
GOTHENBURG UNIVERSITY
SCHOOL OF BUSINESS, ECONOMICS AND LAW

BACHELOR THESIS IN
INDUSTRIAL AND FINANCIAL MANAGEMENT

SPRING SEMESTER 2015

**CASH FLOW AND CAPITAL
EMPLOYED: ITS RELATIONSHIP AND
IMPACT ON FIRM VALUE**

- A CASE STUDY OF A FIRM OPERATING
IN THE TECHNIQUE DEVELOPMENT INDUSTRY

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JUNE 2015



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Acknowledgement

We would like to thank Taylan Mavruk, as the supervisor of this paper, whom has given us guidance and feedback through the process. His extensive knowledge, as professor in Corporate Finance, has given us a deeper understanding of the subject, which we hope to forward to the reader of this paper. We would also like to thank our research company and supervisors for the cherished guidance and help they have given us. The process of this study has been challenging but also a great journey for us.

Gothenburg, May, 2014
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Abstract

Titel: Cash flow and capital employed: Its relationship and impact on firm value – a Case Study of a firm operating in the technique development industry

Seminar date: 2015-06-04

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Keywords: Cash Flow, Capital Employed, Firm Value, Sensitivity Analysis.

Introduction: Maximizing the shareholder value is the main purpose for many firms. To be able to do so it is important to work with the firm's cash flow and return on capital employed. Many firms only focus on generating a good profit and forget or find it complicating to work with the cash flow due to difficult calculations. These problems are often face on lower levels such as for business units. By improving the Return on Capital Employed and Cash Flow already at lower levels it will have a greater impact on the whole firm. It will also be easier for a deeper look to find slacks and which factors the company need to work with.

Purpose: The purpose with this study is to make it easier for the financial managers to work with cash flow at lower levels by creating a simpler cash flow model. The study also aims to highlight the relationship between capital employed and cash flow.

Method: A case study is performed and the essay uses a quantitative approach with help of a qualitative method for a deeper analysis. Two simpler cash flow models is created and analyzed on each of the three business units. Important variables and how those affect ROCE is investigated from earlier research. The relationship between the Capital Employed and Cash Flow is analyzed.

Conclusion: The study shows that both of the models can be used when calculating cash flow for a whole year. When considering monthly basis there is still some improvement that needs to be made. The study provides propositions for further improvements, since the study its self is limited in this area because of lack of information. The created model 1 is recommended over model 2, since it provides a better overall result and would also be easier to adjust when needed. The study shows that there is a relationship between capital employed and cash flow. It also confirms earlier researches regarding which parameters that influence ROCE the most.

Definitions

The following is a description of words and abbreviations. This to get an early introduction and understanding of the definitions used in the study.

DCF	- Discounted Cash Flow
FCF	- Free Cash Flow
ROCE	- Return on Capital Employed
EBIT	- Earnings before Interest and Tax
ROS	- Return on Sales
CTR	- Capital Turnover Ratio
GP	- Gross Profit
S	- Sales
R	- Total Revenue
SR	- Sales on Total Revenue
E	- Expenses
ERR	- Expenses to Revenue Ratio
NOPAT	- Net-operating Profits after Taxes
WACC	- Weighted Average Cost of Capital
OPEX	- Operating Expenditure
COGS	- Cost of Goods Sold

Capital Employed (CE)

Capital Employed is in this thesis referred to as the total amount of capital actively used to create profit. When “employing capital” you are making an investment. Capital Employed could therefore be seen as the value of the assets employed in the firm (Economic.se).

Stakeholder

A stakeholder is in this thesis referred to as a person or an organization that has an interest in the firm, such as investors, employees, lenders, suppliers and the community, only to mention a few (Investopedia.se).

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1. INTRODUCTION

In this chapter the problem background and discussion of the chosen subject will be presented. Followed by the research questions and aim of the study.

Historically, firms face restrictions by both stakeholders and the market. A firm will always try to find the best way to use its resources to make the greatest profit and least loss; working around its restrictions. The financial issue of a firm constantly being regarded and analyzed makes the value of the firm an important factor of wealth for its shareholders. The valuation of the firm becomes an important tool, which can contribute to the value of the firm; because the free cash flow available for shareholders will increase as the value of the firm increases (Dastgir, Khodadadi & Ghayed 2010). Cash flows identify the level of cash needed to cover operational expenses, where free cash flow represents the final cash available after the subtracting of expenses. It is therefore important for firms to use a suitable cash flow forecasting method to make sure they cover these expenses. This is how the relationship could contribute to an increase in firm value (Vishwanath 2009).

This study will discuss and highlight the importance of firm value and cash flow valuation on lower business units. According to the financial manager at our investigated firm, business unit valuation creates a great advantage for the firm by earlier reaching the source of a cash flow problem. Valuation on lower levels will keep a closer contact to managers on each level and makes it easier to adjust a problem already on a small scale. With this source of information it will also be easier for financial managers to make decisions to increase firm value already on a lower business unit level.

1.1 PROBLEM DISCUSSION

After valuating the firm comes the important issue of how the firm can increase its firm value. Therefore, this study will investigate two of the determining variables; *cash flow* and *capital employed*.

As a case study, this investigation will be based on a practical financial problem in a real context. The research questions of this study were formulated together with the investigated firm and adjusted to suit other firms within the same industry. The investigated firm recognizes problems in both increasing firm value and creating a suitable model for forecasting cash flow.

According to Hassani and Misaghi (2013) cash flow has significant value to the firm and could be seen as the third primary financial statement in a corporate finance report. Literally many studies have been made on learning the behavior and effect of cash flow on firm value, which will be presented in the theory part of this study. Hassani and Misaghi (2013) investigated the effect of various factors on operational cash flow and found that there is a meaningful relationship between capital employed efficiency and operating cash flow. The value of the firm's cash flow is closely linked to the efficiency of the company's capital employed. Therefore, the understanding of this connection becomes major importance.

Camelia (2013) investigated the analysis model for return on capital employed and its impact on firm value. He studied the sensitivity of the determining variables and found profitability as one of the most sensitive variables when determining capital employed. Another study (Wallace 2012) came to the same conclusion regarding this variable, which is why we have chosen to primary focus on profitability as return on capital employed (ROCE).

The importance of working with lowering capital employed is often forgotten in large complex firms, although it does have a great impact on cash flow as well as firm value. Here, it is also important to highlight the possibility of how this action can add value already on lower business unit levels. Previous research (Camelia 2013) has been done on which variables that are important when determining capital employed, but firms do lack knowledge and research information when it comes to the sensitivity of these variables. Camelia (2013) made an extended presentation of the variables that affect the profitability of capital employed. This study will continue the research on how and which variables to focus on when aiming for a higher firm value seen to capital employed.

According to previous research both cash flow and capital employed do have a significant impact on firm value. Hence, a research gap exists regarding cash flow valuation and relationship between the two variables on business unit level.

Hassani and Misaghi (2013) proved the positive relationship between cash flow and capital employed and presented capital employed and profitability as main factors when determining operational cash flow. This means that by increasing efficiency on one of these variables the firm would also increase its operational cash flow. Although, the firm has to find the level where the loss in cash flow forecast accuracy is equal or more than the

increase in profitability. Wallace and Camelia also discuss this chain reaction although they use the perspective of internal resources allocated towards increased firm value. According to the financial manager at our research firm it would be interesting to apply the ideas from previous research on a firm operating on today's market. This may contribute to deepen the knowledge within the investigated firm as well as give ideas for future financial strategies. The aid to a better financial strategy when it comes to capital employed is of great interest for firms on today's market, according to the financial manager at our research firm.

Creating strategies to increase firm value has inspired and captured many researches. Hence, more researches could be done investigating the action and relationship between the variables determining firm value. Furthermore, no notable previous research has been investigating firm value on a lower business unit level.

The issue regarding capital employed becomes extra important since this could be seen as a recently developed method to create firm value. If this thesis could create new ideas and strategies to increase capital employed, it would give our investigated firm an advantage on the market. Because of this essential contribution, our financial manager recommended us to investigate the sensitive variables of capital employed.

Examining the relationship between cash flow and capital employed is of great interest for both firms and shareholders. The possibility of working with cash flow and capital employed to increase firm value on lower levels of the firm is hardly known in the real industry. According to the financial manager at our investigated firm, a study on this subject would be of great interest for the whole industry. The financial manager highlights the importance of working with adding value already on lower business unit levels. Hence, there are no previous researches that investigate this specific problem. Therefore, an investigation of the value on lower business unit levels would highly contribute with guidance for large complex firms on today's market.

Finding the correct model for forecasting cash flow on business unit level is another common problem for firms within the investigated industry. According to the firm at issue, this is one of their major challenges at the finance department. The firm attempts to find a simple model that suits their context, but on a business unit level. When previously trying to solve this problem, the result either falls far from the forecasted result or the model used is considered too complicated. The financial manager at our investigated firm means

that by using cash flow estimation on business unit level the firm would be able to improve the cash flow valuation for the whole firm. The firm would be able to reach a deeper understanding of possible changes and improvements earlier than if only looking at the firm as a whole. Another incentive for using cash flow forecasting on lower levels is to involve the management at the lower level to work towards a Business Unit that operates for generating a higher cash flow. This will benefit the whole firm, including other business units. By examining the classic free cash flow model together with the context of the investigated firm one may find a middle way. The new model suggestion may then be adjusted to fit other complex firms within the same industry.

1.2 CONTRIBUTION OF STUDY

This research would truly contribute to both theoretical and practical knowledge on the subject. By investigating firm specific problems within the technique development industry we will contribute with improvements applicable on current market situations. This study will contribute to practical guidance by creating a new model for forecasting cash flow on business unit level. The study will also investigate the profitability of capital employed and highlight the important relationship between cash flow and capital employed. The understanding of this relationship will create possibilities to add value already on a lower business unit level.

The reliability of the practical contribution aspect of this study is supported by interviews with decision makers and financial managers at the investigated firm. These interviews contribute with a real perspective of how firms work with increasing value on lower levels today. This study will use this insider information and highlight possible changes to add value already on lower business unit levels. Finally, this study can be used as framework for large complex firms when working with finding possible sources for increasing firm value already in lower levels of the firm.

1.3 RESEARCH QUESTIONS

To investigate the previously mentioned problems following research questions have been formulated together with our investigated firm:

- Is it possible to create a simpler model for forecasting cash flow per business unit?
- How could the sensitive variables determining capital employed be used to increase the Return on Capital Employed and further on Firm Value?

1.4 AIM OF STUDY

The main aim of this study is to create a simpler model for forecasting cash flow inspired by previous research. The study aims to highlight the relationship between capital employed and the method of cash flow valuation. Furthermore, the study aims to investigate which variables to keep a closer look at when trying to increase firm value.

1.5 LIMITATIONS IN THE STUDY

As a case study this study will solely investigate one large multinational firm within the technique development industry. The investigated firm could be seen a representative of similar firms within the same industry. As a result, the contribution of this study will mainly be applicable to this specific industry.

Further descriptions of limitations such as time and data collection are to be found in chapter 3 Methodology.

1.6 THE INVESTIGATED FIRM

The investigated firm is a Swedish multinational firm within the technique development industry. The firm operates in countries all over the world and has thousands of employees. The products which the firm sells is highly customized, they operate in different type of projects and the ordering from customers do fluctuate a lot. This case study will focus on a specific department and investigate the cash flow and ROCE for its three specific business units. These business units do operate in a similar way, but do differ within type of products and geographic areas. The sizes of the Business Units do differ. The business units do not have their own equity or debt. Instead they use internal invoicing and each of the business unit has their own cash until the end of the year. This economic structure opens for problems, such as which of the business unit that shall be charged for the

depreciation when the units share equipment. The business unit will be referred to as number 1, 2 and 3.

2. THEORY

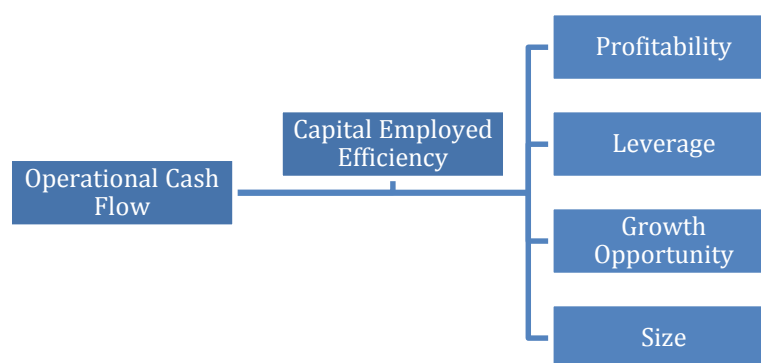
This chapter will present a short review of previous literature, as well as give an overview of researches that have been done in this area.

2.1 THE RELATIONSHIP BETWEEN CAPITAL EMPLOYED AND CASH FLOW

Hassani and Misaghi investigated the relationship between capital employed efficiency and operational cash flow (2013) and found that reducing capital employed could make a more efficient operational cash flow. This chain reaction could be explained by the close connection between capital employed and the weighted average cost of capital (WACC). By reducing capital employed one will reach a lower weighted average cost of capital. This is followed by an increased value of cash flow, which in turn will increase the value of the firm. According to Hassani and Misaghi there is a positive relationship between the two variables. Furthermore, as firm value is closely linked to the value of the firm's cash flow the understanding of this relationship becomes major important.

The linear function presented in Figure 2.1 highlights the connection between the dependent variable (operational cash flow), the four control variables (size of firm, leverage of firm, growth opportunity and profitability) and one main variable (capital employed efficiency).

Figure 2.1 Hassani and Misaghi's model of the relationship between Operational Cash Flow and Capital Employed Efficiency.



The study of Hassani and Misaghi is based on quantitative data collected from selected firms on the Tehran Stock Exchange. Information from banks, financial institutions, etc. has been excluded.

The study proves that there is a meaningful relationship between capital employed and operational cash flow. Although there is a difference between firms with high and low level of operating cash flow in terms of capital employed efficiency (Hassani & Misaghi 2013).

2.2 MEASURES OF CAPITAL EMPLOYED

Return on Capital Employed (ROCE) is a measurement of a firm's profitability. The ratio describes how efficient the firm is when it comes to convert its capital employed into profit (Camelia 2013).

The model Camelia refers to as the initial classical model for measuring return on capital employed:

$$ROCE = \frac{\text{Gross Profit (GP)}}{\text{Capital Employed (CE)}} \quad (1)$$

Burja Camelia, Associate Professor at the University of Alba Iulia, investigated the traditional ROCE analysis model and found that some extensions could be made. The result of the study shows that some of the determining variables of ROCE are more sensitive than others. According to Camelia, an increase in these variables will act positively on the firm's ROCE, such as capital turnover, sales efficiency, shares of sales in the total revenues and expenses' efficiency. These results contribute useful information and guidelines financial managers and investors (Camelia 2013).

In his study, Camelia highlights the importance of understanding the external business environment's impact on internal resources. The appreciation of the profitability of capital employed is closely linked with the dynamics of the firm's performance, which has a strong connection to the external business environment. Expectations by stakeholders are also a driving factor concerning the appreciation of capital employed. According to Camelia, the firm's main focus should be on the mobilization of internal resources when reaching to increase its ROCE. The internal resources can be used to create possibilities from the external environment. According to Camelia the firm's profitability will increase together with the improvements of efficiency in the production and commercialization activity.

David Wallace (2012) also investigated the sensitivity of variables determining capital employed and reached a similar conclusion as Camelia. In his study Wallace found that the main variables to be considered for a healthy ROCE are *profitability* and *activity*. By this Wallace highlights the importance of operational efficiency and activity within using

resources in an efficient way. The study presents the classical model for measuring ROCE a way to test operational efficiency, which could further on make an assessment of the firm's performance. The model could be used as guidance for management to improve the firm's activity and profitability, as improvements in these areas will lead to improvements in ROCE. Similar to Camelia, Wallace's study highlights the internal improvement related to the external business environment. The link between the activity and profitability is dynamically reflected in ROCE. The interactive nature of the formula contributes to the strengths and weaknesses of the firm's financial strategy. Wallace means that this should be the first area to review when it comes to increasing profit or reducing costs.

Camelia investigated the two main determining variables in the initial classical model for measuring ROCE; Return on Sales (ROS) and Capital Turnover Ratio (CTR). His result shows that the model could be broken down in order to assess the influence of other sensitive variables. Two more variables that act through Return on Sales were found; Sales on total revenue (SR) and Expense to revenue ratio (ERR). These variables exert a direct action on ROCE (Figure 2.2).

Figure 2.2 The relationship of the variables influencing Return on Capital Employed (ROCE).



The derivation of the initial classical model for measuring ROCE can be found in Equation 3 and 4. The changes to the model highlight the importance of efficiency in Return on Sales. According to Camelia, the focus on Return on Sales is promoted by sales representing the key of business. The new model explains the development of a sale-focused corporate culture. This result is exposed through the indicators, which show the measure in both revenue from goods sold and expenses' efficiency. The extended model considers a more analytical perspective of economic indicators than the initial classical model (Camelia 2013).

A healthy ROCE should exceed the firm's weighted average cost of capital (WACC), which means the firm is creating value for its shareholders. A healthy ROCE is triggered by a high profit margin or low capital employed and the opposite for an unhealthy ROCE. It is therefore important to consider other variables when investigating the change in ROCE, such as internal dynamics, communication and external factors (Damodaran 2007).

Wallace also investigated the difference of measuring ROCE on business unit level or individual business level. He found that ROCE might be even more useful in lower levels of the firm as it has a closer connection to management. At a lower business unit level ROCE would contribute more to managerial decisions when it comes to allocating internal resources than on a higher level. ROCE could show indications of investing or not, evaluate if shareholders expectations are fulfilled, evaluate sustainable growth or analyze the performance of projects.

Wallace's study investigates the performance of ROCE based on information from primary listings on the New Zealand Stock Exchange for 2009, 2010 and 2011 (Wallace 2009).

2.3 MEASURES OF CASH FLOW

The value of the firm could be seen as the most important factor of wealth for its shareholders. The valuation of the firm becomes an important tool, which can contribute to the value of the firm; because the cash flow available for shareholders will increase as the value of the firm increases (Dastgir, Khodadadi & Ghayed 2010).

Cash flows identify the level of cash needed to cover the operational expenses of the company and recognize potential shortfalls in cash balances. It could also be used to review the firm's performance and analyze whether the firm is achieving its financial objectives. Not enough cash will lead to unnecessary borrowing, management problems, underinvestment and expansion delay. Problems due to lack of finances could even lead to liquidation (Ruback 2000).

According to Vishwanath (2009) forecasting cash flow could be seen as one of the main tools when valuating a company. Discounted Cash Flow (DCF) methods are a commonly accepted on today's market. These models are based on the dynamics of profit and time of investment. A firm must take into consideration the investment required today to

generate future profit. Therefore, the cash flows are seen as future-expected value discounted at a level reflecting the risk of the investment. (Vishwanath 2009).

McInnis and Collins investigated the effect of cash flow forecasts on accrual quality and benchmark beating and found that cash flow forecasting may not only be positive. According to their research cash flow forecasts and forecasted earnings can also be negative for the firm. McInnis and Collins mean that the transparency forced by forecasting do diminish the firm's ability to control future earnings (McInnis & Collins 2010). Other researchers believe that cash flow forecasting is crucial for the firm. Almeida, Campello and Weisbach write in their research "The cash flow sensitivity of cash", that cash flow forecasting contributes to security regarding resources and operational expenses. This security gives confidence to project managers and decision makers to take chances and to work towards the firm's financial goals.

2.3.1 FREE CASH FLOW METHOD

Free cash flow represents the cash flow available for all investor in the company; both shareholders and debt holders. Among the different techniques used to value companies through analyzing cash flow, the Free Cash Flow method is the most commonly used one. In this method, the interest tax shield will be excluded from the free cash flows and the financial performance is calculated as operating cash flow minus capital expenses. The tax deductibility of interest is treated as a decrease in cost of capital using the after-tax weighted average cost of capital (WACC). When using this method the discount rate therefore has to be re-estimated each period of valuation (Kaplan and Ruback). The FCF method could be seen as complicated but is still the most commonly used method by firms on today's market. Thus, the model has received critique because of its complicity. By using the FCF model much weight is put on using the correct discount rate. This evaluation will heavily affect managerial investment decisions and could result in both over- and underinvesting (Ruback 2000).

2.4 INFORMATION ASYMMETRY

The flow of information and a well functioning communication environment is very important in a firm. The information must both be delivered and received in the correct way; leaving the correct message. Ismail, Nilsson and Bou-Hamdan studied the subject of flow of information in their study "Informationssymmetri på Finansiella Marknaden" where they proved information as an important tool for a well functioning internal core

structure of the firm. The study proves that the communication gap between colleagues can cause major problems for the firm. It is important with a well functioning flow of information where both communicators are on the same level. The information deliverer and the information receiver need to cooperate to create a smooth transmission. If there is a miscommunication somewhere in the chain of information flow there will be more difficult for the firm to succeed on the market. Ismail, Nilsson and Bou-Hamdan also found that it is important to deliver the right information, as well as the right amount, to establish a giving communication and flow of information. It is therefore important for the deliverer to know in advance what kind of information the receiver needs, as well as what kind of information the receiver are able to understand. The knowledge of information asymmetry is beneficial for the firm and should be obtained by any firm who aims to improve their internal functioning (Ismail, Nilsson and Bou-Hamdan).

3. METHODOLOGY

In this chapter the method and approach are described in detail in order to investigate the research questions. The methodology further describes the working process from a quantitative and qualitative perspective. Throughout the chapter there will be a continuous discussion and critique regarding reliability and validity.

3.1 RESEARCH DESIGN

This study uses the case study approach, where a single phenomenon is investigated in a natural setting to obtain in-depth knowledge. The context is important in this type of research. The aim is to understand the different actions of variables in a specific context. This case study uses multiple methods for collecting data; both qualitative and quantitative, which will be presented below.

When using a case study approach it is significant to use the correct data collection and sampling method. This is important for comparison of the qualitative and quantitative research result to previous research ensuring reliability and validity (Collis & Hussey 2009).

3.2 METHODOLOGICAL APPROACH

The choice of using the case study approach has been firmly thought through and discussed together with our investigated firm. We believe this approach is the most suitable approach for our research as it has many similarities to a classic case study. Furthermore, as we base the research solely on one firm, investigating their internal resources and strategies, the case study approach was a given choice for us.

3.3 WORKING PROCEDURE

The process of this paper consists of four stages: selecting the case based on formulated research questions, literature review, data collection and analysis. The research questions are formulated together with the investigated firm and further on modified to suit similar firms in the same industry. In order to create a giving discussion on the subject we started the process with a review of previous literature. Followed by quantitative and qualitative data gathering to deepen the analysis. Finally, in the analysis, the results of the study are discussed and compared to previous research. The working procedure has been continuously discussed and criticized throughout the whole process to ensure reliability and validity. We believe to have found a working procedure suitable for this study, following the case study approach.

3.4 LITERATURE REVIEW

In order to create a valid and reliable discussion we have compared our results to previous research. In order to create the frame of references we used the sequential literature review process presented by Collins and Hussey (2009). This process starts with reviewing previous literature, followed by a discussion and identification of suitable models for the specific research. The key variables of this study are based on previous research and discussed with the investigated firm. Only published articles have been used in this study, as they are more reliable (Collis & Hussey 2009).

3.5 DATA COLLECTION

The data sources can be either primary or secondary data, where this study will use primary data, represented by the review of previous research and collection of information from our investigated firm and interviews with project managers.

When using a case study approach it is significant to use the correct data collection and sampling method. The choice of variables and sensitivity analysis models have been deeply discussed and criticized throughout the data collection. Both models and variables have been discussed and chosen together with supervisors at the investigated firm. To assess a clear and reliable discussion the data was retrieved and summarized to only discuss the most sensitive and significant variables affecting firm value.

We have chosen to divide the study into a quantitative and qualitative part, as we use both approaches as part of the case study approach. The qualitative approach is based on perceptions and ideas. The quantitative approach is based on numbers and values, which could be seen as more objective data (Collis & Hussey 2009). In this study, the quantitative part is represented by a presentation of the methods used for measuring the two main factors of the study; cash flow and capital employed. The qualitative part is represented by interviews with project managers.

3.5.1 DATA TIME FRAME

This study concerns the accounting year of 2014 (final balances 2013 to final balances 2014). We are aware of the short period of time for making a deeper analysis on the subject, but we compensate the lack of time with an extended amount data for this period. In the study, we will use both quantitative and qualitative data and continuously compare the results to previous research. To be able to create a reliable and valuable discussion we will

look at quantitative data such as cash flows, balance sheets and statements of comprehensive income of three different business units at the company at issue. In a qualitative data perspective we were given the opportunity to interview nine project managers working in three different business units (three per business unit). These interviews contribute to a broader perspective and new influences on the questions at issue.

Using a case study approach impacts the importance of correct data collection comparing the qualitative and quantitative research result to previous research ensuring reliability and validity (Collis & Hussey 2009). We believe that we will be able to yield a relevant and valuable discussion as regards time, where the extended amount of data compensates and strengthens the conclusion.

3.6 QUANTITATIVE DATA

In order to answer the research questions we will primary use the quantitative research approach where we will look at variables affecting firm value. To create a clear overview the data collection and analysis of variables will be divided in two main focus areas; capital employed and cash flow. Thereafter the relationship between the two focus areas will be presented in order to create a clear and giving discussion.

This study is based on a case study of a large multi-national firm within the technique development industry. At this firm we have got the opportunity to investigate data from three different business units. We believe that the differences in variable data between these three units will contribute to a giving discussion on the subject. In this firm we will look at historical data, which we will analyze and compare to previous research. We are aware of the need of assumption and generalization of certain circumstances when only looking at one company representing a whole industry, but we do believe that our study will contribute to future research and be valuable for other companies within the same industry.

3.6.1 CASH FLOW PART

We have, after reviewing the classic FCF model thoroughly, chosen to investigate three different models for forecasting cash flow (Table 3.1). The challenge here was to create a model applicable on lower business units. At our investigated firm the business units do not hold their own equity or debt etc. We therefore wanted to explore if it would be possible to use the Incoming Payments and subtract the Expenses to estimate cash flow.

After discussing different parameters affecting cash flow with the finance department at each business unit, we arrived at a model that consists of:

- *Incoming Payments*: From this parameter we will derive the inflow of cash.
- *Project Cost of Goods Sold (COGS)*: From this parameter we will derive the cost of different projects.
- *Other Costs of Goods Sold (COGS)*: From this parameter we will derive the cost that occurs independent of projects.
- *Operating Expenditure (OPEX)*: From this parameter we will derive the cost/expenditures that arises as a result of normal operations.

Because of the large amount of operation done in projects we have chosen to divide COGS into *project* and *other*. Project COGS do hold an average weight of approx. 80 % of the total COGS, reviewed from the firm's financial income statement. A separation of project and other COGS would be needed to investigate the fluctuations in project COGS, since these will have a great impact on final cash flow. Project COGS will therefore be looked at on a monthly basis, while other COGS will vary in the different models. Income payments will also be kept on a monthly basis because of high volatility. Operating expenditure (OPEX) and depreciation will remain quite stable at a lower business unit level. Hence, these variables will also vary in the different models.

Table 3.1 Suggestions of models for forecasting cash flow:

Cash Flow Model 1	Cash Flow Model 2
Monthly Incoming Payments	Monthly Incoming Payments
- Project COGS Monthly	- Project COGS Monthly
- Other COGS Average	- Other COGS Monthly
- OPEX Average	- OPEX Monthly
= Cash Flow	= Cash Flow

To obtain a high validity we have tested the two models in three different business units at our investigated firm. These business units do operate with similar products within the same geographic area and are of comparable size.

The model suggestions are based on the following information at the firm at issue:

- Income Statement from 2014 (per month) for each business unit
- Balance Sheet from 2014 (per month) for each business unit
- Cash Flow Statement from 2014 (per month) for each business unit
- 9 different projects (3 from each business unit), with cost statements

In our calculations we will use historical data from 2014 (final balances 2013 to final balances 2014), which is describes and discussed earlier in the method section *3.4.1 Data Time Frame*. The year will thereafter be divided into 10 periods, which is representing the way the firm operates today. Months with low operational activity are here merged with the following month.

The new measures and valuation models have been continuously tested and compared to the classic FCF model (Equation 2) to ensure the validity of the new models. In this study, we have used confidential numbers only. We have therefore chosen to present the results in “percentage of consistency”. This means that if reaching 100 % “consistency” the tested model gives the exact same answer as a complete FCF calculation. If reaching 75 % “consistency”, the tested model gives the same answer in 75 times out of 100. The values reached using the classic FCF model will in this study be referred to as “true values”. As we only use historic data when calculating the free cash flow we must accept that these values are correct.

Free cash flow represents the cash flow available for all investor in the company and is calculated as followed (Vishwanath 2009):

$$\begin{aligned}
 &\text{Free Cash Flow (FCF)} \\
 &= \text{NOPAT} + \text{depreciation} -/+ \text{capital expenditure} \\
 & \quad -/+ \text{working capital} \qquad \qquad \qquad (2)
 \end{aligned}$$

where:

$$\text{NOPAT} = \text{Net operating profit after tax} = \text{EBIT}(1 - \text{tax rate}) \quad (3)$$

$$\text{EBIT} = \text{Revenue} - \text{cost of goods sold} - \text{operating expenses} - \text{depreciation} \quad (4)$$

To get a deeper understanding of the performance of the two models we have chosen to look at following factors when comparing the result to the classic FCF model:

Consistency of Volatility – This will tell us the difference in standard deviation between the two models. This will contribute to the understanding of the result of the model analyses.

Consistency of Average & Yearly basis (year of 2014) – These values will contribute with calculations over a longer time period; this to get better perspective than only looking at calculations monthly.

Correlation between our model suggestions and the classic FCF model – The correlation describes how well the two models co-vary.

P-value from the correlation – the p-value tells us how significant the value of the correlation is. A good level of significance is considered below 5 % (Gelman 2013).

Standard deviation - The standard deviation is a statistical measure of how much the different values of a population deviate from the average value (Tsiang 1972).

3.6.1.1 MATERIAL COGS AS A PART OF PROJECT COGS

As there is a large variation in project COGS we have chosen to investigate the weight of material cost of goods sold within the projects. This will give us a better perspective of the amount of material COGS in relation to project COGS. We would like to investigate if the material COGS are expensed in the correct period. If they are not, this could be one explanation of why the new model suggestion does not hold. Material that has already been paid for in a previous period should not charge the next period. Therefore, it is important for the firm to make sure the material is expensed in the correct period. If we take this into consideration the suggested model will improve dramatically.

To investigate this we will primary use a qualitative approach, such as interviews with project managers. The interviews will focus on the flow of information throughout the working process of each project. This information will make easier for us to understand the complex communication process of each project. If the managers feel that there is a shortage of flow of information this may be one reason for the large variation in material COGS. Additionally, we will also look at quantitative data, such as in-depth information of costs for each project. This part of the study is important, as it will contribute to the

creation of a new simpler cash flow model. The interview questions are to be found in Appendix 1.

3.6.1.2 MODEL CRITIQUE

There will be a difference in final cash flow between the two models, but we believe that the increase in profitability by using the simpler model will be higher than the loss in accuracy by using the complete classical FCF model (Vishwanath 2009). Previous researches consider profitability as one of the main determining variables for both operational cash flow and the efficiency of capital employed. The possible increase in profitability by using a simpler model for forecasting cash flow therefore becomes an important decision factor for financial managers. (Hassani & Misaghi 2013)

3.6.2 CAPITAL EMPLOYED PART

To be able estimate variables determining the efficiency of the firm's capital employed we will adopt the research process used by Camelia, which is presented below (Equation 5). This research process is considered for a case study on a similar firm as the one investigated in this study. The previous research compared the final balances of two years, while this study will compare more detailed information during one year; balances of each month during one year. To reach a higher reliability when comparing the result of the two studies we will use both average and samples of the population in all of the three business units. We believe that the difference in data analysis will create a new perspective of the same study process. As following the same research process as Camelia we will investigate the previously presented variables affecting the return on capital employed (ROCE):

- Influence of changes in the Capital turnover ratio
- Influence of variation in the rate Return on sales
- Influence of variation of indicator Sales on total revenue
- Influence of modification of the Expense to revenue ratio

Following formulas show the result of Camelia's study on sensitivity of variables determining capital employed; the modification of profitability due to the coexistent action of all factors:

$$\Delta ROCE = ROCE_1 - ROCE_0 \quad (5)$$

1. Influence of changes in the Capital turnover ratio:

$$\Delta ROCE(CTR) = ROS_0 * \Delta CTR \quad (6)$$

2. Influence of variation in the rate Return on sales:

$$\Delta ROCE(ROS) = \Delta ROS * CTR_1 \quad (7)$$

by which:

- 2.1 Influence of variation of indicator Sales on total revenue:

$$\Delta ROCE(SR) = \left(\frac{1 - ERR_0}{SR_1} - \frac{1 - ERR_0}{SR_0} \right) * CTR_1 \quad (8)$$

- 2.2 Influence of modification of the Expense to revenue ratio:

$$\Delta ROCE(ERR) = \frac{-\Delta ERR}{SR_1} * CTR_1 \quad (9)$$

By using these variables we will find the sensitivity of their influence on ROCE. The result will be compared to previous research to investigate in which regard we reach similar patterns of variable sensitivity (Camelia 2013).

We have chosen to primary focus on profitability of capital employed (ROCE). Camelia's research process (2013) focuses on profitability as one of the most sensitive variables when determining capital employed. Another study (Wallace 2012) came to the same conclusion regarding this variable.

3.6.2.1 MODEL CRITIQUE

We have chosen to primary investigate the variable profitability (ROCE) as it is considered one of the most sensitive variables when determining the efficiency of capital employed. Both previous studies, by Camelia (2013) and Wallace (2012), do highlight profitability as a highly determining variable. By only looking at the change in one variable we are aware of the need of assumption and generalization of the influence of other variables, such as size, leverage and growth opportunity (Hassani & Misaghi 2009). Although we do believe that only looking at one variable also could give a more profound discussion on this certain variable. The detailed investigation on profitability will be of great value for the investigated firm and similar firms within the same industry.

One must also be critical when choosing one single research process (Camelia 2013) to base the essentials of the research on. In this thesis, we do consider the previous research as reliable and hope to contribute with an interesting perspective on the subject.

3.6.3 THE RELATIONSHIP BETWEEN CASH FLOW AND CAPITAL EMPLOYED

Hassani and Misaghi (2013) proved the positive relationship between cash flow and capital employed. We will use their hypothesis to create a deeper discussion on the relationships impact on firm value. Hassani and Misaghi's research presents capital employed and profitability as main factors when determining operational cash flow. This means that by increasing efficiency on these variables the firm would also increase its operational cash flow. The model proves that it is important to find a balance between gains and losses when using a simplified model for forecasting cash flow. Therefore, the firm has to find the level where the loss in cash flow forecast accuracy is equal or more than the increase in profitability.

We have chosen to investigate the *profitability* since this variable is not only one of the determining variables when measuring cash flow; it also affects capital employed. This makes profitability one of the most important factors to look at for firms wanting to increase its cash flow (Hassani and Misaghi 2013).

3.6.4 CRITIQUE QUANTITATIVE DATA

This type of research is objective, which makes it easy to interpret and compare to other quantitative sample methods. Although, to keep the reliability and validity of a quantitative study one need to use large sample populations together with the correct sample method (Collis & Hussey 2009). The time horizon of the quantitative data is limited, which could be seen as an unreliable aspect. Furthermore, the quantitative data is only collected from three business units within the firm. This means we have to consider the chosen business units good representatives for the whole firm to ensure validity of the study. We ensured this reliability and validity by using different sample sizes and a large range of financial measurement parameters. Furthermore, we will use the qualitative method to understand the meaning of the conclusions produced by the quantitative data.

3.7 QUALITATIVE DATA

In order to create a giving discussion we have chosen to not only use quantitative data, but bring in a qualitative perspective as well. Qualitative methods may be used to understand

the meaning of the conclusions produced by quantitative methods. With qualitative methods it is possible to give a more precise and testable expression to qualitative ideas (Collins & Hussey 2009).

To be able to get deeper insight in the firm, regarding their problems and improvement possibilities of the financial issues, we had the possibility to interview the financial manager of the firm. The interview questions are to be found in Appendix 1. This study also will consider 9 interviews with project managers for 9 different projects. In these projects we will investigate the influence of flow of information on the efficiency in capital employed and cash flow. The interviews will also be used to get a deeper understanding of the weight of material COGS within the projects (earlier described in 3.5.1.1 Material COGS as a part of Project COGS). The interview questions are to be found in Appendix 2.

By adding qualitative data we will reach a profounder discussion, which will be needed when investigating the act of the sensitive variables when measuring both operational cash flow and the efficiency of capital employed. The qualitative perspective will therefore be significant to create a giving discussion (Bryman & Bell 2009).

3.7.1 CRITIQUE QUALITATIVE DATA

As qualitative research methods are partly based on subjectivity, they can be seen as the researchers own perception of the subject. The contribution to future research is often questioned by this critique (Collins & Hussey 2009). With this in mind, we have formulated the interview questions to create an as non-subjective information source as possible, but still dealing with the impact of management preferences. According to Collis and Hussey are both quantitative and qualitative research needed to fully understand a subject.

3.8 RELIABILITY

Reliability is a measurement of the truth and accuracy of a study. High reliability is reached when the same result is to be reached even if the study were to be replicated. Especially in quantitative research the reliability must be discussed concerning stable or random sample variations (Collis & Hussey 2009). To improve the reliability of this study, we have used both small and large sample populations when analyzing the data. We have also collected data from three different business units to localize different patterns of changes in variables. Furthermore, sensitivity analysis was performed in several different aspects to

test internal reliability and volatility of variables. The tests provide information on each variable as well as the relationship between the different variables.

3.9 VALIDITY

Validity determines if the study is produced in a correct and valid way. If valid, the results of the study can be generalized and compared to other research results (Collis & Hussey 2009). To ensure validity of this study, we have only used research methods based on previous research. Only published reports have been reviewed, which contribute to the validity of this study. As developing new measures of cash flow and capital employed the validity of the study is central. To ensure validity of new measurements, the choice of variables have been discussed and criticized throughout the whole working process. Additionally, our supervisors at the investigated firm have been an important resource of industry-based knowledge. This knowledge has contributed to the possible generalization of the study within the technique development industry. The results of this study can be seen as an extension of previous research on the subject (Collis & Hussey 2009).

4. EMPIRICAL RESULTS

This chapter presents the empirical results. First, the two model suggestions for cash flow will be presented in detail. Thereafter, the firm's capital employed efficiency will be investigated in line with previous research.

4.1 NEW VALUATION MODEL FOR FORECASTING CASH FLOW

The interviews with the financial manager clarified the need for a simpler model to rationalize the cash flow forecasting process. By working with cash flow already at lower levels, the firm would be able to decrease the expenses due to less time consumed. The creation of a cash flow model on business unit level will influence the managers at lower levels to work more efficient in order to increase the cash flow.

The implementation of a cash flow forecasting model on business unit level will help the firm in early state. It could also be used to see how the different operations would affect the cash flow. The models are considered to catch up the cash flow in a good way. The parameter incoming payments is considered to match the sales in a good way according to the financial manager. This is motivated with that the firm uses a 30 days payment period for their customers. The average period before payment is 20 days. The firm would be satisfied if the model reached a level of 80 % - 90 % of consistency. This means that the model needs to generate a value that matches the outcome from the real FCF model up to at least 80 %. For example, if the value reached by the real FCF model is 100 000, the outcome from the created model needs to be at least 80 000. This level would help them to get a perception of how the cash flow will develop during the different periods. The cash flow calculation on business unit level contributes to the cash flow valuation of the whole firm, which in turn will affect firm value. Additionally, the model will make it easier to deeper understand specific operations and other expenses that affect cash flow.

Below follows the results of the comparison between the two model suggestions (Table 4.1) and the classic FCF model (Equation 2). 100 % “consistency” is reached when the tested model gives the exact same result as the FCF model. We have also chosen to look at a selected number of ratios (volatility, correlation and p-value), which is presented together with each model.

Indicator	Business Unit	January & February	March	April	May	June	July & August	September	October	November	December
Percentage of Consistency	1	72%	40%	10%	41%	25%	48%	50%	56%	67%	10%
	2	99%	92%	21%	20%	91%	60%	96%	20%	70%	20%
	3	65%	35%	30%	43%	60%	40%	42%	58%	73%	20%
	Average	79%	56%	20%	35%	59%	49%	63%	45%	70%	17%

According to the test of model 1 in Table 4.1, none of the business units holds perfectly for this model. In this model, the percentage of consistency has a high average volatility and varies from 17 % to 79 %. Business unit 2 reaches the best result when considering this model, where four out of ten periods reach a result that exceed 90 % consistency. By looking at the average of all the three business units, we see which of the periods that have resulted in a better outcome. A possible explanation of the low percentage of consistency could be that the incoming payments affect do not match how the sales affect the cash flow in the real FCF model. Another explanation could be that the expenses variables do not catch the fluctuations from the variables used in the real FCF model. These factors make it hard for the simpler model to catch up fluctuations between months, which could lead to a very low percentage of consistency in some of the periods.

Business Unit	Volatility	Monthly average	Year of 2014	Correlation	P-Value
	Percentage of Consistency				
1	75%	100%	100%	97%	0,0004%
2	87%	89%	79%	81%	0,1018%
3	71%	75%	72%	96%	0,0024%
Average	78%	88%	84%	91%	0,0348%

Table 4.2 shows the percentage of consistency of the volatility, the monthly average and the year of 2014. The ratio for business unit 1 does show the best result with a 100 % yearly percentage of consistency. Regarding business unit 2 and 3 the results are lower, but both models still reach an outcome over 70 % consistency. The volatility is similar between business unit 1 and 3 with approximately 70 %, while business unit 1 reaches the best result with 87 %. When considering the correlation, all of the business units correlate in a good way with the FCF model. Furthermore, the p-values are all below 5 %, which mean that the correlation is significance.

Indicator	Business Unit	January & February	March	April	May	June	July & August	September	October	November	December
Percentage of Consistency	1	88%	37%	25%	38%	20%	59%	65%	65%	65%	10%
	2	50%	81%	45%	40%	40%	85%	100%	40%	65%	25%
	3	68%	40%	32%	60%	62%	30%	55%	64%	74%	40%
	Average	69%	53%	34%	46%	41%	58%	73%	56%	68%	25%

Table 4.3 shows that, similar to model 1, this model does not hold perfectly for any of the business units. The average percentage of consistency varies from 25 % to 73 %. Business unit 2 reaches the best outcome in this model as well, which might be explained by good communication between managers within the business unit. The same factors that are

considered as explanation of the low percentage of consistency in model 1 also holds for model 2. Model 2 has monthly variables for other COGS and expenses, which explains why the result does differ between the models.

Business Unit	Volatility	Monthly average	Year of 2014	Correlation	P-Value
	Percentage of Consistency				
1	82%	100%	100%	92%	0,0078%
2	89%	72%	79%	85%	0,0609%
3	73%	77%	72%	87%	0,0100%
Average	81%	83%	84%	88%	0,0262%

Table 4.4 presents the result of the ratios calculated on model 2; where we find approximately the same outcome as in model 1 when measuring the percentage of consistency. The business units have an overall good correlation with the outcome of the real FCF model. The p-values of this model are under 5 %, which, which makes the result of the measured correlation reliable.

Indicator	Model	January & February	March	April	May	June	July & August	September	October	November	December
Percentage of Consistency	1	79%	56%	20%	35%	59%	49%	63%	45%	70%	17%
	2	69%	53%	34%	46%	41%	58%	73%	56%	68%	25%

Table 4.5 presents an overview of the average percentage of consistency between model 1 and 2 for each of the ten periods. The dark cells represent the highest percentage per period. According to this table, the best average will be reached when using model 2. It has a higher percentage of consistency in six out of ten periods.

Model	Volatility	Monthly average	Year of 2014	Correlation	P-Value
1	78%	88%	84%	91%	0,0348%
2	81%	83%	84%	88%	0,0262%

Table 4.6 presents an overview of the chosen ratios from Table 4.2 and 4.4. This table gives another answer than table 4.5 According to this table should model 1 be chosen since it has more parameters with better result. Model 2 has a higher percentage of consistency of the volatility. Regarding the total year of 2014 it should be the same since the difference between the two models is that model 2 uses a monthly average calculated from yearly

basis, and thereby should the result for the whole year be the same. The p-values are very low which represent a high level of significance.

4.1.1 MATERIAL COGS AS A PART OF PROJECT COGS

The following part will show the results of the two models considering the weight of material COGS not affecting the cash flow per period.

Table 4.7 Material cogs as a percentage of project cogs												
Business Unit	Indicator	January & February	March	April	May	June	July & August	September	October	November	December	Year of 2014
1	Average % of material in relation to project cogs	30%	34%	12%	36%	37%	35%	18%	36%	30%	18%	29%
	Volatility between the projects	16%	17%	5%	7%	30%	30%	7%	12%	15%	10%	15%
2	Average % of material in relation to project cogs	40%	95%	58%	95%	25%	42%	40%	61%	27%	29%	51%
	Volatility between the projects	16%	50%	19%	60%	6%	28%	34%	39%	16%	2%	27%
3	Average % of material in relation to project cogs	99%	35%	40%	63%	97%	55%	46%	95%	95%	99%	72%
	Volatility between the projects	20%	40%	25%	8%	35%	30%	22%	18%	22%	6%	23%

Table 4.7 shows the average of material COGS in relation to project COGS per period and business unit. Business unit 1 holds the most stable result with a yearly average of 29 % and a volatility of 15 %. For Business Unit 2 the average fluctuates a lot more, where the average reaches up to 95 % of the material COGS. In this business unit the overall average for the year is 51 % with a volatility of 27 %. Business Unit 3 holds the highest average, which reaches up to 99 % of material COGS. The yearly average for this business unit is 72 % with a volatility of 23 %.

Table 4.8 Results of Model 1 after considering material part of project cogs												
Business Unit	Indicator	January & February	March	April	May	June	July & August	September	October	November	December	Year of 2014
1	Percentage of consistency	Before	72%	40%	10%	41%	25%	48%	50%	56%	67%	100%
	Percentage of consistency	After	88%	60%	45%	60%	55%	57%	92%	84%	69%	100%
	Improvement		16%	20%	35%	19%	30%	9%	42%	28%	2%	35%
2	Percentage of consistency	Before	99%	92%	21%	20%	91%	60%	96%	20%	70%	79%
	Percentage of consistency	After	100%	100%	40%	100%	100%	100%	100%	42%	100%	38%
	Improvement		1%	8%	19%	80%	9%	40%	4%	22%	30%	18%
3	Percentage of consistency	Before	65%	35%	30%	43%	60%	40%	42%	58%	73%	20%
	Percentage of consistency	After	100%	41%	38%	58%	71%	79%	100%	73%	80%	100%
	Improvement		35%	6%	8%	15%	11%	39%	58%	15%	7%	80%

Table 4.8 shows how the different outcome for each of the business unit considering the weight of material COGS not affecting the cash flow per project. The indicator *before* represents the result in percentage of consistency that was reach before making any

adjustments. The indicator *after* represents the change in percentage of consistency when taking into consideration that not all of the material COGS shall affect the cash flow in this particular period. This is calculated by adjusting the original value of project COGS with the result from the chosen projects as shown in table 4.7. In model 1, we reach the best result when the material COGS' payment date is taken into consideration. The result after considering the material COGS shows that a higher percentage of consistency is reached. The periods without an increase in consistency already hold a high percentage of consistency. If the material COGS payment date is considered the percentage of consistency will be improved up to 100 % in some periods. At a yearly basis two out of three business units achieved a result of 100 % consistency. The third business unit reached 82 % consistency.

Table 4.9 Results of Model 2 after considering material part of project cogs													
Business Unit	Indicator		January & February	March	April	May	June	July & August	September	October	November	December	Year of 2014
1	Percentage of consistency	Before	88%	37%	25%	38%	20%	59%	65%	65%	65%	10%	100%
	Percentage of consistency	After	88%	50%	55%	58%	53%	62%	92%	86%	67%	45%	100%
	Improvement		0%	13%	30%	20%	33%	3%	27%	21%	2%	35%	0%
2	Percentage of consistency	Before	50%	81%	45%	40%	40%	85%	100%	40%	65%	25%	79%
	Percentage of consistency	After	100%	100%	55%	100%	100%	100%	100%	49%	100%	38%	100%
	Improvement		50%	19%	10%	60%	60%	15%	0%	9%	35%	13%	21%
3	Percentage of consistency	Before	68%	40%	32%	60%	62%	30%	55%	64%	74%	40%	72%
	Percentage of consistency	After	100%	43%	38%	75%	72%	45%	100%	82%	80%	100%	82%
	Improvement		32%	3%	6%	15%	10%	15%	45%	18%	6%	60%	10%

Table 4.9 shows the same considerations as table 4.8, but with numbers for model 2. Improvements are achieved in every period for model 2, excluding the periods that already have a 100 % of consistency. The result for model 2 is similar to the result of model 1. This model also reached the highest percentage of consistency at business unit 2. When looking on yearly basis two out of three business units reached 100 % of consistency. The third business unit reached 82 %, which is one the same as in Model 1.

To investigate how large amount of the material cost for the project that is bought in another period, we did choose to do interviews with each of the project managers. These interviews confirmed our presumption concerning the material cost. Seven out of nine project managers feel like they do not get enough information before and after the project. There seems to be a communication gap between the project manager and the logistics department. According to the project managers participating, the flow of information

between different business units and project groups is poor. All of the nine project managers believe there are changes that can be made to increase the flow of information and communication. The managers thereby did not possess information of when the material attributed from the projects is ordered and paid for.

4.1.2 IN DETAIL - MONTHLY

A deeper look into why the models did not hold and why there were such high fluctuations in percentage of consistency present a new perspective. In the period of April and December both the Models had difficulties to give a feasible answer. The deeper look revealed that the parameters used in the model, highly differed between the months that reached a high percentage of consistency and those who did not. After simulation with excluding of periods with lower percentage of consistency, both of the models did provide a better result. Unfortunately was the result not good enough to motivate the model for a recommendation. There was still a high degree of uncertainty.

4.1.3 MODEL CRITIQUE

Following factors need to be considered when discussing the result of the models.

The time horizon: We were only able to look at data from 12 months. A longer time horizon consisting of three or five year could have led to another result. It would also have been easier to find seasonal or other fluctuations and peaks that might should be excluded. This would have increased the validity of the model and contributed to factors and findings that would have improved the model.

Projects: The three projects for each business units that we have chosen, might not contribute to a true picture of the outcome.

Factors: All factors that is used in the real FCF is not considered in the simpler model which contribute to the difference in the outcome.

10 instead of 12 periods: The Company uses 10 periods instead of 12 periods, they consider January & February as one period as well as July & August. The model might hold better if we would consider 12 periods instead of 10, but since they do not report in that way, it is impossible for us to calculate it.

Exchange rates: Different exchange rates lead to different values. Since the business units do operate in exactly the same regions this will affect the outcome.. This can also be one

explanation to why the results differ between the different business units since, they have some unique countries per business unit.

4.2 AN EFFICIENT LEVEL OF CAPITAL EMPLOYED

To be able to make a dynamic analysis of the profitability, the financial statements of the three business units were analyzed in line with Camelia's working procedure (see 3.5.2 Capital Employed Part). The data together with the results for each business unit are presented in table 4.10. Note that some variables only show "N/A", this because of the confidentiality of our investigated firm.

Indicators	Symbol	Business Unit 1				Business Unit 2				Business Unit 3			
		2013	2014	Absolute changes	Dynamic 2013/2014	2013	2014	Absolute changes	Dynamic 2013/2014	2013	2014	Absolute changes	Dynamic 2013/2014
Gross profit	GP	N/A	N/A	N/A	125,5%	N/A	N/A	N/A	121,0%	N/A	N/A	N/A	128,0%
Sales	S	N/A	N/A	N/A	120,0%	N/A	N/A	N/A	115,5%	N/A	N/A	N/A	123,0%
Revenues	R	N/A	N/A	N/A	121,0%	N/A	N/A	N/A	116,0%	N/A	N/A	N/A	123,5%
Expenses	E	N/A	N/A	N/A	114,0%	N/A	N/A	N/A	112,0%	N/A	N/A	N/A	120,0%
Total capitals	TC	N/A	N/A	N/A	105,0%	N/A	N/A	N/A	101,0%	N/A	N/A	N/A	102,5%
Return on sales (%)	ROS	19,2%	20,1%	0,9%	104,6%	21,5%	22,5%	1,0%	104,8%	15,4%	16,0%	0,6%	104,1%
Capital turnover ratio	CTR	0,97	1,11	0,14	114,3%	1,21	1,39	0,17	114,4%	1,38	1,70	0,32	123,0%
Expenses to revenue ratio (%)	ERR	71,5%	67,3%	-4,1%	94,2%	61,2%	59,1%	-2,1%	96,6%	78,8%	76,5%	-2,2%	97,2%
Sales on total revenue (%)	SR	94,7%	93,9%	-0,8%	99,2%	93,9%	93,5%	-0,4%	99,6%	93,8%	93,5%	-0,4%	99,6%
Return on capital employed (%)	ROCE	18,7%	22,4%	3,7%	119,5%	26,1%	31,3%	5,2%	119,8%	21,2%	26,5%	5,3%	124,9%

The analysis of the economic-financial condition of the firm's chosen business units reveals a positive result for its resources in the short term. The sale for each business unit has increased from between 15,5 % to 23 % and the gross profit from between 21 % to 28 %. The total capital employed has increased with an insignificant amount compared to the increase in sales. The return on capital has increased from between 3,7% to 5,3 % for each of the business units.

A greater value of ROCE indicates more effective usage of its capital (Camelia 2012). The ROCE for each business unit is greater than the cost of capital per business unit. This confirms that they operate with an efficient capital employed and generate a value for the shareholders. During the analyzed period the Expense to Revenue ratio remained negative for all business units, with negative values between 2,1 % to 4,1 %. This indicates that the growth rate of expenses is lower than the growth rate of revenue. Although, one critical aspect is the Sales on Total Revenue, which has decreased to below one percentage, compared with the level of previous year.

Table 4.11 Contribution of influence factors to profitability variation				
Specification	Symbol	Impact of factors on the capitals' profitability (%)		
		BU 1	BU 2	BU 3
Return on Capital Employed (ROCE)	Δ ROCE	3,7%	5,2%	5,3%
Capital turnover ratio (CTR)	Δ ROCE (CTR)	2,7%	3,8%	4,9%
Return on sales (ROS)	Δ ROCE (ROS)	1,0%	1,4%	1,1%
Sales on total revenue (SR)	Δ ROCE (SR)	0,3%	0,2%	0,2%
Expenses to revenue ratio (ERR)	Δ ROCE (ERR)	4,9%	3,1%	4,1%

Table 4.11 shows the change in the sensitive variables presented in the study by Camelia; referred to as influence factors to profitability variation.

The two direct influence elements have contributed to a positive effect on the Return of Capital Employed. These are the Capital Turnover Ratio (CTR) and the Sales efficiency (ROS). The Capital Turnover Ratio (CTR) was positive and resulted in an increase of ROCE with between 2,7 % to 4,9%. The Return on Sales (ROS) also had a positive impact on the firm's profitability and generated a growth of ROCE between 1 % to 1,4 %. Although the sales versus revenues structure (Sales on Total Revenue) were adjusted, it did not have a negative outcome. The adjustment led to a capitals' profitability increase by 0,2% to 0,3%. The enhancement of the expenses' efficiency, induced by the reduction of the Expense to revenue ratio increased ROCE with 3,1% to 4,9 %.

5. ANALYSIS

This chapter initially discusses how the results from section four relate to the relationship between cash flow and operational capital employed when focusing on increasing firm value. Furthermore, it gives insights in possible changes for a more efficient operating valuation and forecasting process.

This study was made to investigate the creation of a simpler model used to value cash flow and to show the relationship between cash flow and ROCE. Regarding the new cash flow model, the result of the study shows that it did not hold for consistency of 100 % each month. Although, when looking on yearly basis both model 1 and 2 do show a better result, especially when taking the material COGS into consideration. The interviews presented a new perspective on material COGS that partly explained why the models do not hold. A weak integrated system as well as a poor flow of information between business units and managers disfavor the forecasted values. Because of the poor integrated system and lack of time we were not able to investigate the material COGS further. Although, it would have been interesting to see how much of the material COGS that actually should be charged each month to affect the Cash Flow. Due to our limitations in time and information, we have chosen to deeper investigate the parts of the study where we have reached more information. Therefore, the analysis will focus on the sensitive variables determining cash flow and ROCE.

Firstly, we will discuss and choose one of our cash flow model suggestions. This model will be investigated and compared to the classic FCF model through a sensitivity analysis. This will explain how different variables will influence the chosen model compared to the real FCF model. The cash flow part will be more deeply discussed in part 5.1. Furthermore, a sensitivity analysis has also been done on the capital employed part. In chapter 4.4 we did obtain a result equal to the earlier research made by Camelia. This result will be discussed, criticized and compared to other researches on the subject in chapter 5.2. Finally, we will use sensitivity analysis together with tornado charts to discuss how different parameters influence cash flow and ROCE.

5.1 CASH FLOW FORECASTING ON BUSINESS UNIT LEVEL

Ruback (2000), Vishwanath (2009) and Hassani and Misaghi (2013) highlight the importance of cash flow as a benchmark of the firm's ability to cover operational expenses. Vishwanath means that cash flow forecasting could both be used to measure the firm's performance and to find possibilities of adding value. Almeida, Campello and Weisbach

state “cash flow forecasting is crucial for the firm. It contributes to security regarding resources and operational expenses, which gives confidence to project managers”. This might be one explanation of the poor performance by project managers regarding budgeting their projects. According to the financial manager at our investigated firm, the firm is in great need of a well functioning system for cash flow forecasting. The non-functional structure used today may disfavor the decision making by project managers, which was proven further on in the interviews with project managers.

With this said, the estimation of cash flow is extremely important. Being able to forecast cash flows already on business unit level would make an even greater contribution to final firm value, according to the financial manager at our investigated firm. Interestingly, even if firms do have practical needs for cash flow models on lower unit levels there are no notable previous researches in this area. Vishwanath’s study shows the initial classical FCF calculation, but there are limitations for doing this at business unit level.

It is important to also consider the negative arguments regarding cash flow forecasting. McInnis and Collins state “cash flow forecasting may not only be positive. The transparency forced by forecasting does diminish the firm’s ability to control future earnings”. McInnis and Collins do have a point here, although we believe that the arguments strengthening cash flow forecasting are stronger than the negative aspects.

5.1.1 COMPARISON OF MODEL 1 AND 2

When investigating our first research question “is it possible to create a simpler model for forecasting cash flow per business unit?”, yes would be the simple answer. Although, we found that the action of creating this model is not that simple. In this question we have arrived at two different model suggestions, which are shown in table 3.1. The difference between monthly and average, is to see whether the average will capture fluctuations in a better way.

Table 3.1 Suggestions of models for forecasting cash flow:

Cash Flow Model 1	Cash Flow Model 2
Monthly Incoming Payments	Monthly Incoming Payments
- Project COGS Monthly	- Project COGS Monthly
- Other COGS Average	- Other COGS Monthly
- OPEX Average	- OPEX Monthly
= Cash Flow	= Cash Flow

After investigating the suggested models we have come to the conclusion that none of the models hold perfectly for every month (see table 4.1. and 4.3). The further question is now

how we can change the model to reach a better percentage of consistency, in line with the classic FCF model?

The previous research by Hassani and Misaghi states *“it is important to find a balance between gains and losses when using a simplified model for forecasting cash flow. Therefore, the firm has to find the level where the loss in cash flow forecast accuracy is equal or more than the increase in profitability”*. This means that although the new model suggestion is not perfect it may still result in increased profitability. According to the financial manager at our investigated firm, they would lower the operational expenses if using a simpler model. Although, these savings must benefit the profitability enough to increase cash flow. As presented in Hassani and Misaghi’s research *“profitability and capital employed are main factors when determining operational cash flow”*. This means that by increasing efficiency on these variables the firm would also increase its operational cash flow. The chain reaction proves that the use of a simpler valuation model will be profitable for the firm, if it reaches a cash flow outcome close enough to the classic FCF model.

Previous research by Dastgir, Khodadadi & Ghayed states *“the valuation of the firm becomes an important tool, which can contribute to the value of the firm; because the cash flow available for shareholders will increase as the value of the firm increases”*. This together with Hassani and Misaghi’s findings on cash flow and profitability could drive the creation of a simpler cash flow model.

In both model 1 and 2 the percentage of consistency did occasionally reach up to 100 %, but fluctuated between the months. This means that even though the result for each month was not good enough (see table 4.1 and 4.3), the yearly ratio could be a valuable tool for the estimation if it catches up the correlation. The p-value tells us that the correlation for the both models is below 1 % and thereby has a high level of significance.

Both models use monthly values for payments and project COGS, which is why the models reach the same result when considering the weight of material COGS not affecting cash flow. The deeper analysis of material COGS as a part of project COGS reached the lowest change of result for business unit 1. This business unit also reached the best results in percentage of consistency throughout the whole study. Furthermore, business unit 2 and 3 reached lower results and also have a higher degree of material as a percentage of the project COGS. This proves that the weight of material COGS is one of the major reasons for the failure of the two models. The interviews with project managers also

strengthen this conclusion. The results of the interviews show a gap in flow of information between the logistics department and the project managers. Logically, this gap will contribute to a deeper loss if the project managers at one business unit deal with more material within their projects. In some of the periods the average percentage of material COGS reached over 90 %. As the interviews with the project managers showed a poor communication structure, it is not hard to believe that not all of the material were bought in that period. We also investigated and found that there is no connection between having an extremely high material COGS and high sales.

The limited information regarding the date of payment of material and how the investigated firm place orders did prevent us from a deeper analysis. Information regarding how they place orders would be of great interest. For example if they favour few but large order this would have an effect on the material cogs, cash flow and so our model. Due to our limitation of information we can only state that from the information that we have access to, it is likely that both models would be improved if considering the material COGS of the project. The company should therefore consider implementing a logistics system, by which managers easily can trace the material. This would not only help to improve the cash flow model, it would also provide managers with valuable information such as stock levels of different components. This would improve the co-operation with clients and it would be easier for the managers to decrease costs and the cash out flow.

Which of the two models is then the best to use?

Both model use monthly values for payments and project COGS, but they do differ regarding the other COGS and expenses. When looking at table 4.5, model 2 reaches a higher average, but model 1 reaches a higher amount of months with over 90 % consistency. In this question it is important to remember that other variables also affect the result of each month. If we had been able to look at a longer time horizon, we would have been able to determine whether the result followed the seasonal fluctuation and other trends. If this was not the case, it could be one explanation of why model 1 sometimes gives a more accurate percentage of consistency. This is one possible explanation, however, it is difficult for us to draw any definite conclusion because of the lack of information. When comparing the two models in table 4.6, model 1 reaches the same or a higher average in all of the parameters except the volatility. As we mentioned before, both models show good values on yearly basis and good correlation, which could be seen as stronger factors than volatility. According to our comparison, model 1 should be chosen if the firm is

satisfied to use the model as guidance on yearly basis or uses monthly average which are based from yearly numbers. Even though model 1 reaches a 100 % of consistency for business unit 1 on yearly basis, it is hard to tell if the model would be considered the best representative for other business units and other firms.

It is difficult to tell why neither of the models do not hold for business unit 2 and 3. Possible reasons could be due to unusual fluctuations or payments that were paid either too late or too early. The exchange rate may affect the business units differently because they operate in different regions. Furthermore, we must not forget our limitation with the time horizon. Since we only were able to look deeply into the year of 2014, it is hard to tell how the models would perform when considering a longer time horizon. A longer time period would make it easier to find unusual fluctuations and variations between the months and years. This data would be essential for future investigation on creating a model for forecasting cash flow on business unit level.

According to the financial manager at our investigated firm, the market practically does demand a simpler model for forecasting cash flow on business unit level. This demand could be used as one of the driving arguments for developing this kind of model. Even if we have not been able to reach a final solution in this study, we have come to conclusions regarding yearly guidelines for forecasting cash flow on lower levels.

How good does the model need to be, before it would create value to the firm?

By reviewing Vishwanath's study on the classical FCF model, we come to the conclusion that when creating a simpler model there will be a difference in final cash flow outcome. Although this does not mean creating a simpler model would be impossible. According to both the previous research by Hassani and Misaghi and the financial manager at our investigated firm, the creation of such a model would still be beneficial. With that said, it is important to compare the increase in profitability and the loss in forecast accuracy when using a simpler model. Hassani and Misaghi states that this relation should be considered when working with operational cash flow. According to the financial manager at our investigated firm, they would be satisfied with a level between 80 – 90 % of consistency. At this level they would reach a balance between the increase in profitability and loss in accuracy, stated by Hassani and Misaghi. At this point our recommendation would be to use our model on yearly basis. Furthermore, the model could be used on monthly basis as an average from the yearly basis to still reach a minimum of 80 % consistency.

After comparing our results with previous research we have come to the conclusion that the use of model 1 would be preferable. This model provides the same result when looking on yearly basis and a better result when looking at monthly average and the correlation. Model 2 does reach a similar result, but with a lower correlation.

The differences between model 1 and model 2 are found in the two last variables: *other COGS* and *expenses*. In these variables, model 1 uses an average of the ten periods and model 2 uses monthly estimation. Other COGS and expenses do not constitute a large portion of the total expenses, compared to the project COGS. They are therefore not as important to be looked at on monthly basis as the project COGS. When looking at the fluctuations from month to month, we recognize most fluctuations in the project COGS and the two other expense variables are quite stable over time. By using the average it is also possible to catch the seasonal fluctuations. Ruback and Vishwanatha's critique concerning the calculation difficulties would also be satisfied since model 1 includes simple calculations.

5.1.2 SENSITIVITY ANALYSIS BETWEEN MODEL 1 AND REAL FCF MODEL

In this part of the analysis we will use the sensitivity analysis approach to deeper investigate the four following variables: *Incoming payments/sales*, *project COGS*, *other COGS* and *operational expenses (OPEX)*. This will show the sensitivity of our model compared to the classic FCF model. In this section, we have chosen to only discuss model 1 as it have proven to have a better outcome than model 2.

The reason why we have chosen the four variables is because they will affect both models. The limitation is that the real FCF model does not consider incoming payments and our model does not consider sales. The firm uses an invoicing period of 30 days and they have an average of 20 days before they get their payment. This is the only way to compare the first variable between the two models. Therefore one need to be critical concerning the outcome of this variable.

Our model and the classis FCF model should in a perfect scenario show the same adjustment in percentage. This was not achieved in this study. According Vishwanath "*there will be a difference in final cash flow outcome*", which was confirmed by our results. The exact same value of cash flow can only be reached if both models would have the same outcome of the cash flow before any adjustments are made. This because values of the adjustment

will be presented as in percentage of change compared to the value before any adjustment is made. This limitation of the sensitivity analysis must be considered.

Indicator - Sensitivity as a percentage	Business Unit 1		Business Unit 2		Business Unit 3	
	Real Model	Model 1	Real Model	Model 1	Real Model	Model 1
Δ 10 % Incoming payments / Sales	38%	22%	29%	25%	52%	38%
Δ 10 % Project Cogs	18%	19%	22%	18%	28%	26%
Δ 10 % Other Cogs	1%	1%	2%	2%	0%	0%
Δ 10 % OPEX	7%	7%	21%	18%	12%	9%

Table 5.1 describes how the model 1 and the real model are affected when changing the four variables with an increase and decrease of 10 %. The table shows the change percentage of the total outcome of cash flow that will be changed compared to the outcome before adjustment. According to our earlier result on the percentage of consistency, business unit 1 reached 100 %, business unit 2 79 % and business unit 3 72 % (see table 4.2). Our model should follow these results and react similarly to the real FCF model. Business unit 1 with 100 % consistency should be the only business unit to reach the exact same analytical result as the real FCF model. This is supported by the value of 100 % consistency before any adjustments.

By changing the first variable we can see a difference in influence on our model and the classic FCF model. The effect becomes greater on the classic FCF model which considering sales, compared to our model which is considering incoming payment. A possible explanation for this is that the incoming payments are not equal to the sales. Furthermore, the cash flow outcome before was not identical in all business units.

Considering business unit 1, the difference between the two models may be explained by the lack of co-variation between incoming payments and sales. When considering the results for the other three variables, we see almost the exact same result in business unit 1 as in the real FCF model. The only difference is found in project COGS, where there is a difference of one percentage. This speaks for our model's ability to catch the fluctuations in these project COGS, other COGS and OPEX.

Considering business unit 2 and 3, we can see that the results from our model are close to the result from the real FCF model; with a difference of 0 % - 3 %. A possible explanation is the difference between the real model and model 1 before any adjustment. Business unit 2 only reached 79 % consistency and business unit 3 72 % consistency before the adjustment. Another possible consideration is that business unit 3 holds higher sales than

the other business units in relation to the incoming payments for this specific period. Customers placing orders in December to lower their result and avoid taxes or other incentives may explain this. This will lead to sales affecting the year of 2014. Instead, the incoming payments will arrive in January and therefore affect the year of 2015.

According to the result from table 5.1 we can tell that our model shows a good result and catches up the changes in the variables compared to the real FCF model, but implications are found when forecasting payments/sales. Further improvement of the model would be to investigate the correlation between the payments and the sales at a longer period. Even if our model does reach a good result we have to be critical and also consider the variation of other variables. Variables such as depreciation, capital expenses and working capital are not included in the sensitivity analysis. Although, our model does catch up the effect of these variables, e.g. the depreciation will affect the income statement, which will affect the expenses. Alternative, other cogs, capital expenses and working capital would affect the incoming or outgoing payments.

The sensitivity analysis in table 5.1 does not show how the total outcome (percentage of consistency) would be affected when changing the variables. Table 5.2 will therefore be used to clarify this question. This will measure how good the two models co-vary at a yearly basis.

Table 5.2 Sensitivity Analysis on yearly basis (Jan - Dec 2014) - Model 1						
Indicator - Percentage of Consistency	Business Unit 1		Business Unit 2		Business Unit 3	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Before adjustment	100%		79%		72%	
Δ 10 % Incoming payments / Sales	79%	88%	88%	71%	52%	50%
Δ 10 % Project Cogs	100%	99%	75%	84%	78%	76%
Δ 10 % Other Cogs	99%	99%	78%	79%	71%	71%
Δ 10 % OPEX	99%	99%	75%	84%	69%	75%

In table 5.2 the indicator before adjustment shows the percentage of consistency on yearly basis before any adjustment is done. This table shows if the result in table 5.1 can be motivated or not. E.g. for business unit 1 which has a percentage of consistency of 100 %, then if the variations in percentage is close to each other, the result in table 5.2 also should be close to each other. Regarding business unit 1 in table 5.2, the last three variables show a good result by almost reaching a 100 % match. The first variable “Incoming payment / Sales” does fluctuate when we increase or decrease the variables and the outcome does differ compared to before the adjustment. This is explained by the difference between our model and the real FCF model, which is also showed in table 5.1. Regarding business unit

2 and 3, there is also a difference in value. This can be explained by the results from table 5.1, but also by the percentage of consistency that was not 100 % before the adjustment.

As proved in the two sensitivity analyses (table 5.1 and 5.2) our model does give a 72-100% of consistency when considering variations in the four variables. Especially business unit 1 does reach a good result. Even though this is a high percentage for business unit 1, the other two business units do not reach the satisfied level of 80-90 % of consistency, set by the investigated firm. This highlights the complicity of creating a cash flow forecasting model suitable for different business units within a complex firm. Also, we must consider if the investigated business units can represent all units at the firm. Because of our limitations in time and information we will not be able to complete the creation of an efficient forecasting model on business unit level but we have contributed with a giving discussion on the subject. The suggested model did hold for one of the business units. Therefore it cannot be fully rejected. The recommendation for our investigated firm would be to firstly improve the communication and then redo the research including more business units during a longer time period. These guidelines would also be applicable for other complex firms with similar problems in cash flow forecasting.

5.2 ANALYSIS OF PROFITABILITY OF CAPITAL EMPLOYED (ROCE)

When investigating our second research question *“how sensitive are the different variables determining capital employed and how could they be changed in order to increase firm value?”* we have chosen to follow the same working process as Camelia. By continuously comparing our result to previous research, we will ensure reliability.

Our result regarding the variable sensitivity of capital employed is in line with previous research. Hassani and Misaghi, Camelia and Wallace highlight the importance to focus on profitability. Profitability as one of the major variables when aiming to increase firm value was confirmed in our result (table 4.10) where we see a positive change in all variables affecting ROCE. When estimating the firm’s performance, we found that, during the investigated year, each of the business units has improved the potential of economic financial growth. This is verifying that there are real capacities to create capital value with efficiency, which also increases firm value.

Both Wallace and Camelia states *“the factors that influence a company’s capital profitability are several and strongly related to the external and internal restrictions of the firm. The firm needs to manage their resources in an efficient way in order to be capable to generate value”*. Wallace means *“this should*

be the first area to review when it comes to increasing profit or reducing costs". One interesting aspect in our results is the confirmation of the poor communication system and flow of information within our investigated firm. This again is another argument for the firm to focus on this kind of problems.

In line with Camelia's study, our investigation of the profitability of capital employed (ROCE) has shown vital parts, which have to be considered from the managerial decisions regarding how to run the company to achieve the best profitability (table 4.11). According to Wallace, *"an efficient management is an essential aspect for enhancing the economic-financial potential of the company and it needs to be reflected in all of the production factors used in the operation"*. The firm can only reach profitability when it is able to use its resources in a good way; receiving revenues that exceeds expenses. As presented in the result (table 4.11) the indicator ERR, shows that the efficiency of expenses will have a direct influence of the profitability.

According to Camelia, *"one factor with tremendous significance for the company is how efficient and effective a company is with their commercialization activity, to be able to meet the competitive environment"*. The indicator Return on Sales proposes that a company's efficiency will increase along with enhancement in the resource allocation. This means that they both need to increase their sales' share in the total revenues and reducing the expenses to revenue ratio. This is confirmed in our study (table 4.11). The growth rate of a company is highly related with the influence of the important factor. In our study the growth rate is measured as the Capital Turnover ratio (CTR). A usage with a superior efficiency of capitals is suggested to lead to an improved yield for investors, which is also confirmed in our study.

The different influence factors on profitability will be affected with limitation related to the characteristics of the competitive environment. The interviews with project managers and the financial manager supports this conclusion. Our results are here is in line with Wallace's study, which highlights the importance of managerial structure and development. By identifying the influence factors and possessing knowledge on their action and relationship, the firm will be more efficient in their monitoring. This is also strengthened by the research by Almeida, Campello and Weisbach. This research states that increased security within the firm will increase the confidence and courage of decision makers, which in turn will be beneficial for the firm.

Regarding the profitability of capital employed, we have come to the same conclusion as Camelia. Additionally, this study has considered critique and arguments from other

researches on the subject in order to develop new perspectives. This study considered different quantitative and qualitative data, as well as a different time period than Camelia, which will ensure reliability and validity of the study.

5.3 THE RELATIONSHIP BETWEEN CASH FLOW AND CAPITAL EMPLOYED

To analyze the relationship between ROCE and cash flow we will use sensitivity analysis. Regarding this relationship, our results are in line with previous research. Hassani and Misaghi states *“there is a meaningful relationship between capital employed and operational cash flow. By reducing capital employed one will reach a lower weighted average cost of capital. This is followed by an increased value of cash flow, which in turn will increase the value of the firm”*. Wallace and Camelia also discuss this chain reaction. They use the perspective of internal resources allocated towards increased firm value. Furthermore, our results from the interviews with project managers and the financial manager have highlighted the importance of working with both cash flow and capital employed. Previous research by Dastgir, Khodadadi & Ghayed states *“the valuation of the firm becomes an important tool, which can contribute to the value of the firm”*. This together with Almeida, Campello and Weisbach’s research on the sensitivity of cash flow could be seen as one argument for the relationship between cash flow and firm value. According to Camelia, Wallace and Hassani and Misaghi, ROCE is also linked to firm value, which strengthens the relationship between ROCE and cash flow. According to Camelia *“expectations by stakeholders are also a driving factor concerning the appreciation of capital employed”*. Interestingly, expectations by shareholders are one important factor regarding cash flow and firm value as well. Regarding cash flow forecasting, Hassani and Misaghi presents the strongest argument for the relationship between cash flow and capital employed. By using their model we see the direct linkage between the two variables. The model proves that it is important to find a balance between gains and losses when using a simplified model for forecasting cash flow. Hassani and Misaghi state *“the firm has to find the level where the loss in cash flow forecast accuracy is equal or more than the increase in profitability”*.

This is why we, in this study, have chosen to focus on the investigation of the variable *profitability*. This variable is not only one of the determining variables when measuring cash flow; it also affects capital employed. This makes profitability one of the most important factors to look at for firms wanting to increase its cash flow, ROCE and firm value. As firm value is closely linked to the value of the firm’s cash flow the understanding of this relationship becomes major important.

Table 5.3 presents the sensitivity analysis of the variables determining ROCE and cash flow. In this model, we have chosen different variables than used before in model 5.1 and 5.2: Sales, Expense and Capitals. The change in variables are motivated by the need of finding variables influencing both ROCE and cash flow. In the real FCF model, sales and expenses affect cash flow through the profit (EBIT). The influence of capital investments is found in working capitals or capital expenditure. Our cash flow model is influenced by sales when considering the incoming payments. In the sensitivity analysis (table 5.3), expense Capital investments are affecting through outgoing payment, which reduces our incoming payment.

An increase in sales will lead to an increase in EBIT, which further on will affect the cash flow in a positive way. The increase in sales also increases the return on capital, return on sales and other factors that contributes to an improvement in ROCE. Expenses do have a negative influence on the cash flow as for the ROCE. This linkage is in line with previous research by Hassani and Misaghi.

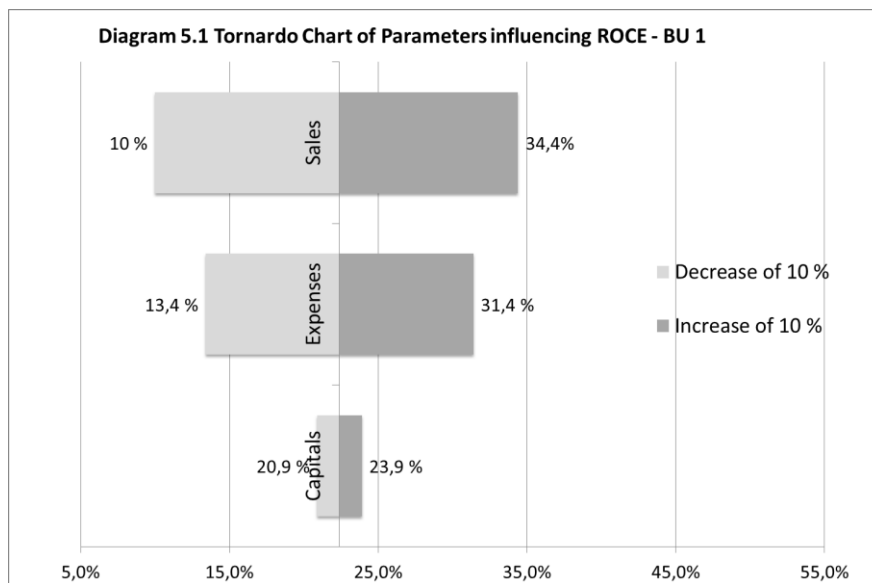
Table 5.3 Sensitivity Analysis ROCE vs Cash Flow				
Indicator		BU 1	BU 2	BU 3
Current ROCE		22,4%	31,2%	26,5%
Δ 10 % Sales	Δ ROCE	12,0%	14,0%	17,0%
	Δ Cash flow	38%	29%	52%
Δ 10 % Expense	Δ ROCE	9,0%	11,0%	13,0%
	Δ Cash flow	20,0%	25,0%	32,0%
Δ 10 % Capitals	Δ ROCE	1,5%	3,0%	3,0%
	Δ Cash flow	7,4%	9,3%	10,5%

Table 5.3 presents the effect on ROCE and Cash flow when changing the variables with 10 %. The results are shown in percentage and will thereby be the same for an increase as for a decrease. The table shows that the change in sales has the greatest influence on both ROCE and Cash Flow. Interestingly, according to Camelia *“the firm’s profitability will increase together with the improvements of efficiency in the production and commercialization activity”*. This could be seen as changes in line with increasing sales, which strengthens the result of the sensitivity analysis.

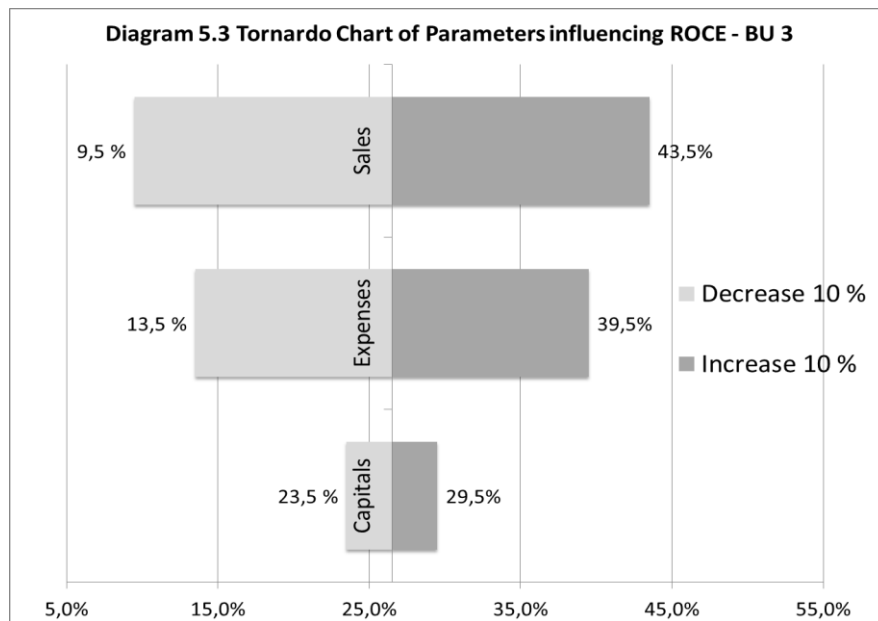
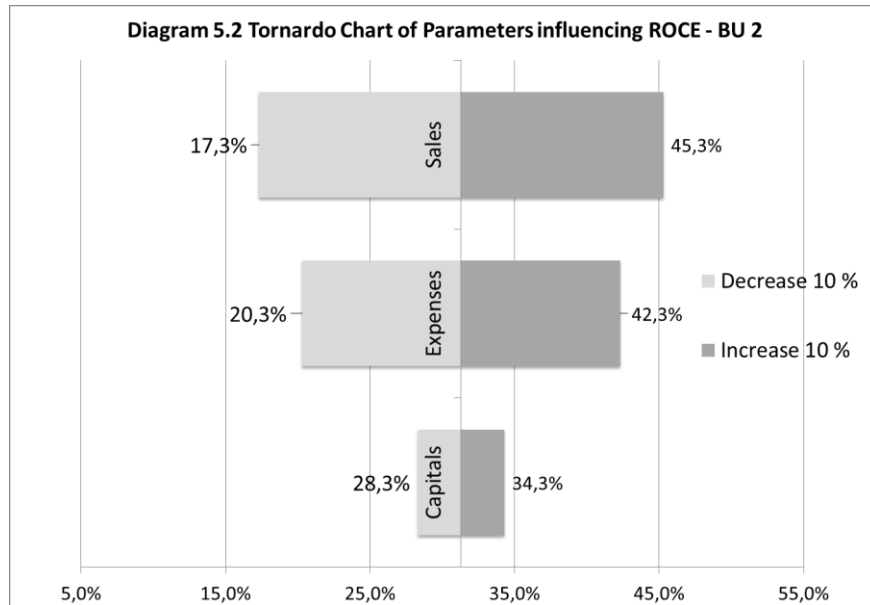
One must not forget that these results could be different regarding different firms and industries. If you analyse a company with low sales but high amount of capitals, the result would be different. The results from the table show us that both the cash flow and ROCE will be affected by changes in the three variables. In this model the cash flow will be

affected more, since these parameters do have a more direct influence on cash flow. When calculating the ROCE, the effect will reach through other variables, as is describe in method 3.5.2. The effect on ROCE will therefore not be as strong as the effect on cash flow.

The effects from table 5.3 is graphically displayed in the tornado charts below, where diagram 5.1 represents business unit 1, 5.2 business unit 2 and 5.3 business unit 3.



The tornado charts show the effect when varying the different variables. The variable that has the strongest effect on the outcome is placed in the top of the graph and the one with the least effect in the bottom. The starting value is placed in the middle of the graph. The dark shaded area displays the result when increasing or decreasing the variables. The tornado charts are chosen as they easily illustrates the result from the sensitivity analyses. The tornado charts only illustrate the result from the ROCE part of table 5.3. The FCF part will not be illustrated due to difficulties created by confidential information.



The current state of business unit 1 is found at 22,4 %, which will vary from 17,3 % to 34,4 % in a total range of 24 %. The current state of business unit 2 is found at 31,2 % and 26,5 % for business unit 3. Sales will have the greatest impact on business unit 3. A possible explanation of why sales has a higher influence, than both expenses and capitals, is because sales is larger than expenses and will thereby affect the gross margin more. The variable capitals is minor in relation to sales and will thereby not affect ROCE in the same portion. The tornado charts may show another appearance when considering another firm with a different financial structure.

In this study, we have reached a conclusion that proves the theory by Hassani and Misaghi on the relationship between cash flow and capital employed. This theory has also been criticized and discussed through the perspective of other researches, such as Camelia and Wallace. By increasing variables that affect the ROCE and profitability, one will also affect the cash flow.

6. CONCLUSION

In the final chapter, the conclusions of our study will be presented. Finally, suggestions for further research will be given on the subject.

After our investigation of cash flow and capital employed, we have come to the conclusion that it is possible to create a simpler cash flow model, yet there are complications. Although none of the two models did reach a perfect result on monthly basis, they both showed good results on yearly basis. Consideration is needed regarding the validity of the two models since they are based on the period of year 2014 and at only three business units. Nevertheless, based on our study model 1 is preferred due to its high average of consistency, and it is recommended to be used on a yearly basis. However, there are limitations and possible factors that may have affected our findings, which must be taken into consideration.

The short time period of data and the poor flow of information within the firm limited us from carrying out a deeper analysis regarding the monthly fluctuations. The deeper look would have revealed how much the material COGS affect the incoming payments and how the model would respond in a longer time horizon. This information would have been valuable for making adjustment for improving our model. Given that the firm wanted at least 80 % of consistency for implementing the model, when looking on a yearly basis, the model only reached this level for one of the three business units. Considering this, the model should be tested for a longer time period and analyzed further before being implemented. Furthermore, as the comparison of the impact on model 1 and the real FCF model, when changing different variables, revealed a good connection for all variables except “sales / incoming payments”, this proves that the model will work to a certain point. However, as mentioned before an improvement is needed for a better result.

The study has proved the connection between capital employed and cash flow which is mentioned in earlier research. It has also proven that there are four important parameters that positively affect ROCE such as Capital Turnover Ratio, Return on Sales, Sales on Total Revenue and Expenses to Revenue Ratio. The firm should therefore focus on these variables by purpose in order to increase its firm value.

By letting the manager at the lower level constantly work with variables that both affect ROCE and cash flow, the interest of the shareholders regarding value maximization will be fulfilled.

From our qualitative part of the study we found that there is a shortage regarding the flow of information between different departments. By implementing a system that increases the flow of information, it will make it easier for the management to further increase its cash flow and return on capital employed.

6.1 PRACTICAL AND THEORETICAL CONTRIBUTIONS

The study has contributed to practical guidance by creating a new model for cash flow calculations. Even though it is not perfect, it represents a good start to future research. This study could be used as guidelines for further practice where other firms may create the model suggestion to be more suitable for the specific firm. Furthermore, the proved relationship between cash flow and capital employed highlights it as an important connection to work with in order to increase firm value.

6.2 FURTHER RESEARCH PROPOSAL

The problems we have faced due to lack of information, have been to a disfavor for the creation of the cash flow model. It would therefore be of great interest to analyse the model even deeper including more information during a longer time horizon. It would be of great interest if our model, or an improvement of our model, would be tested in different types of firms. Especially where the factors mentioned in our “Model Critique” in chapter 4.1.3 could be eliminated. Finally, it would be interesting to analyse how firms work with their cash flow and return on capital employed. If they constantly work with maximization of these variables and if the management at lower business levels possess the knowledge of the relationship that exist.

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APPENDIX 1 - INTERVIEW QUESTIONS: FINANCIAL MANAGERS

How do you operate today with cash flow calculation?

What disadvantages do you find with today's approach?

What advantages do you find with an easier way of measuring the Cash Flow?

Which variables do you find important to consider in a new Cash Flow model?

How do the managers at lower business unit levels work with cash flow?

How good does the new model need to be before you would consider implementing it?

APPENDIX 2 - INTERVIEW QUESTIONS: FLOW OF INFORMATION, PROJECT MANAGERS

Cooperation is one of the cornerstones of project management - what does collaboration mean to you?

How do you handle communication with different parts of the business before, during and after the project?

As a manager, is it possible for you to get information regarding when the different material is bought and stored in the logistics department? If so, is it an easy or complex procedure? Please specify.

Is there any part of the communication between the units you think should be improved?

Do you feel like you can provide enough information about the project from / to other units involved in the project? If no, how do you think this could be improved?

Do you follow up the project and make communication improvements?

Do you think the company is working enough to improve communication?

Are you aware of how enhanced communications could improve your work situation?