

## MASTER

### Improving the economic profit by creating a better balance between profit and costs of using capital

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# Final Report

## Improving the Economic Profit by Creating a Better Balance Between Profit and Costs of Using Capital



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## **I. List of used Acronyms**

AG	Advisory Group
BBIC	Balanced Business Improvement Card
CF	Cash Flow
COC	Costs of using Capital
DAG	Director Advisory Group
EVA	Economic Value Added
HRM	Human Resource Management
ICT	Information and Communication Technology
IPV	Index of Present Value
IRR	Internal Rate of Return
KPI	Key Performance Indicator
MT	Management Team
NOR	Non Order Related
NPV	Net Present Value
PAF	Project Authorization Form
PI	Profitability Index
RH	Royal Haskoning
RI	Residual Income
RM	Revenue Management
ROE	Return on Equity
ROI	Return on Investment
SBAH	Stichting Beheer van Aandelen Haskoning
SMART	Specific, Measurable, Attainable, Realistic and Tangible
WACC	Weighted Average Cost of Capital
WIP	Work In Progress

\* *In appendix E, the same list of acronyms can be fold open*

## **II. Abstract**

This study is aiming at analyzing and improving the organizational processes for project value measurement and creation at Royal Haskoning, a consultancy organization with about 3200 employees. The study applies to the decision making process at the operational level of the organization, especially project acceptance and control. Interventions are focused on creating a better balance between profit and using working capital. This is done by providing information to decision makers about the Net Present Value of projects.

### **III. Preface**

This document is the Master Thesis of my graduation project for Industrial Engineering and Management Science. In this report the results of the study that has been conducted between mid-march 2006 and the end of April 2007 are described.

This study provides founded interventions that can help improving the added value of the projects, and thus the organization as a whole. I truly hope that the designed interventions are implemented in the current processes and that it will help to create a prosperous future for Royal Haskoning and their employees.

Although it was difficult at times to find the right structure for reporting this rather unique combination of implementing value measurement techniques in a project based consultancy organizations, I find myself very proud of the results that are delivered.

Here, I would like to use the opportunity to thank those that have helped and supported me during this study. First of all I want to thank Drs. F.P.D. van Bel and Dr. A. Kastelein for the pleasant cooperation. Besides sharing some interesting stories, they also provided me with useful directions for my study. It was a pleasure working with them.

I couldn't have wished for a better supervisor from Royal Haskoning. Ir. M.W. Wise-Hoevenaars MBA was always there for me when I needed something, whether it was a good conversation or some help with finding the right persons to interview. Thank you.

Thanks to my kind roommates at Royal Haskoning that were always there to help me, I have enjoyed working there. Thanks Mojgan, Alexander, Cindy, Liesette and Fieroza. I will miss working with you on a daily basis.

Finally, I would like to thank my friends and family for the enjoyable quality time I had with them and my parents for supporting me and believing in me, especially during the last phase of this study.

Daan Loonen  
Blitterswijck, April 2007

#### IV. Management Summary

This study is based on a problem statement that was determined after an initial analysis of the current situation with regard to cash flow management was made. The problem, for which the report presents an analysis, interventions and an implementation plan, is:

*The current form of cash flow management on project level does not lead to a decision making process which is based on creating value, but on creating profit. This has a negative influence on the economic value of projects, due to the decisions about future cash flows that are made during the project's acceptance, execution and evaluation phase.*

The literature study provided fundamental information about what the added value of a project for the organization is. This is not measured in profit, but in Net Present Value (NPV). The difference between those two figures is the costs that are linked to the capital that is used for doing the project, also called opportunity costs of working capital. Focusing on profit leads to a situation in which the importance of working capital reduction is undervalued.

This conclusion has a large effect on project acceptance. Currently, project acceptance is mainly based on the profit and profit margin forecasts in the Project Authorization Form (PAF). The first step in improving current cash flow management processes is to start with creating NPV and Index of Present Value (IPV) forecasts during the proposal phase. The IPV is like the profit margin, but based on the NPV. To calculate both NPV and IPV, a cash flow forecast has to be made. This includes information about invoicing, terms of payment and moment of creating costs.

The Advisory Group Director (DAG) must interpret the information presented by the PAF and decide whether the proposal can be sent to the client. To do this properly, the primary target has to be: **optimizing the NPV of the advisory group**. Therefore, an extra cost component "cost of working capital" should be added to the budget of an advisory group, the amount of this component should be subtracted from the advisory group profit and lead to the added value of an advisory group. Attaining the added value of an advisory group should become the key performance indicator of an advisory group. This will lead to project acceptance based on optimizing the added value of the advisory group.

The next step in optimizing the NPV of projects after they are accepted, is to monitor the cash flows during the project execution phase and compare the findings with the planning. The financial consequences of the deviations between actual and planned results can be provided in redesigned reports. This information will stimulate project managers to be on-time with invoicing, and other cash flow aspects like making sure that clients live up to the terms of payment. This intervention on monitoring cash flows is more complex than the proposed interventions during the project acceptance phase, mainly because the input and output of Agresso (the main financial information database) has to be changed.

When the available cash flow, due to the reduction of working capital, can be reinvested at an 8% rate of investment; the interventions on the project proposal phase and advisory group budgeting lead to an increased profit of about 500.000 euro per year. If also the proposed interventions with regard to project monitoring and evaluation are implemented, the increase in yearly profit is forecasted to be about 1.000.000 euro.

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## **1. Introduction and Problem Statement**

### **1.1 Introduction**

Organizations that are performing in a competitive environment with small profit margins need an extra focus on efficiency because a small difference in the profit margin has a relatively large impact on being financially successful. There are several ways to become more efficient, one of them is optimizing the quality of decision-making. The giant leap in ICT and computer power leads to a situation in which all kinds of information can be captured in databases. A proper query system can subtract useful information that can be provided to those who need it for decision-making. The enormous amount of available information makes it difficult to determine what information should be provided to whom and at what time. Management accounting is a discipline that helps structuring the information flows to achieve an efficient working environment where decisions are based on the right information.

The study that is reported here is intended to improve the added value of Royal Haskoning in the future due to proper use of management accounting techniques. Royal Haskoning is one of the leading engineering companies in The Netherlands with total sales of 280 million Euro and approximately 3200 employees worldwide in 2005. It is working in an environment with increasing competitiveness and relatively low profit margins.

1.2. Structure of the study

The structure of the study is based on the Ten-Steps-Plan of Kempen and Keizer (2000). The structure is shown in figure 1.1. The execution of this study is based on this structure.

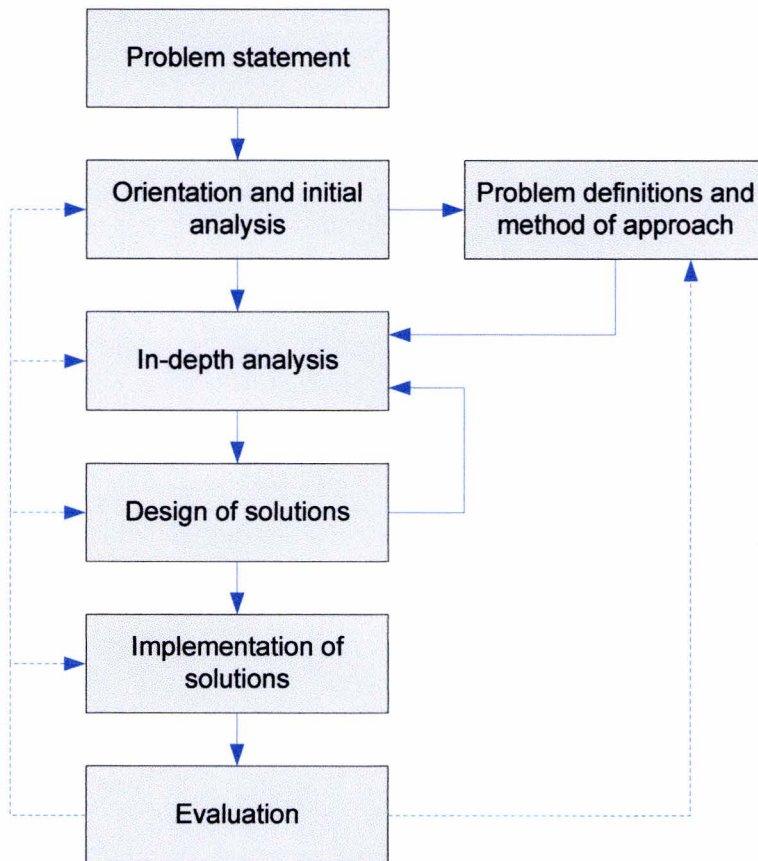


Figure 1.1: Structure of study

The study finds its origin in the problem as stated by Royal Haskoning, this problem statement is provided in the next section (1.3). Section 1.4 shows the research plan for the orientation and initial analysis. The results of this initial analysis are presented in chapters two and three. This information is used to base the problem definition on that is presented in chapter four. In chapter five, a method of approach to the in-depth analysis is presented. This method of approach provides the structure for that part of the study, including a research model for the subsequent phases of this study.

### 1.3. Problem statement

Through continues improvements, Royal Haskoning is improving its competitiveness. The last few years the profit is increasing, unfortunately the amount of capital that is used to realize this profit is also increasing. Even though the profitability of Royal Haskoning is also increasing, the financial staff of Royal Haskoning thinks that the amount of working capital (relative to the turnover) can be reduced substantially to increase both profit and profitability even further.

The financial staff of Royal Haskoning is not content with the lack of focus on working capital through the organization. The value of possible acquisitions is currently calculated though the Economic Value Added (EVA) method. Therefore they think that EVA also might help creating focus on working capital within Royal Haskoning. This belief leads to the following question that resulted in this study:

*Can you find out what the advantages and disadvantages of implementing Economic Value Added (EVA) are, and to what problems the implementation of EVA might lead.*

After some discussion about the reasoning behind this question, it became clear that the following research question is more precisely related to the problem:

*The current form of cash flow management on project level does not lead to a decision making process which is based on creating value.*

In chapter three will be explained what the difference between added value and profit is, and how important it is to focus on value, instead of profit.

### 1.4. Description of research model for orientation and initial analysis

The research model, presented in figure 1.2, is used to obtain: 1. the current situation at Royal Haskoning with regard to project cash flow management and value management, and 2. a frame of reference as provided by the literature. From the discrepancy between these two findings, a problem definition is obtained and research questions are determined.

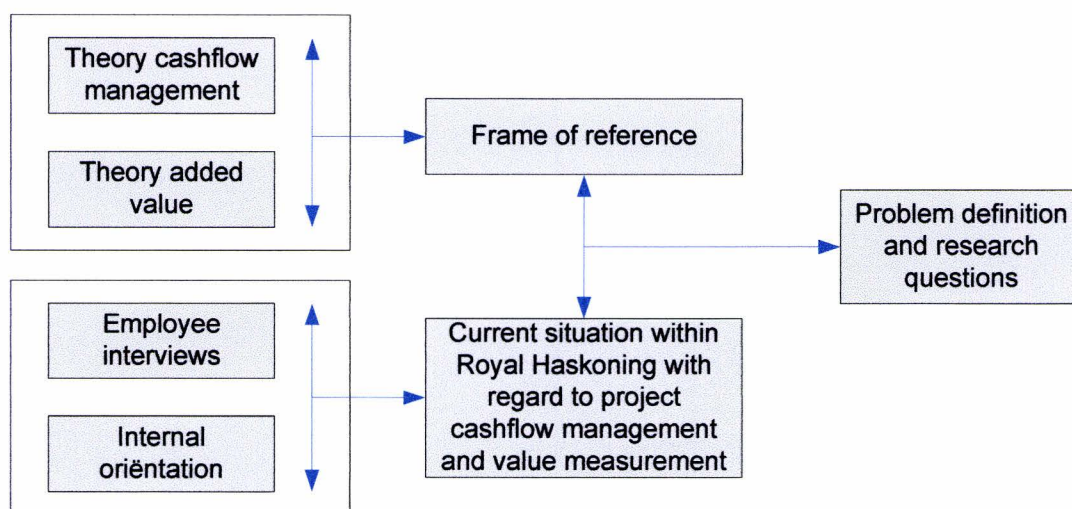


Figure 1.2: Research model according to Verschuren & Doorewaard

### **1.5. Methods of information gathering**

To be able to see what the actual problem with regard to cash flow management and value measurement at Royal Haskoning is, a literature review is done to provide a reference about cash flow management and value measurement techniques.

In order to get an overview about the current situation at Royal Haskoning with regard to project cash flow management and value management the following information gathering techniques are used:

#### **1. Semi-structured interviews**

Interviewing employees in different functions provide insight in the experience of project cash flow management from different point of views.

#### **2. Documentation**

Gathering and studying diverse documents about actual operational processes with regard to project cash flow management and value measurement.

#### **3. Reporting**

Studying the different reports used to inform project managers and advisory group managers

## 2. Royal Haskoning

### 2.1. Organizational structure of Royal Haskoning

Compared to a more general presentation of the organizational structure, the one of Royal Haskoning is presented up side down. This is done to emphasize the importance of its clients.

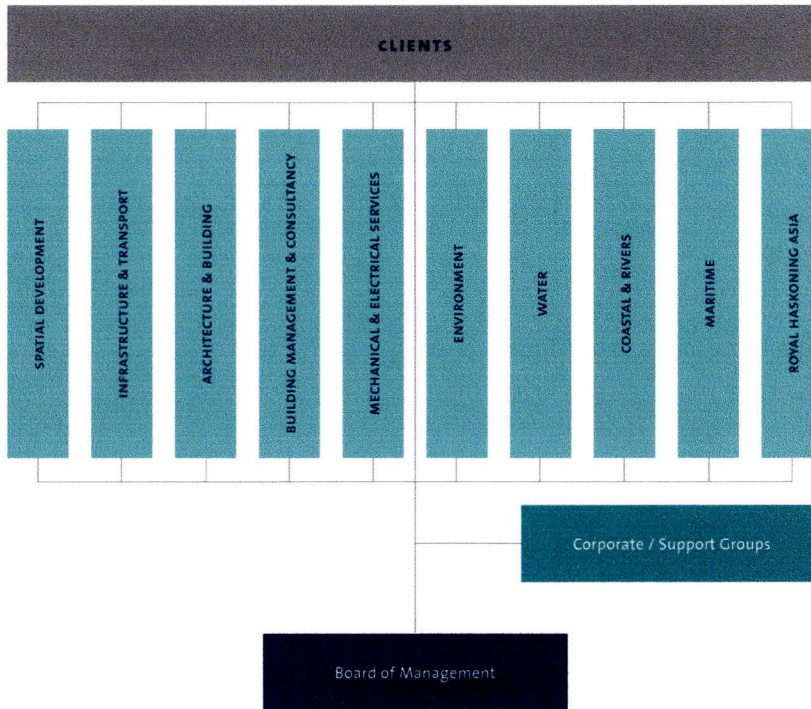


Figure 2.1: Organizational structure of Royal Haskoning

The functional diagram provides more insight in the hierarchy within Royal Haskoning, this study is performed under the management of corporate group finance. In total there are ten Divisional Directors and about eighty Advisory Group Directors. The Board of Management, Director Group Finance, Director HRM and the Divisional Directors are the members of the Management Team. Figure 2.2 provides a graphical overview.

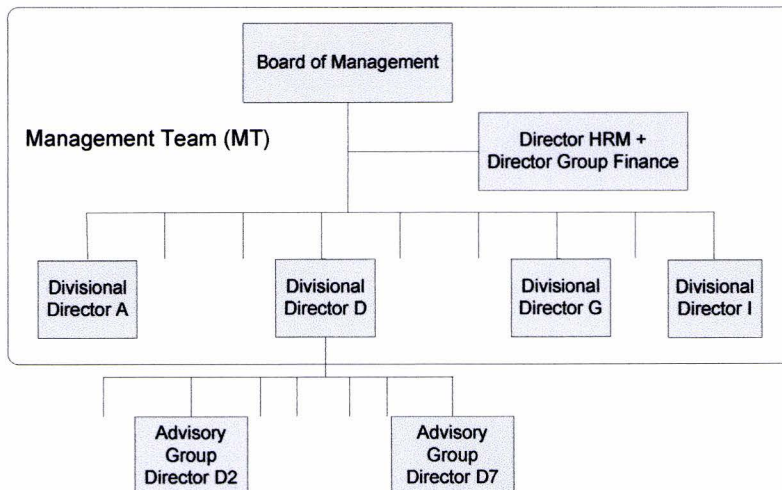


Figure 2.2: Functional structure of Royal Haskoning

2.2. Ownership structure

On the fourth of January 1980 the ownership structure changed from a partnership with seventeen partners to a private limited company. This was done to limit the personal responsibilities of the partners with regard to Haskoning. Later that year the “Stichting Beheer van Aandelen Haskoning” was created; its purpose was, and still is, to manage the shares of “Koninklijke Haskoning Groep B.V.” and “B.V. Gemeenschappelijk Bezit Aandelen Haskoning”. “Stichting Beheer van Aandelen Haskoning (SBAH)” is the owner of “B.V. Gemeenschappelijk Bezit Aandelen Haskoning” which owns 20% of the shares of the “Koninklijke Haskoning Groep B.V.”; the other 80% is owned by “Stichting Beheer van Aandelen Haskoning”. The shares owned by “B.V. Gemeenschappelijk Bezit Aandelen Haskoning” are certified and through “Stichting Spaarloon I” partly owned by employees. Figure 2.3 is made to make the situation more visible

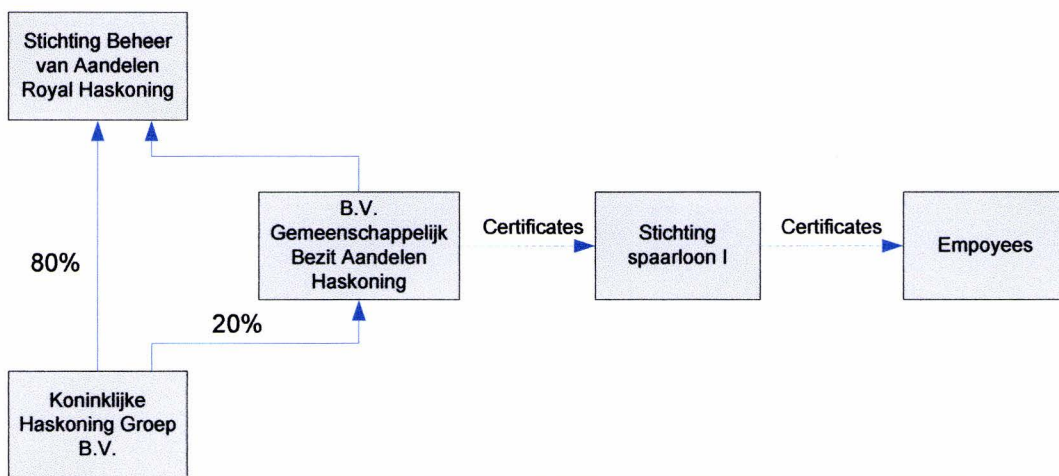


Figure 2.3: Ownership structure “Koninklijke Haskoning Groep B.V.”

The certificates owned by the employees can only yearly be traded with the “Stichting Spaarloon I”. Once a year the price of a certificate (and a share) is calculated by dividing the book value of the equity of Royal Haskoning by the total number of shares (the value of a certificate is exactly the same as the value of a share); this is the price employees get for their certificates. Some adjustments can be made with regard to the depreciation of goodwill; Royal Haskoning tries to minimize these adjustments.

The only way to buy certificates is through the use of the “spaarloon regeling”. Once a year, when the value of the certificates is calculated, it is possible to trade certificates for a period of two months. All employees are given the opportunity to sell all certificates they own (I will not explain the used tax regulations for the employees), the amount of certificates they can buy is limited by the amount that can be saved through the “spaarloon regeling” which is about 1250 euro per year per employee. When all certificated (representing 20% of all shares) are sold to employees, it is not possible to buy any more certificates. Currently it is not likely that this will happen in the near future.

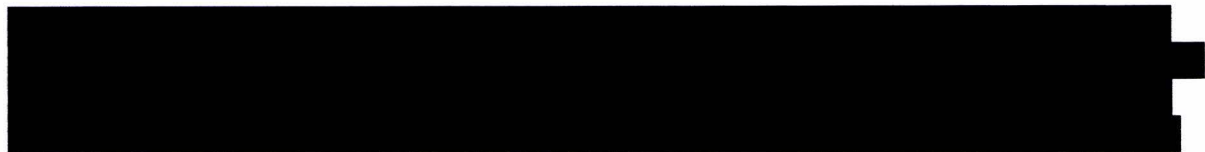


Table 2.1 provides an overview of all share- and stakeholders with their personal financial objectives and decision authorization.

Shareholder / Stakeholder	Financial objectives	Decision maker
SBAH	None	Yes
Certificate holders / Employees	Reduction of total number of shares and an increase in equity	No
Board of Directors, Director Corporate Finance, Director HRM, Divisional Directors and DAG's	Information has not been given	Yes

Table 2.1: Shareholders / Stakeholders

According to the annual report 2005 the following financial objectives are set for 2006:

- An increase in turnover of at least 5%
- Despite investments in the ICT and inflation, the costs of support groups should remain constant. This should be possible through economies of scale
- A profit level that is equal to the average of last two years, €5,5 million
- To increase the liquidity, the focus on working capital reduction still remains. The objective is a positive cash flow that is at least equal to the net profit

### 2.3.2. Reporting

There are about twenty different reports that can be generated, varying from monthly reports to project forecasts. The overview of all mentioned reports is provided in appendix 1. In this paragraph the reports that are used for project and advisory group monitoring are described.

Report	Name	Level	Subject	Target group
AG075	Project Budget	AG	Budget and results per project	Project Management + DAG
AG113	Project Report	Project	AG075 in more detail	Project Management
AG044	Project Forecast	Project	Expected turnover and costs	Project Management
AG100	Monthly report	AG	Results and graphs	DAG
AG032	Project results	AG	Project results	DAG

Table 2.2: Reports

Within Royal Haskoning the format in which information is provided differs between divisions. Advisory group directors also tend to have different ways of informing their project managers. They too have a lot of autonomy with regard to these processes within their advisory group.



Figure 2.4 provides an overview of the reports that project managers are supposed to get. In reality, this is not always the case, but it provides a good understanding of the possibilities of the divisional administration.

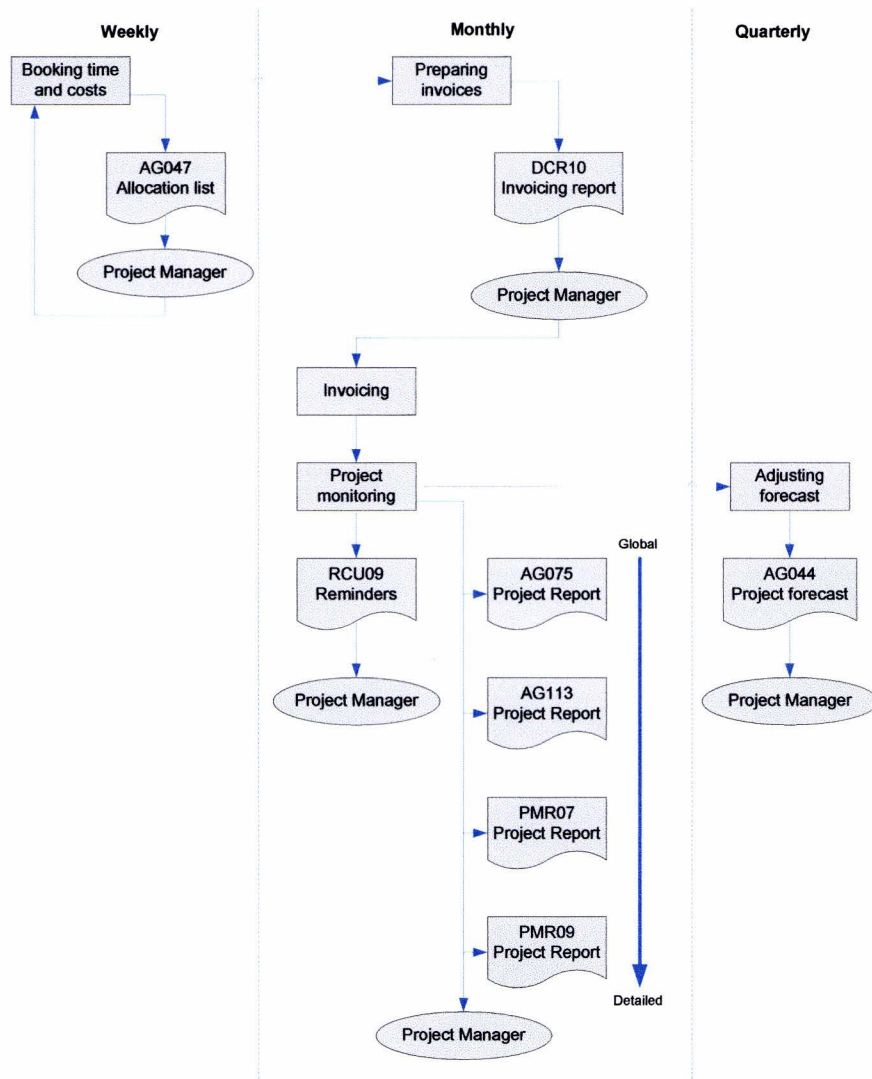


Figure 2.4: Report overview

### **3. Value creation and cash flow management**

#### **3.1. Introduction**

In today's business, efficiency is very important. Whether it is the small grocery store which has to compete with a supermarket, or two big steel producing companies, efficiency is one of the main issues in being competitive. There are a lot of aspects within a company that can or cannot be efficient, for instance: acquiring good employees, marketing, logistics, operational processes, etc.

The problem statement, as provided in section 1.3, shows that the financial staff of Royal Haskoning has the feeling that the efficiency at project level can be increased by making use of modern cash flow management techniques. Before the impact of cash flow management on the efficiency can be provided, the value of a project has to be determined. Section 3.2 will provide information on value measurement, and section 3.3 provides information on cash flow management techniques.

**3.2. What is the value of a project?**

First, the term “project” has to be defined:

An effort performed by the staff of Royal Haskoning to fulfill a client’s need, resulting in one or more payments by the client.

To be able to compare several methods of value determination there are two examples given of the same project with different moments of payment by the client. In example 1 the client pays on a monthly basis. In example two the client pays after three milestones in the project. Both projects cost € 108.000 to do and the client has to pay € 120.000 to get it done. It takes 12 months to complete the project and each month € 9.000 costs are made. The following table provides the cash flows of each project:

Month	Project 1		Project 2	
	incoming cash-flow (CF)	outgoing CF	incoming CF	outgoing CF
1		9.000		9.000
2	10.000	9.000		9.000
3	10.000	9.000		9.000
4	10.000	9.000		9.000
5	10.000	9.000	40.000	9.000
6	10.000	9.000		9.000
7	10.000	9.000		9.000
8	10.000	9.000		9.000
9	10.000	9.000	40.000	9.000
10	10.000	9.000		9.000
11	10.000	9.000		9.000
12	10.000	9.000		9.000
13	10.000		40.000	
Total	120.000	108.000	120.000	108.000

Table 3.1: Project cash flows

The profit of each project is 12.000, the profit margin is: (profit / total) costs \* 100% = (12.000/108.000) \* 100% = 11,1%

According to Bierman & Smidt (1988): “One of the basic concepts of business economics and managerial decision making is that the value of an amount of money is a function of the time of receipt or disbursement of the cash.

The concept “time value of money” determines that a euro today is worth more than a euro next year. This is true when interest is positive, for instance 8%. A euro today would be worth 1,08 euro next year, which is more than one euro. What does this concept means for the value of the two projects? Project 1 will be worth more because the incoming cash flows are earlier in time.

There are several “discounted cash flow methods” that take the time value of money into consideration in this example the most well known method, Net Present Value (NPV), is used. According to the NPV the values of project 1 and 2 are respectively 10776 and 9678. This means that project 1 is worth 11% more than project 2.

In the next table the calculations for the NPV are given. The number 0.644% is the monthly interest percentage that leads to 8% per year:  $1.00644^{12} = 1.08$ . This figure is based on several WACC calculations that are made in Appendix D.

Month (t)	r = 1.00644		Project 1		Project 2	
	Discount factor = $1/r^t$		effective CF	Value at t=0	effective CF	Value at t=0
	A		B	C=A*B	D	E=A*D
1	0.994		-9000	-8942	-9000	-8942
2	0.987		1000	987	-9000	-8885
3	0.981		1000	981	-9000	-8828
4	0.975		1000	975	-9000	-8772
5	0.968		1000	968	31000	30022
6	0.962		1000	962	-9000	-8660
7	0.956		1000	956	-9000	-8605
8	0.950		1000	950	-9000	-8550
9	0.944		1000	944	31000	29261
10	0.938		1000	938	-9000	-8441
11	0.932		1000	932	-9000	-8387
12	0.926		1000	926	-9000	-8333
13	0.920		10000	9200	40000	36800
<b>Total</b>			<b>12000</b>	<b>10777</b>	<b>12000</b>	<b>9678</b>

Table 3.2: NPV of projects 1 and 2

Because the money that is used in an organization is not only borrowed, but also provided by shareholders, using merely the interest percentage is not correct. The WACC is a method that provides a more correct percentage to use for discounting future cash flows in projects. More information about the theoretical basics of the WACC can be found in Appendix C.

### 3.3. What is cash flow management?

Cash flow management starts when a proposal for a project is made. This proposal functions as a blueprint for all future cash flows of a project. It says something about when invoices are sent, what terms of payment are used, and when costs are made. When a project is accepted, cash flow management continues being an important aspect of project management. Sending invoices according to the agreements and focusing on on-time payment by client are such aspects.

Finally, the management of cash flows can be evaluated to improve cash flow management on future projects

## 4. Problem definition

### 4.1. Introduction

According to the research model, provided in section 1.4., this chapter provides the analysis that leads to a conclusion about the current situation within Royal Haskoning with regard to project cash flow management and value measurement. This chapter ends with the problem definition and the research questions for the in-depth analysis.

### 4.2. Analysis

To get a profound image of the current situation within Royal Haskoning, Semi-structured interview were held with advisory group directors, the finance competence centre manager and quality manager. Besides these interviews, a lot of conversations were held with project managers and the divisional financial administrators. During both the interviews and conversations, a lot of documents were provided that helped creating an image of what information is provided and used by employees that make decisions that influence future cash flows of projects.

#### 4.2.1 Configuration of key elements

There are several phases in a projects lifetime that are characterized by decisions based on provided information. In this section, for three of these phases, the decision making process at Royal Haskoning is described. It starts with the proposal phase, continued by the execution phase and finally the evaluation phase is described.

##### *Proposal phase:*

Almost all proposals are written by the person who will be the manager of the project after the proposal is accepted by the client. Before a proposal is send to a client, the advisory group direct has to approve the proposal. If, for some reason, the expected result of the project is negative, the board of directors has to give its approval for it.

The result of the project is calculated by making assumptions about: 1. the amount of hours particular persons, with particular hourly rates, have to put in the project, 2. other costs, like travel and printing costs, and 3. the total amount of money paid by the client. The result of the project is:  $result = 3 - (1+2)$



*Project execution phase:*

During the project execution phase the project manager is provided with several reports (see section 2.3.2) that give insight in the amount of costs that are made, invoices that are send and money that is paid by clients. This information is provided in several detail levels. When compared with the information that is used for decision making during the proposal phase, it can be concluded that it is the same sort of information that is monitored during execution phase, namely costs and income. It is also the same information that is not taken into account, namely when these cash flows take place.

This does not mean that nothing is done to reduce the amount of working capital. The are debtor reports that provide information about the age of outstanding debtors. This should trigger project managers to respond and contact the debtor.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

### 4.2.2. Conclusion

Even though there is some focus on working capital reduction it is difficult for decision makers to put it in to perspective with regard to the impact it has on the economic value of a project. Figure 4.1 shows the cause and effect diagram of this statement.

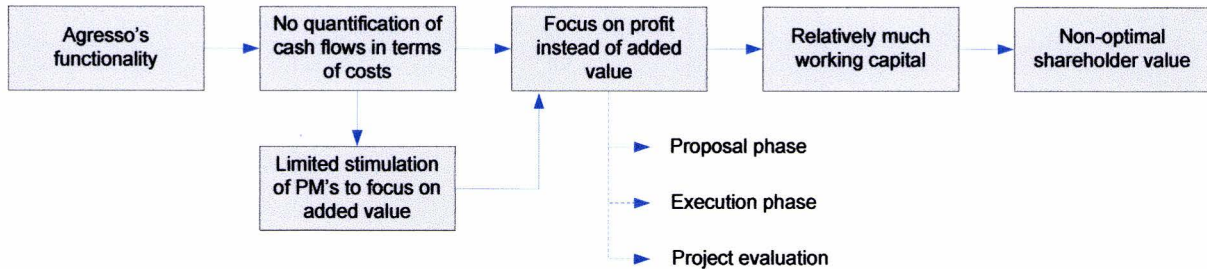


Figure 4.1: Cause and effect diagram



### 4.3 Problem definition

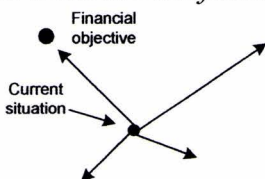
The current project cash flow and value measurement tendencies at Royal Haskoning leave considerable room for improvements. The following problem defines the current problem and is used for further in-depth analysis of this study:

*The current form of cash flow management on project level does not lead to a decision making process which is based on creating value, but on creating profit. This has a negative influence on the economic value of projects, due to the decisions about future cash flows that are made during the project's acceptance, execution and evaluation phase.*

In the next section, research questions are given that are used as a basis for further in-depth analysis that should lead to a more detailed overview of the relevant aspects in terms of literature and the current situation at Royal Haskoning.

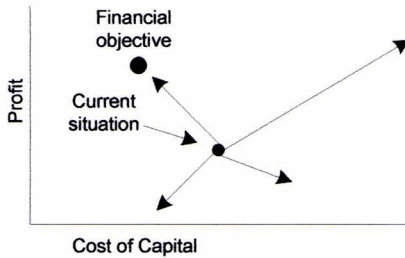
### 4.4 Research questions

1. What are the financial objectives of Royal Haskoning?



There should be a clear and more detailed description of the financial objectives for Royal Haskoning. These objectives should describe to what situation the redesigned system / processes should lead. Think of it as a formula 1 race: you can have the best equipment, but if you don't know where to go you won't win the race.

2. *What information determines to what extend Projects and Advisory Groups are contributing to achieve the financial objectives of Royal Haskoning.*



The answer to this question shows what information must be available to keep track of the achievement with regards to the objectives. Gathering this information on project level will be a powerful mechanism to increase the learning process of project managers and create possibilities to stimulate them properly.

3. *What processes and systems within Royal Haskoning are related to gathering information that is necessary to provide the information as mentioned in the answer in question 2?*

Some of the present processes and systems will be used in the redesigned system. Therefore it is essential to have a complete overview of the present processes and systems that are used for gathering information about projects and its contribution to the financial objectives.

4. *What processes within Royal Haskoning are related to providing information to project managers and advisory group directors to show them to what extend they contribute to the financial objectives?*

The information that is gathered by the processes and systems, mentioned in sub-question 3, has no use at all if it isn't used. The answer to sub-question 4 will explain what information is provided to project managers and advisory group directors, and how this information is provided.

5. *What is the discrepancy between the information that is provided to project managers and advisory group directors and the information that should be provided according to the financial objectives of Royal Haskoning (1)?*

The answer to this question will provide information about the shortcomings of the current information provision during the proposal, execution and evaluation phase. It can be used to determine on what issues should be focused during the design of the interventions.

6. *Are the costs of using capital that is used by Royal Haskoning already included in the hourly rate of the employees?*

If the costs of using capital are already included, the hourly rate should be reduced because the costs of using capital are already paid for through a higher hourly rate.

7. *What are the preconditions for possible interventions?*

Before starting with designing different interventions, it is useful to know what preconditions have to be taken into account when the interventions are designed.



## 5. Method of approach

This chapter describes how the rest of the study is constructed to solve the problem as defined in section 4.3.

*The current form of cash flow management on project level does not lead to a decision making process which is based on creating value, but on creating profit. This has a negative influence on the economic value of projects, due to the decisions about future cash flows that are made during the project's acceptance, execution and evaluation phase.*

First, a literature study is done to provide more in-depth information about project acceptance, capacity planning, project management and project evaluation.

The questions about the current situation at Royal Haskoning that have to be answered are given in section 4.4. These answers are provided in chapter 7 and are based on the knowledge acquired by interviews, conversations and the literature study.

After the answers to the research questions are provided, it becomes clear what interventions can be undertaken and what advantages and disadvantages each intervention has. This information is given in chapter 8. The implementation plan provides a suggestion about the sequence in which several interventions can be implemented. Besides the sequence it will show what aspects of a particular intervention deserve extra attention.

## 6. Literature study

### 6.1. Introduction

Most literature on cash flow management and actual value determination of projects are based on big and long term projects like building a new production facility. In this study a method has to be found that can be used in a consulting environment where thousands of projects are done every year. It is more difficult to find literature about this particular subject than it is for the more general investment problem. The reason for this might be that the total amount of working capital in this sector is relatively small compared to other sectors, like production firms.

When a proposal for a project has to be written, there are two aspects that should always be taken into account to make sure that it suits the current situation within the advisory group.

The first aspect is capacity. In short, when there is a lot of available capacity, a project does not have to be as profitable as when there is hardly any capacity left. Höck (2005) provides an interesting insight about this subject.

The other aspect is the calculation of profitability, or value creation. Section 6.3 is dedicated to the NPV method. The NPV of a project is its true added value. But this method has also its limits, those will be discussed. This will lead to one more section about the “index of present value”.

### 6.2. Decision rules for project acceptance

Capacity planning at service organizations is mostly done by the managers of departments and relies mostly on the experience and feeling of the manager. Michael Höck has written a paper, Revenue Management of Consulting Firms, in which he describes the differences between capacity planning at consultancy firms and the airline industry. Consultancy firms and service organizations will be used as synonyms from this point on. The paper is written with the intent to: “transfer two fundamental control mechanisms popular in the airline industry to the project selection, scheduling and workforce allocation problem of large scale consultancies.” [Höck (2005)].

There are some fundamental differences between the two organization types that make it difficult to transfer the fundamental control mechanisms used by the airline industry. Höck mentions that there are differences in the following business processes: Forecasting, Pricing and Capacity control.

These differences are taken into account during the transformation of the decision rules for project acceptance.

[Höck (2005)]: *“In general, the use of reserve capacity is taken into account in the objective function via penalty costs. The control problem is then to determine the optimal opportunity costs with regard to forecast data available.” “Forecasts in the consulting industry rely primarily on price information, e.g. predicting a trend in the customers’ willingness to pay, while the particular demand structure as well as work contents of future projects is unknown. A simple RM (Revenue Management) concept often used in practice is then to define a target ROI (Return On Investment) for the project selection.”*

Another approach to project selection and price setting can be compared with the Expected Marginal Seat Revenue (EMSR), popular in the airline industry. “Here, two types of resource capabilities – normal and reserve capacity – are distinguished, which both can be utilized to accomplish a project. Reserve capacity is set aside for future, more profitable orders, so that the utilization of this capacity type is associated with opportunity costs (Jacob [19])”

In general the two described methods rely on the same fundament, which is when a relative high capacity load is expected, the profitability of the scarce capacity should be increased. This profit margin management should lead to a more balanced and financially beneficial use of available capacity. To conclude, it can be said that there are mainly two figures that are crucial for proper project acceptance; **(future) occupation rate and the profit margin.**

The current occupation rate of an advisory group is known and the advisory group director should be capable of making a forecast of the future occupation rate. Nevertheless, it should be said that these expectations do influence the project acceptance decisions currently made at Royal Haskoning, but only based on feelings / experience and not on measurements. As mentioned in section 10.4, it could be useful to do another study about the importance of capacity expectations during project acceptance.

It is the profit margin, currently used for project selection, which is the point of discussion in this study. The reason for this, are the findings made in section 3.2 where two identical projects are compared that have the same turnover, profit and profit margin, but due to different moments of payment by the client represent different value.

When the profit margin is used for project selection, it becomes possible that the wrong project is selected due to a difference in the expected moment of payment, and thus amount of working capital involved. The amount of used capacity should be compared with the value it creates. Bierman & Smidt (1988) and Brealey & Myers (2003) have come up with a method that makes it possible to provide a profit margin based on the NPV of a project. To be able to use this method, the NPV has to be known. The next section describes the NPV in detail, including its disadvantages.

### 6.3. Net Present Value

*“The Net Present Value method of evaluating investments is built on the assumption that we can define the appropriate discount rate to be used to find present value equivalents of future sums. If the Net Present Value of the investment’s cash flows is positive, then the investment is acceptable. The output of the net present value method of investment evaluation is an absolute dollar amount.” [Bierman & Smidt (1988)]*

*“The NPV is a direct application of the present value concept. Its computation requires the following steps: (1) Choose an appropriate rate of discount, (2) compute the present value of the cash proceeds expected from the investment, (3) compute the present value of the cash outlays required by the investment, and (4) sum the present values of the proceeds minus the present values of the outlays. The sum is the NPV of the investment.” [Bierman & Smidt (1988)]*

*“The concept of net present value allows efficient separation of ownership and management of the corporation. A manager who invests only in assets with positive net present values serves the best interests of each one of the firm’s owners, regardless of differences in their wealth and tastes.” [Brealey & Myers (2003)]*

Till this point the NPV looks quite promising. In the next section the NPV is put in the context of an important aspect of project selection and evaluation: Ranking projects.

### **Ranking projects according to NPV**

*“Let us consider the use of net present value as a ranking technique. First, the net present value does not tell us how much capital had to be committed to the investment. Two small investments may well be better than one large investment, even though the large investment has a larger net present value than either of the two small investments (but not larger than their sum). Second, the net present value is the result of an assumption about the time value of money that with rationing may not be appropriate. Neither of these difficulties is bothersome in the absence of capital rationing, but with capital rationing, they eliminate present value as an effective means of ranking investments.” [Bierman & Smidt (1988)].*

If a company has unlimited capacity and capital at its disposal, the ranking of projects according to NPV would be correct. As mentioned in the section about the situational aspects of this literature review, the capital budgeting method should be able to determine proper decision rules for a situation in which capacity is limited. The capital use is of subordinate significance. The NPV method is not capable to take the amount of used capacity into account and therefore cannot provide information about the efficiency with which the capacity is used.

In Brealey & Myers (2003) a separate section is dedicated to this limitation. This section starts with the following introduction: *“Our entire discussion of capital budgeting has rested on the proposition that the wealth of a firm’s shareholders is highest if the firm accepts every project that has a positive net value. Suppose, however, that there are limitations on the investment program that prevent the company from undertaking all such projects. Economists call this capital rationing. When capital is rationed, we need a method of selecting the package of projects that is within the company’s resources yet gives the highest possible net present value.”*

Both Brealey & Myers (2003) and Bierman & Smidt (1988) see the need for a method that can help making capital investment decisions when resources are limited. The solution they offer is the Index of Present Value (IPV), also known as the Profitability Index (PI).

### **Conclusion about NPV**

If a manager doesn’t have unlimited capacity and capital at its disposal and he has to make a choice between two projects with known NPV he might still make the wrong choice. The reason for this is the lack of information about the total use of capacity.

In the next section a method is discussed that, according to both Brealey & Myers (2003) and Bierman & Smidt (1988), provide a solution that helps making the right investment decisions when resources are limited.

**6.4. The index of present value**

Brealey & Myers (2003) use the term profitability index, Bierman & Smidt (1988) use index of present value. Both methods can be written in two different ways namely:

A:  $\frac{\text{net\_present\_value}}{\text{investment}}$  and B:  $\frac{\text{present\_value\_of\_cash\_proceeds}}{\text{investment}}$  According to the

examples that are given, and the following statement of Shapiro & Balbirer (2000), it can be concluded that with “investment” the present value of the investment(s) is meant. The relationship between formulation A and B is:  $B - 1 = A$

[Shapiro & Balbirer (2000)]: *“The profitability index, also called the benefit-cost ratio, of a project is the ratio of the present value of the cash inflows divided by the present value of the cash outflows. The profitability index tells us to accept projects with a ratio greater than 1.0. This method is consistent with the NPV method since profitability indexes greater than one imply an NPV > 0.”*

Notation A:  $\frac{\text{net\_present\_value}}{\text{investment}}$ , has the most resemblance with the notation of the profit margin. For instance 0,09 or 0,13 instead of 1,09 and 1,13. From this point on, the term “index of present value” is used, and relates to  $\frac{\text{net\_present\_value}}{\text{investment}}$ .

**6.5. Conclusion**

The NPV method is perfect for determining the value of future cash flows that might be created by a future project. Without capacity and capital limitations is can perfectly rank projects according their added value expectations. When the capacity becomes limited, decisions based on the NPV might not lead to optimizing the added value of the company. The reason for this is explained in section 6.2, when capacity is scarce, using it should be compensated. This can be done by introducing penalty costs or increasing the effectiveness of the used capacity. To calculate how effective capacity is used, the Index of Present Value (IPV) has to be calculated, this figure is a combination of the NPV and the capacity that is used.

## 7. Research questions and results

### 7.1. Introduction

As mentioned in the research method this chapter provides the answers to the research questions. These answers are based on interviews, conversations and literature. This chapter is followed by the chapter where the possible interventions are designed. These interventions are based on the following answers.

### 7.2. Answers on research questions

#### Question 1:

*What should the financial objectives of Royal Haskoning be?*

Conversations with the Director Corporate Finance of Royal Haskoning lead to the conclusion that Royal Haskoning wants to pursue the same objectives as a company with “active” shareholders pursues. In general, this will be shareholder value.

In the summary of chapter 11, *Creating Value for Shareholders*, in *Modern Corporate Finance* by Shapiro & Balbirer (2000) the following statement is made:

*“The extent of value creation (the excess of the market value of the stock over the equity investment per share) is determined by three factors: (1) the spread between a project’s actual and required rates of return on the equity-financed portion; (2) the volume of investment opportunities expected to earn higher than required returns; and (3) the number of years the higher yield is expected to persist.”*

In the summary of chapter 3, *Fundamental Principles of Value Creation*, in *Valuation Measuring and Managing the Value of Companies*, by Copeland, et al. (2000) the following five key lessons of value creation are given:

1. *In the real market, you can create value by earning a return on your invested capital greater than the opportunity cost of capital.*
2. *The more you can invest at returns above the cost of capital the more value you can create (i.e., growth creates more value as long as the return on capital exceeds the cost of capital).*
3. *You should select strategies that maximize the present value of expected cash flows or economic profit (you get the same answer regardless of which you choose).*
4. *The value of company’s shares in the stock market equals the intrinsic value based on the market’s expectations of future performance, but the market expectations of future performance may not be an unbiased estimate of performance.*
5. *The returns that shareholders earn depend primarily on changes in expectations more than actual performance of the company.”*

When combined with the mentioned statements of Shapiro & Balbirer (2000) and Copeland, et al. (2000) the following conclusions can be drawn with respect to what leads to an increase in shareholders value:

- Increase (future) economic profit (profit –costs of used capital)
- Increase growth potential
- Focus on continuation and risk reduction (reduction of expected return on equity)
- Only accept projects with a positive NPV over the long term

The current objectives as mentioned in the annual report of Royal Haskoning are:

- Increasing turnover
- Maintaining net profit
- Maintaining cost level of support groups
- Improving liquidity (through focus on working capital)

Most of the objectives mentioned in the annual report are related to the objectives that lead to more shareholders value. The relationships are unfortunately not mentioned in the annual report, but with some general reasoning the following links can be seen:

- With proper project selection, the increase in turnover will lead to an increase in economic profit. It also leads to an increase in growth potential, and because of diversification it might lead to continuation and risk reduction.
- The focus on profit should prevent accepting projects with a negative profit expectation to improve turnover figures.
- Maintaining cost level of support groups makes it easier to have projects with a positive NPV / economic profit. It makes the company more competitive and therefore increases continuation, reduces risks and increases economic profit.
- Improving the liquidity of the organization has a positive effect on all four objectives that lead to shareholders value. In short, projects become more profitable, positive cash flows can be used to invest and because of improved competitiveness the continuation is increased and risk is reduced.



**Question 2:**

*What information determines to what extend projects and advisory groups are contributing to achieve the objectives of Royal Haskoning?*

According to the answer on sub-question one, the following objectives lead to an increase in shareholders value:

- Increase economic profit
- Increase growth potential
- Focus on continuation and risk reduction
- Only accept projects with a positive NPV over the long term

The most important objective that should always be kept in mind while making decisions is the increase in economic profit. At project level, this results in optimizing the NPV of the project. This can be achieved by focusing on all different cost factors, including the costs of using capital that has to be used. Besides the current cost management system, cash flow management leads to a more complete cost management system. This will help decision makers to optimize the NPV of projects. This information should be available when the proposal is send to the client, because it determines whether it generates enough value to do the project. During the project execution phase the cash flow should be monitored to trace

significant deviations from the budget and the reasons for these deviations should be made visible. This information should lead to better project management. After the project is finished, an evaluation should be made that includes a comparison of the budgeted and realized results, including the capital costs.

At advisory group level more aspects than the NPV of projects determine to what extent it helps attain shareholders value. A summation of the NPV's of all projects done at this advisory group does not lead to the NPV of an advisory group. The reason that this situation occurs comes from the cost-allocation method Royal Haskoning uses. Royal Haskoning is content with this method and it will not be redesigned in this assignment. At this moment the system provides information about the costs that are made directly and indirectly, by the advisory group, and the turnover that is generated.

[REDACTED]

[REDACTED]

**Summary of information that should be available**

**Project level:**

Proposal phase: NPV, index of present value, cash flow planning

Execution phase: Cash flow realization, reasons for deviation from planning

Evaluation phase: NPV, index of present value, reasons for deviation from budget

**Advisory group level:**

Budgeted: turnover, occupation rate, economic profit, costs of capital

Realized: turnover, occupation rate, economic profit, costs of capital



**Question 3:**

*What processes and systems within Royal Haskoning are related to gathering information that is necessary to provide the information as mentioned in the answer in question 2?*

**Project level:**

First of all, a definition has to be made about what information is necessary for generating the NPV, index of present value and cash flow planning / realization at project level.

When a cash flow planning is made, the NPV and index of present value can be calculated according to a given WACC. After the planning is made, the system has to be provided with enough information to determine the actual cash flow pattern. The reasons for deviating from the planning can be calculated accordingly.

In short, the necessary information is a cash flow planning at the start of a project and a record of all expenses, invoices and payments by the client.

The Project Authorization Form (PAF) (appendix B) is ideal for providing the cash flow planning and the AG044 Project Forecast for keeping it up to date. A lot of information is already available and kept up to date, like the turnover, terms of payment, and expected costs. These two information carriers can be redesigned to provide the necessary information.

The database, from which Agresso subtracts its data, is filled with information from Time sheets, Expense claim sheets, Basware (incoming invoice system) and other project related expenses insert by the administration. The detail level of this information (e.g. amount, date, project number etc.) is, according to the manager of the finance competence centre, sufficient to calculate a realized cash flow pattern of each separate project.

**Advisory group level:**

Turnover and occupation rate at advisory group are budgeted and monitored by using information about the projects and employees within the advisory group. A budget about the expected average working capital is and should be continued to be made. Through the use of the WACC, this figure can be transformed into an amount of costs related to the expected use of capital. This information should be integrated in the current budget of advisory groups and monitored accordingly. Processes that are involved in this process are budgeting and using existing project based information about the use of capital.

**Question 4:**

*What processes within Royal Haskoning are related to providing information to project managers and advisory group directors to show them to what extent they contribute to the financial objectives?*

Information with regard to the performance of a project or advisory group is provided by reports that are generated by Agresso. The reports are described in section 2.3.2. and provided in appendix A, in the answer of this question only the reports used for communicating the financial state / realization of a project, or advisory group are discussed.

**Question 5:**

*What is the discrepancy between the information that is provided to project managers and advisory group directors and the information that should be provided according to the financial objectives of Royal Haskoning?*

At the end of the answer to question 2 the following summary is given:

**Summary of information that should be available**

**Project level:**

*Proposal phase: NPV, index of present value, cash flow planning*

*Execution phase: Cash flow realization, reasons for deviation from expectation*

*Evaluation phase: NPV, index of present value, reasons for deviation from expectation*

**Advisory group level:**

*Budgeted: turnover, occupation rate, economic profit, costs of used capital*

*Realized: turnover, occupation rate, economic profit, costs of used capital*

During the proposal phase of a new project, the NPV and index of present value should be available in the PAF to support decision making. At this moment this information is not available. There are two crucial aspects that have to be available for generating the expected NPV and index of present value of a future project. These aspects are the WACC and a cash flow planning.

During the execution and evaluation phase no information is available about the realization of the expected cash flow planning and no reasons can be given for deviating from the planning. With both the WACC and the cash flow planning available, it becomes possible to provide this information. Because the AG075's main purpose is to inform the advisory group directors and project managers of the status of all ongoing projects, it seems logical to make the adjustments to this report. More details about this redesign are provided in chapter 8 and 9.



It can be concluded that the current information provision is related to current financial objectives. When the objectives about liquidity and nominal profit are combined to create an objective about the economic profit, the shortcomings of the current information provision become visible. Several reports and budgets have to be redesigned to overcome these shortcomings. These changes are presented in chapter 8 and 9.

**Question 6:**

*Are the costs of capital that is used by Royal Haskoning already included in the hourly rate of the employees?*

[REDACTED]

**Question 7:**

*What are the preconditions for possible interventions?*

This question is asked in nearly every interview. From all answers the following 6 preconditions cover the most important aspects:

- The changes must be **explainable to advisory group directors**, who have to understand the economical foundations and be able to explain it to the project managers.
- It must be **easy to interpret** the given figures at both project and advisory group level. (Colors, graphs, cockpit view...)
- The changes **should not lead to a substantial increase in workload** for any of the users of the system.
- There must be a **clear relationship between Key Performance Indicators (KPI's) at project acceptance, -monitoring and -evaluation phase.**
- It must be **possible to attach incentives at these KPI's at both project and advisory group level** that influence decision making in a way that lead to decisions that are more focused on shareholder value.
- The proposed changes **have to be supported by Agresso.**

### 7.3. Conclusion

The focus on financial aspects is throughout the organization too much focused on profit. This can be concluded from the forecasts made in the annual report, budgets from advisory groups and reports used for project monitoring and evaluation. Information about the forecasted use of capital is very limited and not quantified, therefore it cannot be put in perspective of the profit that is made.

By using the NPV, it becomes possible to see what impact the use of capital has on the profit that is made. The information to calculate the realized NPV of a project is already available, but not yet used. To create a forecast of the NPV of a project, a cash flow planning should be made, this is important because it is used as a basis for project monitoring and control. The AG075 report can be redesigned to provide useful information about the progress of each project in an advisory group and the deviations they have from their cash flow forecasts.

The interventions mentioned in the next chapter are designed to improve the decisions made during the proposal phase by introducing the NPV and IPV forecasts of a project. The interventions that lead to improvements on the execution and evaluation phase are based on a regular provision of information on the differences between forecasted cash flows and realized cash flows. The preconditions as mentioned in the answer of question 7 were kept in mind during the design of the interventions.

## 8. Design of Interventions

### 8.1. Introduction

This chapter describes several interventions that, together, provide a solid foundation for tackling the problem as defined in section 4.3. These interventions are based on the results of the in-depth analysis that can be found in chapter 6 and 7.

In the next section a layout of the different interventions is given, this is followed by a detailed description of each intervention.

### 8.2. Overview of interventions

Figure 8.1 shows four major elements that are subject to change. Each element is divided into two or three interventions. The sequence in which the interventions are implemented is up to the decision makers of Royal Haskoning. When it is incrementally implemented (not at once) the sequence is different because Agresso will not be changed directly and the “light” interventions are implemented. Therefore, no conclusions should be drawn from the sequence that is used in this chapter. In chapter 9 the different sequences of implementation are discussed.

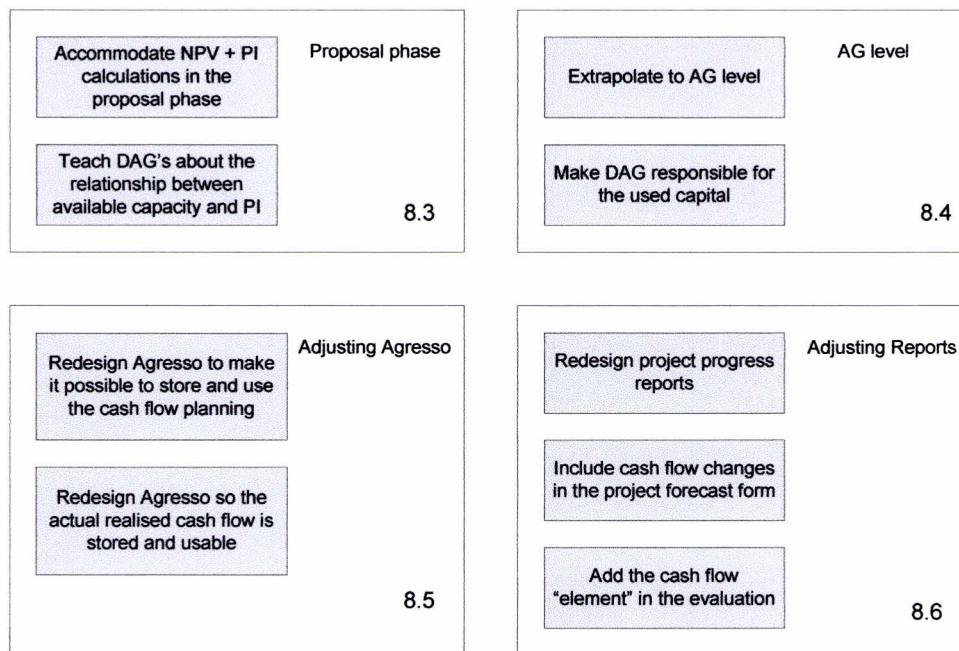


Figure 8.1: Overview of interventions

### 8.3. Proposal phase

The proposal phase is the first phase of a projects lifetime. In this phase, a lot of crucial decisions are made with regard to the future of the project. The definition of tasks that have to be done is written down, an estimation of the total costs is made, the amount of money that a client has to pay is determined and finally the terms of payment are set up. Besides some negotiations, these are the current (financial relevant) actions that are undertaken at the proposal phase.

As shown in the answers of the research question, it is possible to quantify costs that are linked with the use of capital in a project. When the profit is reduced with this cost element it provides a better insight in whether a project adds value to the company. This number is called the Net Present Value (NPV) of a project. Like profit, this NPV should also be placed in perspective of the size of the project. Where the profit-margin is used to place the profit in perspective, the Index of Present Value (IPV) is used to place the NPV in perspective.

To get the expected NPV and IPV of a project during the proposal phase the moment and size of the in- and outgoing cash flows should be estimated. This provides direct insight in the financial influence the moment of payment by the client has. The examples given in section 3.2 are provided to show what information is necessary to provide the NPV and IPV. Besides the NPV and IPV information, one column about the invoicing moment is added. This extra information adds insight in the terms of payment with the client and the feasibility of the cash flow forecast. The following table (8.1) provides what information should be available in the proposal phase.

Month	Project 1			Project 2		
	Invoicing	Incoming CF	Outgoing CF	Invoicing	Incoming CF	Outgoing CF
1	10.000		9.000			9.000
2	10.000	10.000	9.000			9.000
3	10.000	10.000	9.000			9.000
4	10.000	10.000	9.000	40.000		9.000
5	10.000	10.000	9.000		40.000	9.000
6	10.000	10.000	9.000			9.000
7	10.000	10.000	9.000			9.000
8	10.000	10.000	9.000	40.000		9.000
9	10.000	10.000	9.000		40.000	9.000
10	10.000	10.000	9.000			9.000
11	10.000	10.000	9.000			9.000
12	10.000	10.000	9.000	40.000		9.000
13		10.000			40.000	
Total	120.000	120.000	108.000	120.000	120.000	108.000
Profit			12.000			12.000
<b>NPV</b>			<b>10777</b>			<b>9678</b>
Profit margin			11,1%			11,1%
<b>IPV</b>			<b>10,4%</b>			<b>9,3%</b>

Table 8.1: Expected NPV and IPV

When a minimal profit margin of 11% for doing the project is asked, both projects fulfill that demand. But when the demand of the IPV is set to 10%, we can see that project 1 fulfills that demand, where project 2 fails to fulfill that demand. This information leads to better decisions because the time value of money is used.

#### Pros

- NPV and IPV lead to better decision making
- Direct feedback on the influence of the moment at which clients pay, thus more working capital conscious proposal making
- Creates a framework for invoicing
- The planning can be used for monitoring cash flows

#### Cons

- It takes some time to produce an expected cash flow model for a project

### 8.4. AG level

The DAG determines whether a proposal is accepted and sent to the client. He checks it on several aspects like legal responsibility, capacity problems, financial issues etc. The financial issues consist of the credibility of the profit and profit margin that will be made. As mentioned in section 8.3 profits and profit margins should be replaced by NPV and IPV, the same goes for the financial aspects that the DAG looks at.

The reason why the DAG is the right person to criticize proposals is because he has particular targets for the advisory group he manages. He is the person that has an overview of the occupation rate, generated turnover, profit etc. of the advisory group. He knows what profit margin particular projects should have to realize the targets of the advisory group.

When the DAG is confronted with the NPV and IPV of a project he should be able to put it in perspective of the advisory group's target. For this reason it is necessary to extrapolate the changes made on project level, to the advisory group level. This can be done by creating an annual budget for the total costs that can be linked to the use of capital by projects within a particular advisory group. The main target of an advisory group should become the profit (as it is currently known) minus the costs that can be linked to the use of capital. The most easy and understandable method of calculating the costs that can be linked to the use of capital is by multiplying the current budgeted, and realized working capital numbers on AG level, with the WACC that can be calculated according the method provided in Appendix C.

When this transition is made the DAG has interests in accepting proposals that have an acceptable NPV and IPV. **High costs of using capital that are compensated by a higher profit are no problem because the main target is value creation.**

DAG's can point the proposal maker on the fact that through some changes in the moment that invoices are send some more value can be created. Through this additional point of focus, more value can be created by doing the same projects.

### 8.5. Adjusting Agresso

To make it possible to monitor the current cash flows of projects and compare them with the forecasts made in the Project Authorization Form (PAF), it is necessary to make some adjustments in Agresso.

The cash flow forecast, made in the proposal phase as mentioned in section 8.3, should be part of the PAF. It should be possible to extract this information from the PAF and put it into Agresso where it is possible to make use of this information whenever necessary.

The next step in the redesign of Agresso is to make it possible to summarize all costs made by a project per period. This should also be the case for invoices that are sent, and payments made by the client. The reason why it is necessary to know when invoices are sent is because this creates more insight in the breakdown of the costs of using capital. Questions like: “why did we use more capital than expected?” can be answered in more detail because it is clear whether invoices are sent to late, or the client has waited too long before paying the invoice.

When both forecasted and actual information with regard of project cash flows are known, some very interesting reports can be created during project execution and evaluation. These reports can be used for controlling projects and learning more about the cash flows of projects. In the next section some suggestions are given with regard to adjusting reports.

### 8.6. Adjusting reports

I want to emphasize that when Agresso is capable of providing structured information with regard to the forecasted and realized cash flows of projects, an extensive amount of changes to reports can be realized. Only the changes that help improving the NPV by creating a better balance between profit and costs of using capital are taken into account.

The following three questions provide insight in what has to be known during project execution and evaluation with regard to the cash flow:

1. How much do the costs of using capital deviate from the forecast (absolutely and relative to the size of the project)?
2. What is the impact of this deviation on the NPV and IPV of the project?
3. What are the reasons for this deviation? (administration, client, cost structure)

1. At the end of each period (4 weeks), it should be possible to see the forecasted “turnover”, “total costs” and “debtors” of a project at that specific point in time. This information is sufficient for determining the forecasted cash flow (working capital) at the end of a period (turnover – total costs – debtors).

The realized “turnover”, “total costs” and “debtors” at the end of a particular period is already given in the AG075. When both forecasted and realized figures are provided in the AG075, they should be compared to create the following information:



End of period 8

Forecasted			
Total invoiced	Total costs	Debtors	Cash flow
80,000	72,000	40,000	-32,000
Actual			
40,000	72,000	0	-32,000
Difference			
-40,000	0	-40,000	0

End of period 9

Forecasted			
Total invoiced	Total costs	Debtors	Cash flow
80,000	81,000	0	-1,000
Actual			
80,000	81,000	40,000	-41,000
Difference			
0	0	40,000	-40,000

End of period 10

Forecasted			
Total invoiced	Total costs	Debtors	Cash flow
80,000	90,000	0	-10,000
Actual			
80,000	90,000	0	-10,000
Difference			
0	0	0	0

Table 8.2: Example of cash flow information

The figure in the right hand bottom corner of the tables is the difference between forecasted and realized cash flow. When these figures are cumulated and multiplied with the monthly WACC, the total absolute deviation of costs of used capital is calculated. For the given three periods in the example this results in  $(0 + -40.000 + 0) * 0.00644 = -258$  which stand for 258 extra costs of using capital. To put this number in perspective it is divided by the total actual costs and presented as a percentage:  $(258 / 90.000) * 100\% = 0,3\%$ .

2. It would also be interesting to see what the influence on the NPV of the project is. This can be done by using the following formula:  $1 - ((NPV - \text{“extra costs of using capital”}) / NPV) = 1 - ((9678 - 258) / 9678) = 0,027$ . Which means that because of the extra costs of using capital the expected NPV is reduced by 2,7% when all three incoming cash flows were only one month late, it would lead to a 8% reduction of the NPV. The same calculations can be made for the change in IPV.

During project execution it is better to compare the deviation of costs of using capital with the total amount of actual costs that are made, instead of focusing on the impact the extra costs have on the NPV of the project. The reason for this is that large projects tend to have large deviations in terms of absolute amounts and there can be several reasons to accept such a project with a relative low NPV expectation. When the deviation of the costs of using capital is put in perspective of a low NPV expectation, it will result in a large impact but that doesn't say much about the actual deviation in costs for using capital.

During the final evaluation of a project, the realized NPV and IPV are compared with the forecasts. When there are substantial deviations (a 1% reduction of IPV for instance) the causes for these deviations have to be found.

3. Besides deviations with regard to total costs (excluding costs of used capital) and income, the costs of used capital are also compared with the forecast. If the costs of used capital are deviated from the forecast, the cause can be found by doing the following: Summarize the difference of "total invoiced", "total costs" and "debtors" for all past periods. In this example only periods 8, 9 and 10 are given. The following information about differences follows:

$$\text{Total Invoiced} = -40.000 + 0 + 0 = -40.000$$

$$\text{Total Costs} = 0 + 0 + 0 = 0$$

$$\text{Debtors} = -40.000 + 40.000 + 0 = 0$$

We have seen earlier in this section that the total costs of used capital were higher than forecasted. A negative number behind "total invoiced" indicates that one or more invoices were sent too late. For "total costs" and "debtors" it works the other way around. A positive difference of "debtors" means that a client has waited longer than forecasted before paying an invoice. A positive difference in "total costs" means that more costs are made than forecasted, this has a negative impact on working capital.

## 9. Implementation

### 9.1. Introduction

In this chapter, two different implementation possibilities are presented. Section 9.2 provides a structure that makes it clear what interventions are implemented in the two different possibilities and it explains why this distinction is made. After this is made clear, both implementations are discussed in the final two sections.

The six preconditions, mentioned in chapter 7 question 7, are taken into account when the interventions were designed in chapter 8. In this chapter they are also taken into account when the final details about the implementation are provided.

### 9.2. Structure

The first thing that is done when a project is considered is creating a Project Authorization Form (PAF), in the proposed situation this form is added with information about the cash flows during the project. Project proposal acceptance is done by the DAG and based on the information provided by the PAF. Implementing this intervention can be done with or without changing Agresso. The partial implementation will contain mainly changes in the project acceptance process. The full implementation will extend the interventions made in the partial implementation. Besides changing the project acceptance process, the project monitoring and evaluation phase are adjusted to better fit the key performance indicators in the proposal phase.

This distinction is visualized in figure 9.1. The PAF + DAG section is adjusted in both the partial and full implementation. The Agresso + Reporting section is only adjusted when the design is fully implemented.

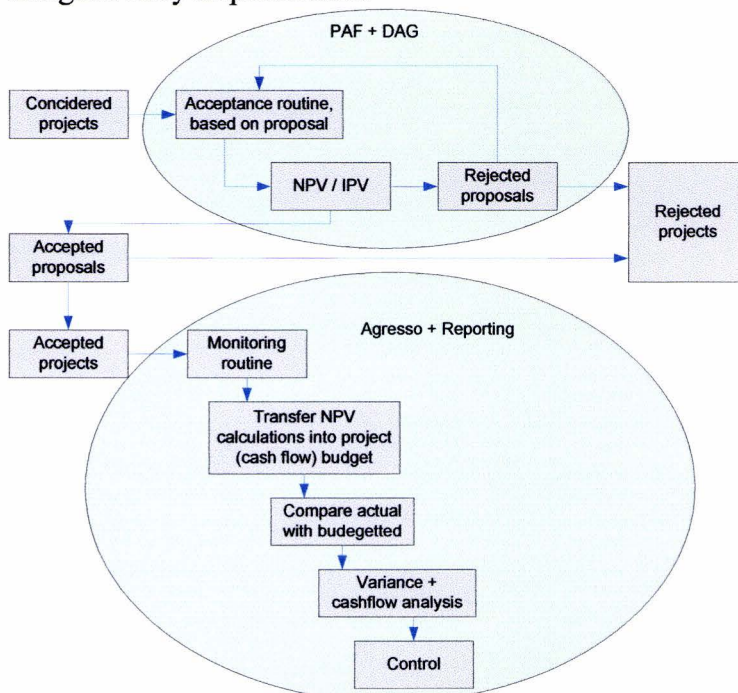


Figure 9.1: Implementation structure

### 9.3. Partial implementation

The functions of the partial implementation are limited to the proposal phase. The changes should stimulate project managers and DAG's to start paying attention to the expected NPV and IPV of projects. This can be achieved by executing the following 5 steps:

1. *Redesign PAF*
2. *Redesign AG budget*
3. *Teach DAG's about NPV and IPV, on both project and AG level*
4. *Teach project managers (proposal makers) about their role in the new situation*
5. *Explain the changes to the Controllers and Divisional administrators*

#### 1. *Redesign PAF*

The PAF is meant to provide the decision maker (in this case the DAG) with sufficient information to base its decision and actions on. When the information as presented in table 8.1 is added to the PAF, the DAG can base its decisions on the NPV and IPV of the projects. It also provides the DAG with detailed information about the expected cash flows; this information can be used to show the proposal maker how more value can be created (e.g. the DAG can tell the proposal maker that a particular client will accept advance payment and thus more value can be created with changing the total costs for the client).

#### 2. *Redesign AG budget*

To make sure that the DAG doesn't have a high generated profit in his best interest, some changes within the budget of the advisory group have to be made. The NPV should replace the profit as being the key performance indicator. This is done by forecasting the total costs of using capital for all projects in a particular year.

At this moment there is a yearly budget for the total amount of working capital. This number should be converted into a cost component, namely the costs of using capital. This cost should then be subtracted from the budgeted net profit. This leads to the forecasted NPV of the AG in a particular year. When the NPV of an advisory group becomes the key performance indicator, the DAG will criticize PAF's on the NPV and IPV, instead of profit and profit margin. This is exactly the synergy that is needed to make the transformation a success.

3. *Teach DAG's about NPV and IPV, on both project and AG level*

By implementing step 1 and 2 the actual changes to the system are made. The following steps are about educating the users of the system.

Start with a simple theoretical explanation why NPV is a better method to determine the value of a project, than profit is. Then use examples, like the one in section 8.3, to emphasize the importance of changing to NPV. When this is done, explaining that the profit margin has to be changed to IPV.

Provide some additional examples where the impact of changes with regard to moment of invoicing and terms of payment is made clear. Think about reduction the time between invoicing and payments and earlier invoicing in both the proposal phase and during project execution.

Finally, provide examples of advisory groups to show them how large the impact of working capital can be on the added value of an advisory group, and how unfair it is to compare advisory groups on basis of their profit, instead of their added value.

4. *Teach project managers (proposal makers) about their role in the new situation*

Firstly, it is the DAG's task to inform the project managers of the changes within the advisory group. Despite this general function of the DAG, it is not uncommon to organize central lectures in the larger establishments of Royal Haskoning about radical changes in the operational processes. It would be a good idea to do this also for this change, all employees that are involved have to attend this lecture that could be held from 16-18h followed by an informal moment to stimulate internal discussions about the changes. The following list of attendants provides as a basis for sending invitations: DAG's (and higher level management), project managers, divisional controllers and administrators, quality managers, Finance competence employees and other interested personnel.

5. *Explain the changes to the Controllers and Divisional administrators*

In this partial implementation the changes at administrative level are not very extensive. The added information in the PAF is not processed into Agresso, nor monitored. Although the moments of invoicing might be used as triggers for the administrators to ask the project manager for permission to send the invoices, I would place all responsibility for on-time invoicing with the project manager.

The only major change in administration is the reporting of the monthly and yearly advisory group results. The new layout for this report should be presented and explained to all group finance employees; this can be done during a finance lunch.

The controllers should be more extensively informed about the theoretical background and the budgeting of costs of using capital.

#### 9.4. Full implementation

The drawback of the partial implementation is that there is no monitoring process for the cash flow of projects. Because of this, there is no realized NPV figure at the end of the project and project managers will be responsible for the profit, instead of the NPV of a project.

The reason why this realized NPV calculation isn't part of the partial implementation, is because Agresso has to be redesigned to make that possible. Redesigning Agresso is a time consuming and complex task. Nevertheless, it has to be done to monitor, control and evaluate projects on the NPV.

The following steps have to be undertaken after the partial implementation is realized:

1. *Integrate the project cash flow forecast into Agresso*
2. *Make it possible to summarize the costs, invoices and incoming payments per 4 week periods, and store these figures*
3. *Redesign AG044 – project forecast*
4. *Redesign AG075 – project budget*
5. *Create guidelines for interpreting the AG075*
6. *Explain the changes to all that are effected by the changes*

##### 1. *Integrate the project cash flow forecast into Agresso*

The result of the partial implementation is that there is a PAF with a cash flow forecast, including the moment of invoicing. To be able to use this information during project execution and evaluation, it should be stored in Agresso. This is a task that can be performed by the Finance Competence Center.

##### 2. *Make it possible to summarize the costs, invoices and incoming payments per 4 week periods, and store these figures*

To be able to compare the forecasts made in the PAF, there have to be made some changes to Agresso with regard to how the gathered information is stored. Currently it is possible to see how much costs are made, what amount is invoiced and what amount is paid by the client. This information should be made available for each period since the project started. Again, it is the Finance Competence Center that has to adjust Agresso to this function.

##### 3. *Redesign AG044 – project forecast*

Every three months new forecasts are made for the currently active projects. These forecasts are made by filling in the AG044. Because the forecasted cash flows also changes, it should be possible to add this information in the AG044. This can be realized by adding a table, like the one in the PAF (table 8.1, section 8.3). The original forecast should always be stored and used for the final evaluation. The latest forecast is used for monitoring and controlling a project, this way it is prevented that a project manager is confronted with the same deviation over and over again.

##### 4. *Redesign AG075 – project budget*

Once step 1, 2 and 3 are realized, it becomes possible to add the newly available information to current reports. The AG075 is the report that is currently used to provide a summary of the progress of all projects within an AG or of one project manager. It provides information about the total costs and income that are forecasted and the actual costs, invoices and debtors.

This report can be added with information about the current difference in turnover, total costs, debtors and working capital. All differences of working capital in the past can be summarized and shown in the report. This figure can be multiplied with the monthly WACC to calculate the extra costs of the difference in cash flow. To put this cost aspect in perspective of the project, it has to be divided by the total actual costs of the project. These changes are shown in the following group of tables:

Project	Forecast (Period X)				Actual (Period X)			
	Turnover	Total costs	Debtors	Cashflow	Turnover	Total costs	Debtors	Cashflow
A	5,490	7,992	0	-2,502	5,490	4,293	0	1,197
B	4,000	3,520	0	480	4,740	4,526	0	214
C	56,985	54,513	11,397	-8,925	73,585	55,010	13,803	4,772

Project	Difference				Impact on economic profit		
	Turnover	Total costs	Debtors	Cashflow	Cumulated difference in Cash Flow	Costs of this difference	% of actual costs
A	0	-3,699	0	3,699	9,472	-61	1.4%
B	740	1,006	0	-266	-13,664	88	-2.5%
C	16,600	497	2,406	13,697	107,143	-690	1.3%

Table 9.2: Adjustments to the AG075

The differences are given a particular color to make it easier to interpret the numbers. The green color means that the difference is positive with regard to the cash flow (e.g. if the difference in total costs is a negative number, it is colored green because it has a positive effect on the cash flow). If the influence is negative, like more debtors, it is colored yellow.

When the impact on economic profit is relatively large, like the second row (-2,5% of total costs), it must be possible to easily see the causes as mentioned in section 8.6.

If the AG075 is used for the evaluation, it must present information about forecasted and realized NPV and IPV. The difference can be presented in the form of a percentage with which the NPV has increased or been reduced. When all this information has to be provided the report has to be sent in a digital form. Otherwise an extra report with regard to project evaluation has to be designed. From interviews that have been held it is known that the possibility of digitizing some reports is already investigated.

### 5. Create guidelines for interpreting the AG075

One of the selection criteria is the convenience with which the added information can be interpreted. One of the measures that is already mentioned is using additional colors. Another possibility to make it easier to focus where it is needed can be realized by introducing some norms like: if the “% of actual costs” is outside the + or - 1% range and the “costs of this difference” are higher than 200 or lower than -200, the number is in “bold”. In this case only the third row in table 9.2 is focused on (with regard to the cash flow). The given numbers are suggestions, in reality these should be chosen carefully to make sure that the focus is on the right projects.

6. *Explain the changes to all that are effected by the changes*

As a basis, the same can be done as mentioned in the partial implementation at point 4. Because the changes in the full implementation are more extensive, the users have to be informed more intensively. Not only during the implementation phase guidance should be more intensive, but after about half a year, a session can be held about the current experiences and results at that point in time. It is important to keep an eye on where in the organization the most support is needed. This can be at the financial administration, but also at project or advisory group management. It is hard to forecast what function groups need the most guidance after the transformation is made.



## **10. Conclusions and recommendations**

### **10.1. Introduction**

In this chapter, the most important findings of this study are concluded in section 10.2, this includes conclusions drawn to the in-depth analysis and designed interventions. In Section 10.3 the limitations of this study are discussed. This chapter ends with a section about recommendations.

The study performed at Royal Haskoning started with the question to investigate the Economic Value Added (EVA) method. The reason for this interest in EVA was to reduce working capital at Royal Haskoning.

In the orientation and initial analysis phase of the study, interviews were held and documentations and reports were analyzed. This led to a description of the current processes with regard to project cash flow management. Together with a small study about value measurement methods, a conclusion was drawn that lead to the following problem definition:

*The current form of cash flow management on project level does not lead to a decision making process which is based on creating value, but on creating profit. This has a negative influence on the economic value of projects, due to the decisions about future cash flows that are made during the project's acceptance, execution and evaluation phase.*

Based on this problem statement, seven research questions were formulated. The in-depth analysis consists of two parts, first a literature study was done about value determination techniques in both absolute and relative forms. The second part of the in-depth analysis consisted of answering the research questions.

The literature study concluded that the Net Present Value (NPV) method is the best method for determining the value that is created by doing a project. To put this in perspective of the size of the project, the Index of Present Value (IPV) has to be calculated, its form and function can be compared with the profit margin of a project.

The answers to the research questions provided a detailed image of the current processes with regard to project proposal acceptance, project execution and project evaluation. This information was used as a basis to determine what processes had to be changed, and what information has to be available when making particular decisions.

### **10.2. Conclusions**

The following conclusions were drawn in the in-depth analysis:

1. The literature study validated what I already had learned during my study, namely: creating added value is more important than creating profit. During the in-depth situational analysis it was found that at the operational level of Royal Haskoning this statement was not used in practice and the focus was mainly on creating profit without focusing on the amount of capital that has to be used.

2. To create a situation in which at the operational level people start focusing on working capital reduction to optimize the added value of the operations, the following has to be done:
  - Project acceptance should be based on NPV and IPV instead of profit and profit margin, and thus cash flow forecasts should be created during the proposal phase.
  - Project execution monitoring should include cash flow monitoring. Reasons for deviations should be determined and used for project controlling.
  - Project evaluation should be focused on the difference between budgeted NPV and realized NPV. Reasons for deviations should be found and used for improving future budgeting and project management.

These conclusions are used for designing interventions. The interventions are designed in such a way, that the implementation can be separated in two major parts. The first part is “proper project acceptance and proposal making based on optimizing the NPV” and the second is “focusing on cash flows and added value during the project execution and evaluation phase”.

To ensure proper project acceptance and proposal making based on optimizing the NPV the following interventions have to be implemented:

1. The PAF has to be redesigned to make it possible to include a cash flow planning and automatically calculate the NPV and IPV of the project.
2. The expected yearly added value of AG’s have to be budgeted and this KPI should become as important as the profit of the AG currently is, this will lead to an increased level of involvement from the DAG with regard to optimizing the total NPV of all projects.

The following intervention takes more time and effort to implement because Agresso has to be redesigned. These interventions stimulate focusing on cash flows and added value during the project execution and evaluation phase.

3. After the cash flow planning is made, the realized cash flow can be monitored and reasons for deviation can be given. During the execution of a project this information can help controlling the project. When a project is evaluated the information can be used to learn from.

Reasons for deviations that can be found by using this method are: too late/early invoicing, too late/early payment by client and different timing/amount of costs.

The initial investment costs for implementing step 1 and 2 are estimated at 62.000 euro, thanks to a reduction in WIP and debtors; the yearly net profit is estimated to increase by about 500.000 euro.

The initial investment costs for implementing all three steps are estimated at 136.000 euro, the yearly net profit is estimated to increase by about 1.000.000 euro.

### 10.3. Limitations

In this section the limitations of the proposed interventions are provided. These limitations are all relevant to the study that is done and can provide opportunities to further improve the current and future added value of Royal Haskoning.

1. The given solution to the problem is not implemented top down, like EVA would be. It does not support decisions made at corporate level, like company acquisitions and other investment decisions.
2. It is difficult to prevent that people argue about the extra bureaucracy the changes have created. But through a proper implementation process in which the changes are explained, and estimated results are presented, the arguing should be kept to a minimum. Another method that might help reducing the feeling of increased bureaucracy is to digitize the reports; this is explained in the next section.
3. Although the employees reward system is mentioned and explained in chapter two, it has never been criticized nor improved. The performed study does lead to a situation in which better information is provided that can be used as a basis for the employees reward system.
4. Little attention is paid to the role that the divisional administrators can fulfill in reducing the Work in Progress (WIP) by faster invoicing and debtor reduction by better debtor management. Their function is really underrepresented in this study.

### 10.4. Recommendation for further study

As mentioned in section 6.2, there are two financial aspects crucial for proper project acceptance, namely: profit margin and (future) occupation rate. This study is focused on reducing working capital by providing information about the economic profit, working capital and adjusted profit margin (Index op present value). Doing another study about the possible benefits of changing the attitude towards the importance of focusing on the capacity aspect of a project and the advisory group might lead to promising results.

Another recommendation is to focus on possible improvements at the divisional administration with regard to working capital reduction. Think about how the employees can be stimulated to speed up the invoice process and to pro-actively contact debtors about invoices that should have been paid yet. Another point of attention at the divisional administration is the distribution of responsibilities.

During this study I had some thoughts about what the next step with regard of digitizing reports could be. At this moment, almost all reports are digitally available. I think it would be a good idea to focus on some next level improvements like: by clicking on the debtor amount of a particular project (in the AG075 report) you get detailed information about the debtor status of that project. Or improve the availability of the reports by making them at all time accessible instead of sending them.

Think about other ways to get access to more capital. Instead of reducing working capital, it might be a good idea to increase short- or long term liabilities. This might even reduce the WACC and therefore the costs of using capital.

## **11. Study evaluation**

### **11.1. Introduction**

In this chapter the practical and scientific relevance of this study is provided. This final chapter ends with a personal reflection and my opinion about the support I got from my supervisors at the university and Royal Haskoning.

### **11.2. Practical relevance**

Large multinational companies that are listed in the national stock index have shareholder meetings, one of the yearly discussions is about next years forecasts. Shareholders have the desire to measure income according to their return on investment. This meant that the more they invest in the company, the more value they want for it. This natural behavior will lead to a vision that incorporates the theories behind Net Present Value (NPV), Added Value and Index of Present Value (IPV). The effects of this point of view will lead to an added value perspective on divisional results and the divisional director will try to stimulate the employees in his division to create profit without using too much capital.

When we look at Royal Haskoning, we see that the main targets on corporate level are focused on profit and turnover. Especially on operational level, where thousands of cash flow decisions are made, this leads to a non-optimal balance between used capital and profit generation. This study exposed the current situation with regard to cash flow planning on the operational level and came to the same conclusion.

The interventions are designed to optimize operational decisions with regard to adding value when decisions between profit and capital use have to be made. To make it work, higher level management should have the same interests, adjusting their current interests into interests that coincide with the changes made on the operational level seems to me to be the best option to support creating a better balance between used capital and profit.

### **11.3. Scientific relevance**

As mentioned in the introduction in chapter 6 (literature study), very little literature is available on cash flow management and value determination in an organization that yearly executes thousands of projects. The main difference with cash flow management and value determination as mentioned in most literature is that the amount of used capital is not limited and projects are not mutually exclusive because of capital use, instead they can be mutually exclusive because of capacity limitations.

This study shows that in a situation that is not limited by the amount of capital, but by capacity limitations, it is not enough to focus on profit and profit margin to base decisions on. The capital that is used for project execution should not be given without a cost, therefore it is important to use NPV instead of profit. Because projects can be mutually exclusive because of capacity limitations, the IPV should be used to determine what project provides most NPV per capacity unit that is used.

Although both NPV and IPV methods are described in literature, I couldn't find any scientific documentation about the possible benefits it could have for a project based organization. This study provided enough information to show what benefits the use of NPV and IPV can have.

#### 11.4. Reflection

What I already knew from earlier experiences and personality test, is that I can be very enthusiastic when I start with something new (like a project, chapter, literature study, etc.), but when I finished about 80% to 90% of that particular “something” I can lose my interest. This is probably related to my curious nature and desire to learn new things. Therefore it is not my preference to keep talking about some details of things I have done, I prefer looking at new things / problems and have some interesting discussions about them.

This said, it is logical that I found that a lot of conversations I had with my supervisor at Royal Haskoning, Maartje Wise, were rather focused on the content that I had delivered and not very open with regard to several concepts I had in my mind. Nevertheless I have to say that she is very good at explaining the “flaws” in the delivered content, and at motivating me to finish that last 10% to 20% of the thing we were talking about. Right now I better understand that Maartje probably knew that finishing something was a weak point of mine and that thinking about possible solutions, concepts, etc. was not. Therefore I am grateful for all she has done for me. She also created the opportunity to interview a lot of different managers throughout the organization. I doubt whether this would have been possible without her help. Each time I had a particular question she new who I had to talk to and most of the time she introduced me personally. All other persons I worked with at Royal Haskoning were also very helpful.

At the university the discussions with my primary supervisor, Fred van Bel, were both based on content and solution focused concepts. We spend hours discussing several options about how to tackle the problem and how to cope with the fact that it should be kept simple and understandable for the users. During these conversations I could confirm my thinking process which gave me the confidence I needed for finishing this project. This is exactly what I missed during the weeks that he was ill and not able to support me the way I was used to. This lead to some delay, but I am happy he could be my supervisor during the last phases of this study.

Unfortunately I didn't have had many conversations with my secondary supervisor, Allard Kastelein. His expertise was very valuable for providing me with feedback about several models I have used and the structure of this report. Besides that, he pointed me on the fact that my study had a rather narrow view and that it is important to look at the aspects that interfere with the subject you are working with. This helped me with writing the limitation and recommendation sections of this study.

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## Appendix C – Weighted Average Cost of Capital (WACC)

In this section it is described how the WACC of a company can be calculated. An excel model is made to calculate the WACC of a company. With this model it becomes easy to see what consequences changing particular parameters have. This model is based on the information provided in this appendix and given at the end of this appendix.

According to [www.investopedia.com](http://www.investopedia.com) the WACC is defined as:

*“Calculation of a firm's cost of capital in which each category of capital is proportionately weighted. All capital sources - common stock, preferred stock, bonds and any other long-term debt - are included in a WACC calculation.*

*WACC is calculated by multiplying the cost of each capital component by its proportional weight and then summing:*

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc)$$

*Where:*

*Re = cost of equity*

*Rd = cost of debt*

*E = market value of the firm's equity*

*D = market value of the firm's debt*

*V = E + D*

*E/V = percentage of financing that is equity*

*D/V = percentage of financing that is debt*

*Tc = corporate tax rate*

*Broadly speaking, a company's assets are financed by either debt or equity. WACC is the average of the costs of these sources of financing, each of which is weighted by its respective use in the given situation. By taking a weighted average, we can see how much interest the company has to pay for every dollar it finances.*

*A firm's WACC is the overall required return on the firm as a whole and, as such, it is often used internally by company directors to determine the economic feasibility of expansionary opportunities and mergers. It is the appropriate discount rate to use for cash flows with risk that is similar to that of the overall firm.”*

Some elements of the given equation need further explanation that is given in the following paragraphs.

### Market value of the firm's Equity and Debt

The Market value of the firm's Equity is necessary for determining the WACC.

S.C. Myers and R.A. Brealey's book, Principles of Corporate Finance, provides a formula to determine the current market value of the equity. The following formula is given on p65:

$$P_0 = \frac{DIV_1}{r - g}$$

$P_0$  = current market value of the equity

$DIV_1$  = Next years dividend

r = expected return on investment

g = expected growth rate of dividend



$$DIV_1 = DIV_0 * (1 + g)$$

A.C. Shapiro and S.D. Balbirer (2000) provide exactly the same formula to determine the current price of the stock.

According to M.J. Painter (1995) the market value of a firm's equity can be calculated by the following formula:

$$V_0 = \frac{R_0 * (1 + g)}{r - g}$$

$V_0$  = current market value of the asset

$R_0$  = the future sustainable earnings to the source(s) of financing

$r$  and  $g$  are the same as in S.C. Myers and R.A. Brealey's formula.

It can be concluded that all three literature sources provide consistent information about the valuation of a company's stock.

According to this valuation method the following figures determine the current value of a company's stock ( $V_E$ ): expected cash flow to equity ( $R_{E0}$ ), expected growth rate of future cash flow to equity ( $g_E$ ), and the expected rate of return ( $r_E$ ).

For example:

$$R_{E0} = 6 \text{ Mln}$$

$$g_E = 5\%$$

$$r_E = 13\%$$

$$V_E = 6 * (1,05/0,08) = 6 * 13,1 = 78,8 \text{ Mln}$$

According to M. Painter (1995) the book value of the debt is often its market value. The influence of the book value of the debt on the WACC is also limited. This is explained later in this section.

### Cost of Equity and Debt

M. Painter (1995) explains in his article how the ROE should be adjusted with regard to the expected growth rate of the Net Income After Taxes:

$$\text{“Growth\_adjusted\_equity\_rate} = \frac{(1 + r_E)}{(1 + g_E)} - 1\text{”}$$

$r_E$  = equity\_rate = nominal required rate of return by equity holders = ROE

$g_E$  = growth\_rate = expected nominal growth per year in cash flow to equity

growth\_adjusted\_equity\_rate = Cost of Equity (Re)

If the cost of debt and the interest rate(s) are identical, the WACC can be calculated by using a combination of the equation provided by [www.investopedia.com](http://www.investopedia.com) and the methods provided by M. Painter (1995), S.C. Myers and R.A. Brealey's, A.C. Shapiro and S.D. Balbirer (2000).

There is one parameter that makes determining the WACC as complex as it is, this is the  $r_E =$  nominal required rate of return by equity holders. A lot can be written about methods to determine this parameter. The Capital Asset Pricing Model (CAPM) is one of the methods that can be used to determine this parameter. Like most methods it has advocates and adversaries. In my opinion the benefits of using CAPM to determine the “nominal required rate of return by equity holders” is minimal in Royal Haskonings situation. Stakeholders that are also employees might prefer to reduce risks and ROE to increase the continuation of Royal Haskoning and improve the working environment beyond economical effectiveness. Due to such influences the CAPM loses effectiveness.

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