standardization

Another important cause for the lack of quality inside the Nibag processes and projects is the absence of standardization within the way of working. This lack of standardization has led to wastes of transportation, waiting, defects and over processing. At the moment the project leader is free to decide whether he does a kick-off or an evaluation with the client or third party. It is better to oblige that the (big) projects must do a kick-off and an evaluation with the client and (important) third parties. The financial manager decides whether a project leader has to do a kick-off or project evaluation. During the study about project Aanmeer I saw that the project leader had not arranged a kick-off or an evaluation, while the project workers pointed out that they were in need of these activities.

Another aspect which will bring more standardization in the processes is the use of standard forms, templates and text blocks. This will result in more unity and systematic in the work of Nibag. Nowadays, every project worker makes his own documents and all these documents must be checked before their leave the company. When the employees can develop standard forms, templates and text blocks, this permanent check can be replaced by a check on a sample basis.

A third aspect which will bring more unity and standardization within the company is about the disorder within the company. This disorder has led to several wastes of inventory. When I walked through the building I saw so much paperwork, files, bookcases and post-its. With the help of cleaner desks Nibag can create more order.

A stimulation of the standardization inside Nibag will give more structure to the projects and with the help of that the value streams will become more systematic. The standard forms, templates and text blocks will also help the company to develop comparable value streams for every project (Jones and Womack, 2003).

6.2 Recommendations

This chapter continues with the most important aspect of the study; the answer on my research question:

How can Nibag improve its service quality to get a profitable company?

It is the question I will respond directly in this paragraph. On the basis of the previous conclusions I recommend Nibag to follow the twelve suggestions below whether it wants to improve its service quality and become a profitable company. The order of rank I have

chosen is important, because it offers the hierarchy of the solutions. Nibag should implement these solutions, in the following rank:

1. On the first place the management team should develop awareness and create discipline about the importance of codification and documentation with respect to a project. Employees must realize that the documentation will help them to manage their information and knowledge, so they can execute activities and projects with less waste. The decrease of waste and the availability of information will stimulate the discipline, which is necessary to prevent falling back to the old situation.
2. When there is awareness and discipline, the management team should introduce an internal information system which contains all the project information and knowledge within Nibag. The data will be secured on a manageable and structured way. With the help of this system the employees of Nibag can effectively deal with the knowledge related problems.
3. At the same time as the implementation of the internal information system, the management team should establish a planning system, which is integrated with the progression and which is available for all the involved parties of a project. This system creates overview and intelligibility. Every employee makes his own planning, sends it to the coordinator, which is responsible for the total planning of employees and projects.
4. After the two systems above are putting into use, it is time for the management team to develop an internet 'portal' on which the company, the client, as well as eventual third parties can log in. This portal stimulates the cooperation, gives an overall picture of the project and carries all the project information, such as progression, planning and agreements.
5. The fifth recommendation will be implemented simultaneously with the previous and the next solution. Because when the internal information system and the planning system are working, the management team has to oblige a kick-off, a project evaluation and a third party evaluation at the big projects or important third parties. This will bring more standardization into Nibag's way of working.
6. As well as the fifth solution, this recommendation will stimulate the standardization into the Nibag way of working. The employees of Nibag have to make use of standard forms, templates and text blocks. This will reduce the necessity of the permanent checks and stimulates the standardization and unity in their projects.
7. When the systems are working and the standardization is stimulated, the project leaders and sales men must create a Customer Relationship Management (CRM) database with existing and potential clients, client information, forecasts, possible phone calls or visits and link it to the 'new social media'.
8. Together with the CRM database, the P&O manager has to establish an HRM-database which carries all the information and competences of the employees. Integrate the database with the capacity of the personnel and the project leader can easier compose a project group on the basis of documentation.
9. At the same time of the implementation of the CRM and HRM database, the project leaders have to create a database, comparable with the HRM-database, for third parties. The database consists of a list with all the potential third parties and their competences. Project leaders will be able to make solid decisions when they have to select a third party.
10. After that there follows a time-consuming, but useful solution. Everybody within Nibag has to stimulate the cooperation between 'Uden' and 'Oldenzaal'. These establishments should work as a unity, share knowledge and take advantage of each other's location. This can lead to synergy.
11. The last but one recommendation is that the management team must continue with the training and education of the employees. These measures will decline the amount of errors and helps the employees to become more all-round and Nibag to become more flexible.

12. The last suggestion is about the clean desk policy. The policy must stimulate the employees to remove the numerous paperwork, files and bookcases within the organization. This will bring more order inside the company and it stimulates the work climate.

6.3 Summary

The conclusion tells the story of this study. It answers the last sub question; *How can Nibag eliminates the wastes?* The company has to change several things in their way of working. Nibag has to focus on 'documentation', 'planning', 'cooperation' and 'standardization'. Documentation is important, because Nibag must manage its knowledge and information more accurate, so that the information that is needed is available and correct. The planning has to be arranged on a different way, because there is a lack of overview into the planning and progression of a project. The cooperation between involved parties deserves attention, because there are too many misunderstandings between Nibag, clients and third parties. Standardization is the last item, it is important for Nibag to standardize the way of working within the company. Every project has to consist of particular activities, like a kick-off and an evaluation, and the employees have to make use of standard form, templates and standard text blocks.
On the basis of the conclusion twelve recommendations are formulated. These suggestions are answering the research question of this research; *How can Nibag improve its service quality to get a profitable company?* The most important solutions for the company are:

- The management team should develop awareness and create discipline about the importance of codification and documentation with respect to a project.
- The management team should introduce an internal information system which contains all the project information and knowledge within Nibag.
- The management team should establish a planning system, which is integrated with the progression and which is available for all the involved parties of a project.
- The management team should develop an internet 'portal' on which the company, the client, as well as eventual third parties can log in.
- The management team has to oblige a kick-off, a project evaluation and a third party evaluation at the big projects or important third parties. Next to that the employees have to make use of standard forms, templates and text blocks.

CHAPTER 7. Discussion

I have concluded that Nibag is a company with some imperfections. I think this research have its imperfections too. In this chapter I will define the shortcomings of the study and indicate directions for further research.

7.1 Shortcomings

This study was about the improvement of the service quality at Nibag. The result is twelve recommendations which can help Nibag to become more profitable. However the study tells a true story, there are some shortcomings:

- During my field research I decide to select two projects to investigate thoroughly. Although I was looking for two projects which exist of exactly the same activities, I did not succeed. This is because every *MJOP* is a good made to measure and there are not two exactly the same projects. I realize it was not a perfect comparison between the two projects.
- The field research included two interviews with project workers of both *MJOP* projects. I preferred to speak to the project leaders, but this was not possible. However I received the email contact between them and the project workers and I could verify many of their activities during the projects it would be better to speak to them personally. But the project leader of project Aanmeer does not work for Nibag anymore and the project leader of project BZVG had no time for an interview.
- To verify the words of the project workers of Nibag, it would be better to talk to the clients and eventual third parties too. Because my field research was internally and I had only six months I did not speak to BZVG, Aanmeer or a third party.
- Out of the twelve recommendations there are six which recommend Nibag to introduce a system or a database. Although I think these systems and databases will really help Nibag to perform better, I realize the introduction of all these systems and databases will be expensive and time consuming.
- While I was doing my research, there were four other students which were doing a graduation assignment. One of these assignments had some overlap with my own research and it is possible that it influenced my research. This assignment was about an ERP-system and it opened my eyes with respect to such systems and their contribution to the work situation.

7.2 Further research

The recommendations I did are clear and obvious. Nibag has to change its work situation and I think its performance will improve. But before the company just starts to work out my recommendations, it has to investigate the following:

- Before implementing any system, Nibag has to be sure that the system fits perfectly with the company. The firm must investigate which functions are necessary, desirable and which functions are redundant within the system. In this study Nibag has to talk to the employees, clients and third parties to ask for their opinions and their desires. Without such an investigation there is a great chance of failure.
- Next to an investigation with respect to the exact design of the systems, Nibag has to investigate how they can implement these systems within the organization. Implementation is the last step by the introduction of a new system, but is often underestimated. The researcher who will study the implementation can use the method of Kotter (1996), who provided eight steps which help organizations to a successful implementation.
- Another recommendation which needs to investigate more thoroughly is the cooperation between Oldenzaal and Uden. At the moment they work more like

two different organizations in stead of cooperating partners. It is a challenge to find the causes for this situation and to change this into a situation which can lead to synergy.

- The last advice I gave in chapter 6 was about the clean desk policy. This policy needs further research about how to establish such a policy and how to remove all the paperwork inside the company. The researcher can use the methodology of 5S, which is a lean service tool and is explained by Hirano (1996).

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Appendix 1. Interview session 'sales'

Datum: 29-03-2010
Aanwezigen
Interviewers: Gökhan Buyuktipi
Marcel Morsink
Paul Sombekke
Wouter Weusthof
Geïnterviewden: Sales man S
Sales man T
Sales man U

Programma

1) **Inleiding door: Paul duur: 5 minuten**
als start van de interviewsessie lichten we toe wat het doel en achtergrond van de bijeenkomst is, wat we willen bereiken en wat we gaan doen. Tevens worden de mensen voorgesteld.

2) **Huidige situatie schets door: allen duur: 25 minuten**
in dit deel van de sessie zullen we aan de hand van vragen een goed beeld proberen te krijgen van de huidige situatie omtrent de 'verkoop'.

Vragen over:

Functie	- wat - relatie met verkoop
Processtappen	- input verkoop - proces verkoop - output verkoop
1e klantcontact	- hoe bereikt de klant Nibag? - hoe bereikt Nibag de klant? - verlies van potentiële klanten - verschillen per segment - wat als klant niet wordt bereikt? - welke mediums (%)?
Klantgegevens	- klantgegevens verzamelen/vastleggen/functie - leads verzamelen/vastleggen/functie - klantbehoeften verzamelen/vastleggen/functie - verlies van gegevens/info/behoeften? - de gebruikte systemen
Verkoop	- de stap van 1e klantcontact naar verkoop - belang/voorbereiding/functie 1e gesprek - wat als de verkoop lukt/niet lukt? - factoren die verkoop beïnvloeden - essentie succesvolle verkoop - toezeggingen over doorlooptijd/beschikbaarheid van mensen
Planning	- afstemmen verkoopinspanning m.b.t. personeel - toewijzen van mensen aan opdracht

3) **Wenselijke situatie schets door: Marcel & Gökhan duur: 30 minuten**
deze fase van de sessie zal bestaan uit een brainstormsessie in de vorm van een interactieve discussie. Aan de hand hiervan proberen we een idee te krijgen van de wenselijke situatie voor de geïnterviewden

Vragen:

Processtappen	- verspillingen in de input/proces/output - verbeterpunten input/proces/output
1e klantcontact	- betere en meer klanten bereiken - beter bereikbaar voor klanten - verlies van potentiële klanten voorkomen? - ideale medium/rol intranet?
Klantgegevens	- beter klantgegevens vastleggen/verwerken - beter leads vastleggen/verwerken - beter klantbehoeften achterhalen/vastleggen/verwerken - fouten voorkomen m.b.t. klantgegevens/leads/klantbehoeften - ideale systemen/rol intranet/sms-functie/linked-in?
Verkoop	- voorbereiding 1e gesprek - hoe kan de verkoop groeien & mislukte verkoop dalen? - verbeterpunten m.b.t. toezeggingen - rol intranet/ contactstatus & klokregistratie
Planning	- fouten in de afstemming en gevolgen daarvan - verbeterpunten bij planning van inkoopinspanning

De totale bewaking, het controleren of alle vragen zijn beantwoord, het in de gaten houden van de tijd en het notuleren wordt gedaan door Wouter

Appendix 2. Interview session 'planning'

Datum: 08-04-2010
Aanwezigen
Interviewers: Paul Sombekke
Wouter Weusthof
Geïnterviewden: Planner P
Planner Q

Programma

Inleiding

Huidige situatie: vraag-antwoord (45 min.)

1. Info verzameling	Hoe wordt projectleider bepaald? Hoe wordt een projectgroep geformeerd? Worden deelprojecten gemaakt/toegewezen? Hoe worden de middelen toegewezen? Wat is het belang van de plaats waar de dienst wordt geleverd? Wat is de rol van de offerte, plan van aanpak (afspraken met de klant) bij de inventarisatie? Hoe, op basis waarvan worden de uurafspraken gemaakt (pic's)? Welke zaken horen nog meer bij de inventarisatie? Hoe wordt de inventarisatie vastgelegd, gecommuniceerd? Worden er wel eens foute inventarisaties gemaakt? Waarom?
2. Realisatie	Hoe ziet de planning eruit? Wie maakt deze? Software?

	Wordt er gebruik gemaakt van standaarddocumenten, checklisten? Is er sprake van fasering? Wordt er gebruik gemaakt van voorspellingen, analyses, eerdere projecten? Wat is de rol van de klant bij de realisatie? Hoe, op basis waarvan worden externe partijen geworven? Wat zijn de risico's van het aantrekken van externe partijen? Gaat er vaak wat mis bij de externe partijen? Hoe wordt de planning vastgelegd/gecommuniceerd? Met wie wordt de planning gecommuniceerd? Wordt er een planning gemaakt voor externe partijen? Worden er deelplanningen gemaakt voor individuele projectmedewerkers?
3. Voortgang	Hoe wordt bepaald of iemand zich houdt aan zijn verantwoordelijkheden? Hoe vaak, door wie wordt de voortgang gecontroleerd? Zijn er voortgangsgesprekken, hoe vaak, met wie? Hoe worden deelprojecten afgestemd? Tussen projectmedewerkers, externe partijen? Hoe wordt de voortgang gecommuniceerd met de klant/externe partijen? Wat zijn de meest voorkomende risico's van een planning? Hoe beheers je deze risico's? Lukt dit? Waarom niet? Hoeveel invloed heb je op de risico's? Wordt een planning wel eens bijgesteld? Door wie? Waarom bijvoorbeeld? Wat zijn de gevolgen van een bijstelling? Boetes?
4. Afsluiting	Is er sprake van een evaluatie na afloop van een project? Met de klant, externe partijen? Hoe wordt deze evaluatie vastgelegd, gecommuniceerd?

Nu wordt in een paar minuten het planningsproces globaal in kaart gebracht op een groot vel papier. Dit dient als korte samenvatting van deel 1 en zo hebben Paul en Wouter een duidelijk beeld van de huidige situatie, dit zal de creatieve sessie ten goede komen.

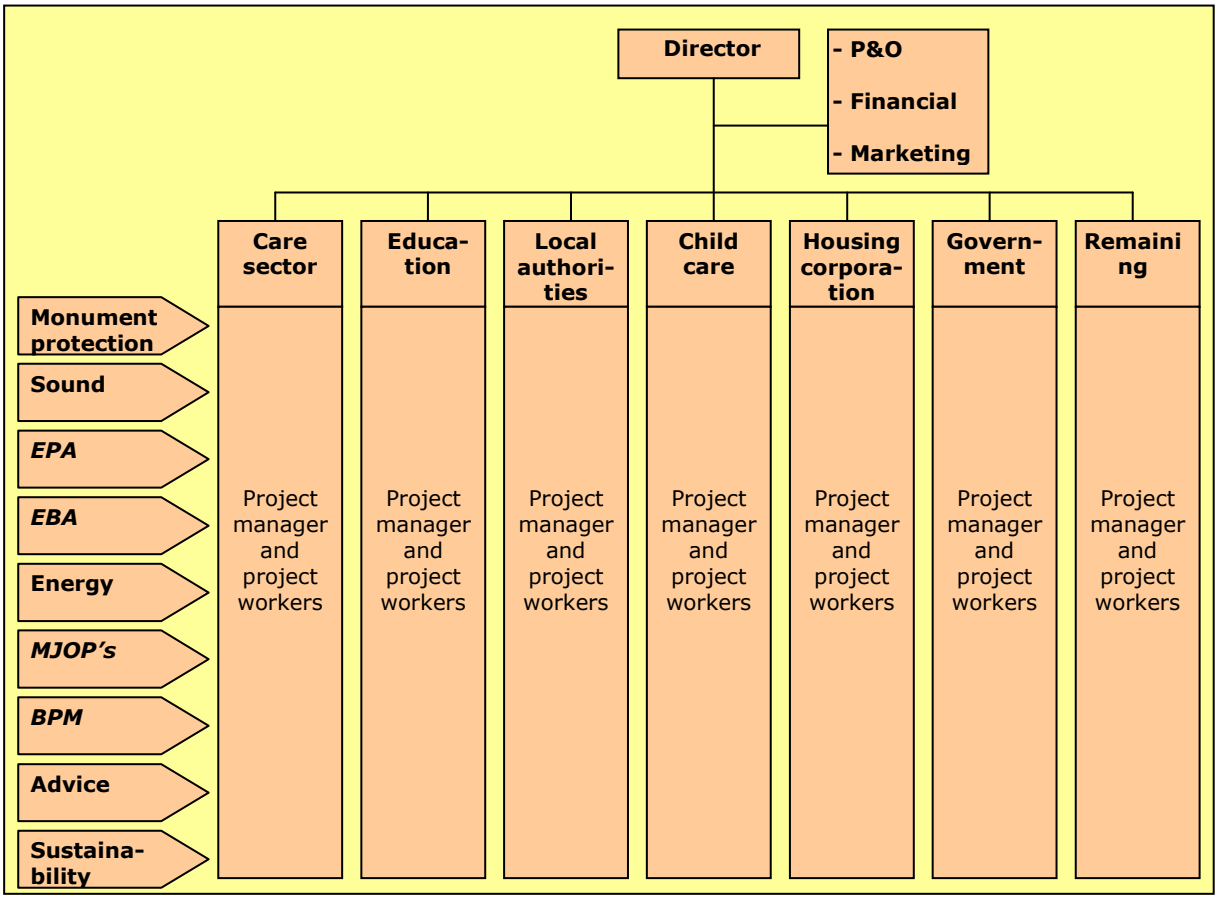
Wenselijke situatie – creatieve sessie (45 min.)

Aan de hand van een creatieve sessie proberen we de wenselijke situatie in kaart te brengen. Alle aanwezigen krijgen memo's waarop ze verbeterpunten van het planningsproces kunnen aandragen. Deze verbeterpunten worden daarna besproken, geanalyseerd en in het huidige proces geplaatst.

1. Ideeën aanbrengen

2. Ideeën plaatsen in proces/analyseren

Appendix 3. Visualization of Nibag



Appendix 4. Nibag's segments or markets

1. Care sector

As a result of the stricter care indication and the increasing competition it is essential for the care organizations to strengthen their market position. In the past years you see more and more new products and services. It is all about the surplus value for the client. The care institutions have to develop a suitable total resolution.
Housing plays an important role in this. Care organizations are obliged to control the functionality and quality of their real estate. Real estate management becomes a part of the conduct of the business.
Nibag is working or has worked for several care institutions, like Aveleijn, Livio and Ambulancezorg Nederland.

2. Education

Education vision and learning concepts, that are the key aspects of education. Housing and the facilities have to answer on these central aspects. It is important to map the relations between education vision, housing concepts and image. A relative new development in the education sector is the creation of a clean and healthy air in the class rooms, so the children or students can perform better.
Nibag is working or has worked for many education institutions, like Saxion, ROC Twente and Hogeschool van Amsterdam.

3. Local authorities

Local authorities have form time immemorial a lot of real estate in their property. They provide housing for many different clients. The accommodation for their clerks and the

neighbourhood centre are good examples. The interest for social real estate is growing and through the attendance of multifunctional accommodations and the intensification of rules and instructions real estate housing becomes more and more a complex task for the local authorities.
Nibag is working or has worked for various local authorities, like Enschede, Alkmaar and Maastricht.

4. Child care

The child care market is going through a lot of changes. The government demands in the first place more market forces and at the same time they want an increase in the child care institutions. In this tightened competition housing is still a very important aspect. The expenses for housing are large, efficient maintenance and effective management must lead to cost savings and the pass for combined investigations with other parties.
Nibag is doing or has done all kinds of child care projects for e.g. Partou, Humanitas and Kern.

5. Housing corporation

For the housing corporations there are some big challenges ahead: a lot of houses which are in property of the corporations do not meet the needs to the demands of today, are wasting energy and the ventilation is bad. Adjustments and restructuring are very expensive and to undertake these kinds of challenges the corporations have to work together with other involved parties. The market relationships are changing, new possibilities are announcing.
Nibag is working or has worked for many corp0orations, like Domijn, WBO Wonen and Triada Wonen.

6. Government

As well as the local authorities the government has much real estate in their property. The government can use these buildings for all sorts of destinations. However, often it as to be a multifunctional accommodation and through all the rules and instructions there is a task for advice agencies to accompany these processes.
Nibag has worked or is working for the Dutch government and several districts, like Noord-Holland, Utrecht and Overijssel.

(Website Nibag)

Appendix 5. Nibag's products or supporting activities

1. Monuments

Monuments are buildings at which the community attached big value. We want to be sure that the monuments are protected for the next generations. Monuments are tangible, material remains of our cultural history. Maintenance and conservation are the key aspects for protection of the monuments.
Nibag is doing or has done several projects, like the Chassékerk in Amsterdam and country estate De Klokkenberg in Breda. (Website Nibag; protection of monuments)

2. Sound

We live in a world of movement and sound and are surrounded through road, train and air traffic. Noise-sensitive buildings such as houses, schools and office blocks are often situated nearby busy infrastructure and airports. Following the *Wet Geluidshinder* have local authorities, *Rijkswaterstaat* and *ProRail* the task to restore houses, schools and apartment houses with noise exposure. The implementation of these restorations is not always easy. Solutions can be founded in sound protection measures and complementary house front measures.
Nibag is doing or has done various sound remediation projects, for *ProRail* and for many houses in Enschede, Hengelo, but also in, for example, Alkmaar. (Website Nibag;) sound remediation)

3. *EPA*

An energy label gives insight in the energy performance of your house or office building. Nibag has the complete certification of the BRL 9500. That means that Nibag can provide your houses or offices with an energy label or 'Energy Performance Diploma', called EPC in Dutch. Next to this Nibag can provide a specific and extensive advice for houses or buildings, which calls EPA-W (for houses) and EPA-U (for buildings). Since a couple of years Nibag has also an *EnergieCertificatenSysteem*, which is a web-based software tool which can calculate an energy performance advice after filling in all the information needed.
Nibag is doing or has done al lot of energy performance projects in buildings all over the country, like projects in Deventer and Amersfoort. (Website Nibag; Energy Performance Advice)

4. *EBA*

The quality of air inside a lot of buildings and especially schools is very bad. The reason is a high CO2-level because of less ventilation. This can result in concentration problems and reduction of performances by students and teachers. An assessment of the indoor environment is described in the 'Energy and Indoor Environment Advice' (*EBA* in Dutch). After the *EBA* follows a rapport with practical and efficient measurements to improve the indoor climate.
Nibag is doing or has done all kinds of *EBA*-projects in, for example, Roozendaal, Hillegom and Bergambacht. (Website Nibag; Energy Indoor Environment Advice)

5. Energy

As a result of extensive purchase of energy can Nibag provide their clients a lot of benefit, which can increase till an advantage of 20% in comparison with the current running energy contracts. Energy is very expensive these days and when you can offer your client profitable contracts it is interesting for them. Next to these contracts Nibag is taking on the general and technical services.
Nibag is doing or has done various energy-projects for many clients, like BZVG, Humanitas and SKSG. (Website Nibag; energy)

6. *MJOP's*

To create insight in the maintenance situation Nibag is formulating 'More Years Maintenance Projects', in Dutch *MJOP's*. The advantage of an MJOP for a company is that they receive a clear overview about the expected costs for maintenance for a specific period. With this information companies can make reservations and if necessary, they can push the maintenances backwards or forwards. The costs will be manageable for the owner.
Nibag is doing and has done several *MJOP*-projects for different companies, like DHL, Leerrijk in Waalwijk and RGD. (Website Nibag; More Years Maintenance Projects)

7. *BPM*

The management of a complete building process (*Bouw Management Proces)* is another product of Nibag. A building process often starts with a figure and Nibag has the people who can make the figures. Once the figures are made and one is picked out, Nibag selects the building contractor, installation company and other organizations who are together accomplish the project. Nibag will manage this whole process form the start till the end and the company is the responsible party.
Nibag is doing and has done many *BPM*-projects for all kinds of companies, like Fontys, DHL and Bouw & Infra. (Nibag, Multi-intelligent in huisvesting presentatie, 2009)

8. Advice

Through the years Nibag has collected a lot of knowledge in the housing market. This knowledge is valuable for many other organizations and it happens sometimes that one company wants a Nibag advisor. These consultant can give proper advises about the aspects he is specialized.

Nibag has given their advice on various organizations, like the Rijksgebouwendienst, Leerrijk and local authorities like IJsselstein. (Website Nibag; Advice)

9. Sustainability

Sustainable construction is not a choice anymore, but the only way we can and must build in the future. The constant changing world, the climate and the shortage of building materials are sufficient motives to build sustainable. Nibag declares that sustainability is very important and one of the basics of the future. The company thinks it is naturally to advise and accompany their clients to create sustainable building projects.
Nibag is doing or has done several sustainable projects, for e.g. Humanitas or the local authority Harderwijk. (Website Nibag; Sustainability)

Appendix 6. Examples of wastes

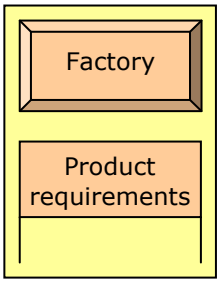
1. Waste of overproduction - Purchasing items before they are needed - Processing paperwork before the next person is ready for it - Franked loan agreements lying - More promotional materials printed than required - Photocopies of forms used instead of printed booklets
2. Waste of motion - Customer service executive having to walk to get brochures and forms in a retail financial services branch - Collection agency going to wrong address - Multiple visits by salespeople to get the right documents from customers - Scattered departments in an organization - Walking to/from copier, central filling, fax machine while executing a process
3. Waste of inventory - Filled in-boxes (electronic and paper) - Excessive sales literature/brochures in retail bank branch - Piles of loan files lying in branches/offices - More stationery than required - More IT equipment than required in a workplace - Documents/records held beyond retention period
4. Waste of transportation - Excessive e-mail attachments - Multiple hand-offs - Multiple approvals - Files moving from one branch to another - Movement of documents from hub to spoke - Multiple movements of cash - Couriering/express mail
5. Waste of waiting - Customers waiting in line at a bank branch or ATM - Files and documents waiting for signatures or approval - Associates in a process waiting for earlier process to finish - New employees awaiting infrastructure/computer - Customer waiting in phone banking/call centre queue - Information technology system downtimes - Time taken to respond to customer queries
6. Waste of underutilized people - Process associates being treated as robots by managers - Not involving the associates in process improvements - Not leveraging the qualities of individuals to the fullest - Not using the creative brainpower of employees

- Not giving the right assignment/work - Uneven work distribution/load balancing
7. Waste of defects - Errors made while filling out the application form of a mortgage customer - Incorrect name printed on a credit card - Incorrect data entry - High rejection rates in savings account opening forms
8. Waste of overprocessing - Redundant steps in a process - Multiple inspections in a process - Lack of operator training - Undefined or unclear customer requirements - Overdesigning a product or service for a customer - New products are launched without adequate back-end processes - Inept design - Inadequate technology

(Sarkar, 2008)

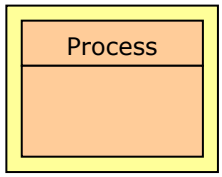
Appendix 7. Action plan for the value stream mapping tool

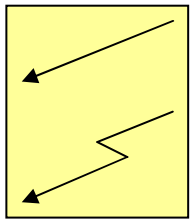
Developing a future state begins with an analysis of the current situation. You must have a good overview at the whole process. In a production factory you can simply take place in the factory and watch what happens. In a service organization you have to take care of getting truth information about projects. You can accompany in a particular project or take a look at the project descriptions which are collected.



Then it al starts with the product requirements. We'll represent these requirements with a factory icon. Underneath this icon we'll draw a data box recording the requirements of the product.

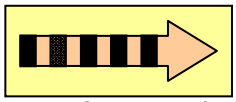
The next mapping step is to draw the basic production processes. To indicate a process we use a process box. The general rule is that a process box indicates a process in which the material or information is flowing. Since drawing one box for every single processing step would make the map unwieldy, we use the process box to indicate one area of material flow, ideally a continuous flow. The process box stops wherever processes are disconnected and the material flow stops. As you are investigating the flow, you need to collect data that is important for deciding what the future state will be. So a data box is drawn under each process box. In these data boxes you put information like, cycle time, number of people required and lead time. A comparable box is drawn for the 'planning', which is collecting information from the work floor, consolidates and processes it, and sends specific instructions to each manufacturing process about what it should produce and when.



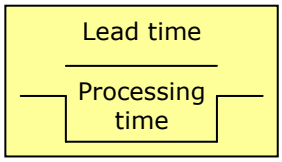


But how do we add these information flows at the value stream map? We draw a narrow line to show information flows. This line is modified with a lightening when the information flows electronically. A small box is used to describe the information flow.

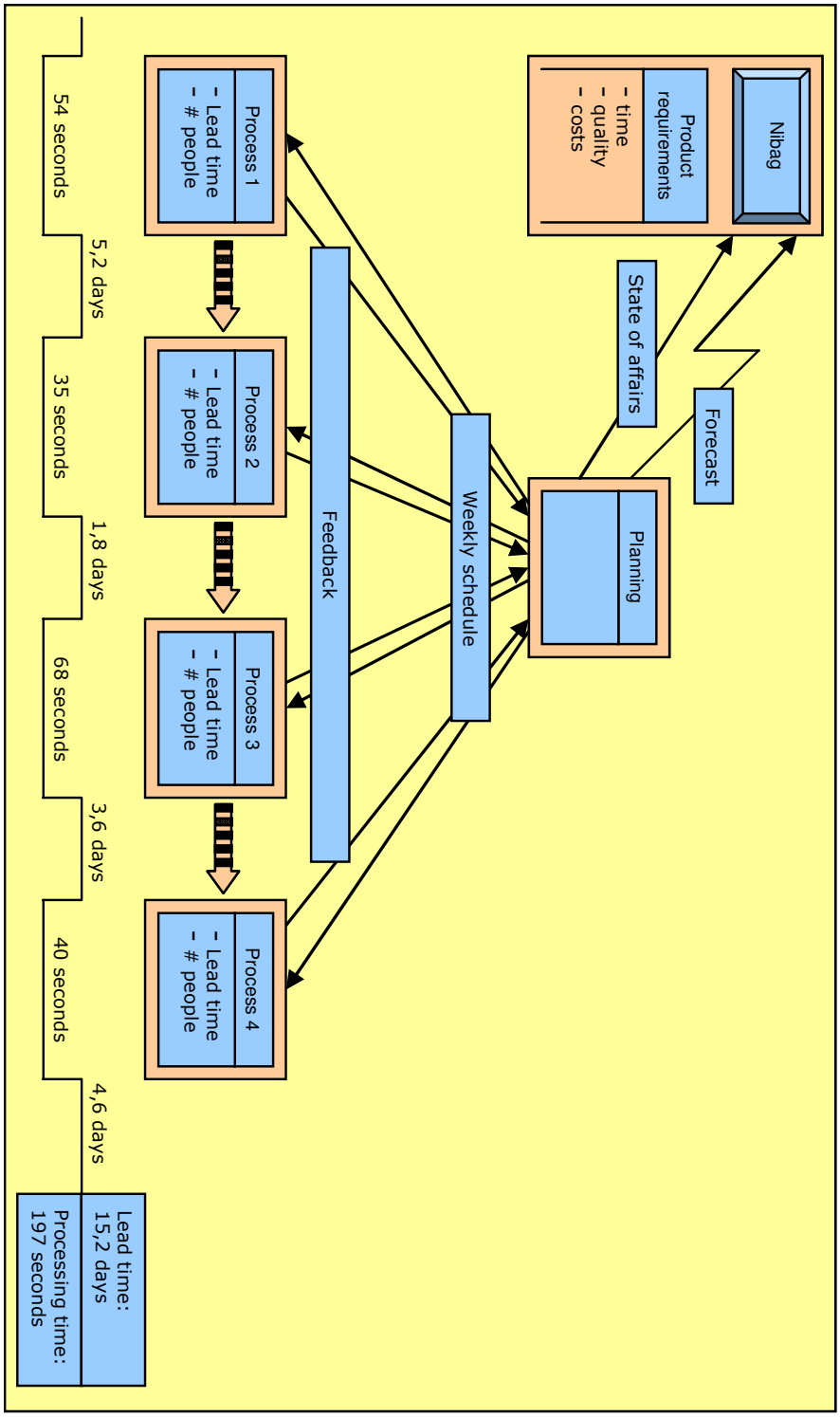
As you figure out how each process knows what to make for the following process and when to make it, you can identify a critical piece of mapping information: material movements that are pushed by the producer. 'Push' means that a process produces something which is needed by the next process and pushes it ahead. The mapping icon for push movement of material is a striped arrow. This icon is drawn between each process.



With the data from observation of current operations drawn, we can summarize the current condition of this value stream. Draw a timeline under the process boxes and inventory triangles to compile the



production lead time, which is the time it takes one part to make its way through the process. After that you add the value-adding time or processing time for each process in the value
stream. You can now compare the processing time with the lead time. Now follows an example of a complete value stream mapping drawing with the icon's we described above. (Rother & Snook, 2003)



Appendix 8. Relevant situations for different research methods.

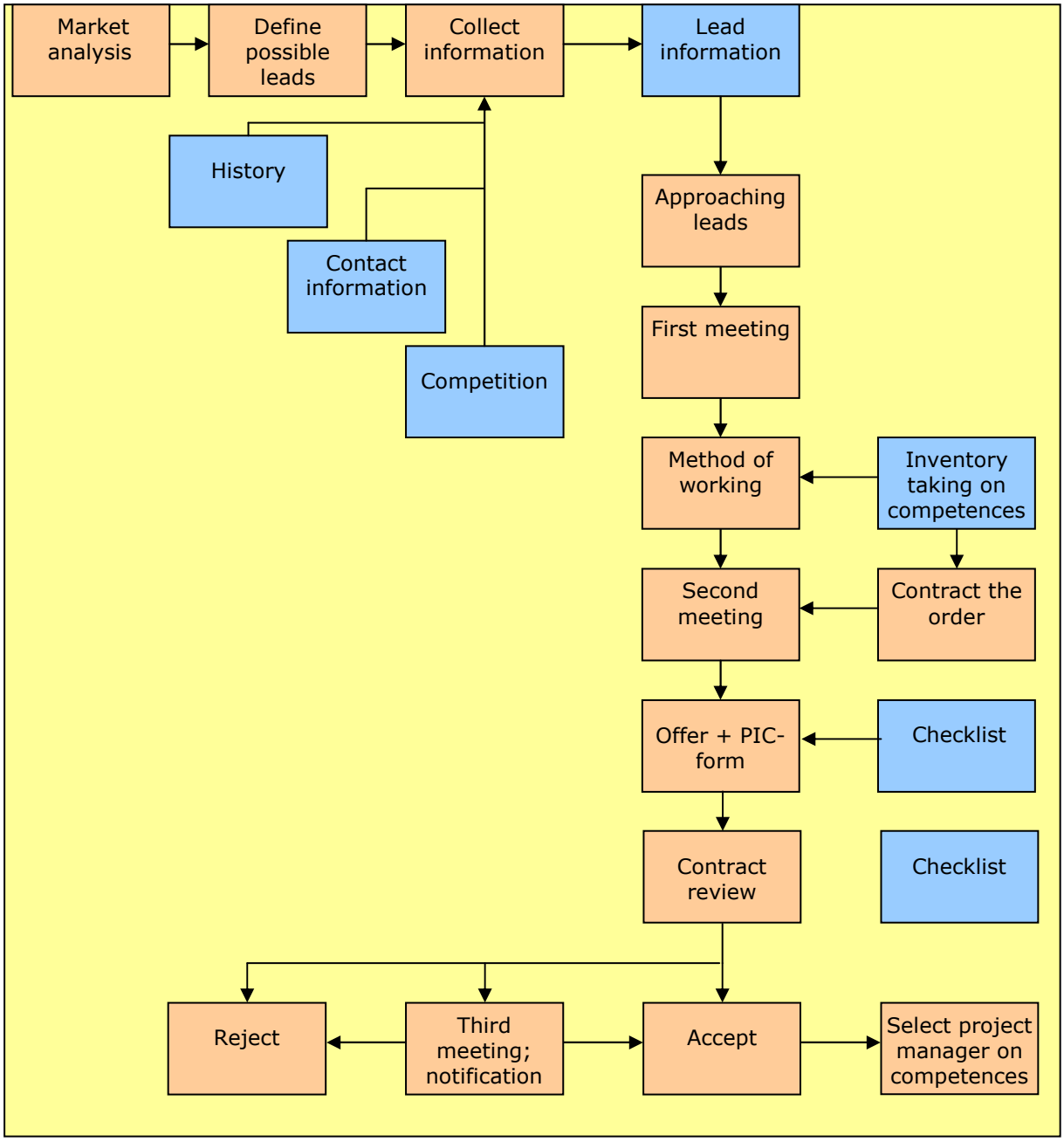
Method	Form of research question	Requires control of behavioural events?	Focuses on contemporary events?
Experiment	how, why?	yes	yes
Survey	who, what, where, how many, how much?	no	yes
Archival analysis	who, what, where, how many, how much?	no	yes/no
History	how, why?	no	no
Case study	how, why?	no	yes

(Yin, 2009)

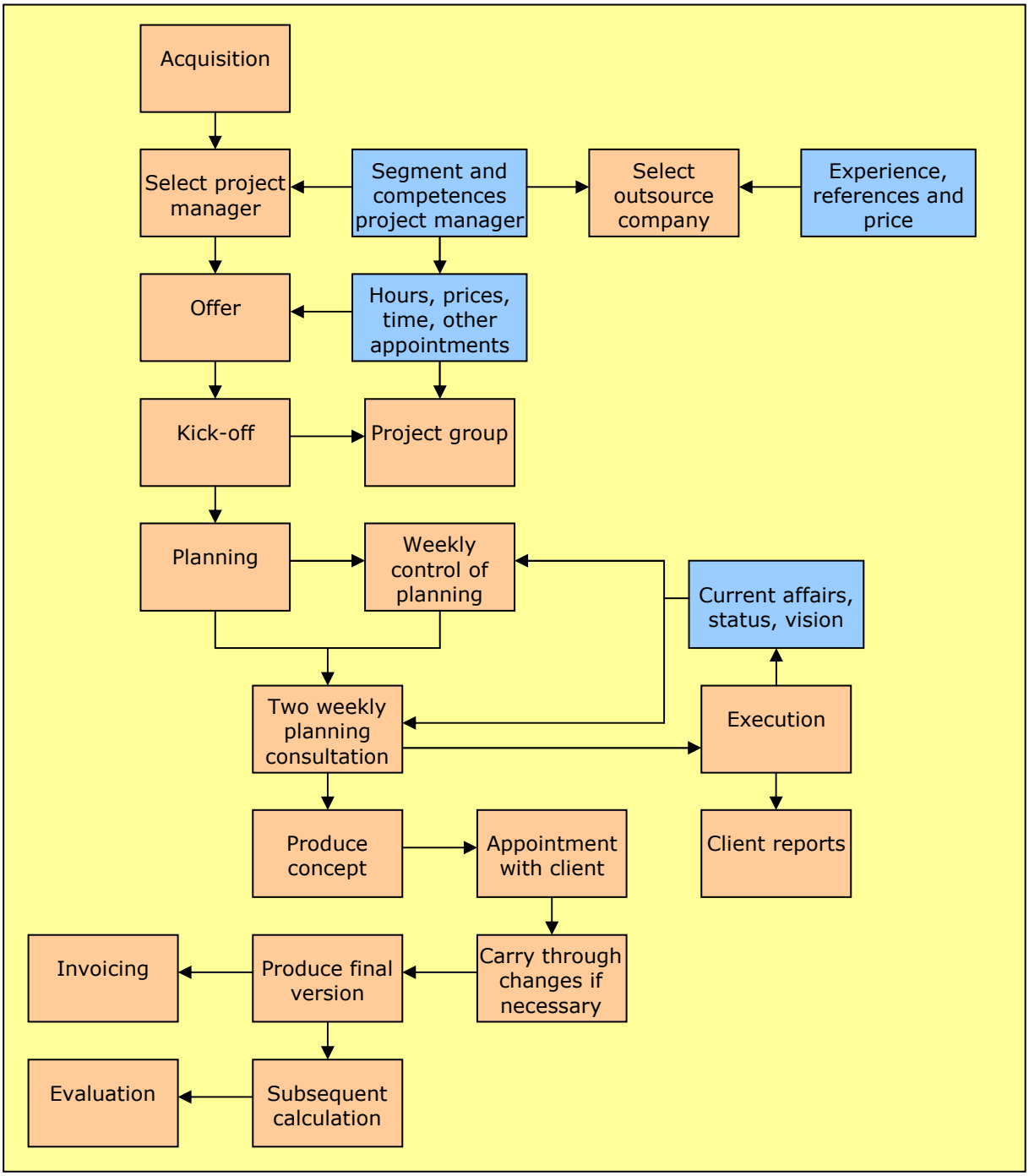
Appendix 9. Questionnaire for the research projects

Level	Question
1	- what is your function inside Nibag? - what is your role in this particular project?
2	- how does the planning of this project look like? o is the project fulfilling the planning so far? why not? - what are the basic processes of this project? o how much people you need per process? o what is the lead time? o what is the processing time? - which information flows were there? o is it an electronic flow or not? o between who is the flow (planning, management team, work floor, project leader)? - what are the wastes within processes/project? o were there wastes of overproduction? which? examples.. o were there wastes of motion? which? examples.. o were there wastes of inventory? which? examples.. o were there wastes of transportation? which? examples.. o were there wastes of waiting? which? examples.. o were there wastes of underutilized people? which? examples.. o were there wastes of defects? which? examples.. o were there wastes of over processing? which? examples.. - what is the budget of the project? o can you keep the project inside the budget? why not?
3	- are there differences/similarities between the successful and the flopped case? o which? o can you explain these?
4	- what is the meaning or value of this project for the whole research? - is what we see at this project typical for the organization Nibag?
5	- what says this project about the quality policy inside Nibag? - what can we conclude about the quality policy of Nibag?

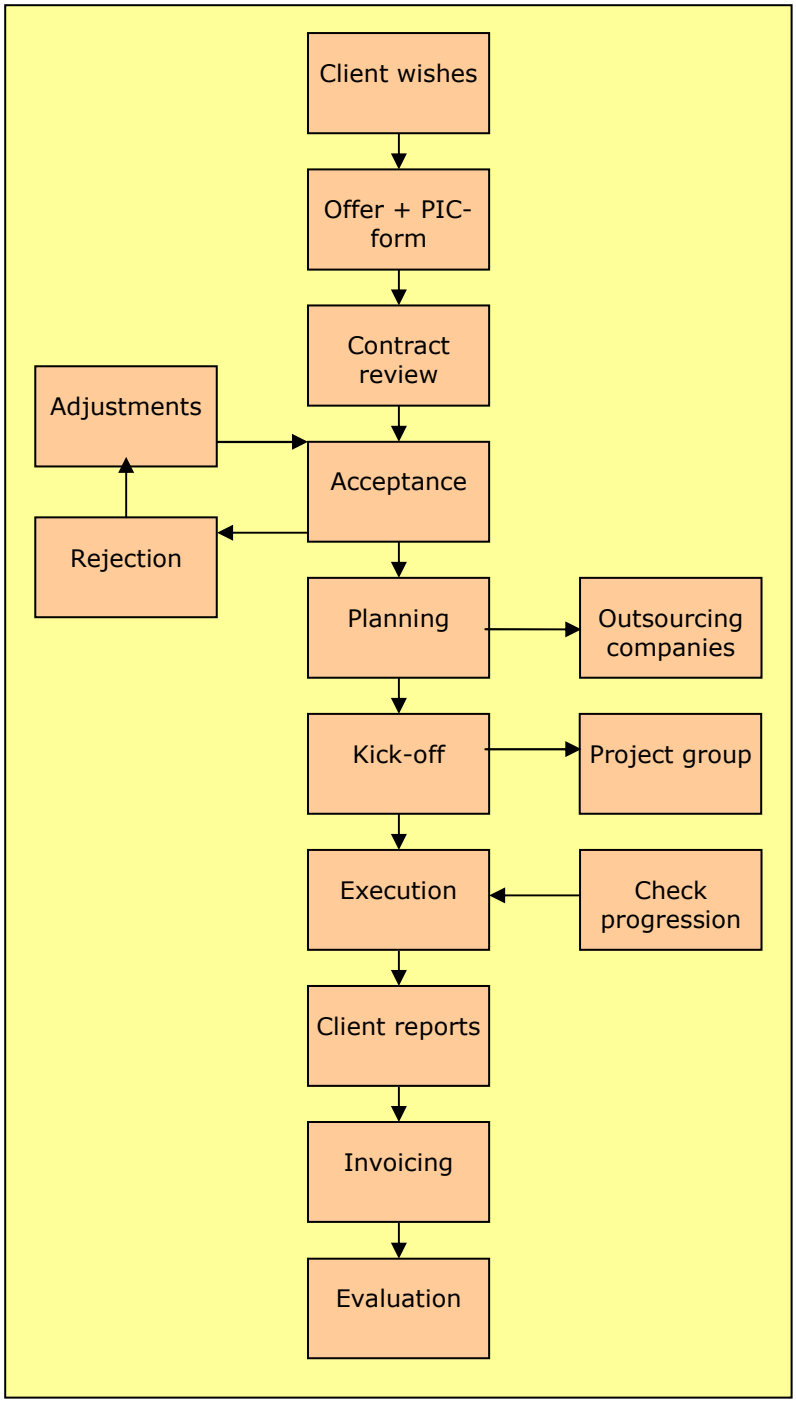
Appendix 10. Current sales process



Appendix 11. Current planning process



Appendix 12. Current total process



Appendix 13. Interview with Project worker A

Interview project worker A **MJOP Aanmeer 2009**

Algemeen

- Wat was jouw rol in dit project en in onderstaande fasen?
- Het proces bestond volgens de documenten uit de volgende 10 stappen, klopt dit?
    1. intake met verantwoordelijke
    2. verzamelen van NAW-gegevens
    3. verzamelen van gegevens contactpersonen
    4. verzamelen van bouwkundige tekeningen
    5. inspecties
    6. uitwerken van schriftelijke rapportage
    7. uitwerken van de onderhoudsbegroting
    8. het maken van de lijnenschets
    9. aanleveren concept rapport
    10. aanleveren definitieve rapport
- Invulformulier

Verspillingen

9. Onnodige beweging van mensen
- Was alle informatie beschikbaar of moest je vaak langslopen bij collega's?
- Moest je vaak naar de planning vragen van het project of was altijd duidelijk wanneer je wat moest doen?
- Hoe ben je omgegaan met het probleem van de grote afstand tussen Oldenzaal en Aanmeer?
- Hoe verliep de communicatie tussen Nibag, de gemeente Aanmeer en de verschillende schooldirecteuren? Zou een soort 'portal' waar alle partijen in kunnen loggen handig zijn?
- Hoe verliep de communicatie tussen jou, je collega's en de projectleider?
- Wat vind je van de tweewekelijkse overleggen m.b.t. de planning? Noodzakelijk?
- De gemeente Aanmeer en de scholen hebben gedeeltelijke verantwoordelijkheid m.b.t. het onderhoud. Namen beide partijen deze verantwoordelijkheid?

10. Overproductie
- Lag er wel eens werk op je bureau te wachten totdat je eraan kon beginnen?
- Of bleef jouw werk te lang bij een collega liggen, voordat hij eraan begon?
- Wegens het ontbreken van actuele tekeningen moest er extra werk plaatsvinden, ging de gemeente Aanmeer hiermee akkoord?

11. Onnodige voorraad
- Wat vind je van alle mappen, dossiers, papierwerk dat in elk kantoor te zien is? Zou dit niet meer gedigitaliseerd moeten worden?

12. Onnodig transport van documenten/materialen
- Heb je in dit project last gehad van de afstand tussen Oldenzaal en Uden?

13. Onnodig wachten
- Kon je altijd snel alle benodigde informatie vinden of kostte het soms veel tijd om bijv. klant informatie of project voortgang te vinden?
- Wat vind je van de harde schijf van Nibag? Kun je er makkelijk mee werken?
- Zou het makkelijker zijn geweest als er meer standaarddocumenten worden gemaakt m.b.t. deze en andere MJOP-projecten? (offertes, plan van aanpak, contracten etc.)
- Hoe was de rol van de projectleider? Liet hij je je gang gaan of zat hij je telkens aan te sporen?

14. Fouten
- Zijn er aanwijsbare fouten gemaakt in het project?
- Is er een evaluatie gedaan? Wat heb je ervan geleerd?

15. Overbodig werk
- Wat vind je ervan dat veel documenten, zoals offertes, eerst moeten worden gecontroleerd?
- Zouden technische hulpmiddelen dit soort projecten kunnen versimpelen?

Appendix 14. Formulary about project *MJOP* Aanmeer 2009

Invulformulier **MJOP Aanmeer 2009**

1. Processtappen
Het MJOP project Aanmeer 2009 doorloopt de onderstaande 10 stappen. De vraag is per processtap:
- hoeveel verschillende mensen heeft Nibag ingezet om de processtap te doorlopen?
- wat was de 'lead time*' van de proces stap?
- wat was de 'processing time**' van de proces stap

Probeer onderstaand schema **zo goed mogelijk** in te vullen.

Proces stap	Hoeveel mensen?	Lead time*	Processing time**
1. Intake-gesprek			
2. NAW-data verzamelen			
3. Contactpersonen gegevens verzamelen			
4. Bouwkundige tekeningen verzamelen			
5. Inspecties			
6. Schriftelijke rapportage			
7. Onderhoudsbegroting			
8. Lijnenschets			
9. Concept rapport			
10. Definitieve rapport			

*= 'lead time' is de tijdsperiode tussen de start van het ene proces stap en de start van de volgende proces stap. Dus bijv. de tijd tussen de start van het doen van de inspecties en de start van het schriftelijk rapporteren is 15 werkdagen. Voor de laatste proces stap (het definitieve rapport) geldt de tijd tussen de start van het aanleveren van het definitieve rapport en de afsluiting van het project.

**= 'processing time' is de tijdsperiode die daadwerkelijk waarde toevoegt aan de proces stap (waar de klant voor betaalt). Dus bijv. de tijd die het kost om de NAW-data te verzamelen is 60 minuten.

2. Planning
Om het proces te doorlopen is er een planning gemaakt waarin alle 7 processtappen één voor één dienden te worden uitgevoerd. Vul in of de planning wel of niet is gehaald. Onder de tabel kan worden toegelicht waarom dit niet het geval was.

Proces stap	Planning	Wel/niet gehaald

1. Intake-gesprek		
2. NAW-data verzamelen		
3. Contactpersonen gegevens verzamelen		
4. Bouwkundige tekeningen verzamelen		
5. Inspecties		
6. Schriftelijke rapportage		
7. Onderhoudsbegroting		
8. Lijnenschets		
9. Concept rapport		
10. Definitieve rapport		

Waarom niet?
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Appendix 15. Formulary about project *MJOP* BZVG 2009

Invulformulier **JOP BZVG 2009**

1. Processtappen
Het JOP project BZVG 2009 doorloopt de onderstaande 7 stappen. De vraag is per processtap:
- hoeveel verschillende mensen heeft Nibag ingezet om de processtap te doorlopen?
- wat was de 'lead time*' van de proces stap?
- wat was de 'processing time**' van de proces stap

Probeer onderstaand schema **zo goed mogelijk** in te vullen.

Proces stap	**Hoeveel mensen?**	**Lead time***	**Processing time****
1. concept jaarplan			
2. bespreking concept			
3. definitieve jaarplan			
4. voorbereiding			
5. inkoop			
6. uitvoering			
7. evaluatie			

*= 'lead time' is de tijdsperiode tussen de start van de ene proces stap en de volgende proces stap. Dus bijv. de tijd tussen de start van het maken van het concept jaarplan en de start van de bespreking van dit concept is 15 werkdagen. Voor de evaluatie geldt de tijd tussen de start van de evaluatie en de afsluiting van het project.

**= 'processing time' is de tijdsperiode die daadwerkelijk waarde toevoegt aan de proces stap (waar de klant voor betaalt). Dus bijv. de tijd die het kost om het concept jaarplan te bespreken is 45 minuten.

2. Planning
Om het proces te doorlopen is er een planning gemaakt waarin alle 7 processtappen één voor één dienden te worden uitgevoerd. Vul in of de planning wel of niet is gehaald. Onder de tabel kan worden toegelicht waarom dit niet het geval was.

Process stap	Planning	Wel/niet gehaald
1. concept jaarplan	oktober 2008	
2. bespreking concept	december 2008 / januari 2009	
3. definitieve jaarplan	januari 2009	
4. voorbereiding	january t/m september 2009	
5. inkoop	january t/m september 2009	
6. uitvoering	january t/m september 2009	
7. evaluatie	september / oktober 2009	

Waarom niet?
1.
2.
3.
4.
5.
6.
7.

Appendix 16. Interview with project worker B

Interview project worker B **JOP BZVG 2009**

Algemeen
- Wat was jouw rol in dit project?
- Het proces bestond volgens de documenten uit de volgende 7 stappen, klopt dit?
    1. genereren van het concept jaarplan 2009
    2. bespreken van het concept jaarplan met BZVG
    3. genereren van het definitieve jaarplan 2009
    4. voorbereiden van jaarwerkplan
    5. inkopen voor het jaarwerkplan
    6. uitvoering van het jaarwerkplan
    7. evaluatie van het jaarwerkplan voor 2009
- Invulformulier

Verspillingen

16. Overproductie
- Lag er wel eens werk op je bureau te wachten totdat je eraan kon beginnen?
- Of bleef jouw werk te lang bij een collega liggen, voordat hij eraan begon?

17. Onnodige beweging van mensen
- Was alle informatie beschikbaar of moest je vaak langslopen bij collega's?
- Moest je vaak naar de planning vragen van het project of was altijd duidelijk wanneer je wat moest doen?
- Hoe ben je omgegaan met het probleem van de grote afstand tussen Oldenzaal en de BZVG-vestigingen?

- Hoe verliep de communicatie tussen jou, de projectleider, je andere collega's, BZVG, de derde partijen? Zou een soort 'portal' waar alle partijen in kunnen loggen handig zijn?
- Wat vind je van de tweewekelijkse overleggen m.b.t. de planning? Noodzakelijk?

18. Onnodige voorraad
- Wat vind je van alle mappen, dossiers, papierwerk dat in elkaar kantoor te zien is? Zou dit niet meer gedigitaliseerd moeten worden?

19. Onnodig transport van documenten/materialen
- Heb je in dit project last gehad van de afstand tussen Oldenzaal en Uden?

20. Onnodig wachten
- Kon je altijd snel alle benodigde informatie vinden of kostte het soms veel tijd om bijv. klant informatie of project voortgang te vinden?
- Wat vind je van de harde schijf van Nibag? Kun je er makkelijk mee werken?
- Zou het makkelijker zijn geweest als er meer standaarddocumenten worden gemaakt m.b.t. deze en andere MJOP-projecten? (offertes, plan van aanpak, contracten etc.)
- Hoe was de rol van de projectleider? Liet hij je je gang gaan of zat hij je telkens aan te sporen?

21. Fouten
- Zijn er aanwijsbare fouten gemaakt in het project? (bijv. documenten kwijtgeraakt) Welke?
- Is er een evaluatie gedaan? Wat heb je ervan geleerd?

22. Overbodig werk
- Wat vind je ervan dat veel documenten, zoals offertes, eerst moeten worden gecontroleerd?
- Zouden technische hulpmiddelen dit soort projecten kunnen versimpelen?