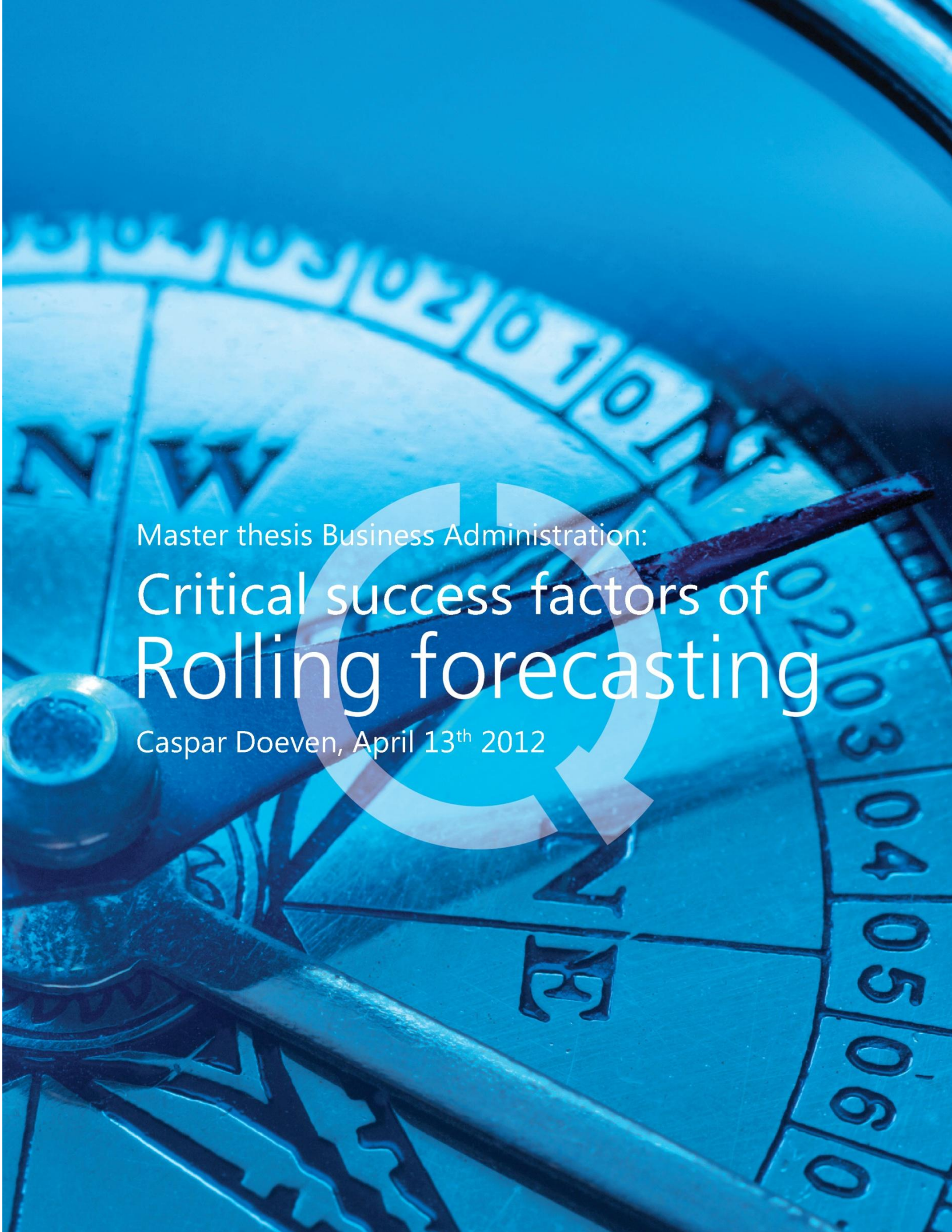

Master thesis Business Administration:

Critical success factors of Rolling forecasting

Caspar Doeven, April 13th 2012

Master thesis

Critical Success Factors for rolling forecasting
in the consumer packaged goods business

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Due to the sensitive nature of the content in this thesis, all names of the companies and participants are made anonymous.

Preface

Many companies struggle with problems producing an accurate outlook for the organization. World markets are changing more rapidly than before, which increases the need to adapt business plans to the environment on a more regular basis. Critics argue that the budget, which is traditionally the most used method to produce a forecast, does not fit with the current requirements. In the quest for an alternative, rolling forecasting is proposed.

Although research is available on the perceived benefits of rolling forecasting and a comparison between rolling forecasting and budgeting, little is known regarding the factors determining the success of rolling forecasting. This research is an attempt to provide both practitioners and researchers with a framework which identifies the critical success factors for rolling forecasting. The positive and negative experiences of AkzoNobel Decorative Paints, FrieslandCampina, Heineken, Unilever, VION Food Group and Vrumona where the main source of data of in this research.

However, I would not be able to do this research and finish this thesis without fantastic help and support of many, which I would like to thank. First of all, I would like to thank my supervisors of the University of Twente, Tom de Schryver and Henk Kroon, for their critical, but always helpful feedback on both my research proposal and this thesis. Their reviews helped me to improve this thesis.

Furthermore, I would like to thank Loek Meijers of ConQuaestor for providing me with the fantastic opportunity to conduct my research at ConQuaestor and supporting me in the process. Not only have I learned a lot during the last six months working on this thesis, I have also really enjoyed working at there.

Conducting research is not possible without the time and effort of respondents. Therefore, I want to thank all eleven respondents for their time and for sharing their experiences and opinions, and the colleagues of ConQuaestor which organized the first contact.

This thesis reflects the official end of my time as a student in Twente. Therefore, I want to thank Martine and my family for their continuous support during my study.

Caspar Doeven
April 13th, 2012

Management summary

Introduction

Rolling forecasting is a method used by companies to produce a regular updating forecast with a moving window (Tanlu, 2007). The method is proposed in the end of the 1990s as replacement for traditional budgeting, as it is believed to solve some of the perceived downsides of the budget. Rolling forecasting gives companies the opportunity to produce a forecast which is longer than the end of the fiscal year, which results in better management information. Furthermore, a regular updating forecast is expected to have more accurate results in comparison with the traditional budget. In practice however, rolling forecast is most used as supplement to the budget, instead of a replacement.

ConQuaestor is, as a consulting organization, interested in producing a proposition in rolling forecasting for their clients. In order to gain more knowledge on the process and practices of rolling forecasting, ConQuaestor would like to know what the critical success factors of this method are, and how these factors influence the success of rolling forecasting.

Research question

The following research question is formulated:

"What are the critical success factors for a best fitting design, implementation and deployment of rolling forecasting within the Consumer Packaged Goods business and how do these factors influence the success of rolling forecasting?"

The answer to this question is relevant for both ConQuaestor, and for companies that work with rolling forecasting. For ConQuaestor, the conclusions of this research will be helpful to expand the existing knowledge on the topic rolling forecasting. For companies currently using, or planning to use rolling forecasting, the answer to the main research question will provide useful information to improve or implement the rolling forecast, and thereby improve the performance of the company.

The choice for Consumer Packaged Goods (CPG) companies is made because of two reasons. Firstly, rolling forecasting is relative frequently used in CPG companies, compared to other industries. Therefore, these companies have broad experience with using the method. Secondly, ConQuaestor has a wide network of clients in the CPG business. Choosing for this industry therefore reduces the risk of finding not enough participants.

Theoretical framework

To find an answer to the main research question, existing literature on rolling forecasting, budgeting and sales forecasting is examined in order to find factors which might influence rolling forecasting. This resulted in a list with factors, which are divided over the components of the rolling forecasting framework, designed to structure this research. The rolling forecasting framework exists of six components: Surrounding factors, Design, Input, Process, Output, and Act.

Research methods

To assess the factors defined in the six components of the rolling forecasting framework, research is conducted with eleven respondents of six companies in the consumer packaged goods business. Two methods of data collection are used: An online survey and on-site focused interviews. In the online

survey, the respondents were asked to value the importance of the factors on a seven-point Likert-scale. The interviews are used to find explanation for the given scores. To improve the reliability of this research, companies were selected in different states of rolling forecasting (implementing, using, decided not to use), and respondents were selected in different functions of the process (delivering input, producing the forecast, reviewing the output).

Critical success factors

This study found that 28 factors are critical success factors of rolling forecasting. These factors can have important influence on the success of rolling forecasting and can be managed by the company. Furthermore, 9 factors are found to be surrounding factors, which do influence the rolling forecast and its success, but cannot be influenced by the management of a company. All factors and its relations are graphically displayed in figure 1. The orange boxes represent the critical success factors and all factors in grey boxes are the surrounding factors. The blue boxes are the indicators for successful rolling forecasting.

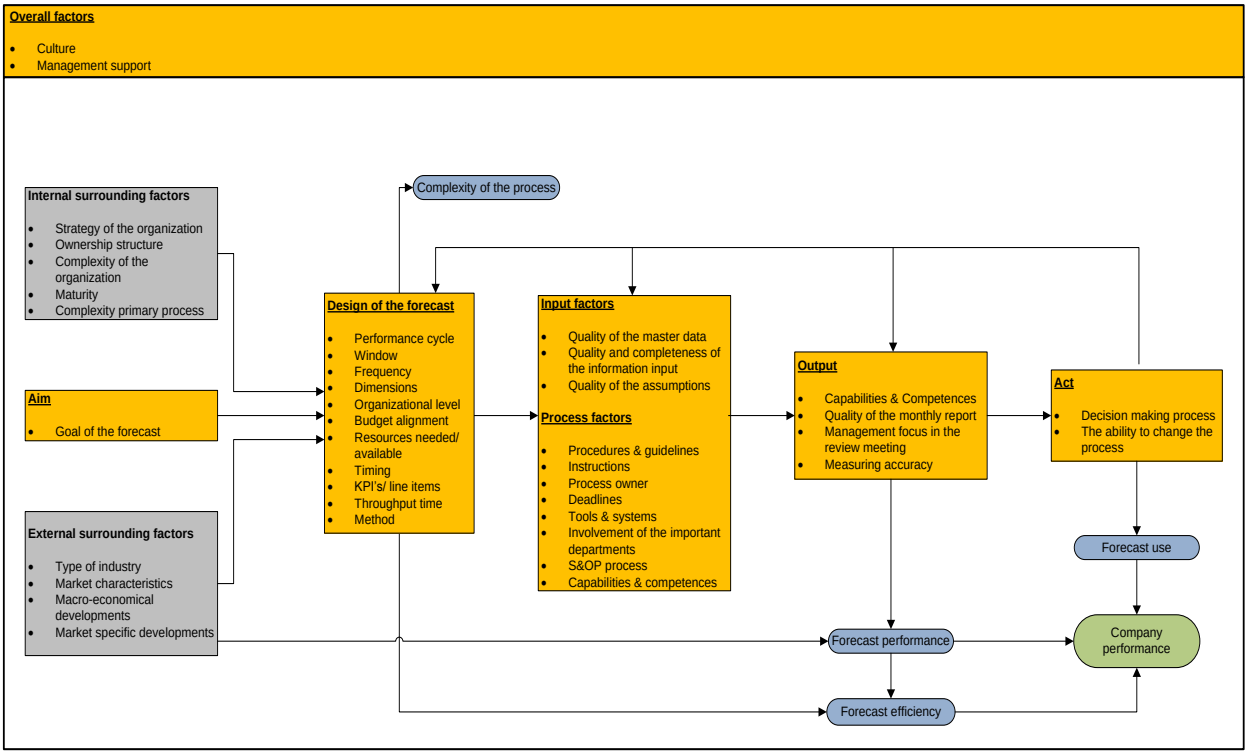

Figure 1: Critical Success Factors model

The results of this research show that companies cope with different surrounding factors by changing the design or the process of their rolling forecast. The internal surrounding factors (factors from inside the company) influencing the rolling forecast are the strategy of the organization, ownership structure, complexity of the organization, maturity of the organization and complexity of the primary process influences the rolling forecast.

The external surrounding factors (factors outside the company) with influence on the forecasting process are the type of industry, market characteristics and developments in both the macro-economy and the market of the company. Furthermore, the design of the forecast is highly influenced by the goal of the

forecast. This research shows that companies use rolling forecasts for different purposes, and change the design of the forecast according to the goal of the forecast.

The design component includes all factors that characterize the rolling forecast. Partly, this includes the essential design choices for a company, like the window, the frequency, the dimensions, organizational level, alignment with the budget, timing, KPI's/line items and the throughput time. The other part includes more broad design principles like the performance cycle, the culture and the amount of resources available. The results show that these factors can all be labeled as critical success factors, since making the right choices, fitting with the surrounding factors and the goal of the forecast, determines how successful the rolling forecast is. Furthermore, the choices made for the Design factors influence the complexity of the rolling forecast. Increasing the level of detail for the dimensions or the frequency for the forecast, for example, automatically leads to a more complex rolling forecast. A more complex rolling forecast is more difficult to organize and to manage, which increases the risk of making mistakes.

The information needed to produce the rolling forecast is determined in the design phase. A rolling forecast, which is aimed at providing an outlook for the mid-long term, should contain other information compared to a forecast aimed at aligning the short term production planning. The factors found critical for the success of rolling forecasting are the master data, information input and assumptions. The results show that the same reasoning is applicable for the factors of the process of the rolling forecast. The process component includes the actions needed to produce a forecast and its supporting elements. The factors found critical are the procedures and guidelines, instructions and deadlines in the process, but also the role of the process owner, involvement of all important departments and the coupling with an existing S&OP process. Furthermore, the right use of tools and systems to support the process and the capabilities and competences of employees and managers are found critical for the success of rolling forecast.

The rolling forecasting process results in a report which is used to discuss the outcome. The quality of the report and the focus of management in this meeting are critical success factors. Furthermore, the measurement of accuracy is beneficial for the forecast performance and the right use of the forecast. Actions need to be taken with the forecast output to make use of the output of the rolling forecast. In this component, the decision making process determines how efficient and effective the forecast output is translated into actions, where actions to improve the forecasting process are described by the factor ability to change the process.

At last, there are two factors which do not fit to one of the components. These factors are the culture within the company and support of the management. Both factors are found to influence all rolling forecasting practices, from the design phase until the act phase.

Existing literature on sales forecasting used forecasting accuracy and forecasting use as indicators for success (Zotteri and Kalchsmidt, 2007). However, this research found evidence that companies also consider the efficiency of the rolling forecast for determining the ultimate success of rolling forecasting. Companies are found to make design choices which are positive for the efficiency of the process, but in the mean time negative for the forecasting accuracy.

Most critical components

Next to the model with critical success factors, the four most important areas with factors are distinguished. Companies implementing rolling forecasting should above all make sure that attention is paid to these factors:

1. The design of the rolling forecast;
2. The input data used;
3. Support in the process;
4. Capabilities and support of the employees and the managers.

The design is important for two reasons. Firstly, companies should make sure that the design fits with the surrounding factors (e.g. type of industry and market) and the goal of the forecast. By adapting the window, timing and frequency to these circumstances, companies allow themselves to make optimal use of the forecast output. Secondly, it is seen as important that companies limit the complexity of the rolling forecast as much as much as possible. A more complex process leads to an increased change of making mistakes and producing an outdated forecast. This can be achieved by selecting only a limited number of KPI's and choosing for less detail.
The input data is found to be important, since the quality of the input data used is a large denominator for the quality of the output. This means that better data directly leads to better forecasting accuracy.
This research has found that it is impossible to produce a rolling forecast without support in the process. Support is needed, for example from the right tools and systems and the amount of resources available, to successfully transform the input data into output data. Without this support, companies are unable to produce an accurate output.
The last important group of factors is the functioning of the people in the process. Although a significant part of the rolling forecast exists out of computerized actions, the actions and interpretations of employees and managers still play a great role in both obtaining high forecast accuracy and a good forecasting use.

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Chapter 1. Introduction

1.1 Introduction

This objective of this chapter is to provide an introduction to this master thesis, which is aimed at finding the critical success factors for rolling forecasting. This chapter will consequently introduce the problem, the background of rolling forecasting, the research objective and main research question and the framework used in this research.

1.2 Introduction to the problem

1.2.1 Characteristics of rolling forecasting

Rolling forecasting is a tool in the planning and control cycle, which is used to produce an outlook for the upcoming period. The goal of a rolling forecast is to provide information that can be used for the planning, resource allocation, communication and control. (Tanlu, 2007).

There are four characteristics which define rolling forecasting. First, a rolling forecast is a regular updated forecast (Tanlu, 2007; Haka, & Krishnan, 2005). Most companies use a monthly or quarterly updating interval (Barret, 2003). Second, a rolling forecast has a moving ("rolling") window (Tanlu, 2007; Haka, & Krishnan, 2005). Each time the forecast is updated, the forecasting window is extended with the same period. An update of a six quarters rolling forecast at the end of each quarter includes an update on the enduring five quarters and an additional forecast for the sixth quarter. An updated rolling forecast includes the latest information from the markets, together with the most recent realized results of the company, named 'actuals'. These actuals provide the company with information regarding the performance in the past, which can be used to adjust the rolling forecast for the future (Tanlu, 2007). The window and frequency of a rolling forecast is graphically shown in figure 1. Third, rolling forecasts are not tied to performance evaluation (Tanlu, 2007). With decoupling rolling forecasts with management performance targets, rolling forecasts are expected to be more accurate in comparison with methods that are coupled with targets. Fourth, a rolling forecast is generally made in less detail than the budget (Tanlu, 2007). A less detailed forecast is easier to produce, what makes regular updating possible.

5-Quarter Rolling Forecast

	Forecasts made for:									
Forecasts	Year 2					Year 3			Year 4	
Made on:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Year 1 Q4	F_{1-3}	F_{1-3}	F_{1-3}	F_{1-3}	F_{1-3}					
Year 2 Q1	A	F_{2-1}	F_{2-1}	F_{2-1}	F_{2-1}	F_{2-1}				
Year 2 Q2	A	A	F_{2-2}	F_{2-2}	F_{2-2}	F_{2-2}	F_{2-2}			
Year 2 Q3	A	A	A	F_{2-3}	F_{2-3}	F_{2-3}	F_{2-3}	F_{2-3}		
Year 2 Q4	A	A	A	A	F_{2-4}	F_{2-4}	F_{2-4}	F_{2-4}	F_{2-4}	
Year 3 Q1	A	A	A	A	A	F_{3-1}	F_{3-1}	F_{3-1}	F_{3-1}	F_{3-1}

Notes: **A** represents actual results for the quarter, and F_{i-j} represents a forecast for the current quarter prepared on year *i*, quarter *j*.

Figure 2: Graphical display of rolling forecasting (Tanlu, 2007)

1.2.2 Introduction to ConQuaestor

This assignment was executed on behalf of ConQuaestor Consulting. ConQuaestor, founded in 2004, offers clients solutions for strategic and operational problems, in the area of finance (www.conquaestor.nl). The services of the company are divided in Consulting, Finance Professionals and Interim Management (www.conquaestor.nl). After rapid growth in the first years, there are nowadays 400 employees working for ConQuaestor. The Consulting department is amongst others working on assignments for clients that encounter issues in accounting & reporting, business IT management, governance, audit, risk & compliance and planning & control.

Examples of issues of clients in the planning & control field are the long throughput time and limited added value of the budget. Increasingly, the solution for these problems is sought in rolling forecasting. ConQuaestor has the ambition to expand their proposition towards rolling forecasting. In order to fully understand the processes and the practices of this method of forecasting, ConQuaestor wants to know which factors influence the success of a rolling forecast and how these factors influence the success of rolling forecasting. This assignment is aimed at providing ConQuaestor with the knowledge to expand the services of the firm with rolling forecasting.

1.3 Rolling forecasting

1.3.1 Background

Rolling forecasting is originally proposed as alternative for the budget (De Waal, 2002; Fraser, & Hope, 2003a; Berland, 2011). The budget is a management control mechanism, used within companies to plan activities, coordinate sharing of information, control costs, and motivate employees (Merchant, & Van der Stede, 2007). In the late 1990's, the debate around the disadvantages of the budget cycle increased. The opponents claimed that there is a widespread disappointment within companies about the budget and that it should be replaced with other tools and methods (Fraser, & Hope, 1999; 2003b; Hansen, 2003; De Waal, 2006). De Waal (2002) found that rolling forecasting was the most named alternative.

Hansen, Otley & Van der Stede (2003) summarized a list with the twelve most mentioned downsides of budgeting. Two of these downsides relate to the use of rolling forecasting. Firstly, he opponents stated that budgets did not add enough value in relation with the time spend to prepare a budget. Jensen (2003) argues that in many companies the budgeting process starts more than six months prior to the start date of a budget, and consists out of many rounds of negotiations, adjustments, fine-tuning and elaboration. One of the reasons for this long process is the detailed scale of the budget. The budget is prepared for the whole company and includes all products, all sales channels and all countries.
Another reason is the coupling of the budget with targets and rewards. Determining forecasts can result in long negotiations between line managers and strategic managers. According to Jensen (2003), negotiations are the result of the way targets are derived from the budget[1]. For example: Line managers know that the given input for the budget becomes their target for the upcoming year. Therefore, line managers will be eager to decrease expectations and lower the forecast. Top management on the other hand, will be eager to increase the forecast in order to motivate the line managers to perform better. This long process is not beneficial for the company as a whole, because costly management time is lost and valuable information is held behind in the negotiations. Both the long process and the negotiations diminish the accuracy of the forecast as assumptions turn out outdated or incorrect (Jensen, 2003).

[1] It should be noted that this is only applicable for performance targets that are derived from negotiations and not for performance targets that are based on models or historical data.

Secondly, the budget does not provide companies with an answer for strategic questions, like the opening or closing of a new factory (Hansen et al, (2003). The focus of the budget on the fiscal year of the company maximizes its window to one year, where strategic questions are characterized by a longer time-frame. Therefore, opponents claim that companies miss a forecast aimed at tactical or strategic level (Hansen et al., (2003). To cope with these issues, rolling forecasting was proposed as the tool that enables continuous planning within an organization for a longer period.

1.3.2 Comparison with the budget

Both the budget and the rolling forecast are tools to produce a forecast for companies. There is an important similarity between these two methods. The rolling forecast and the budget aim at providing an outlook for the future. Furthermore, the outcome of both the budget and the rolling forecast can be translated in an operational planning.

Besides the similarity between rolling forecasting and budgeting, there are several differences. First, where the rolling forecast is used in order to produce an outlook for the organization and obtain a planning, producing a budget serves another purpose: to increase the motivation of employees by stating targets. Budgets are used by many organizations to derive targets and measure the performance of their employees or departments (Jensen, 2003). The only purpose of a rolling forecast is to serve as outlook for the upcoming period.

Second, the window of both methods differs (Tanlu, 2007). The budget is produced for a window matching the fiscal year of the company. The rolling forecast on the other hand, has a rolling window of which the length is designed according to the wishes of the company.
Third, the sequence of updating differs between both methods. A rolling forecast is regular updated, and has therefore a dynamic frequency. The budget on the other hand is produced once a year and is a static method (Tanlu, 2007).
The fourth difference is the amount of detail of the forecast. The budget is a highly detailed document which can contain several hundred line items. The rolling forecast is generally prepared for a smaller number of Key Performance Indicators (KPI's), which are considered most important for the organization.

1.3.3 Current practice

While rolling forecasting was proposed by Hope, & Fraser (1999, 2003a) as alternative for the budget, most companies use rolling forecasting as a supplement (Sivabalan et al. (2009). Apparently, companies see additional value in using a rolling forecast next to the budget, despite the costly management time and resources. A reason for the complementary use of rolling forecasting can be found in the window of rolling forecasting. While an annual budget is prepared for a time horizon until the end of the fiscal year, rolling forecasts enables organizations to look further than that (Hansen et al., 2003).
A second reason is the difference in focus between the budget and the rolling forecast. The planning purpose of the budget is mostly aimed at operational information and decision making, like making action plans and coordinating resources (Merchant, & Van der Stede, 2007). The rolling forecast, on the other hand, provides better information for strategic decisions, due to its longer window (Tanlu, 2007).
A third reason to use a rolling forecast next to a budget is the better accuracy of the rolling forecast. Tanlu (2007) found that the forecasting accuracy of a department with relative few environmental uncertainty and demand uncertainty has improved significantly when switching from a budget to rolling forecasting. Most likely, the improved accuracy is due to the frequent updates of a rolling forecast and the fact that a rolling forecast is not used for performance evaluation.

Forecast accuracy can be measured by the forecast error, which is the difference between the forecast and the actual result. Forecasting accuracy is an indicator of the quality of a forecast.

1.4 Research objective and research question

1.4.1 Research objective

The previous paragraphs are used to introduce the topic rolling forecasting and the company ConQuaestor. ConQuaestor wants to learn which factors influence the success of rolling forecasting. Therefore, the following research objective is stated:

"The objective of this research is to study the factors that influence the success of rolling forecasting in the Consumer Packaged Goods business, and find out how these factors relate to the success of rolling forecasting."

This thesis is an attempt to map all factors that influence the success of rolling forecasting. This will result in a model encompassing all factors which are found to be critical for rolling forecasting. Furthermore, this thesis will describe why the specific factor is a critical success factor by providing a justification how the factor influences the success of rolling forecasting.
This thesis will provide no answer to the question how the factor must be organized by a company to obtain the best forecasting outcome. Subsequent research can be aimed at this question.

1.4.2 Research question

Based on the research objective as stated in paragraph 1.4.1, the following main research question is defined:

"What are the critical success factors for a best fitting design, implementation and deployment of rolling forecasting within the Consumer Packaged Goods business and how do these factors influence the success of rolling forecasting?"

In order to give an answer to the main research question, parts of the question must be defined. The most important part is the term Critical Success Factors (CSF). In this research, the definition of a CSF is based on the definition given by Leidecker and Bruno (1984, page 24) for successful firms. That definition is redefined for successful rolling forecasting. In this research, CSF's are those characteristics, conditions or variables that when properly sustained, maintained or managed, can have significant impact on the success of rolling forecasting.

In this research, factors obtained by literature review and expert reviews will be tested with use of a survey and interviews. The evidence found will lead to a conclusion whether the factor belongs to one of three categories: critical success factors, surrounding factors influencing the rolling forecast, and non-critical success factors. Division of factors over these categories is possible by asking two questions:

- Can de factor have significant influence on the success of the rolling forecast?
- Can the factor actively be sustained, maintained or managed by the management of the company?"

Critical success factors have to fit with the definition of Leidecker and Bruno (1984, page 24). These factors can have significant influence on the success of rolling forecasting and can be sustained, maintained or managed by the company. In other words: the management of a company must be able to influence the success of the rolling forecasting with the factor.
The surrounding factors influencing the rolling forecast are found to have an impact on the success of the rolling forecast, but cannot be influenced by the company. Factors of het last category, non-critical success factors, are found to have no relation with the success of rolling forecasting. For these factors, it is unimportant whether the company can actively influence the factor or not.

The categories are displayed in table 1.

Category	Can influence the success of rolling forecasting?	Can be sustained, maintained or managed by the company?
Critical success factors	Yes	Yes
Surrounding factors influencing the rolling forecast	Yes	No
Non-critical success factors	No	Not important

Table 1: Categories for success factors

The questions which indicators are used for the success of rolling forecasting, is answered in paragraph 1.5.3.

Second, Consumer Packaged Goods (CPG) companies are defined with use of the definition of searchCRM.com as companies that produce non-durable goods for the consumer market, with a short lifecycle ("Consumer Packaged Goods", 2004). That can be products like food and drinks, deodorant and detergents. These products are in contrast with products produced solely for the business to business market, and durable goods like cars or furniture.

1.4.3 Relevance

The main research question is relevant for both ConQuaestor, and for companies that work with rolling forecasting. For ConQuaestor, an answer on the main research question will provide relevant knowledge of the factors influencing the success of rolling forecasting, which can be used by expanding their proposition.
Answering the main research question can also be relevant for companies planning to implement rolling forecasting. Zotteri and Kalchsmidt (2007) found that the performance of a company is related to the forecast performance and the use of the forecast. This means that if companies understand which factors influence the success of rolling forecasting and how these factors influence the success, the quality of the rolling forecast of their company can be improved.

At last, this research is scientifically relevant. The characteristics and benefits of rolling forecasting, and the differences with budgeting are assessed in scientific literature. With identifying the factors that determine the success of rolling forecasting, this thesis adds a different dimension to the scientific debate on rolling forecasting.

1.5 Framework

1.5.1 Introduction to the framework

Although several articles are published on the added value of rolling forecasting (Fraser and Hope, 1999, 2003a, De Waal, 2002, Tanlu, 2007), there is currently not a framework for rolling forecasting. Such a framework would be useful in this research, because of three reasons. First, a framework can be used to structure the research. A framework can provide a useful separation of the whole process in several, independent components. Second, a framework can serve as a check for the completeness of this research. In that way, no important issues are forgotten in the interviews, observations and design of the hypotheses. Third, a framework can be a tool to determine the research scope. In that way, a justification can be given for the topics that are in scope of the research and out of scope of the research. Because of these benefits, a framework is designed that is applicable for rolling forecasting. The starting point for the rolling forecasting framework was the framework for static demand forecasting (see: figure 2) made by Zotteri, & Kalchsmidt (2007).

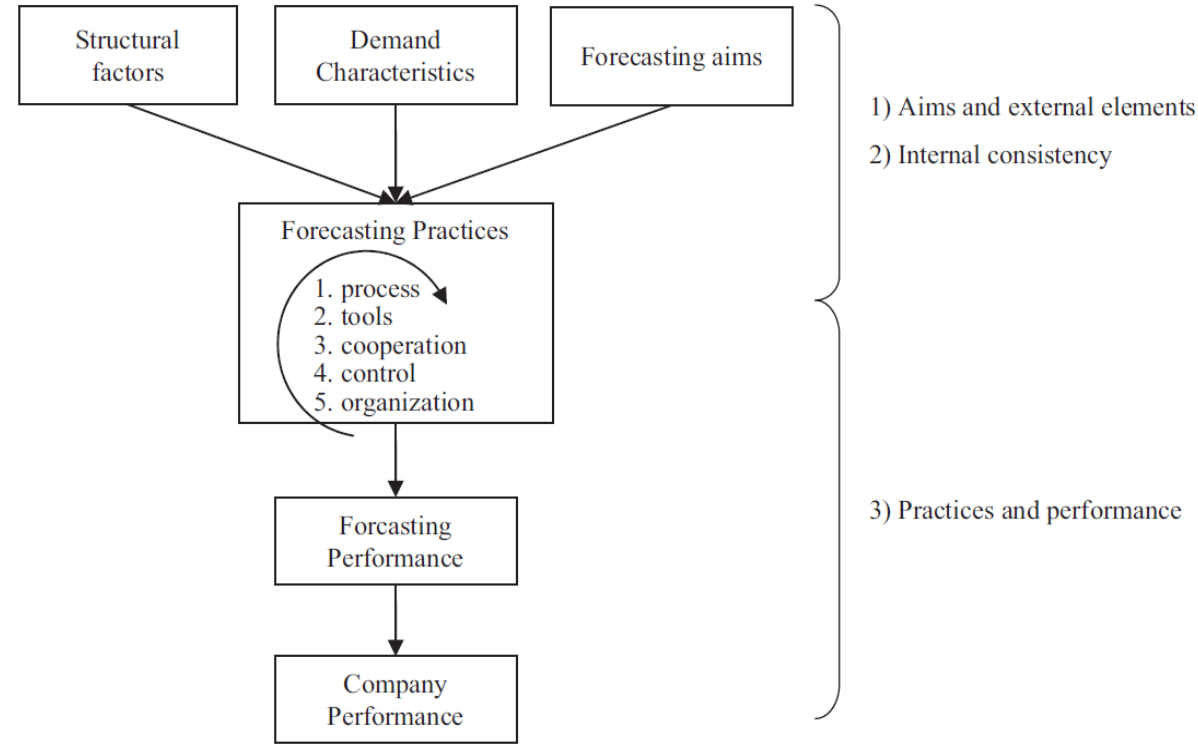

Figure 3: Static demand forecasting framework (Zotteri, & Kalchsmidt, 2007)

This framework shows the relation between external factors, forecasting practices and the performance of an organization. However, the static demand forecasting framework does not fit entirely with the rolling forecasting characteristics. Therefore, several adjustments are made.

There are two reasons for adjusting this framework. The first and most important reason is the incorporation of missing components. Some of the missing factors are less important for static demand forecasting, while others felt beyond the scope of research for Zotteri and Kalchsmidt (2007).

In the framework of Zotteri, & Kalchsmidt (2007) the structural factors, demand factors, and aim of the forecast influence the forecasting practices. However, in rolling forecasting several components underlying the forecasting practices have to be designed first. Examples of factors that influence the

design of the forecast are the frequency of updating and the window of the forecast. Furthermore, the rolling forecast is less detailed in comparison with the budget (Tanlu, 2007). Choices should be made regarding the items to be forecasted, which effect the needed information and the process.
Another component which is not taken into account in the framework of Zotteri, & Kalchsmidt (2007) is the input of information. With using several sources of information to prepare a rolling forecast, it is likely several CSFs are based on using the right information. Therefore, the input component is incorporated in the rolling forecasting framework.
In the framework of Zotteri, & Kalchsmidt (2007) good processes leads to forecasting performance, measured in forecasting accuracy. However, there is a second indicator for the success of a forecast proposed by Mentzer, & Kahn (1997). This indicator is the use of a forecast, in which making better use of the forecast relates to better company performance. Forecasting use is discussed in-depth in the next paragraph, but when using this indicator for the success of rolling forecasting, there should be critical success factors linked with the indicator forecasting use. The component act is included in the rolling forecasting framework, incorporating the actions management takes with the forecast.
The second adjustment is the form of the framework. The static demand forecasting framework as proposed by Zotteri, & Kalchsmidt (2007) is designed for a discontinuous process like the budget. Budgets are prepared once for the complete window, which is the fiscal year of the company (Tanlu, 2007). A rolling forecast, on the other hand, is updated on a regular basis several times during its window (Tanlu, 2007). Therefore, another type of framework is designed that better represents the process of rolling forecasting.

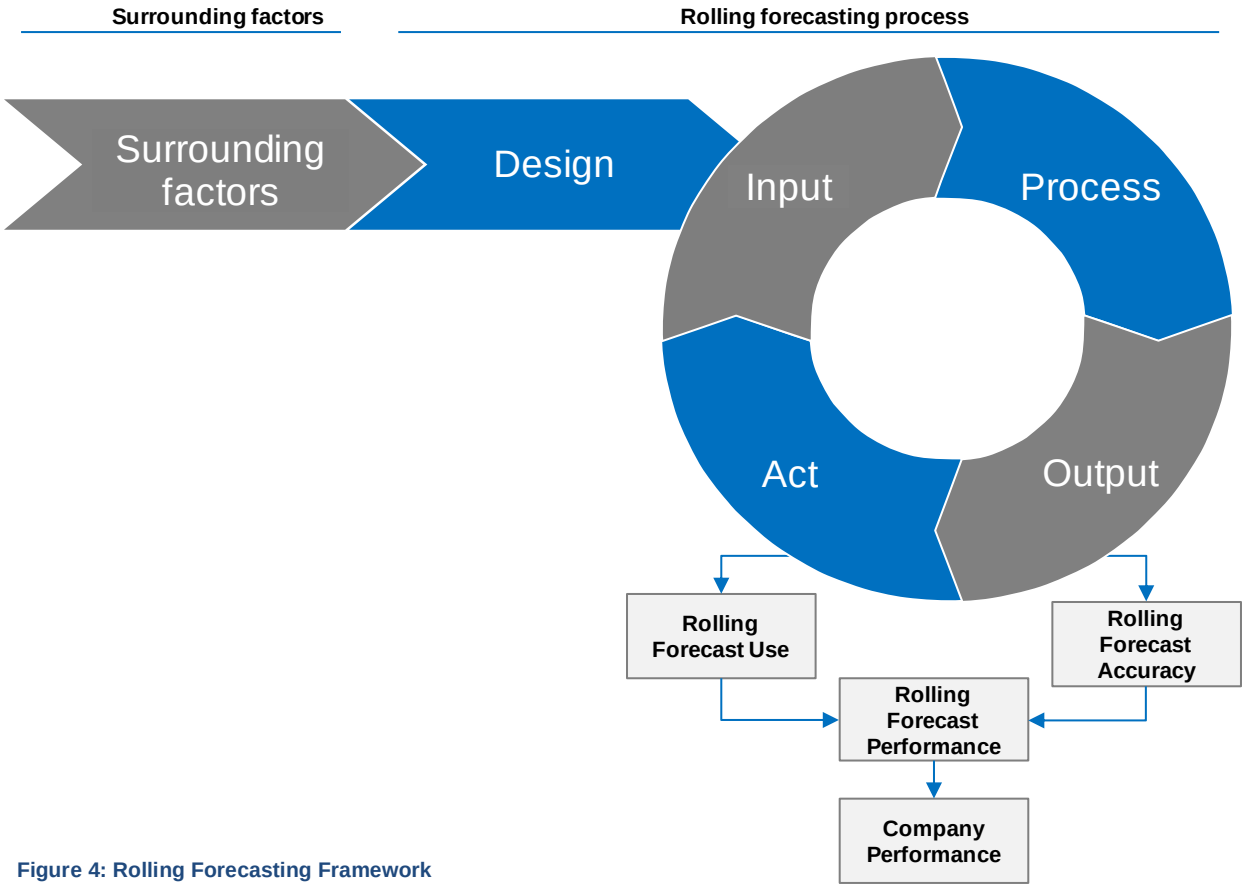

Figure 4: Rolling Forecasting Framework

The rolling forecasting framework used for this research (see: figure 3) is based on the framework of Zotteri and Kalchsmidt (2007), but extended with the abovementioned design, input and act components. Furthermore, the framework is shaped like a Deming cycle. The main reason for choosing a Deming cycle is its link with the continuous process of updating and adjusting. A rolling forecasting process is, in accordance with the Deming cycle, a continuous process. In a six quarter rolling forecast, the company is always updating five 'old' forecasts, and producing one 'new' forecast. The two input factors for the Deming cycle are Surrounding factors and Design of the rolling forecast.

This framework is used to structure the research. The six components of the rolling forecasting framework function as sub questions of this research, which is used to find factors for this research, structure the data gathering and analysis and to draw conclusions. Furthermore, this framework is used to ensure the completeness of the data gathering phase. The surveys and interviews are structured with use of this framework, to make sure no important topics are forgotten. At last, the scope of research is defined with use of this framework. Leidecker and Bruno (1984, page 24) stated in their definition of a critical success factors that a factor can only be critical for the success, when it can be actively sustained, maintained or managed by the management of the company. With this statement in mind, the component surrounding factors is expected to be not a critical success factor, since management cannot actively manage these factors.
The next paragraph will describe all components of the rolling forecasting framework. Since the main objective of this framework is to function in research regarding the critical success factors for practitioners, this framework has a designed with most attention for the practical relevance and for the scientific basis.

1.5.2 Description of the rolling forecasting framework

The first component in the rolling forecasting framework (figure 4) is the influence of surrounding factors. Surrounding factors correspond with Structural factors and Demand characteristics of the static demand forecasting framework of Zotteri, & Kalchsmidt (2007).
In the rolling forecasting framework, Surrounding factors can be divided in Internal surrounding factors and External surrounding factors. *Internal surrounding factors* are for example the strategy of the organization, the complexity of the organization or the culture of the company. *External surrounding factors* are for example the type of industry, the degree of competition in the market or macro-economical developments. Both Internal and External surrounding factors are expected to influence the design of the rolling forecast, but cannot be influenced easy by the company using rolling forecasting.

The second component in the rolling forecasting framework is the *Design* of the rolling forecast. Tanlu (2007) stated that different companies use rolling forecasting in different ways. With applying a different updating interval or window, companies are able to adjust the method to their own preferences. M. Bier (personal conversation, 28-9-2011; 4-10-2011) argued that in a good rolling forecasting design, the window is designed to fit with the type of business. A correct window is extended to where decisions have power (M. Bier, personal communication, 28-9-2011; 4-10-2011). The same reasoning is applicable for other design issues, like the forecasted indicators, or the level in the organization where the forecast is prepared.

In the *Input* component, the necessary information to make the rolling forecast is gathered. M. Bier (personal communication, 28-9-2011; 4-10-2011) explained that several departments have an important role handing in input information. The input of the rolling forecast seems to be an important step, since it determines the quality of the data that is used. When less qualitative data is used or an important source

of information is forgotten, the forecasting performance might decline. Therefore, the component input is added in the framework.

The *Process* component of the rolling forecasting framework is based on the Forecasting Practices of the framework of Zotteri, & Kalchsmidt (2007), and encompasses the actions needed to process needed to produce a forecast and its supporting elements. One example of a supporting element is the use of the right tools and systems.

In the *Output* component of the rolling forecasting framework, the rolling forecast itself is completed. This component is obtained from the framework of Zotteri, & Kalchsmidt (2007), which argued that the output of a demand forecast can be measured, leading to the forecast performance. In most companies a hardcopy report will be produced which summarizes the most important conclusion of the rolling forecasting process.

The last component of the rolling forecasting framework is the *Act* component. In the act component, management can take decisions based on the rolling forecast outcome. Furthermore, changes or adjustments in the process can be discussed, which might increase the success of the process. Mentzer, & Kahn (1997) explained that the success of a forecast is partly determined by the actions taken with the output. In order to test factors related to the use of the forecast, the component act is added to the framework.
After completing the rolling forecasting process, a new round of the rolling forecasting process starts which is based on the old forecast.

1.5.3 Indicators for successful rolling forecasting

Before research can be conducted on the critical success factors for rolling forecasting, the indicators which measure the success of rolling forecasting have to be identified. Otherwise, it would not be possible to analyze and conclude whether a factor is beneficial for the success of rolling forecasting or not.

Zotteri and Kalchsmidt (2007) argued that both the *forecasting performance* and the *forecasting use influence* the *performance of a company*. Forecasting performance is the quality of the output of the forecast, which can be measured by the forecasting accuracy. Rolling forecasting accuracy is an indicator for the quality of the forecast and can be calculated with the forecast error (Tanlu, 2007).
Forecasting accuracy is valuable for the company as measure for the quality of the forecast. A high forecast accuracy that its efforts in rolling forecasting lead to a process in which the actual results are close to the forecast.

The other indicator if the success of rolling forecasting is the *forecasting use.* The forecasting use relates to the actions that are taken with the forecast. Zotteri and Kalchsmidt (2007) found that the impact of a forecast on company performance is influenced by what the forecast is used for (e.g. subcontracting decisions, materials and inventory planning, facilities planning). This concept can be broadened to ‘the way the forecast is used’. Mentzer, & Kahn (1997) argue that mis-using the forecast or not using the forecast at all, affects the business performance. If the forecasting accuracy is good, but managers do not make good use of the forecasting output, the company performance cannot benefit to a full extend.

The construct of forecasting performance and forecasting use is applied in this research. This means that if a factor can have positive or negative influence on the rolling forecasting performance or the rolling forecasting use, and can be sustained, maintained and managed, this factor can be labeled as a critical

success factor. Figure 3 shows the relation between forecasting accuracy, forecasting use and the components of the rolling forecasting framework.

1.6 Conclusion

The goal of chapter was to provide an introduction to this master thesis, which functions as the basis for the rest of this research on rolling forecasting. Rolling forecasting is a method used by companies to obtain a future outlook, characterized by frequent updates and a moving window. Furthermore, rolling forecasts are generally not tied to performance evaluation and made in less detail than budgets. ConQuaestor has the ambition to expand its services with rolling forecasting and wants to learn what determines the success of this method. Therefore, the objective of this research is to find which factors influence the success of rolling forecasting. Furthermore, a justification will be given why this factors influence the success.

This research is not aimed at the question how a company must organize a specific factor, to obtain an optimal rolling forecast performance.

The rest of this research will be structured with use of the rolling forecasting framework. The rolling forecasting framework encompasses all components of the rolling forecast: The surrounding factors of the company partly determine the design of the rolling forecast. Based on the design, the input factors and rolling forecasting process can be organized, which leads to the output of the rolling forecast. At last, management can take actions in the act phase.

Chapter 2. Methodology

2.1 Introduction

The first chapter of this thesis introduced the topic rolling forecasting and the following main research question:

"What are the critical success factors for a best fitting design, implementation and deployment of rolling forecasting within the Consumer Packaged Goods business and how do these factors influence the success of rolling forecasting?"

In order to find an answer to the main research question, multiple research methods have been used. The main goal of this chapter is to explain the reason for choosing these specific methods, outline the characteristics of these methods and elaborate on the usage of these methods in this research.

The selection of the main research methods and the units of analysis are discussed first. Afterwards, the data collection methods are outlined in. This chapter ends with a description of the data analysis and the process of drawing conclusions.

2.2 Selection of the research method and research objects

2.2.1 Method selection

The answer to this main research question must provide in depth information on the relation between the critical success factors and the success of rolling forecasting. Specifically, a critical success factor has to lead to an increase in forecasting accuracy or forecasting use.

Due to the expected large amount of factors that relate to the success of rolling forecasting, a research set-up in which all factors can be tested is needed. To find this answer, multiple research methods are used. Using direct observations or investigating archival records would not lead to a clear conclusion for a long list with factors or would take years to find an answer. By using a survey and interviews, it is expected to find results for a large amount of data points in the relative short time of this interview.

According to Yin (2009), the interview is one of the best suitable methods for perceived causal inferences and explanations. Furthermore, interviews can be targeted directly on the specific topics of research, in this thesis the critical success factors. In advance of the interviews, an online survey is held. Both methods are discussed in-depth in paragraph 2.3.

2.2.2 Units of analysis and sampling

The objective of this research is to find the factors that determine the success of rolling forecasting. Since multiple companies are subject of the research, the subject of research can best be defined as 'the process and organization of rolling forecasting within an organization'. Due to the involvement of multiple companies, each company is treated as a single entity (Verschuren & Doorewaard, 2005). Mostly, interviews are held with multiple respondents per company to obtain a clear picture on the success factors.

Swanborn (2010) states that the first step in selecting cases is to determine the domain for which the conclusions should be valid. This research focuses on companies active in the Consumer Packaged Goods (CPG). The choice for CPG companies is made because of two reasons. Firstly, rolling forecasting is relative frequently used in CPG companies, compared to other industries. Therefore, these companies have broad experience with using the method. Secondly, ConQuaestor has a wide network of clients in the CPG business. Choosing for this industry therefore reduces the risk of finding not enough participants.

Selection of cases is done on a selective sample and partly on pragmatic grounds. By using a selective sample, organizations are selected which have specific characteristics (Verschuren & Doorewaard, 2005). The respondents of this research have experience with rolling forecasting and were willing to share rolling forecasting practices and thoughts regarding relations between CSF's.

In this research, companies are selected in varying stages of rolling forecasting. According to Eisenhardt (1989), theoretical sampling helps to focus on theoretical useful cases, for example, cases that represent conceptual categories. The sample of this research exists out of three companies which currently deploy rolling forecasting, one company which is planning to use rolling forecasting and one company which actively made the decision not to use rolling forecasting.

Phase of rolling forecasting	**Respondents**	**Companies**
Planning rolling forecasting	N = 1	Company A
Using rolling forecasting	N = 3	Company F, Company B Food Group, Company D
Decided not to use rolling forecasting	N = 1	Company C
Not using real rolling forecasting	N = 1	Company E

Function of the participant	**Respondents**	**Companies**
Marketing & Sales	N = 1	Company E
Supply Chain	N = 1	Company F
Purchase & Planning	N = 1	Company D
Business controller/finance	N = 3	Company A, Company F, Company B
Manager	N = 5	Company E, Company A, Company C, Company F, Company B

Table 2: Overview of companies and respondents

An overview of the applied windows and frequencies of the companies is added in appendix 2.

Company E was expected to fall in the first category with companies currently using rolling forecasting. However, during the interviews it became clear that applied forecast was tied to year-end and focused on updating the yearly budget. The year-end focus contradicts with the definition of rolling forecasting as stated in paragraph 1.1, where a rolling forecast is characterized as a regular updating forecast with a moving window.
The respondent added that Company E is planning to implement Integrated Business Planning, a monthly updating rolling forecast with a window of 24-months. This forecast is expected to be implemented world-wide soon.

Due to the deviation between the definition of rolling forecasting and the currently applied method of Company E, the results of this company cannot be taken into account completely. Whenever possible, the results of this company are outlined in the results chapter of this research. A justification for using the results will be given whenever these results are used.

The selection of cases on pragmatic grounds means that cases are selected partly on inconsequent criteria, such as personal interest and involvement, incidental contacts of the researcher or proximity to the university (Swanborn, 2010). In this research, companies out of the network of ConQuaestor are approached to participate.
Within each company, interviews are conducted with managers and employees in different functions, in order to obtain information from different angles. Participants are selected in three different groups, based on the process steps in the rolling forecasting framework, which is described in paragraph 1.5. The first group of participants is the employees active in the process of delivering information that is used to produce the rolling forecast, like Marketing & Sales or Production. The activities of these departments are focused within the 'input' phase of the rolling forecasting framework. The second group of participants are employees involved in creating the rolling forecasting, like business controllers. The creation of the rolling forecast corresponds with the 'process' phase and the 'output' phase of the rolling forecasting framework. The third group of participants is managers that use the output of the rolling forecast in the review meetings and take management decisions based on the rolling forecasting output. Managers are active in the 'output' and the 'act' phase of the rolling forecasting framework. Furthermore, most of the participating managers were involved in the design phase of the rolling forecast. This relates to the design phase of the rolling forecasting framework and is partly based on the surrounding factors of the rolling forecasting framework.

2.3 Data collection methods

In this research, data is collected with use of desk research, expert interviews, an online survey and case studies. The relation between the different data collection methods is displayed in figure 5. Desk research and expert interviews are used to obtain a list with factors which might influence rolling forecasting. This list is first tested with an online survey. The output of the survey and the list with factors are used as input for the interviews. The output of both the survey and the interviews leads to a conclusion per individual factor.

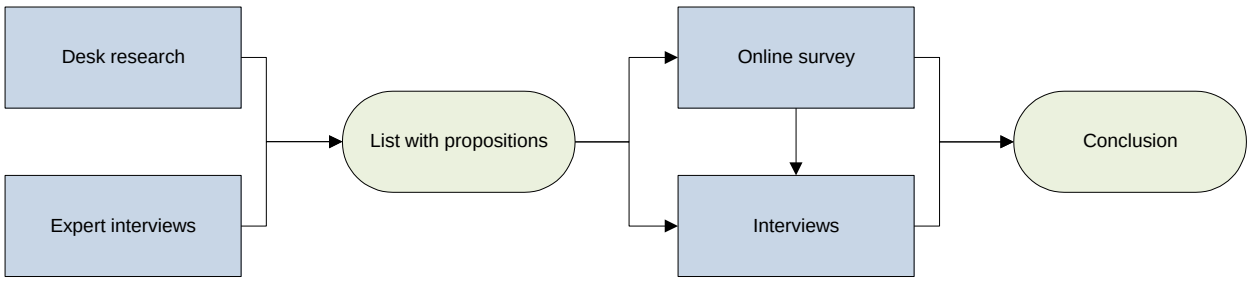

Figure 5: Data collection methods

Eisenhardt (1989) states that using different data collection methods strengthens the grounded theory. This is named triangulation of evidence. With triangulation, the success factors for rolling forecasting are

approached from different angles, after which the findings are compared. Confirming findings from different methods support the generated hypothesis, while conflicting findings improve the generation of new hypothesis. In this research, survey outcomes are compared with interview outcomes. For example: One of the participants gave a low score for the factor 'measuring accuracy'. In the interview, the participant explained that measuring the accuracy of a forecast can be very beneficial for a company, but that it is not current practice within his company. Yin (2009) confirms the positive impact of triangulation: the combination of different sources and qualitative and quantitative data improves the validity of the research.

2.3.1 Desk research

Desk research is a method in which background information is examined from (online) libraries and archives, with the main goal to compare different points of view and structure the obtained information (Verschuren & Doorewaard, 2005).

Desk research is used to structure the research and facilitate the analysis of data. The strategy for analyzing the data in this study is relying on theoretical propositions, which is discussed in detail in paragraph 2.4.2. The theoretical propositions used to analyze the data are derived from the desk research. Predefining a list with factors is crucial to let this strategy succeed (Yin, 2009). Furthermore, these factors helped to structure the further research methods.
In order to produce a list with factors, existing literature on rolling forecasting, budgeting, beyond budgeting and sales forecasting was examined. This list is discussed in chapter 3.

The preliminary CSF list was structured with use of the components of the rolling forecasting framework. For example: existing literature stated that decoupling target setting and forecasting is needed to obtain an unbiased forecast outcome (Moon, Mentzer, Smith & Garver, 1998; Merchant & Van der Stede, 2007). The factor performance cycle was added to the list, in the internal surrounding factors category.

2.3.2 Expert interviews

To make sure the list with factors obtained by literature review was complete, several experts are asked to validate the findings. Furthermore, these experts added several factors which were not obtained by the literature review.

The added factors are outlined and discussed in paragraph 4.2.

2.3.3 Online survey

The first stage of the research design was an online survey. A survey is a technique of questioning with a high level of pre-structuring, in general containing more closed questions than an interview and mostly used to target a larger group of respondents (Verschuren & Doorewaard, 2005).

The online survey served two goals. First, the survey helped to gather information of the participating companies regarding the. Second, the survey was used to let companies score the importance of the pre-defined hypotheses. The given scores of the participants gave a first indication for the importance of the predefined hypotheses. Furthermore, the scores helped to bring focus in the interviews. Since the time available per interviews was limited, topic selection in advance was needed to discuss the most important topics. The results helped to make choices in the topics per interview and use the time in interviews efficient.

The survey existed out of two parts. The first part of the survey was aimed at gathering qualitative data regarding practices and experiences on (the organization of) rolling forecasting. The results of the first part of the survey are used to obtain a clear picture of the surrounding factors, the design choices made in their rolling forecast and rolling forecasting practices of the participating company. For example: One of the constructs found in the desk research was that the complexity of the organization influenced the complexity of the rolling forecasting process, and that a more complex process hindered successful rolling forecasting. In the survey, participants are asked to value the complexity of the organization in terms of the number of brands, the number of SKU's, the number of markets, etc. The survey results provided useful information to prepare the interviews.
The second part of the survey was aimed at valuing the preliminary list with CSF's. Participants are asked to score the influence on successful rolling forecasting of the factors on a Likert-scale. Rensis Likert created a commonly used question format which is one of the most frequently used in survey research, where respondents are asked to answer questions on a scale, like "strongly agree", "agree" or "disagree" (Babbie, 2010). The value of this format is the unambiguous order in output (Babbie, 2010). The output in this research is structured by a 7-point Likert-scale, where a "1" represents very low influence on the success of rolling forecasting and a "7" represents very high influence on the success of rolling forecasting. The output of the second part of the survey gave important direction to focus the interviews. The survey is added in appendix 3.

The survey for the case with Company C was prepared differently, to cope with the different circumstances. Company C has decided not to use rolling forecasting, what means that most of the original survey questions cannot be answered by the respondents of Company C. The respondents filled in a different survey, focusing on the decision not to use rolling forecasting. Each preliminary success factor is scored by the respondents on the influence on the decision not to use rolling forecasting. The survey output is used to structure the interviews.

2.3.4 Interviews

The second stage in this research was the interview. According to Yin (2009), the main difference between a survey and an interview is structure. Surveys contain a rigid line of questions, where interviews are more fluid conversations, aimed at finding explanation. This research made use of focused interviews. Focused interviews are conversations in which a person is interviewed for a relative short period of time, like one hour. The interviews may still contain open-ended questions, but follow a certain line of inquiry (Merton, Fiske, & Kendall, 1990). A major purpose of such an interview is to corroborate certain facts that are expected (Merton et al., 1990). In this research, these expected facts were the survey outcome and the list with predefined factors. The participant was asked to explain the given scores and give examples per topic.
Nearly all interviews were held with one participant and two researchers, who both made interview notes. The interviews were logged on paper and digitally transcribed. Interview notes were sent to the participant for validation. The complete set of interview questions is added in appendix 4.

In this research, annual reports and newspapers are examined in order to get a clear picture of the internal and external surrounding factors of the company. Examples of relevant surrounding factors are the complexity of the organization or the ownership structure. These surrounding factors might influence the design or process of rolling forecasting within a company. The exact relation is examined in the interviews. The interviews conducted with the respondents of Company C were focused on the decision not to use rolling forecasting. With use of the survey outcomes, the topics are discussed that led to the decision not to use rolling forecasting. The main question asked was why the discussed issues had negative influence on the success of rolling forecasting.

2.4 Data analyses

2.4.1 Survey

The two parts of the survey are analyzed differently. The first part of the survey, with information regarding surrounding factors, design choices and practices, is analyzed in order to obtain background information of the company. The information is analyzed per participant as preparation on the interview. The second part of the survey is analyzed to bring focus in the interview. Per participant, 15 to 20 topics are selected to discuss. Selection is done with use of three criteria. The first criteria for selecting topics were the Likert-scale scores per component of the framework. The highest and lowest scores are selected to discuss. The highest scores are relevant, since the participant states that these topics highly influence successful rolling forecasting. The lowest scores were relevant to determine why these topics are not important for successful rolling forecasting.
The second criterion for selecting was the analytic technique of explanation building. The eventual explanation of the research question is the result of explanation building per case, what leads to a series of iterations (Yin, 2009). In this research, per new case the collected survey results are analyzed and compared with the interview outcomes of the prior cases. Topics with striking differences are selected for the interview. For example: One of the participants of Company E scored throughput time a '3'on the Likert-scale for influence on the success of rolling forecasting. In prior interviews, the throughput time was classified as very important, ranging from survey outputs from "5" to "7". The topic throughput time is discussed in the interview to build an explanation.
The third criterion for selecting topics was the function of the participant. In four of the cases, separate interviews are held with employees in different roles of the organization. For employees with a function Marketing & Sales, for example, more questions are selected regarding the input of the rolling forecast, in comparison with a Manager or a Business Controller.

To facilitate the selection process, a case-study database was established in excel where per case and per hypothesis, the preliminary explanation was described. Furthermore, questions were noted that remained open, or came up while comparing the evidence with other cases.

2.4.2 Interview analysis

To facilitate the process of analyzing the interview data, analysis is done by relying on theoretical propositions. According to Yin (2009), this is the most preferred strategy to analyze a large amount of data, in which theoretical orientation guides the analysis. This strategy helps to focus on certain data while ignoring other parts, to structure and organize the research and makes it possible to define alternative explanations (Yin, 2009).

In this research, the theoretical propositions are the preliminary factors that are derived from literature and expert interviews. All interview write-ups, comments and other information was gathered and evaluated. Per factor, the interview write-ups are investigated for confirmation or denial. That resulted in a list with success factors that are marked as critical for the success of rolling forecasting. The analysis is divided in categories to structure the process. These categories are consistent with the categories of the rolling forecasting framework: Internal surrounding factors, external surrounding factors, design, input, process, output and act.

2.5 Conclusions

The goal of this chapter was to explain the research design used in this thesis, which is done by discussing the research methods used, the units of analysis and the process of analyzing data.

The first step in this research was to obtain a list with factors. These factors are obtained by a literature review on rolling forecasting, sales forecasting and budgeting. Afterwards, experts validated and completed the list. In the second phase the obtained factors are tested with use of an online survey and interviews. The combination of both methods is known as triangulation and leads to a strong conclusion per individual factor. The individual survey scores are explained by respondents in the interviews. In reverse, interview statements can be validated by the mean survey scores of all respondents.

In total eleven respondents of six companies are included in this research. Companies are selected in different phases of rolling forecasting. Employees and managers are selected in different functions of the process.

Chapter 3. Literature review

3.1 Introduction

As stated in chapter 1 of this thesis, the goal of this research is to find the critical success factors for rolling forecasting. This chapter will provide a list with factors for possible critical success factors in rolling forecasting, divided over the components of the rolling forecasting framework. Existing literature on rolling forecasting, sales forecasting and budgeting is examined to find the factors in this chapter, which will function as start-up for the research on critical success factors for rolling forecasting.

This chapter is structured with use of the components of the rolling forecasting framework, as discussed in paragraph 1.5. The internal surrounding factors and external surrounding factors are discussed first. The design of the rolling forecast, input information and process factors are outlined afterwards. This chapter finishes with the components output, and act.

In each paragraph, a list with the factors found is shown first. The rest of the paragraph is used to discuss the factors. All factors are coded with the first letter(s) of the component and a number.
A table with the full list of factors is added in appendix 1.

3.2 Preliminary factors

3.2.1 Internal surrounding factors

The first component in the rolling forecasting framework is the influence of surrounding factors of an organization, which can be both internal and external. Zotteri and Kalchsmidt (2007) argued that contextual factors influence static demand forecasting. The internal surrounding factors in this research are the factors influencing the rolling forecast from inside the organization. These factors are expected to partly determine the design or the processes of the rolling forecast. The literature review revealed six factors which might influence rolling forecasting. These will be discussed in this paragraph:

Factor	Code
Strategy of the organization	IS.1
Structure	IS.2
Performance cycle	IS.3
Complexity of the organization	IS.4
Maturity	IS.5
Culture	IS.6

Table 3: Internal surrounding factors

One of the factors of the component Internal surrounding factors that might influence the success of rolling forecasting is the overall *strategy* of the organization (Code: IS.1). Tanlu (2007) stated that the strong strategic focus of the rolling forecasting is one of its benefits over other forecasting tools. If the strategic focus of the method is perceived as a benefit by researchers, the strategy of the organization will influence the design or the practices of rolling forecast. The strategy of the company might for example partly determine the KPI's on which is forecasted or the window of the forecast.
Besides the strategy of the company, also the organizational *structure* (Code: IS.2) is proposed as factor which influences the success of rolling forecasting. Moon et al (2003) concluded that in good forecasting systems, the processes of sales forecasting are adapted to the structure of the organization. This factor is used in this research.

Another factor for the internal surrounding factors is the applied *performance cycle* (Code: IS.3) (Merchant, and Van der Stede, 2007; Moon, Mentzer, Smith, & Garver, 1998). One of the perceived downsides of the budgeting process is its relation with determining targets. As managers can influence the target setting process with the budget outcome, managers are eager to lower the budget. This process is called sandbagging. Therefore, Moon et al. (1998) state that in forecasting processes, targets should not be intertwined with producing a forecast.

The *complexity of the company* (Code: IS.4), which can be made operational in the number of employees, the number of brands, the number of countries served, the number of products or the yearly turnover, might influence the practices and the success of rolling forecasting. Zotteri and Kalchsmidt (2007) argued that the size of the firm influences the design of the forecast and the process of a demand forecast. Furthermore, Moon, Mentzer, & Smith, (2003) state that the size of a company influences the process of sales forecasting.
Another interesting point of view is given by Weber and Linder (2005), which that beyond budgeting is only possible in companies with relative little complexity. Traditional budgeting on the other hand is perceived to fit better with highly complex companies. The reason is the controlling function of the budget, which is required more in more complex organization in comparison with low complex organizations. Since rolling forecasting is originally proposed as element of beyond budgeting, it is likely that rolling forecasting is influenced by the complexity of the company. Therefore, the complexity of the organization is added to the list with factors.

Another internal surrounding factor is the *maturity* of the company (Code: IS.5), which can be defined in terms of the growth phases model. A company in its early years might have less knowledge on forecasting or design their procedures differently, in comparison with high mature organizations. Dalrymple (1975) found that a correlation exists between the maturity of the firm and the accuracy of the sales forecast, and suggested that more mature firms have learned more about the forecasting process. The same reasoning is expected to hold for companies using rolling forecasting.
The last factor which might affect the rolling forecast is the *culture* of the company (Code: IS.6). Moon et al. (2003) stated that there are three types of culture in a sales forecasting process, which can be characterized by; 'address the problems', 'assign the blame', and 'why should I care?'. The 'address the problem' culture is characterized as a culture in which working towards a solution is done 'cross-department'. In these companies it is not important which department is to blame, as long as the problem gets solved. The 'assign to blame' culture searches for the source of the problem and makes the source responsible for solving the issue. Moon et al. (2003) argue that forecasting problems are mostly cross-functional and cross-department. That makes it difficult to make one person or department responsible and solve the problem effectively. The 'why should I care?' culture tends to see forecasting as an unimportant activity. According to Moon et al. (2003), there is little understanding of the added value of forecasts in these companies.
To conclude, Moon et al. (2003) argue that the culture of an organization influences the success of the processes of forecasting and can play an important role in the success of the tool. The culture of the company is therefore added to the list with factors.

3.2.2 External surrounding factors

The second half of the surrounding factors contains the factors from outside the organization that influence the rolling forecasting design, process or the forecasting outcome. In literature on sales forecasting and budgeting, four factors have been distinguished:

Factor	Code
Type of industry	ES.1
Market characteristics	ES.2
Market specific developments	ES.3
Macro-economical developments	ES.4

Table 4: external surrounding factors

One of the external factors of the company is the *type of industry* (Code: ES.1) the company is active in, for example retail, tourism or CPG. Dalrymple (1975) found differences in average sales forecasting accuracy over several businesses. The insurance industry, for example, had a lower forecasting error than banking or manufacturing. Dalrymple (1975) concludes that certain types of industry are better predictable than others. The same reasoning might be applicable for rolling forecasting. Thus, the accuracy of the rolling forecast might be influenced by the industry of the company.
The factor *characteristics of the market* (Code: ES.2) is slightly different than the factor industry of the company. The characteristics of the market encompass the degree of saturation and the degree of competition in the market. McHugh and Sparkles (1983) found a positive relationship between the competition in a market and the accuracy of a forecast. This could be explained by increased awareness of the importance of rolling forecasting in markets with more competition. Both the type of industry and the market characteristics are added to the list with factors.

The accuracy of the rolling forecast can also be influenced by developments in the market (Code: ES.3) or developments in the macro-economy (Code: ES.4) (Winklhofer, Diamnatopoulos and Witt, 1996). Examples of market specific developments which influence the success of forecasting are the grain fires in Russia in 2010. These fires had important influence on the world market prices. Increased market prices have to be taken into account in a forecast. If companies are not able to adjust forecasts in an early stage, the accuracy will decrease.
The same reasoning is applicable for the factor macro-economical developments. Changes in the macro economical developments can influence the demand or supply of a company and thereby affect the accuracy. The financial crisis in 2008, for example, put the world-wide economy in a recession and influenced demand and supply of most of the industries. If the company is not able to adjust the forecast in an early stage, the accuracy will be lowered.

3.2.3 Design

In the design component of the rolling forecast, the company has to make important choices regarding the organization of the rolling forecast. These factors are expected to influence the success of rolling forecasting directly. In current literature, seven factors are distinguished:

Factor	Code
Window	D.1
Frequency	D.2
Dimensions	D.3
Organizational level	D.4
Alignment with the budget	D.5
Resources available	D.6
KPI's/line items	D.7

Table 5: Design factors

Winklhofer et al. (1996) argued that in companies applying sales forecasting, the size of the company and the type of industry of the company partly determine the choice for the first four factors of the design component: frequency, window, dimension and organizational level. The forecasting *window* (Code: D.1) represents the period for which a forecast is made (Tanlu, 2007). Most companies use a window between 5 and 8 quarters. Winklehofer et al. (1996) argued that the industry and the size of the company influenced the choice for the forecasting window, which indicates that the window might be a factor determining the success of the rolling forecast. A window which is too long might be not efficient, while a window which is too short might be not effective. An ineffective rolling forecast cannot be used optimal by the company.
The *frequency* (Code: D.2) of the rolling forecast refers to the number of times the rolling forecast is updated (Tanlu, 2007). The same reasoning is applicable as for the rolling forecasting window, the frequency should be designed according to the surrounding factors of the company. A rolling forecast which is updated too many times cannot be efficient, since much time is spent in producing an update with limited new information. If a rolling forecast is updated too late, new information is not incorporated early enough, which makes the forecast less effective. The accuracy of the rolling forecast will decrease and the output might not be used optimal.

The choice for the level in *dimensions* (Code: D.3) and the *organizational level* (Code: D.4) of the rolling forecast also need to be specified in the design phase, based on surrounding factors (Winklehofer et al., 1996). A rolling forecast can be produced for several dimensions, like the product dimension, sales channel dimension customer dimension or regional dimension. For all dimensions, a level of detail needs to be specified. For example: Within the product dimension a rolling forecast can be produced on the level of a product group, product or Stock Keeping Unit (SKU). A forecast on SKU level is the most detailed level, in which a forecast is produced for every separate packaging of a product. A dairy producer can for example produce a forecast on product group level (milk, yoghurt, desserts), product level (semi-skimmed milk) and SKU level (0.5 liter packages milk, 1 liter packages milk, and 2 liter packages milk). As Winklehofer et al., (1996) concluded in his analysis of sales forecasting that the choice for the level of detail in the dimensions is partly based on the complexity of the company. Larger retailers were found to produce forecasts in the customer dimension on a higher level of aggregation in comparison with smaller retailers. It is interesting to find out whether the choice for the level of dimensions is critical for the success of rolling forecasting or not. The same question can be asked for the organizational level. A rolling forecast can be made on the level of the Operating Companies (OpCo's), Business Units and Business Group, in which the OpCo level is the most operational and the Business Group functions as the highest level within the organization.

When discussing the background of rolling forecasting, it is mentioned that rolling forecasting is proposed as alternative for the budget within the beyond budgeting movement. Nevertheless, Libby, & Lindsay (2010) concluded that the rolling forecast is mostly used alongside the budget, instead of being a replacement. The question can be asked how companies ensure an efficient process while using two forecasting tools. Therefore, the next factor in the design component is the *alignment with the budget* (Code: D.5). Companies might have made certain design choices regarding possible overlap between the rolling forecast and the budget, to prevent an inefficient process.

Furthermore, the amount of *resources available* (Code: D.6) for the rolling forecasting process might be a key issue for determining the success of forecasting. In the survey of Mentzer, & Kahn, (1997) on sales forecasting success, 38% of the respondents disagreed with the statement that in their company 'the sales forecasting budget is sufficient'. 39% of the respondents were neutral and 23% stated that enough budget is available. Asked whether enough people are assigned to the forecasting process, 38% of the

respondents disagreed, 21% was neutral and 42% agreed. The authors concluded that improving the sales forecast often requires more personnel resources. With increasing the resources for rolling forecasting and the number of personnel available, the quality of the forecast and the ability to make optimal use of the output can be increased.
At last, the company has to specify the *KPI's or line items* (Code: D.7) of the forecast. Companies have to make choices for which KPIs the rolling forecast is produced. The KPI's on which is forecasted determine the expected outcome. According to Moon et al. (1998) one of the important choices a company has to make is to determine what to forecast. Many companies make the mistake forecasting the wrong items, what leads to ineffective forecast use. The KPI's/line items is therefore added to the list with factors.

3.2.4 Input

In the input component, the information is gathered that is needed to compute the rolling forecast. The input of the rolling forecast is an important step, since it determines the quality of the data. It seems logical that when less qualitative data is used, or an important source of information is forgotten, the forecasting accuracy will decline. Current literature distinguished two factors:

Factor	Code
Information input	I.1
Assumptions	I.2

Table 6: Input factors

The *information input* (Code I.1) encompasses information of the involved departments, like Marketing and Sales, Production, Logistics, HRM, Finance and Research & Development. The input from the Marketing & Sales department, for example, gives an indication for the expected demand, including the planned promotional activities. Moon et al. (1998) found that companies which were more successful in sales forecasting, used information from more different departments. These companies believe that each of whom can give relevant input to the forecast, should be attached to the process. In that way, the forecasting performance can be improved.
Another input aspect which seems to influence the outcome of a rolling forecast are the *assumptions* (Code I.2) for the process (Moon et al., 2003). For completing the rolling forecast, assumptions are made on items which underlie the projections of the forecast. For example, assumptions can be made on raw material prices, margins or exchange rates. If assumptions turn out to be incorrect (e.g. the Euro/Dollar exchange rate increase with 4% instead of 2%), the rolling forecast accuracy on the overall result in Euro's for a company exporting to the United States, will be significantly lower. Both the information input from departments and the underlying assumptions are added to the list with factors.

3.2.5 Process

The process component of the rolling forecast encompasses all factors which facilitate the organization to successfully execute the process, and thereby improve the forecast performance. A review on existing literature resulted in a list with eight factors for successful rolling forecasting:

Factor	Code
Procedures & guidelines	P.1
Instructions	P.2
Process owner	P.3

Deadlines	P.4
Tools & systems	P.5
Involvement of all departments	P.6
Capabilities & competences	P.7
Throughput time	P.8

Table 7: Process factors

Employees need to know what their role is and what is expected from them in the process. To facilitate this, *procedures & guidelines* (Code P.1) can be beneficial in realizing a clear process (Mentzer, &Kahn, 1997). Furthermore, many companies send *instructions* (Code P.2) as being the first step in the rolling forecasting process. Mentzer, & Kahn (1997) conclude that more than half of the respondents in their survey on sales forecasting practices have formalized processes and clear instructions. There is a clear difference between procedures and guidelines on the one hand and instructions on the other. Procedures and guidelines are prepared and spread once to describe and explain the different roles and actions in the process or the tools which are used. Instructions are prepared and spread before each update of the rolling forecast and can be used to inform the actors in the process of the deadlines and the assumptions which have to be used.
A *process owner* (Code P.3) can help to structure and control the forecasting process. Mentzer et al. (1999) describe the role of the process owner in sales forecasting as "a credible, assertive and confident manager who understands the role of sales forecasting within organizations". A process owner is responsible for the communication and coordination of the process.
These three factors – procedures and guidelines, instructions and the process owner – are all mentioned in literature on sales forecasting to organize the process. These factors can improve the quality of the process, and thereby the quality of the output of a rolling forecast.

The importance of *deadlines* (Code P.4) in the deployment of the process is obtained from sales forecasting literature (Armstrong, 1983). Within rolling forecast, the importance of deadlines is best explained by the fixed moments of data transfer. Most of the actors have strict deadlines for uploading their part of the information. Briefly after such deadlines, the uploaded information is automatically downloaded, consolidated and passed through towards the next actor in the process. The result of an unmet deadline is incomplete or incorrect data in the rest of the process, which will influence the accuracy of the forecast.
Another factor relating to successful use of data is the data transfer through the company, which is done by *tools & systems* (Code P.5). Use of tools and systems seems indispensible when producing a qualitative rolling forecast. Due to the large amount of data, systems are used to store historical data, like sales volume, prices and product information. Tools can be used to produce the rolling forecast, like a demand forecasting tool. Zotteri and Kalchsmidt (2007) stated that successful companies in sales forecasting use a combination of qualitative and quantitative methods to produce a forecast. The tools – quantity methods – are used to support the logic of the qualitative process.

The factors involvement of the important departments (Code P.6) and the capabilities and competences of the employees (Code P.7) relate to the stakeholders in the process and the quality of actions of the actors.
Mentzer, Bienstock and Kahn (1999) state that in a sales forecast, all departments with relevant information need to be involved when producing a good sales forecast. Each department can give relevant information that makes the forecast more accurate. Furthermore, the quality of the actions seems to be a denominator of the success of rolling forecasting, which is labeled capabilities & competences of the employees. In a survey on sales forecasting practices of Mentzer and Kahn (1997), respondents were

asked whether certain qualifications are important in the process. Experience with forecasting, statistics, computer systems and specific business department are named most important. Mentzer et al. (1998) conclude that ongoing training in statistics and business environment is a characteristic of best-practice sales forecasting companies. This means that the rolling forecasting outcome might be determined by the involvement of the different departments in the process and the specific performance of the employees.

The process of rolling forecasting has a certain *throughput time* (Code P.8). The throughput time is the time it takes to produce a rolling forecast, from the moment the instructions are sent until the moment the output is ready. Weber and Linder (2005) Found that the throughput time of producing a budgeting tool is considered to be a derivative of the complexity of the process. The authors write that with the involvement of more decision makers to get to a conclusion, the complexity of the process increases, which results in an increased time to reach an agreement. The same consequence is applicable for rolling forecasting: the more employees are involved and the higher the level of detail that is expected in the output, the longer it takes to produce a forecast. The throughput time is the last factor in the process component.

3.2.6 Output

In the output component of rolling forecasting, a report is delivered which contains the results of the process. The output of the forecast will be presented and discussed in several management meetings. The quality of the output component determines the quality of the use of the rolling forecast. The literature distinguished three factors:

Factor	Code
Quality of the report	O.1
Management focus	O.2
Measuring accuracy	O.3

Table 8: Output factors

The quality of the output component is determined by two components: *the quality of the report* (Code O.1) and the focus of the management (Code O.2). The report, which is created and used in management reviews, mostly contains the last actual results and the latest rolling forecasting output. The actual results are based on the monthly book closing process. The rolling forecast output is the result of the process of rolling forecasting. For the several management layers of the company, these reviews are the main source of information to take its decisions. Miller (1985) found that the way sales forecasting output is presented influences the way output is used. For example: the use of graphs and tables helped higher management to understand and interpret the output and thus make optimal use of the forecasting output.
The *focus of the management* is proposed as the other important denominator for successful rolling forecasting output. According to Barret (2003) the focus of management in review meetings is an important factor determining the success of the discussion. If a manager is backward looking, most of the time is spend on discussing the results of the company. Forward looking management teams, on the other hand, spend most of the time discussing the output of the forecast. Barret (2003) argues that management teams of companies applying frequent updating forecasts must become more forward looking to manage and anticipate for the future.

The quality of the rolling forecast can be determined by the accuracy of output, as is proposed in paragraph 1.5. *Measuring the accuracy* (Code O.3), and thereby measuring the quality of the rolling

forecast, is the last factor of the component output. Companies can track the accuracy of the forecast by measuring the error between the forecast and the actual results. By measuring the accuracy, best practice companies in sales forecasting try to locate areas of improvement of the process (Mentzer et al., 1999; Zotteri, & Kalchsmidt, 2007). One of the conclusions of Mentzer, & Kahn (1997) is that measuring forecasting accuracy improves the success of a sales forecast by stating: "What gets measured gets rewarded and what gets rewarded gets done".

3.2.7 Act

The act phase is the last phase of the rolling forecasting process, and encompasses the actions taken with the output of the rolling forecast. Three factors are found in existing literature, which are expected to influence the use of the rolling forecast:

Factor	Code
Decision making process	A.1
The ability to change the process	A.2
Management support	A.3

Table 9: Act factors

The output of the rolling forecast can be used by the management for two important purposes. Management can use the rolling forecast output for *decision making processes* (Code A.1). Mentzer, & Kahn state that the success of sales forecasting is partly determined by the actions management take with the forecasting outcome. Thus, the success of the use of a rolling forecast might be determined by the actions management takes with the output of the process. This is the first factor for the act component.
Furthermore, the rolling forecast output can be used to make *changes in the rolling forecasting process* (Code A.2). Changes will most likely be made to improve the forecast accuracy in the future. Moon et al. (1998) argue that consequent measuring of accuracy is needed in sales forecasting to identify opportunities for improvement. With improving the rolling forecasting process, companies are able to improve the success of both rolling forecasting accuracy and rolling forecasting use on the long run.

At last, the *support of the management* (Code A.3) seems an important factor in the rolling forecasting process. Mentzer et al., (1998) conclude that in best-practice companies in sales forecasting, top management support for the forecasting process is very important. Moon et al., (1998) state that one of the keys to improve sales forecasting is the importance management gives it. Although in most companies, managers claim that sales forecasting is an important function, the actions that support this claim are lacking (Moon et al., 1998). Management can show their support by giving enough training for employees in the process or by measuring accuracy and providing rewards on a predefined outcome. Employees will be stimulated to put effort in the sales forecast.

3.3 Conclusion

This goal of this chapter was to find factors which are expected to influence the success of rolling forecasting. Existing literature on rolling forecasting, sales forecasting and budgeting is examined, which resulted in 33 factors, divided over the components of the rolling forecasting framework. These factors will be tested in this research

The list with factors is reviewed by experts in the field, to validate the findings and complete the list with missing factors. The missing factors are described in paragraph 4.2. The full list, with both the factors from the literature review and the validation from experts in the field, can be found in appendix 1.

Chapter 4. Results

4.1 Introduction

The first three chapters of this thesis outlined the background of rolling forecasting, the design of this research and a list with factors to be tested. This chapter's objective is to show the results of this research. All factors which might influence the success of rolling forecasting are tested with an online survey and interviews, leading to the conclusion whether the factor is a critical success factor or not.

However, before discussing the research findings, the list with factors was validated and completed by experts in the field. This chapter will start with a discussion of the factors added to this research and a justification. The next paragraph contains an extensive discussion on the findings of this research, per individual factor. This paragraph is structured by the components of the rolling forecasting framework. An analysis of the results is shown in the last paragraph. This includes the rolling forecasting model and a discussion on the most important conclusions of this research.
An overview of the applied windows and frequencies of the participating companies is added in appendix 2.

4.2 Additional factors

The literature review, as discussed in chapter 2, has led to a list with factors which might determine the success of rolling forecasting. This research assessed if and how the factors on this list influence the success of the method. However, before conducting the research, the list with factors is examined by experts to validate the correctness of the factors and complete the list with missing factors. The following factors are added to the list as a result of this validation:

Component	Factor	Code
Internal surrounding factors	Ownership structure	IS.7
Internal surrounding factors	Complexity of the primary process	IS.8
External surrounding factors	Laws and regulations	ES.5
External surrounding factors	Influence of external stakeholders	ES.6
Design	Timing	D.8
Input	Master data	I.3
Input	Budget	I.4
Process	S&OP process	P.9
Process	Complexity of the process	P.10

Table 10: Factors obtained by expert reviews

The *ownership structure* (Code: IS.7) of the organization might influence the implementation of rolling forecasting (M. Bier, personal conversations). Public listed companies, with a large group of shareholders can be focused more on short term results, in comparison with companies which have one owner and might be more forward looking. Less pressure on short term results can improve the changes of implementing rolling forecasting. This factor is most likely overlooked, due to the focus of the articles used in the literature review on the deployment phase of sales forecasting and budgeting. This excludes the implementation phase, where this factor is important. The interview with M. Bier, involved in the design and implementation phase of rolling forecasting, brought additional knowledge.

Another internal surrounding factor which is added is the *complexity of the primary processes* (Code: IS.8). The complexity of the primary process relates to the number of process steps and the degree of difficulty for producing the products. Companies which use the side-products obtained by the production process as input for other products have a more complex production process in comparison with companies without side-products. Companies with a more complex primary process might have more difficulties preparing the rolling forecast, which can influence the forecast accuracy (L. Meijers, personal communication). This factor is most likely not included in the current literature since the complexity of the primary process is very specific factor.
An external surrounding factor which is added to the list is the influence of *laws and regulations* (Code: ES.5). If, for example, the European Union decides to change the laws for processing meat, it might have consequences for the rolling forecast of a meat processing company (L. Meijers, personal communication).
Also external stakeholders (Code: ES.6) might influence the success of the rolling forecast (M. Bier, personal conversation). This factor partly relates to the ownership structure of the company and encompasses stakeholders like shareholders, analysts, banks or customers. Less pressure of external stakeholders can influence the abilities to implement or deploy rolling forecasting. Both laws and regulations and external stakeholders are added to the list with factors.
These two factors are not taken into account in current literature. Probably, due to the fact that most articles deal with practices of forecasting or budgeting and less with factors on which the design is based. Furthermore, the design of budgeting and demand forecasting requires a less demanding design-phase. A less important design phase is a likely reason for the lack of empirical articles.

The *timing* of the rolling forecast (Code: D.8) is added to the list of design factors. Timing refers to the moment in time the forecast is made. If a company plans a forecast in a holiday period, the output might not be discussed as it would be otherwise due to understaffing and thereby lowering the forecasting use (B. Taminiau, personal communication). The regular updating rolling forecast is most likely more affected by the timing of the process in comparison with the budget or a sales forecast. The budget is produced only once a year, where the sales forecast is less demanding than a rolling forecast.

The expert review resulted in two input factors which are added to the list; *master data* (Code I.3) and the *budget* (Code I.4). M. Bier (personal communication) argued that the quality of the master data is crucial factor in computing the rolling forecasting output. Historical sales results, prices and information regarding customers are all stored in the master data, which is used to compute a rolling forecast. Incorrect or incomplete master data will have negative influence on the accuracy of the rolling forecast. It is not clear why the master-data is not found in current literature. Most articles only state that the systems used are crucial for sales forecasting and that information or data in a broad sense should be complete. However, the master-data seems also important for sales forecasting.
The budget might be used by employees to validate the output of the rolling forecast. When large deviations occur between the budget and the rolling forecast, the rolling forecast might be adjusted (L. Meijers). This factor is probably not discussed in current literature, due to the specific character of this factor. As is discussed above, the discussion regarding input factors is limited to statements regarding ‘complete information’.

Two factors are added to the process component of the rolling forecasting framework. M. Bier (personal communication) stated that the rolling forecasting process builds upon a good working *S&OP process* (Code P.9). S&OP stands for Sales & Operations Planning and is a process in which the sales department and the operational departments, like production, align their planning. As the rolling forecast builds upon the S&OP, the quality of the S&OP and the connection between both methods might

influence the success of rolling forecasting. The last factor added to the list of factors is the *complexity of the process* (Code P.10). B. Taminiau (personal conversations) argued that a more complex rolling forecasting process can negatively influence the success of the rolling forecast. More process steps can increase the risk of making mistakes, thus lower the forecast accuracy. For both the S&OP as the complexity of the process counts that these factors are specifically related to rolling forecasting processes. The rolling forecast is expected to be build upon a good working S&OP process. Furthermore, for the budget and the sales forecast the complexity of the process is less important. A rolling forecast, which is regular updating, is expected to be more affected by the complexity of the process.

4.3 Research results for the individual factors

The objective of this paragraph is to find whether the factors obtained by the literature review (chapter 3) and expert review (paragraph 4.2) are seen by practitioners as critical success factors for rolling forecasting. Based on the obtained evidence, all factors are placed in one of these categories:

- Critical success factor;
- Surrounding factor influencing the rolling forecast;
- Non-critical success factors.

Per factor, the survey and interview results are discussed to come to a conclusion. This discussion includes a justification for labeling the factor as critical success factor or not, by describing the relation between the factor and the success of rolling forecasting. At the end of this paragraph, it must be clear *which* factors can be named critical success factors, and *why* this conclusion is made.

The results in this chapter will generally give no answer to the question *how* the factors should be organized by companies to achieve an optimal forecasting performance.

4.3.1 Internal surrounding factors

4.3.1.1 Strategy of the organization

The survey results for the factor strategy of the organization give a mixed result. With an average of 4.1, and scores ranging from a “1” to a “7”, there is not yet an indication for the importance of this factor.

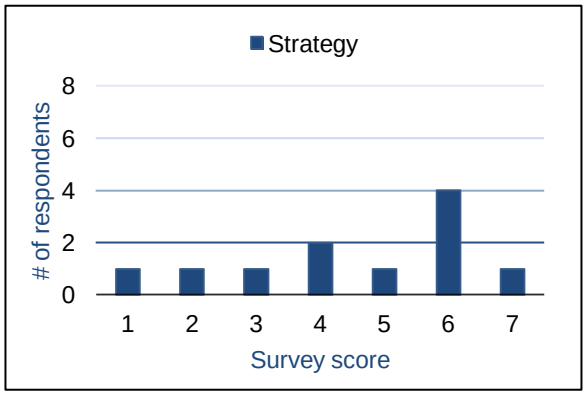

Figure 6: Survey scores strategy of the organization

The interview results give better understanding of the relation between strategy of the company and the success of rolling forecasting. The importance of this factor seems to depend on the purpose of the rolling forecast. One of the respondents of Company B valued the strategy highest. He explained: ‘The goal of the rolling forecast is to steer the organization on the mid-long-term. In order to steer correct, it is necessary that the strategy is incorporated in the rolling forecast by using the correct KPI’s’. This point of view is shared with Company A, where one of the respondents valued the strategy alignment with a “6”. ‘It is very important that the rolling forecast is aligned with the strategy. The rolling forecast monitors the success of the strategy of the company and shows the trend line on the long term. Furthermore, the rolling forecast is used to validate whether the tactical plan is on the right track’. Both companies will use the outcome of the rolling forecast to measure

whether deviations occur in the goals on mid-long-term. In order to measure the correct KPI's the rolling forecast must be aligned with the goals on the mid-long term.

However, this reasoning is not applicable for all respondents. The manager Purchasing & Planning of Company D, responsible for the forecast with a window between three and six months, states that strategy alignment is not important because the rolling forecast within Company D is only used to align the planning of production and marketing & sales. The window is too short to make the connection with the strategy.
This opinion is shared by one of the respondents of Company F, responsible for the forecast with a window of three months. She valued the importance of strategy alignment lowest, since the strategy has no influence on the short-term planning she is responsible for. These different opinions relate to the different purposes of rolling forecasting.

Based on these statements, the conclusion can be drawn that the strategy of the company can be very important for rolling forecasting. If the strategy is not aligned with the rolling forecast, and the output is not reflecting the right indicators, the rolling forecast cannot be optimally used.
Although the management of a company is able to manage the alignment between the strategy and rolling forecast, the strategy itself falls beyond the scope of rolling forecasting. Alignment should be achieved by connecting the KPI's and line items to the strategy, which is a separate factor in this research. Therefore, the factor strategy is labeled as surrounding factor influencing the rolling forecast.

4.3.1.2 Structure

The survey results for the factor structure give mixed results. The output shows a wide range of answers, ranging from a "2" to a "7", with an average score of4.6 and a spike in the middle, indicating that most respondents value the importance of structure neither as highly critical nor as not critical at all. An explanation is obtained by the interview results.

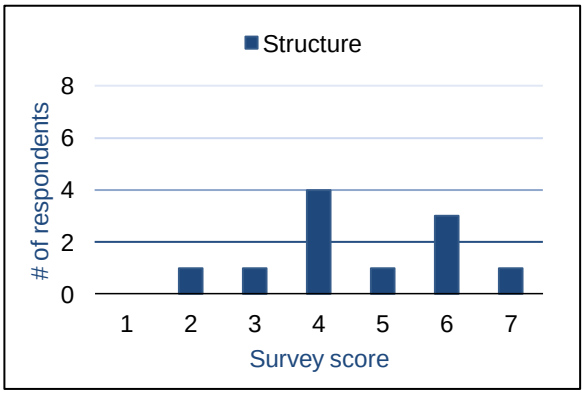

Figure 7: Survey scores structure

Most respondents in the interview explained that the structure of the company was important when the rolling forecast was organized. One of the respondents of Company F stated: 'the structure of the organization must be "strong", in order to let all stakeholders meet each other. Planning and Finance, for example, are active in another area as the Marketing department. These parties have to meet in order to make a correct estimate. Within Company F, the structure of the organization is of a high level (…) due to clear procedures and a clear process. For example: a fixed calendar is used with fixed meetings'.

Another respondent of Company F has a similar statement, and adds that the processes within Company F are based on the structure: 'The structure determines the organization and the processes of rolling forecasting. After a recent reorganization in Company F Benelux, the rolling forecasting process is changed, to cope with the different organizational structure'.

To interpret these statements, it is important to mention that Company F is a company with 167.000 employees and active in 180 countries worldwide. Different statements are obtained in the interview with

a respondent of Company D. With only 400 employees and all located in the same building, the company is much smaller than Company F. The respondent of Company D explained the given score on Structure (a “2”) with stating: ‘The structure is not important in the rolling forecast of Company D. That is, because Company D has a relative flat organization. Therefore, the complexity of the rolling forecasting process can be kept low. The culture within Company D is considered more important’.

These statements lead to the conclusion that the importance of the factor structure is influenced by contextual factors like the complexity of the organization. Furthermore, the structure does not directly influence the success of the rolling forecast, but only influences the processes of rolling forecasting. Therefore, the factor structure is not a critical success factor.

4.3.1.3 Performance cycle

The results from the interviews and the survey do not give a clear image on importance of decoupling rolling forecasts and the target setting process. In the survey, most respondents valued the importance of decoupling target setting and rolling forecasting relative high, with an average score of 4.9.

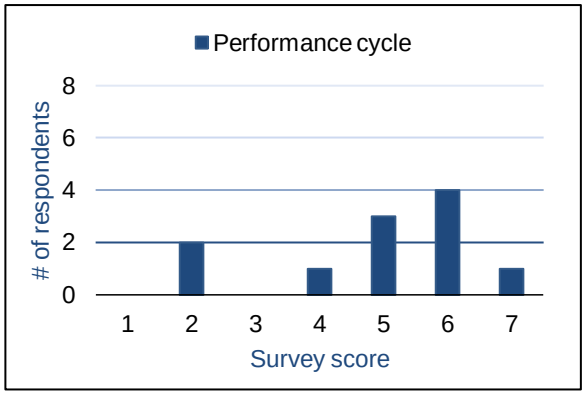

Figure 8: Survey scores performance cycle

The two respondents which gave a “2” stated in the survey that the given score was based on the importance to set targets in order to achieve accurate forecasts. Company F is one of these companies: ‘Company F has targets on the forecasting bias. The forecasting bias is the positive or negative deviation from the actual results. The target of last year was to have a bias between +5% and –5%’.

However, when asked about targets for sales managers based on the forecasting outcome, which is the subject of research in this factor, all respondents agreed that it is not beneficial for the company to derive management performance targets from the rolling forecast. As one of the respondents of Company A stated: ‘Rolling forecasting and target setting need to be two separate processes. It is not desirable to use rolling forecasting to state targets, because it can influence the quality of the forecast.’
Also at Company B, both respondents claimed target setting and rolling forecasting should not be related, with a “5” on the survey. However, Company B determines its budget by fixing the rolling forecast outcome of October, which includes the full upcoming fiscal year. Furthermore, management performance targets are derived from the budget, what means that targets are indirectly derived from the rolling forecast. One of the respondents agreed that gaming issues might appear due to this design, but asks the question how targets can be derived otherwise. The choice for deriving targets indirect from the rolling forecasting output is partly made to have an efficient process. When the budgeting process and the rolling forecasting process can be combined, a lot of time is saved.

Deriving targets from rolling forecasting output makes the review meeting more important. In review meetings of Company B, where the rolling forecasting output is discussed with ‘the next higher level’, the output is not only valued by managers on its correctness, but also on signs for gaming behavior. This clearly increases the complexity of the review meeting. Furthermore, the possibility to “game” the forecast might decrease the accuracy of the forecast.

Other companies in this research use other methods to state targets. Respondents of Company F claimed that targets are based on historical results. One of the respondents of Company A stated that the budgeting process and the rolling forecasting process are completely separated.

It falls beyond the scope of this research to state which manner for deriving targets is the best possible for the company. However, it is clear that a trade-off is made at Company B between having efficient process and increased forecast accuracy. Furthermore, all respondents stated that decoupling targets with the rolling forecast is beneficial for the success of rolling forecasting. The rolling forecasting will have a higher chance of being more accurate when there is no chance to 'game' the forecast. Therefore, and considering the fact that management is able to change the target setting process, the conclusion can be made that the performance cycle of the company is a critical success factor for rolling forecasting.

4.3.1.4 Complexity of the organization

The results of the survey indicate that the complexity of the organization has an important role in the success of rolling forecasting with an average survey score of 5.0 and most scores above neutral.

The interview results support the finding that the complexity of the organization influences the rolling forecast. There are three important relations.

First, the complexity of the organization determines the need for rolling forecasting. The respondent of Company C explained why he decided to implement rolling forecasting in a subsidiary of Company C in Finland: 'The subsidiary produced six different product categories and over 350 SKU's on one production facility. (…) The combination of limited production capacity and many SKU's led to a very complex situation, where SKU's had to be produced at least one month up front. It was not possible to organize a new production moment for an SKU when the amount of products produced was insufficient, due to the tight production schedule'.

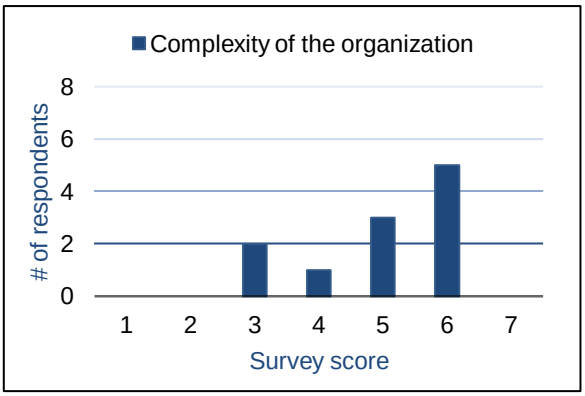

Figure 9: Survey scores complexity of the organization

Thus, in a more complex organization, there is more need to produce an accurate forecast well in advance. Rolling forecasting enabled the subsidiary in Finland to lower the inventory – which positively influences the working capital of the company – and significant less waste on inventory.

Second, the complexity of the organization influences the difficulty to organize rolling forecasting. One of the respondents of Company A explained that in a more complex organization, the necessary workload to create a forecast increases. More brands, more employees involved and more countries directly influence the time it takes to produce a rolling forecast; the throughput time.
The increased difficulty to implement rolling forecasting is confirmed by the respondent of Company C. A respondent of Company F explains how the differences between Company F subsidiaries in different markets, hinder the implementation of the rolling forecast: 'Company F is organized in different sales organizations, which all have different preferences. The complexity of the rolling forecast is influenced by the complexity in the retailer landscape. Furthermore, the complexity is increased by the use of different product categories. Different sales organizations require different techniques to create a rolling forecast in the most efficient way. A one size fits all approach is therefore difficult to attain'.

Third, a more complex process has negative influence on the chance of making mistakes in the consolidation process. Company F provides another example of how complexity influences the chance of making mistakes in the consolidation: 'Within Company F Europe, there is one uniform set of definitions to divide products in product categories. However, some local sales organizations face a challenge to follow the generic European definitions and might require slightly different definitions. Therefore, a couple of products belong to a different category in comparison with Company F Europe. When the actual results are (top down) allocated, mistakes are made and the results cannot be compared to the Europe results'.

The first relation, between the need for using rolling forecasting and the complexity of the organization, is falling beyond the scope of this research, since it is not the objective to find the factors that influence the need for rolling forecasting. The second and the third relation, between the complexity of the organization and the implementation and deployment of rolling forecasting, are more important. The results make clear that a more complex organization has negative influence on both the implementation and the deployment of rolling forecasting, with lower forecast accuracy as possible result. However, it is not likely that the complexity of the organization will be "managed" by the company - for example: serve less countries – to increase the change to successfully implement and use rolling forecasting. Therefore, the complexity of the organization is not a critical success factor, but a surrounding condition influencing the success of the rolling forecast.

4.3.1.5 Maturity growth phase

Both the interview and the survey results make clear that the maturity of the rolling forecast is very important for the success of rolling forecasting. The average survey score is 5.5, with nearly all scores ranging from a "5" to a "7".

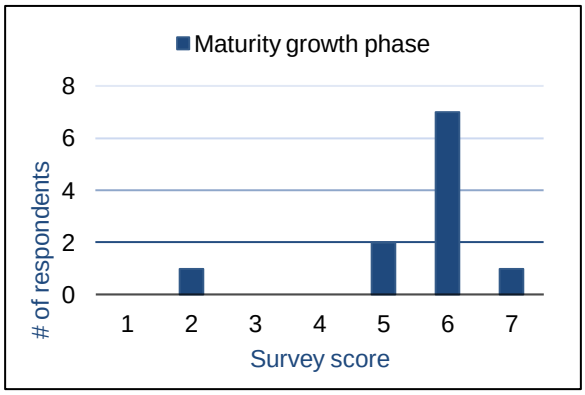

Figure 10: Survey scores maturity growth fase

One of the respondents of Company A explained why the maturity of a company is important: 'Producing a rolling forecast is a demanding process for an organization. If a company is in an early maturity phase, there is not enough knowledge available. Rolling forecasting is a complicated tool, which needs mature processes, systems and organization.' Thus, the maturity of the company influences several factors which are investigated in this research indirectly, like the tools, processes and capabilities of the employees. Furthermore, he stated that a low mature company will not have 'the right mindset' and will not 'be able to state the right priorities'. The right mindset and stating the right priorities is especially important in the design and implementation phase of rolling forecasting, where difficult choices have to be made regarding the design and the organization has to be convinced of the benefits of rolling forecasting.
The respondent of Company C named the maturity of its company as the main reason for not implementing rolling forecasting. He explained: 'In this case, maturity is not the amount of years an organization exists, but the way the systems function, the processes are organized, and the competences and capabilities of the employees and the management to make the process successful. At this moment, Company C does not have the best systems to organize the process, especially on SKU level. Company C is implementing a new S&OP system worldwide in 70 OpCo's, which will improve the quality of the systems used'.

The respondents of Company D and Company A confirmed these findings. The respondent which scored maturity a “2” was the respondent of Company E, which do not use rolling forecasting as it is defined in this research but as the more common update on the budget. The given score is therefore considered as an outlier

Based on both the survey and the interview results, it is clear that the maturity of a company is a factor which influences the success of the implementation and deployment of rolling forecasting. However, the maturity of the company can also be considered as a factor which cannot easily be managed by a company. A process of becoming mature will take a relative long period. Therefore, this factor is not a critical success factor, but an influencing surrounding condition.

4.3.1.6 Culture

The survey scores made clear that the culture of the organization has a major role in the success of rolling forecasting. All given scores are above neutral, with an average of 5.3. The interviews support these findings and enriched the survey results with an explanation.

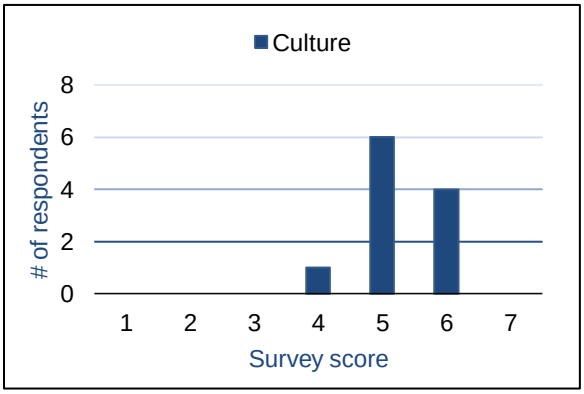

Figure 11: Survey scores culture

One of the respondents of Company F explained why the culture of a company determines the success of implementing rolling forecasting: ‘A new method comes together with a new way of working. Employees must be willing to change. In the beginning, all sorts of issues came up. The new system did not work correctly, or gave incorrect output. As long as employees are open to changes and improvements, these issues can be solved. Only then, the process can be implemented successful. But these issues need to be solved by all departments together. Only blaming other departments is not very helpful for the success’. This statement is confirmed by the respondent of Company D: ‘A sense of urgency and responsibility must be felt within the organization. Within Company D, a culture exists where the departments look together at the integrated forecasting process. That helps to solve problems and make the forecast successful’.

The cultural aspect also determines the success of the deployment phase of rolling forecasting. One of the respondents of Company A explained that information sharing is crucial for the success of rolling forecasting: ‘In a culture with a high degree of authority based on the function of an employee, it will be harder to produce a rolling forecast. A rolling forecast process needs to be transparent, where employees feel free to share information and thoughts’. This quote contains the essence of culture within an organization. If a culture exists where employees do not feel free to report a forecasting outcome that significantly deviates from the pre-set targets, sharing of information cannot be optimal. One of the respondents of Company B gave an example: ‘A culture of accountability can create gaming behavior in the rolling forecasting. Take for example a target on a certain forecasted item of + 20% and a forecast output of -10%. A culture of accountability will give the incentive to game the forecast and report an output much closer to +20%. The negative message will be postponed. It is crucial that management creates a culture in which these messages can be told. Such a culture makes an open discussion possible, which is better for the company’.

Based on the interviews, the conclusion is made that the culture of a company has significant influence on the success of both the implementation and the deployment of rolling forecasting. An open culture, where discussions are focused at solving problems instead of blaming each other, can improve the rolling forecast accuracy. Furthermore, the rolling forecasting use improves when discussions are aimed at solving existing problems, instead of discussing whether a forecast is correct or not. The respondent of Company B stated that management has to 'create a culture', which indicates that the top management can manage the culture of a company. Therefore, the culture of the company is a critical success factor.

4.3.1.7 Ownership structure

The survey scores and the interviews made clear that the influence of the ownership structure on the success of rolling forecasting is very limited. The average score in the survey was 4.1, with most of the scores ranging from "2" to "4". One of the respondents of Company A stated that the cooperation of Company A has no influence of the organization of rolling forecast. One of the respondents of Company F agreed: 'There is no serious influence of the ownership structure on the rolling forecasting of Company F'. It can be concluded that the ownership structure of the company has no influence on the deployment phase of rolling forecasting.

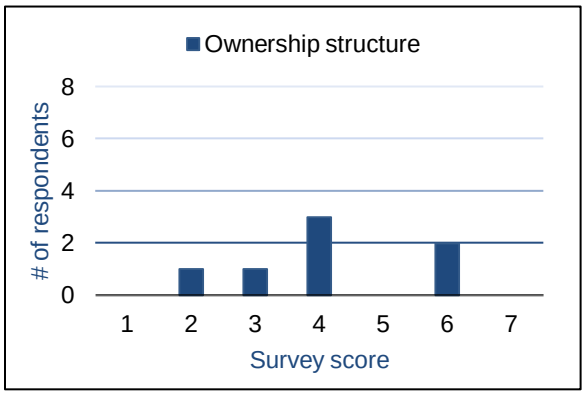

Figure 12: Survey scores ownership structure

However, one of the respondents of Company B explained that the ownership structure of the company was beneficial for the implementation of rolling forecasting: 'Having one shareholder made the environment of Company B more stable and created time for the management to implement the forecasting tool. With a public listed company, the management will feel much more focus on quarterly performance'. The focus on short term results is illustrated by one of the respondents of Company E. Although this company does not use rolling forecasting, the example of the influence of ownership is notable and comparable with companies that do use rolling forecasting: 'Recently, the corporate departments sent out an instruction, stating that the results of the current quarter have to be better than last year. Company E has had a cost saving program last year in which €500 million is saved. Shareholders want to notice improvements in the net results. In order to achieve this improvement, long term investments might be postponed to realize an improvement of the net profit'.

Based on this explanation, the conclusion can be drawn that the ownership structure of a company can influence the success of implementing a tool like rolling forecasting. If shareholders are mostly focused on the net results in the upcoming quarters, it is more difficult to implement a tool like rolling forecasting. However, the ownership structure cannot be "managed" by the company. Therefore, this factor is clearly no critical success factor, but an influencing surrounding condition.

4.3.1.8 Complexity primary processes

The survey results for the complexity of the primary processes indicate that this factor is important for the success of rolling forecasting. The average score for this factor was 4.6, with scores ranging from "3" to "7".

The interview results show that more decisions have to be made in a company with a highly complex primary process, and that these decisions are more complex. A respondent of Company B stated: 'Company B has a complex primary process, since both disassembly and assembly are part of the process. For example: Company B can sell a whole leg of ham, but can also disassemble the leg in smaller components. Each step in the disassembly process results in several side-products that have to be produced separately. The expected sale in ingredients influences the fresh meat production. The complexity of the primary processes makes the rolling forecasting process more complex. Furthermore, the input information becomes more complex.'
A respondent of Company A explained that within Company A, many intercompany streams are present. More intercompany streams make the organization more complex, and increase the workload in the rolling forecasting process, since all intercompany streams have to be forecasted and validated.

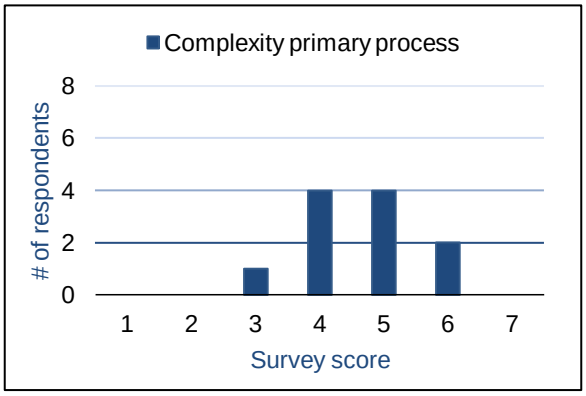

Figure 13: Survey scores complexity primary process

Thus, a more complex primary process of a company leads to a more complex rolling forecasting process, and thereby influences the success of the rolling forecast (the factor complexity of the rolling forecasting process is discussed in paragraph 4.5.10). However, it can be stated that the company has limited influence on the complexity of the primary process. Therefore, this factor cannot be named a critical success factor, but serves as a surrounding factor influencing the rolling forecast.

4.3.2 External surrounding factors

4.3.2.1 Type of industry

The average score in the survey results for the type of industry was a 4.8, indicating that most respondents value the importance of the type of industry for the success of rolling forecasting between neutral and important, which is supported by the fact that all scores range from "3" to "7".

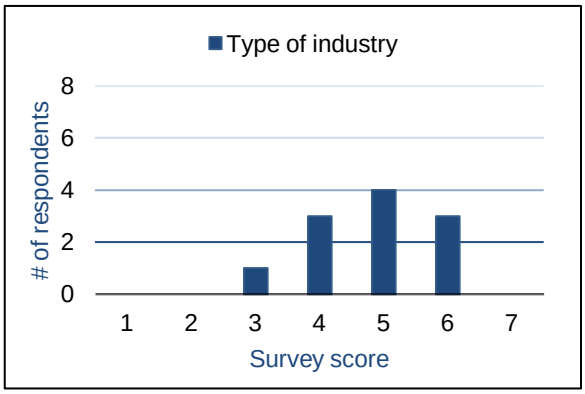

Figure 14: Survey scores type of industry

The interview results show that the type of industry influences the rolling forecast in two ways.
First, the type of industry seems to affect the decision to use rolling forecasting or not. The respondent of Company D briefly states why rolling forecasting is important for his company: 'In fast moving consumer goods, the availability and sustainability of the products is very important. Therefore, the need to have an accurate forecast increases'. This statement is confirmed by the respondent of Company C, which gave a clear example of the difference between the bakery industry and the beer industry. The given example indicates the need for a good working S&OP process, which is input for the rolling forecast: 'In a bakery, every day a range of products is produced but always based on the same ingredients or raw materials (but with different receipts). Also the process is

not very complex. All products need to be prepared a day before based on the same ingredients and the next day basically almost every product is sold. Historical information is often enough to predict the demand.
Company Cs market circumstances are more variable, and thus more complex. The high variable market is influenced by many external factors. One of the factors is the weather. The consumption increases in warm summers. Another factor is the planning of sport events. The successful World Championship of The Netherlands last year had big influence on the beer consumption. A third factor is the planning of holidays and events like queen's day. Furthermore, there is an internal factor influencing demand, and that is the influence of promotional activities. Promotions at supermarkets highly influence the demand, and thus supply. Forecasting is therefore more difficult for Company C and a sophisticated rolling forecasting system more necessary than in case of the Bakery business'.

A second outcome of the interviews was the relation between the type of industry on the design of the forecast. One of the respondents gave a low score for the influence of type of industry, and explained: 'The given score is based on the fact that using rolling forecasting is possible for all types of industry. However, the design of the rolling forecast will differ. Companies in different industries will use different frequencies and windows'. This point of view is supported by one of the respondents of Company A, which stated that the window of a forecast should be partly based on the characteristics of the type of industry.

When analyzing these results, it can be concluded that the type of industry has important influence on the rolling forecast. First, the type of industry determines the need for a good working S&OP process and rolling forecast. In a more complex industry, better forecasting tools are needed. Furthermore, the type of industry influences the design choices made (the design of the forecast is discussed in paragraph 4.3). However, the management cannot influence or change the type of industry of the company, to obtain better forecasting results. Therefore, this factor is labeled a surrounding influencing factor.

4.3.2.2 Market characteristics

The survey results indicate that the degree of competition and saturation of a market can have serious influence on the success of rolling forecasting. This factor relates to the number of competitors in a market and the degree of competition.
With a majority of scores ranging from a "5" to a "7" and an average score of 5.4, the market characteristics are considered important. The interviews shed light on the question how the rolling forecast is influenced by market characteristics.
First, the characteristics of the market determine the need for rolling forecasting. The respondent of Company C explained why the beer market was a factor in considering rolling forecasting. 'Company C has two sales channels or market segments, called on- premise and off- premise, with different customers (…). On premise is the sales to restaurants, bars, discos etc., and while off- premise are the sales to retailers like supermarkets. The on- premise volumes are quite easy to predict, partly because of the long-term contracts with volume agreements and partly because most restaurant and bars work with only one supplier of drinks. Sales and volumes at super markets are much more difficult to predict because of promotional actions - which can be changed on daily basis -, actions of competitors and the complexity of the products. Sales to supermarkets considers much more SKU"s, much more products, etc.
Furthermore, the season, holidays and the planning of sport events largely influence the volume. A rolling forecasting system might help Company C in predicting future sales and volumes.'.

The respondent of Company D named the market characteristics as complicating factor for the success of rolling forecasting. In the market of Company D, most of the products are sold in combination with promotions. Incorporating the promotions in forecasting makes the process more complex: 'The high degree of promotions makes the rolling forecasting process much more complex. All information regarding the promotions needs to be taken into account in the process, the systems, etc. For example: which SKU's are in promotions? How much discount is given? What increase in volume is due to the promo, and what is a normal volume?

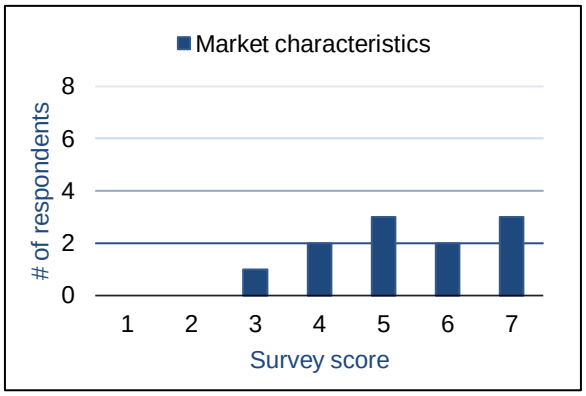

Figure 15: Survey scores market characteristics

Based on these statements, the conclusion can be made that more complex market characteristics make rolling forecasting more useful, but in the same time make the deployment of rolling forecasting more difficult. A more difficult deployment might increase the chance of making mistakes in the process, which leads to a decrease in accuracy. However, the same reasoning is applicable as the reasoning for the type of industry: the company cannot influence the characteristics of the market. Therefore, this factor cannot be labeled as a critical success factor, but is a surrounding factor influencing the rolling forecast.

4.3.2.3 Market specific circumstances

The market specific circumstances and the macro-economical circumstances seem to be comparable. The survey results are comparable and the same reasoning is expressed to explain the scores in the interviews.

The best example of the impact on changing market circumstances is given by a respondent, when asked how forecasting accuracy must be interpreted: 'In September, a vision on the market was created in which the market prices were expected to decrease slightly. Now, in the end of December, we know that the market increased with more than 30%. A rapid changing environment had important impact on the forecast. That is why enough business knowledge is needed to review the forecast at first, and understand the market changes when discussing a forecasting error'. With discussing the low accuracy in the review meeting, Company B copes with uncontrollable events which influence the forecast accuracy.

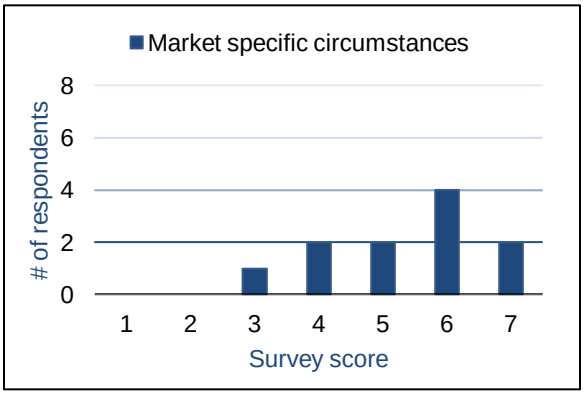

Figure 16: Survey scores market specific circumstances

Company B also copes with market circumstances in advance of the rolling forecasting process: 'Furthermore, changes in the market influence the frequency and the window of the forecast. For the department fresh meat, for example, it is not possible to make a good planning for a period of 5 years. The market circumstances are far from certain. Therefore, a planning is made for 4 to 5 quarters'.

The interview with a respondent of Company D made another aspect of the changing market circumstances visible. 'Within Company D, the market is changing, but not too much. Therefore,

Company D uses statistical models to determine the volume of the rolling forecast. Statistical models need enough historical data to produce a forecast. If the market circumstances are rapidly changing, the historical data is outdated early. That means that statistical models are not the best way to produce forecasts. In the car industry a decrease in sales with over 30% is normal in years of recession. A forecast based on statistical models is much less applicable'.

Based on these statements, the conclusion can be made that the market specific circumstances play an important role in the accuracy of the forecast. When possible, a company should cope with changes by making good assumptions and sending clear instructions. Nevertheless, companies should accept that forecasting accuracy is not only a measure of the quality of rolling forecasting, but also influenced by uncontrollable developments in the market. Therefore, the market specific circumstances cannot be labeled as critical success factors, but only as surrounding factors influencing the success of rolling forecasting.

4.3.2.4 Macro-economical circumstances

The survey results indicate that changing macro-economical circumstances have impact on the rolling forecast, with most scores above neutral and an average score of 4.9.

The interviews confirm this finding. One of the respondents of Company B explained the influence of changing macro-circumstances and market circumstances on the rolling forecast: 'Developments in the market or macro-economy have serious influence on the rolling forecast. The developments with the Greek economy influence the possible sales volume. Furthermore, changes in the price level for the meat stack influence the accuracy of the forecast. Company B tries to cope with these changing by sending clear instructions with assumptions, which are sent top-down. Assumptions are made on, for example, the growth in the economy, the commodity prices and the expected salary costs'.

This point of view is confirmed by a respondent of Company E: 'If you do not respond well to changing circumstances, the rolling forecasting output will be of lower quality because the accuracy decreases. The organization of rolling forecasting needs to be adjusted to the environment to be able to cope with the changes'.

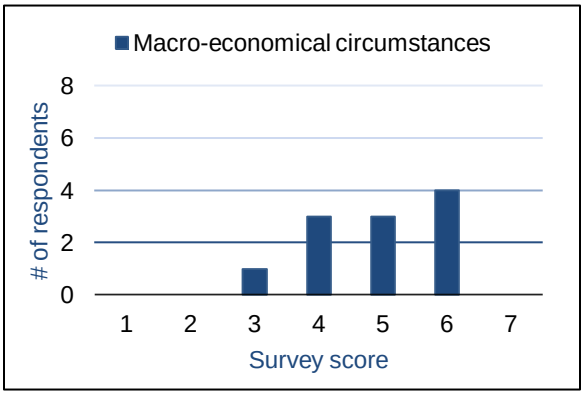

Figure 17: Survey scores macro-economical circumstances

However, it seems not always possible to "cope with changes", as is stated before. A respondent of Company B stated, when asked at the accuracy of the rolling forecast, that the accuracy is highly influenced by external factors: 'If China closes its borders tomorrow or an animal disease outbreak occurs, the rolling forecast output will have a low accuracy'.

At last, a manager of Company F noticed significant changes in the rolling forecast accuracy of the Spain subsidiary, after changes in the macro-economy: 'In Spain, the Company F subsidiary always had poor forecast accuracy. Now, with the crisis and the huge unemployment rates in Spain, the need for an accurate rolling forecast increased. The managers in Spain had to focus on growth opportunities to safeguard their performance. Currently, the forecast accuracy has improved'. This statement indicates that due to macro-economical conditions, the importance of the rolling forecast and the focus on an

accurate outcome increases. However, this statement is not supported by any other evidence in this research. Therefore, one indication is considered not enough to build a conclusion.

The conclusion for macro-economical circumstances is identical as the conclusion for market specific circumstances. As far as possible, companies should cope with changes by adjusting the frequency and the window of the rolling forecast, by sending clear instructions and adapting its assumptions. These actions will increase the accuracy of the forecast. Furthermore, the methods of forecasting can be adjusted to the macro-economical. However, companies have to accept that changing macro-economical circumstances seem to have significant influence on the accuracy of the forecast, without full control of the company. Therefore, this factor is not a critical success factor, but a surrounding factor influencing successful rolling forecasting.

4.3.2.5 Laws & regulations

The results of the survey on the changes in laws and regulations indicate that the influence on the success of rolling forecasting is minimal. The average score is 2.7 (the lowest average score in this research), and all scores range between the “1” and the “4”.

The conducted interviews confirm this finding. The forecast of Company D, for example, contains no link with any changes in laws or regulations. A respondent of Company F explained: There is no reason to change the rolling forecast on basis of changed laws. These do not influence the rolling forecasting process’.

One of the respondents of Company E explained why the laws and regulations are not important. Although the practice of forecasting within Company E is not corresponding with the definition of rolling forecasting, the survey score is in accordance with the scores of other respondents. Furthermore, as both processes are forecasting processes, there is no difference in the impact of laws and regulations. Therefore, the explanation holds for rolling forecasting. A respondent explained: ‘Changes in laws and regulations have limited impact on the rolling forecasting process and its outcome. These changes are more important for companies like Schiphol, Nuon or KPN. At these companies, changes in laws and regulations might be u sed to determine the input factors. Within Company E, the influence is relatively limited.’

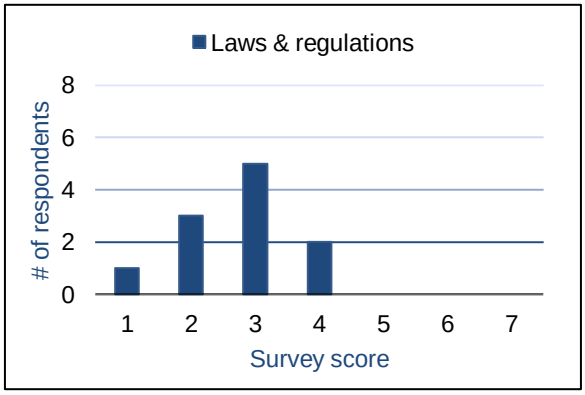

Figure 18: Survey scores laws & regulations

Based on the survey output and the interview results, the conclusion can be made that there is no real influence of changing laws and regulations on rolling forecasting in the consumer packaged goods business. The factor is therefore no critical success factor.

4.3.2.6 Influence of external stakeholders

The results of the survey revealed a mixed outcome. The results had several scores indicating low importance and several scores for high importance of external stakeholders in the rolling forecasting process. Furthermore, the average score was a 3.2.

In the interviews, some of the respondents explained the given score. The respondents of Company D and one of the respondents of Company B could not think of any external stakeholder influencing the rolling forecast. Another respondent of Company B explained why customers have limited influence on the rolling forecast: 'Rolling forecasting is only influenced by internal stakeholders. The customers of Company B have no influence on the success of the forecast. The accuracy of the forecast is determined by the ability to estimate the volume of the customer, but the customer has no role in the process'.

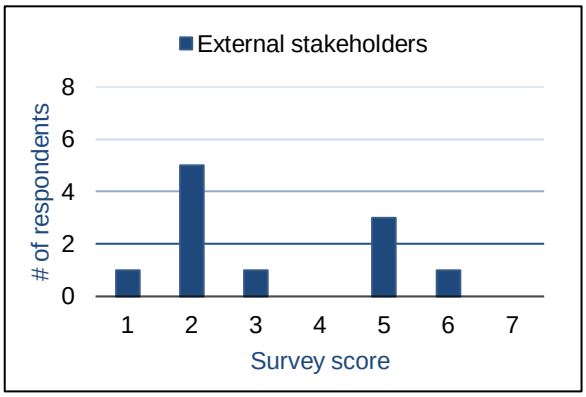

Figure 19: Survey scores external stakeholders

However, two of the respondents of Company F state that customers do influence the rolling forecast: 'Within Company F, the most important external stakeholder is the customer. Company F will do its utmost to meet the customers' wishes, since it cannot happen that products are out of stock. Company F is trying to nurture its customers by discussing planned promotions in an early stage. Also competitors can influence the rolling forecast. Promotional campaigns of competitors have direct influence on the effectiveness of Company F's activities'.

Based on these statements, it is not possible to draw a clear conclusion. There is no clear pattern visible to explain the different statements, neither does the survey provide substantial evidence to base a conclusion on. Therefore, it must be concluded that there is not enough evidence to name this factor a critical success factor.

4.3.3 Design

4.3.3.1 Frequency

The results of the factor frequency are comparable with the results found with the factor window. The survey scores indicate relative high importance of the right choice of frequency, with an average of 4.9. However, one low score is apparent. The interviews shed light on both the high scores and the only low score.

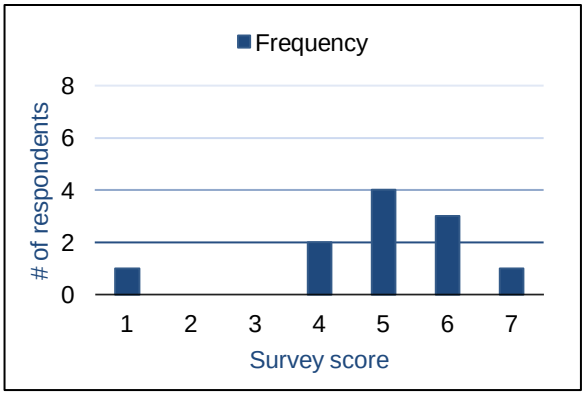

Figure 20: Survey scores frequency

The interview with a respondent of Company outlines clearly why a right choice of frequency is important. 'It is important that the frequency is based on the characteristics of the categories. Within Company F, the forecast is produced monthly. Producing the rolling forecast quarterly is not desirable. For example: Company F produces ice creams and barbeque sauces. A quarterly forecasting cycle will not give enough information to base decisions on. The market can change too much in between two forecasts. Therefore, a quarterly frequency can only fit in a more stable industry. A weekly frequency, on the other hand, is not feasible either, since the process of forecasting requires too much time.' This point of view is

confirmed by the respondent of Company B, who stated that a quarterly process is just right for his company. The right frequency of a rolling forecast should be a consideration between the added value and the added amount of work.

The respondent, who scored window a “1” on the importance of the frequency, had the same reason for the low score as for her score with the factor frequency. She explained the given score: ‘In my function as supply chain employee, the information regarding volume must be up-to-date at any time. There is no set rhythm for updating information, as it is in other departments. For example: the promotional plans are uploaded once in two weeks. In these functions, the frequency is more important. Furthermore, the right frequency is needed to enable the rolling-up of the rolling forecast’.

Thus, for a supply chain employee, the right choice of frequency is not important. However, when producing a rolling forecast for the company, which incorporates more information from other departments than only the expected volume, the right choice for frequency seems to be critical for the success. If the rhythm of forecasting is too low (for example: quarterly instead of monthly), new information is not incorporated soon enough, what means that the output of the forecast will be outdated earlier and the accuracy of the forecast will be lowered. If the updating frequency is too high (for example: monthly instead of quarterly), the forecast will not be efficient. Too much time is spent producing a forecast without enough added value. Therefore, the frequency of a forecast can be named a critical success factor.

4.3.3.2 Window

The survey results indicate that the right choice of the forecasting window is important for the success of rolling forecasting, with an average score of 4.9.

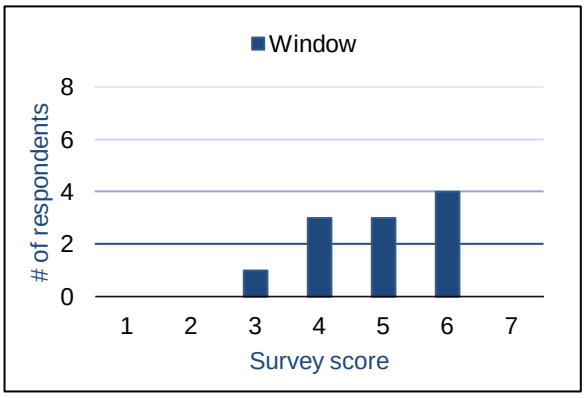

Figure 21: Survey scores window

The interview results show that for most respondents, the window of the forecast is an important design choice. One of the respondents of Company A explained that within Company A, most of the factors are not predictable for a period longer than four to five months. However, this does not apply for all factors: ‘A longer window should only be applied for factors that can be forecasted with relative good accuracy. Volume, for example, can be forecasted relative accurate within Company A over a longer period. Another example is the Capital Expenditure (CapEx), which has a more long term objective. A forecast for one year would even be too short, since decisions cannot be influenced within a year. Costs and prices however, are not predictable over a longer period, what means that forecasting on EBIT over a year is not possible. A balance need to be found between the long and the short term forecast. It might be possible to produce two separate rolling forecasts. For example a rolling forecast for CapEx for three years, and a rolling forecast for volume for one year’. The last part of the quote is exactly how Company F applies its rolling forecasts.

One of the respondents of Company F gave window a “3” in the survey. For her function, the window of the rolling forecast is not important. However, for the overall success of rolling forecast, the window must fit with the goal of the forecast: ‘The window must fit with the goal of the forecast. For example: a

production planning must have a frequency between 3 and 6 months. The capacity planning on the other side needs a much longer window to be effective'.

A last interesting point of view is expressed by one of the respondents of Company B, where the rolling forecast is merged with the budget. 'In order to be able to produce a budget in October together with the rolling forecast, the window must be at least five quarters. Therefore, Company B has chosen to apply a window of four quarters in the normal updates and a window of five quarters in the October update'.

As the interviews outline, the right choice for window must fit with the purpose of the rolling forecast. Applying a rolling forecast with a window of two years to plan the production for the next three months is not very efficient. Furthermore, applying a short window for a rolling forecast in which tactical decisions should be made (for example: opening or closing a factory), is not optimal either. In the last case, not all information possible is incorporated in the forecast, which will lower the accuracy. Therefore, the window of the rolling forecast is a critical success factor.

4.3.3.3 Dimensions

The survey results on the number of dimensions in the forecast are mixed, with a small majority of scores indicating that the right choice for the number of dimensions is very important for the success of rolling forecasting, and several respondents scoring neutral. The average score is a 5.3.

The interviews however, give another picture. The respondents asked to explain their scores are all stating the same reasoning: adding more dimensions is not good for the success of rolling forecasting, and the choice for dimensions should be deliberate choice, influencing the success of rolling forecasting.

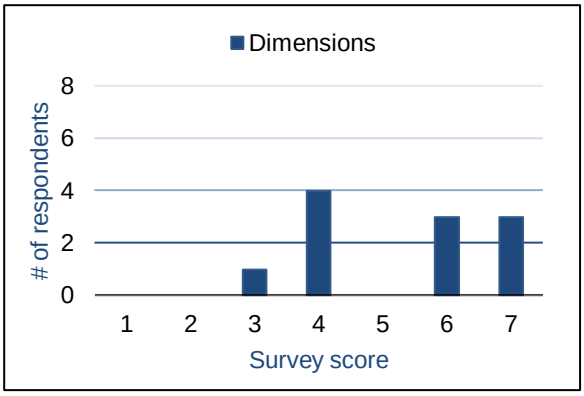

Figure 22: Survey scores dimensions

A manager of Company B explains: 'It is important to forecast on the right level, in order to make the right choice of the complexity of the process. Company B produces over 6000 SKU's, but made the choice not to forecast all of them. If Company B would, the rolling forecast could not be produced in four weeks. Therefore, Company B forecasts only the product groups'. These statements are confirmed with respondents of Company F and Company B.

One of the respondents of Company A stated that he is not happy with the choices made in the dimensions: 'Producing a rolling forecast for all countries in detail has no added value. The choice could be made to produce a forecast for only the 20 most important countries, and fill the rest with assumptions. To prepare a forecast for all countries results in much more work with the idea to be in control. The right choice for dimensions needs to be made in the preliminary stage of rolling forecasting'.

A last interesting point of view on the factor Dimensions is derived from an interview with a respondent from Company F: 'A complicating factor within Company F is the fact that different categories made different choices. The category Home Products choose to forecast on brand level, while other categories made other choices. This increases the complexity of the process'.

To conclude, it can be stated that the dimensions of a rolling forecast is a critical factor for the success of rolling forecasting. All statements indicate that too much detail in the rolling forecast results in a more complex process, with a longer throughput time. Therefore, it can be concluded that companies should always try to limit the level of detail within their dimensions. A carefull consideration should take place where the added value of more detail is critically compared with the increased complexity of the process. Above all, the recommendation to keep it simple seems applicable for the design of the rolling forecast.

4.3.3.4 Organizational level

The survey outcome is giving a clear picture on the importance of the organizational level of the forecast. With scores ranging from a “5” to a “7” and an average of 5.7, all respondents value the organizational level of the forecast as very important.

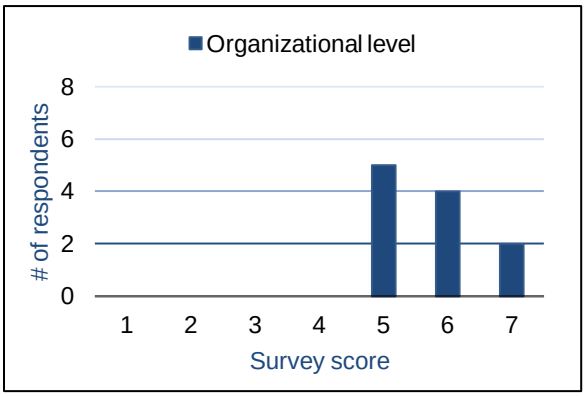

Figure 23: Survey scores organizational level

The respondents asked to explain the given score in the interview, stated that rolling forecasting is a complete bottom-up process, in which the input is given by the operational departments. A respondent explains: ‘It is important to make the business responsible for the forecast, instead of the corporate departments. Within Company B, each business unit is responsible for their own process and their own information. That choice is made because the business (…) has the right information and knowledge to produce the forecast. The responsibility of the process is important, since it gives a sense of ownership to the business. The employees see that the rolling forecasting process is their own process, and thus not only a ‘finance’ process’. One of the respondents of Company F agreed and stated that the forecast should be produced by the business, in order to make sure that business assumptions, risks and opportunities are included in the forecast’.

Based on the survey results and the interviews, the conclusion can be made that the rolling forecast should be made with the business, to incorporate correct and complete information. Therefore, the choice for organizational level is a critical success factor.

4.3.3.5 Alignment with the budget

The survey results do not give a clear picture on the importance of alignment between the budget and the rolling forecast. The scores are ranging from “1” to “6”, with a majority scoring neutral.
Insight in the importance of this factor is given by comparing the mean scores in companies for which the rolling forecast has a connection with the budget, and those without connection. In companies with a connection, the rolling forecast is used to derive the budget (Company B) or has as main goal to provide an update on the budget (Company E Decorative Paintings). The companies where the budget and the rolling forecast are not related have separated processes for the budget and the rolling forecast.

The mean scores for companies with a connection between budgeting and rolling forecasting was 5.0, compared to 3.7 for companies where the budget and the rolling forecast are separated. Two respondents explained their point of view on the importance of budget alignment.

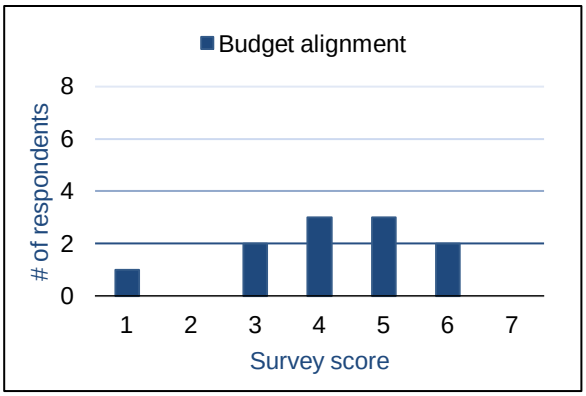

Figure 24: Survey scores budget alignment

One of the respondents of Company A explained that the company discussed to connect the budget with the rolling forecast, but choose to separate both tools: 'Complete decoupling between the budget and the rolling forecast is needed to make sure the rolling forecast is successful. Company A was planning to use the output of rolling forecast 3 as input for the budgeting cycle. However, since the targets are based on the budget, gaming might occur in the rolling forecasting process'. This point of view is confirmed by a respondent of Company D and a respondent of Company F.

One of the respondents of Company B stated that the reasons for connecting the budget to the rolling forecast: 'The rolling forecast of Company B is implemented because of growing dissatisfaction regarding the budget. However, Company B cannot stop with the budgeting process, since Company B NL has to produce a budget for the whole company. It is more efficient to achieve both goals with the same process. Furthermore, one process makes the implementation easier'.

The statements and the survey outcome indicate that the importance of budget alignment depends on the question whether the rolling forecast and the budget are related. Some companies choose to deliberately separate the rolling forecast and the budget to ensure unbiased forecast input. Respondents of these companies generally valued the importance of alignment as very low (3.7). Other companies choose to connect the rolling forecast with the budget, in order to be more efficient, which resulted in a higher average score (5.0). It makes sense that the importance of budget alignment increases when a company decides to connect both methods. The company has to make sure the KPI's are connected, the level of detail is the same and the timing of both methods fits in the yearly planning cycle.

It falls beyond the scope of this research to conclude which design is better. However, when a company decides to align the budget with the rolling forecast, this factor is found to be a critical success factor.

4.3.3.6 Resources available

The survey scores give clear indication for the importance of the amount of resources available. With all scores ranging from "4" to "7" and an average score of 5.5, the resources available are certainly a factor influencing the success of rolling forecasting.

One of the respondents of Company A explained the importance: 'The amount of resources available is one of the key items in making the rolling forecast successful. To make it successful, investments are needed in numbers of employees and good systems that facilitate the process. Implementing rolling forecasting including the necessary systems will need considerable investment and support. If the implementation of their rolling forecasting fails at Company A, the amount of resources available will most likely be the component where it went wrong'.
This point of view – enough resources are needed for good working tools and enough employees - is shared by other respondents.

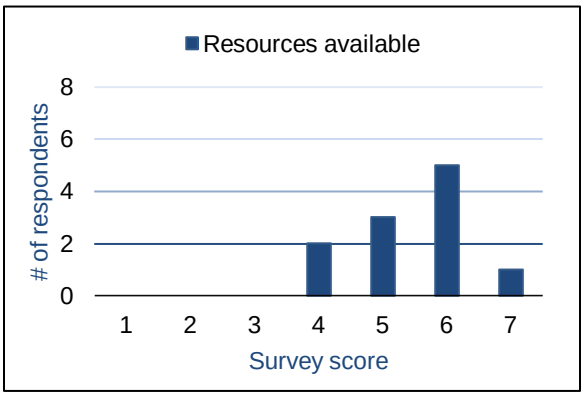

Figure 25: Survey scores resources available

The manager Supply Chain of Company F stated regarded the resources available: 'It is very important that enough resources are made available for the rolling forecasting process and the tools. Assigned resources are necessary to support the process and the tools to keep the process simple. The alignment of tools and the process dictates the reliability of the outcome'.

A respondent of Company D explained that committing not enough resources to rolling forecasting will lead to a negative cycle of events: 'If a company is not committing enough resources to rolling forecasting, the output cannot be good, which means that the forecasts will have a low accuracy. The perceived added value of the forecast will therefore be low, what will result in a discussion on the effect of the resources. This leads to an ongoing process in which fewer resources are made available, and the success of the forecast diminishes.

At last, the manager Purchasing & Planning of Company D explained that the amount of resources needed depends on the complexity of the company: 'If a company is complex in its portfolio, like the number of SKU's produced, more resources are needed, because it makes the process more complex. The rolling forecasting process has to stay manageable'.

Based on the survey outcome and the interview results, the conclusion is that the amount of resources available is a critical success factor for rolling forecasting. If an insufficient amount of resources are made available, this can be seen in the number of employees available for the process and investments made in tools and systems. With more employees and better tools and systems, better forecasting accuracy is possible.

4.3.3.7 KPI's/line items

The survey results indicate that the choice for KPI's and line items in the forecast of the rolling forecast has important influence on the success of rolling forecasting. The average score is 5.4 and all scores are above neutral.

The interviews confirm this finding. The senior finance director of Company B, responsible for designing the rolling forecast explained how the KPI's of the forecast were determined: 'The first step in the design phase of Company B was to understand the business model principles. It took Company B one year to understand and discuss these principles and to make the design of the process. The strategic objectives of the whole company were translated into KPI's that could be forecasted'.

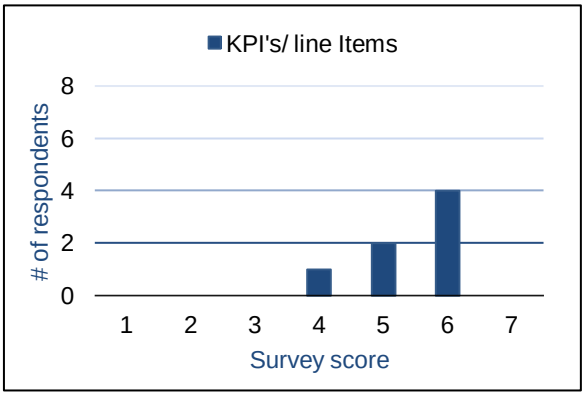

Figure 26: Survey scores KPI's/line items

A respondent of Company F explained why the right choice for KPI's is important for the success of rolling forecasting: 'The line items of the rolling forecast is one of the factors which are discussed over

and over again. The choice for line items reflects the goal of the forecast. The question needs to be asked: “What do we expect of the rolling forecast outcome?” One of the difficulties is that every country within Company F has different whishes regarding the line items. The problem is that when adding one more KPI, the amount of data needed to produce the forecast will increase exponential. It is simply not possible and not desirable to grant all whishes. Therefore, the choice for KPI’s is very important!’.

The interviews made clear that different companies choose for different KPI’s/line items, depending on the goal of the rolling forecast. Furthermore, the choice for the right KPI’s is a very difficult and important step in the design process. When KPI’s are selected which do not match the goals of the forecast, the output cannot be optimally used. Furthermore, selecting too many KPI’s results in an exponentially increasing complexity of the process, which has negative influence on the throughput time and the accuracy of the forecast. Therefore, it can be stated that the KPI’s/line items is a critical success factor for rolling forecasting.

4.3.3.8 Timing

The survey scores on the factor timing are ranging from a “3” to a “7” with an average of 5.0, indicating that timing is an important factor determining the success of rolling forecasting.

However, more interesting results are obtained when dividing the scores in a group with applying a monthly frequency (Company F) , and a group with a less frequent cycle of updating (Company B, Company E). The results show that respondents with a monthly process value the importance of the right timing much lower (average survey score: 4.0) than the respondents with a quarterly or bi-annual process (average survey score: 5.8). The interviews are useful for interpreting these results.

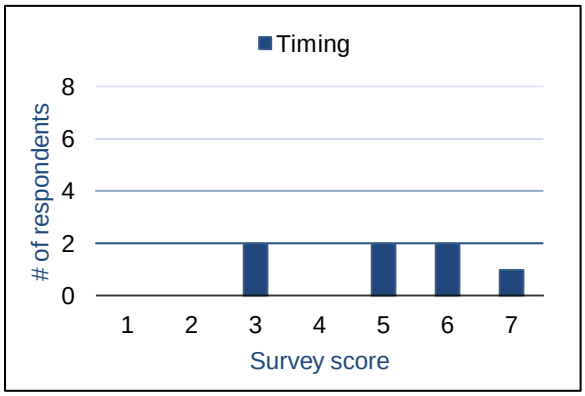

Figure 27: Survey scores timing

When a forecast is produced monthly, rolling forecasting is nearly a continuous process. If a company chooses to have more time in between two forecasts, there is more freedom to plan the forecast at a moment which is more convenient in comparison with other moments.

A respondent of Company E gave some relevant examples of good timing. Although the forecast of Company E is not a rolling forecast, issues of timing are not so much related to the window of the forecast, but to the frequency of updating, as concluded above. ‘For the timing of a forecast, some factors have to be taken into account. Two important denominators are the resources available and the type of business. First, the timing needs to be aligned with the resources available within especially the finance department. Producing a rolling forecast in the holiday period, during the month-end period or during the year-end closing period would be examples of a wrong or difficult timing. Second, the type of business can be considered in the timing. For Decorative Paints, the high peak in sales volume in the summer period requires an intermediate (high level) rolling forecast in that period to be able to take corrective actions with still a substantial part of the high season to come. The need of a forecast resulted in the decision to produce a standalone forecast for the Business Unit’.

The interview with a respondent of Company B indicates that several factors can influence the right timing for a company with a quarterly process: 'The process within Company B starts at the end of each quarter. With this timing, the forecast is ready in the beginning of the new quarter, but with enough time to incorporate the actuals results. This is important for Company B, since the actual results are an important factor to base the new forecasts on. The actuals give direction for the forecast, and give the latest actual results of the company.
Another factor determining the right timing is the workload for the finance department. Since finance has an important role, the yearly calendar of this department can influence the timing of the forecast'

Based on the interviews and the survey results, the conclusion is made that the influence of timing on the success of rolling forecasting, is determined by the updating frequency of the company. For a company with a monthly updating frequency, the right timing is not important. Rolling forecasting is in most cases a continuous process with limited freedom to deliberately choose a moment in time to prepare the forecast. Companies with a quarterly or bi-annual frequency do have this freedom. Furthermore, since there is more time in between two forecasts, it is more important to make the right choice. An ice-cream producing company with a quarterly updating forecast will need a rolling forecast during the summer, the peak-moment of the industry. The forecasting use decreases when the rolling forecast is completed just after the summer. Therefore, timing is a critical success factors for all companies with a quarterly and bi-annual frequency. For companies with a monthly frequency, timing is not a critical success factor.

4.3.4 Input

4.3.4.1 Information input

The survey scores give a clear picture on the importance of the quality and completeness of information input. With all scores above "neutral" and with a majority scoring a "6" or a "7", the respondents value the information input as very important. The average score is a 5.6.

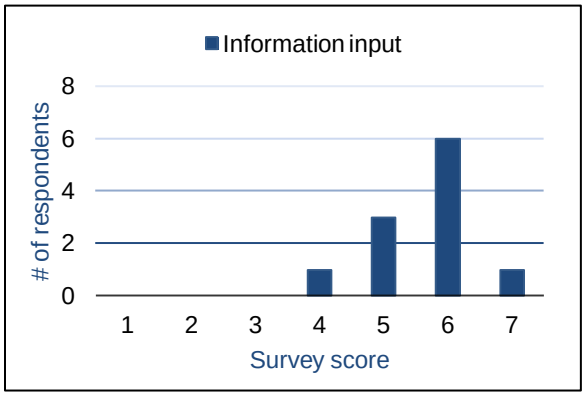

Figure 28: Survey scores information input

Two examples in the interviews explain why the information has to be complete. First, one of the respondents of Company F: 'It is important that all departments with information share that in the process. For example: The products deodorant and toothpaste are sold much in combination with promotions. A promotion can influence the sales volume with more than 50%. Therefore, information regarding the planned promotions and expected volumes is critical for a good forecast. If the marketing department is not involved in the process, or information is not complete, the forecast will not be correct.
Another respondent confirms this finding, and adds: 'The success of a rolling forecast, or any planning tool, starts with getting the volume correct. The volume is especially important for the brand and product group dimensions. However, if there is any information missing in the complete picture of the rolling forecast, the bottom-line result is not correct. For the important product groups and brand, the information needs to be complete. For the least important product groups and brands, information of less detail can be used. These findings are validated by respondents of Company C and Company D.

Based on the survey scores and the interviews, the conclusion is made that the information input is critical for the success of rolling forecasting. The interviews confirm that the information used to produce a forecast, must be complete and correct. Incomplete or incorrect information leads to less accurate forecasts.

4.3.4.2 Assumptions

The survey scores on the factor assumptions make clear that the assumptions are important for the success of rolling forecasting. The average score was 5.7, with most scores ranging from “5” to “7”. The interviews confirm this finding, and give understanding.

First, the respondent of Company C explains how important the assumptions are in making a correct forecast: ‘The quality of the input information is crucial in rolling forecasting. If for instance assumptions made on promotions, discounts and its effects on volumes, prices and revenues are not made correctly (…), the rolling forecast accuracy will be low’.

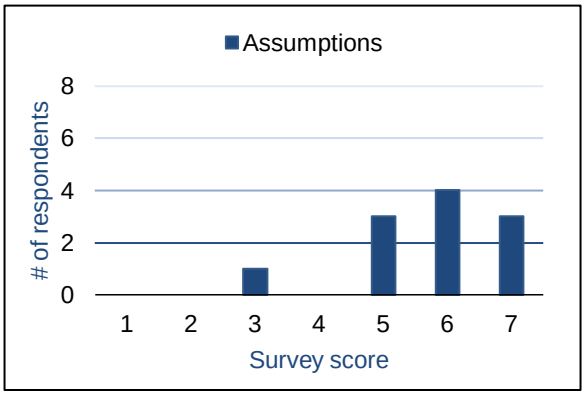

Figure 29: Survey scores assumptions

One of the respondents of Company A explained what happens if the assumption of the milk prices is incorrect: ‘The milk price is an important assumption for Company A. Incorrect assumptions lead to incorrect cost prices. The question how a higher cost price can be passed on towards customers will not be answered correct. Furthermore, the price level determines for Company A what kinds of products are produced. A different price level means that it can be attractive to produce different products.
At the end, if the assumptions are not correct, the forecasting accuracy is lower. Furthermore, if management knows that the assumptions are not right, the rolling forecast will not be used, because it makes no sense to make decisions on data which is not correct’. These statements are confirmed by respondents of Company B and Company A.

One of the respondents however, valued the importance of assumptions a “3”, stating that assumptions are not important. The respondent explained that assumptions are not used in her function as supply chain employee. She explained that the importance of assumptions increases when a company wants to make a forecast “financial”.
At last, one of the interviews at Company F gave insight in what consequences wrong assumptions could have the company: ‘Last summer, a promotion action with an ice cream-brand was organized with one of Company F’s customers. To make this happen, the assumption had to be made that the volume of these Ice creams would be at 160%. Due to poor communication, the assumption was not communicated with the production department. The ice creams turned out of stock, and Company F had to order new ice creams from Company F Turkey, which was costly.
Company F has changed its process for assumptions. Nowadays, the assumptions are of less detail, with only the essential information, which ensures understanding of the factory. Second, the employee who puts the assumption in the system always makes a call to validate whether production understands it’.

The results make clear that the assumptions are an essential part of the input information for rolling forecasting. Assumptions are an important denominator for the final outcome of the rolling forecast, where

a small mistake can have significant negative results. Therefore, the factor assumptions can be labeled a critical success factor.

4.3.4.3 Master data

The survey scores for the master data are very clear. With an average score of 5.8 and all scores above the “5”, all respondents valued this factor as very important for the success of rolling forecasting.

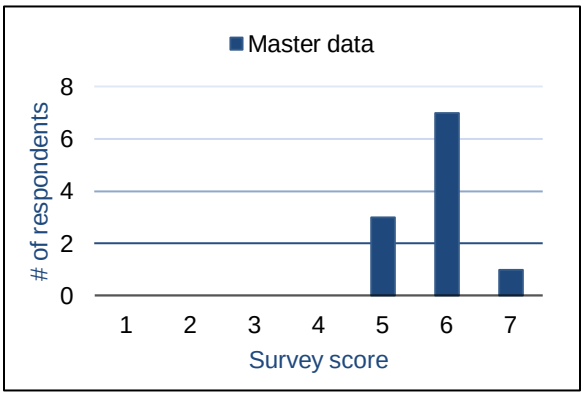

Figure 30: Survey scores master data

The respondent of Company D explained how the master data influences the success of the forecast: ‘Without good quality information in the source system, the forecast cannot be accurate. That is because the statistical methods need historical information that is of very good quality. Wrong source information leads to a low accuracy.
The forecast information of Company D is on SKU and customer level. The difficulty in the source information is the promo-driven sales of Company D. On a monthly basis, the actual sales are imported in the source system. All new data is controlled manually. Without manual control on the new data, errors will not be filtered out what means that the forecasts for the next three years will be based on incorrect data’.

The respondent of Company C has similar statements, and explains what information needs to be right: ‘If the master data is incorrect, the outcome of the rolling forecast can never be correct. The most important issue in the master data of Company C is the right coupling of SKU’s. Every month, new SKU‟s have to be put in the system, and every month SKU’s have to be deleted from the system. For this process, good cooperation between innovation and marketing and sales is needed’.

Based on these statements and the survey results, the conclusion can be made that the master data is a critical success factor for rolling forecasting. Incorrect or incomplete master data will directly lead to lower forecast accuracy.

4.3.4.4 Budget

The survey results do not make clear how important the budget is as input factor for rolling forecast. The average scores is nearly neutral (3.8) and the individual scores range from a “1” to a “6”. However, this factor seems to be related with the factor ‘Alignment with the budget’. Therefore, the survey results are divided again into a group of companies which have separated the rolling forecast from the budget, and a group of companies which have connected the budget and the rolling forecasting process.

The mean scores indicate that respondents of companies which have aligned the budget and the rolling forecast, value the importance of the budget as input factor (score: 4.5) little higher than respondents of companies who have not aligned budgeting and rolling forecasting (score: 3.4). These results are less clear than for the factor budget alignment, and provide less direction towards a conclusion.

Furthermore, the interviews contain no valuable information of respondents who valued the budget as input factor as important. However, with use of previous statements, it is possible to analyse the importance of this factor. Statements in paragraph 4.3.5 outlined that Company B made derives the budget from the roling forecast ouptput. The forecasting process of October directly leads to the budget. Therefore, the quality of the rolling forecast is the same as the quality of the budget, and the other way around. Respondents of Company E explained that the forecast is used to produce an update on the budget. The Budget is important because the latest estimate looks at changes of the Budget assumptions to calculate and explain changes from Budget.

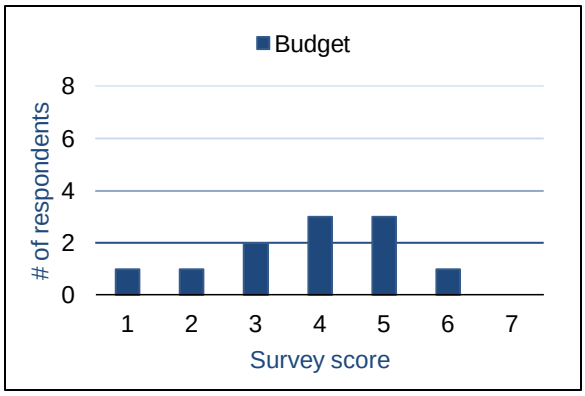

Figure 31: Survey scores budget

Respondents of companies who have separated the budget and rolling forecasting processes stated that the quality of the budget is not important for producing a rolling forecast: 'The rolling forecasting output is always the most up to date, and the most accurate. If there is a significant gap between the budget and the rolling forecasting outcome, the rolling forecasting outcome is used'. This point of view is confirmed by a respondent of Company A.

An interesting point of view of an undesirable connection between the budget and the rolling forecast is given by a respondent: 'The rolling forecast of Company F is produced for 24 months, of which the last period is not very accurate. The reason can be found in the relation between targets, the budget, and the rolling forecast. Managers who are responsible for filling the forecast are rewarded on targets tied to the budget, and thus, based on year-end. Since the focus of these managers in their performance and in forecasting is based on the fiscal year, the period following year-end is not forecasted, but filled in with the expectations of their targets. Instead of a bottom-up outlook, the forecast is filled with top-down stated expectations. The added value of these months is thereby reduced to zero. Ideally, there is no relation between the budget and the rolling forecast'.

With the survey output and the interview statements, it is not possible to state the conclusion that the quality of the budget is a critical success factor for rolling forecasting. However, the interview statements and survey scores do make clear that for companies which have separated the rolling forecast and the budget, the quality of the budget is not affecting the success of rolling forecasting. Moreover, respondents stated that for good rolling forecasting, the connection between the rolling forecasting and the budget should be limited as far as possible. Therefore, it can be concluded that the budget as input factor is not a critical success factor for rolling forecasting.

4.3.5 Process

4.3.5.1 Procedures & guidelines

The survey scores on the factor procedures & guidelines indicate that this factor is important for successful rolling forecasting, with a high peak of respondents scoring "6" and an average score of 4.8.

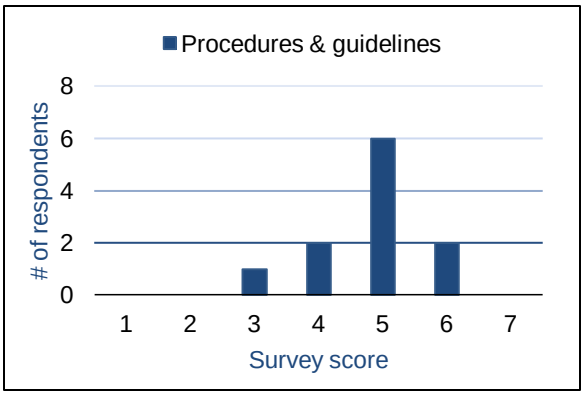

Figure 32: Survey scores procedures & guidelines

One of the respondents explained the need for clear procedures & guidelines in the rolling forecasting process: 'Within Company F, there are many job-changes. A new person has to learn everything all over again. Guidelines can help someone to catch up easy when he is new in the process. But this is an issue that can be improved currently. For example: if someone does not see the importance in attending a meeting, important information might be missing. That can result in two options. First, the accuracy will be lowered because information is not incorporated. Second, the process will be delayed, to make incorporating the information possible'. This point of view is supported by another respondent of Company F, stating that procedures determine how the process is being executed. Better procedures and guidelines will improve the quality of the process. Furthermore, it is interesting to find out why the "3" is given. The supply chain employee of Company F explained that for her function, procedures & guidelines are not needed. However, these will be more important for other functions in the process.

Based on these statements and the survey results, the conclusion can be made that procedures and guidelines can improve the success of rolling forecasting. If all actors know what is expected for their function and what is needed to make the rolling forecast successful, a higher accuracy can be achieved. Therefore, this factor can be called a critical success factor.

4.3.5.2 Instructions

The scores on the factor quality of the instructions indicate that the factor is important, but the relative high amount of scores in "neutral" and the low score give space for discussion. The instructions give more clarity. One of the respondents of Company F, who originally scored instructions a "4", explained why the instructions are more important: 'Good instructions are really important to structure the process. Within the finance department of the Benelux, one employee recently started sending these instructions before the process. These instructions are sent to finance employees and to sales employees. One aspect involved is the timing of the process. Per process step, strict deadlines are stated. Another component is the organization of the process. The instruction makes clear who is responsible for which task.

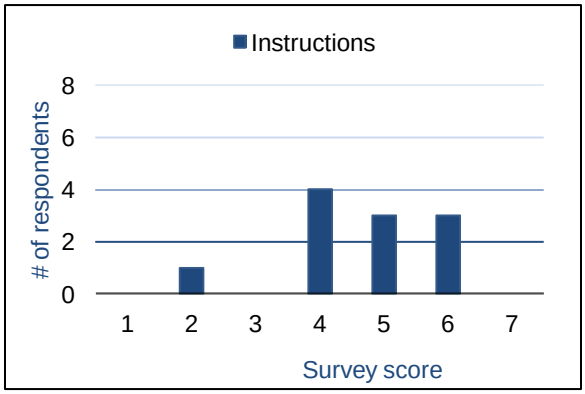

Figure 33: Survey scores instructions

These instructions give a lot of clarity in the process. Employees know who is responsible, and when a task has to be finished. When instructions are not send, the process runs according to the own planning of the departments. That is in most situations too late'. This finding is supported by a respondent of Company B, who also noted that instructions are used to give guidance in using assumptions.

The score of “2” is given by the same respondent who valued the importance of procedures & guidelines and frequency as low. However, when translating the volume forecast in a financial forecast, the role of instructions increases.

Thus, instructions are less important when only producing a volume forecast, without information from other departments. However, when more departments are involved and assumptions need to be included, the importance of the assumptions increases. Based on the interviews and the survey scores, the conclusion can be made that instructions are a critical success factor for a rolling forecast, when a forecast is consolidated and assumptions are used.

4.3.5.3 Process owner

The survey scores for the factor process owner make clear that a process owner is beneficial for successful rolling forecasting. With all scores ranging from a “5” to a “7” and an average score of 5.9, there is little doubt that this factor has benefits in the rolling forecasting process. The interviews make clear what the benefits are. ‘It is important that someone is available to support the sales and operational departments in producing the forecast. The process owners within Company B have a facilitating role, since it cannot be produced by the operational departments alone. The operational departments need a supporting party’. These findings are supported by a respondent of Company A, who stated that a process owner is also important in the implementing phase of rolling forecasting to guide the change.

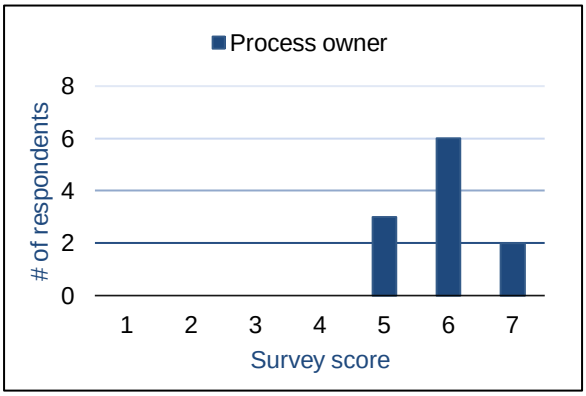

Figure 34: Survey scores process owner

These results clearly indicate that a process owner has a positive impact for rolling forecasting. Both in the transitioning process and in the deployment phase, a process owner can support and facilitate the process. Therefore, the process owner can be labeled as a critical success factor.

4.3.5.4 Deadlines

The survey results on the factor deadlines mostly indicate that this factor is important. Most scores ranged from a “4” to a “6”, and an average score of 4.9. However, one low score draws attention and indicates that not for all respondents’ deadlines is equally important.

The respondents who valued the deadlines as important, stated that the process is very strict planned. The respondent of Company B explains: ‘Meeting deadlines is crucial for successful rolling forecasting, since all phases are scheduled very tight. Missing a deadline means that the whole process is ruined. The sales department has two days to produce a forecast. At day three, the sales department meets with the purchase department to align

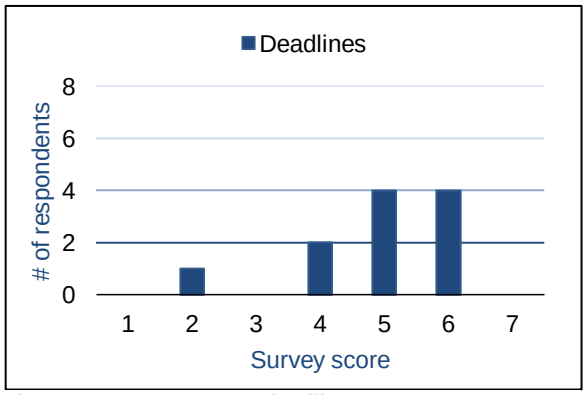

Figure 35: Survey scores deadlines

the forecasts. Delays in the process can cause serious issues'. This reasoning is validated by one of the respondents of Company F, who stated that strict deadlines are very important, especially in a process with many actors.

More interesting is the point of view of the respondent, who valued the deadlines lowest. The respondent states that in her function, as employee in the supply chain, there are no deadlines set. Her responsibility is to have the expected volume up to date at any time. However, she states that when consolidating the forecast, the deadlines are more important.

Based on these findings, the conclusion can be made that deadlines are very important in the rolling forecasting process. The tight forecasting schedule and dependencies on input information makes it necessary that deadlines are set, and met. Therefore, the factor deadline is considered as a critical success factor.

4.3.5.5 Tools & Systems

The survey results make clear that the quality of tools & systems is an important denominator of the success of rolling forecasting. All individual scores given were above neutral, with an average of 5.7.

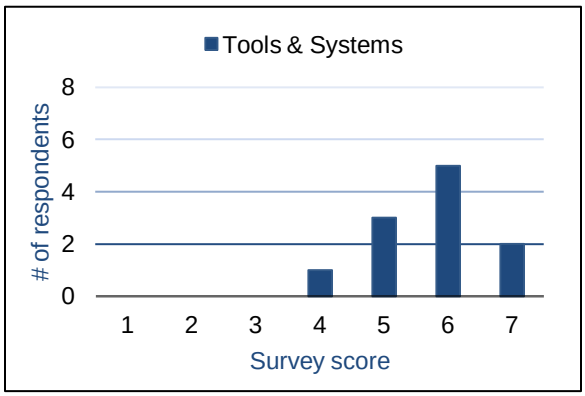

Figure 36: Survey scores tools & systems

The interviews made clear that tools and system play a crucial role in the forecasting process, since most companies base their forecasts on historical results which are stored in computer systems. This makes it impossible to produce a rolling forecast without tools and systems. However, the quality of the tools and system influence the success of the forecast. A few examples in the interviews give understanding:
'Company A uses multiple demand planning tools. However, the issue is that they do not capture all information required for Financial Rolling Forecasting. With the current tools, there are too many steps needed in different programs produce a rolling forecast. A good forecasting tool can replace all these steps. With fewer steps in different programs the chance of making mistakes reduces. Furthermore, the throughput time can be lowered'. The problem with too many different tools is also expressed by a respondent of Company F. She states that Company F is using many stand-alone systems: 'The amount of separate systems makes the rolling forecast process more difficult. The amount of side systems and manual interventions is too high, which disables a fluent process and increases the chance of making mistakes.
One global working system is the ideal solutions for Company F, but also a utopia. A better working system results in a better working process, which again enables Company F to prevent small mistakes from happening'.

Another respondent of Company A explained what can go wrong, if a company does not use the right tools & systems:' Company A is planning to use a program which tracks the remaining duration of contracts. A customer that runs out of the contract which is not taken into account in the rolling forecast can have serious consequences for the quality of the forecast. The reason is that a new contract might involve new prices. If the rolling forecast is prepared on a selling price of € 5,-, but due to increased competition the new selling price is € 4,50, a gap will occur in the results. If the rolling forecast is prepared without the right tools and systems, the risk of a less qualitative forecast increases.

A last example is given by a manager of Company C, who previously worked for a subsidiary of Company C in Finland, where rolling forecasting was implemented: The company used a SAP program to record all data, and invested over €100.000,- in a new forecasting system. It turned out better accuracy was obtained with an APO module of SAP.
One of the main reasons for the failure of rolling forecasting was the level of detail within the new system. The program was designed for too much detail on SKU level in the forecasts. The result was that „too much process" was needed to understand and interpret the data. Furthermore, there were more steps needed in the process. First, data was downloaded from SAP. Then, the data was manipulated in the new system, and finally placed back in the SAP system.
In the end, the accuracy with the new system was lower than with a demand forecasting tool within the SAP system, called APO. SAP APO was easier to use and more integrated within the systems that were already in place.

Abovementioned examples clearly indicate that the tools & systems used by a company are of critical importance for the success of rolling forecasting. Not only is the use of tools and systems indispensible to prepare a rolling forecast, the quality of the tools and systems determines the possibilities to produce a good forecast. However, the last example makes clear that choosing the right tools and system for the process is complicated. The wrong choice can lead to a less accurate forecast. Therefore, the factor tools & systems is a critical success factor.

4.3.5.6 Involvement of the important departments

Most survey scores indicate that the involvement of the important departments is a factor determining the success of rolling forecasting. Most of the scores range from "5" to "7", with an average of 5.6. However, more interesting results are obtained by the survey question on the importance of individual departments. The highest score is given for the finance department, which is involved in all the processes. The lowest average scores are obtained for the HR department, of which most respondents explained is not involved in any way in the process. The HR department is informed afterwards.

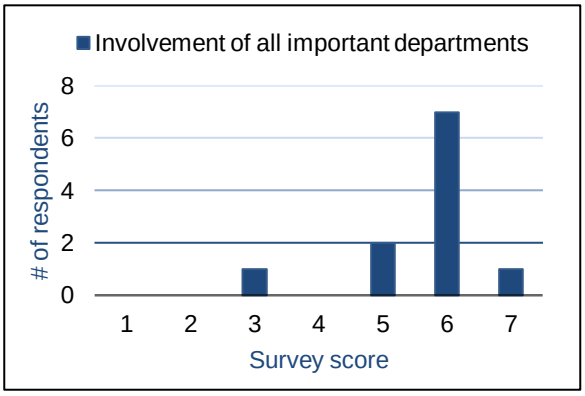

Figure 37: Survey scores involvement of all important departments

An explanation for the involvement of Planning & Control and Marketing & Sales is given by a respondent of Company A: 'If it is necessary, the rolling forecasting. The departments that need to be involved are Marketing & Sales and Planning & Control. The involvement of these departments is of critical importance for the success of rolling forecasting. Planning & Control organizes the process and makes sure all the systems work according to plan. Marketing & Sales are dominant in terms of the input. If the information of marketing and sales is not taken into account, the rolling forecast is of much less value'. A respondent of Company A, who gave the "3" in the survey explained that not necessarily all departments need to be involved. Furthermore, the importance of the rest of the departments seems to vary, depending on the goal of the forecast and the surrounding factors: 'There is a shift in importance of the departments between the forecast of the first three months, and the forecast of the last 9 months. In the first three months, the departments of the S&OP process are very important. For forecasts between three and twelve months, the category

managers have more influence. The category managers know the business and project the expected demand for the specific categories'.

Another example is obtained from the interview of Company B, where the manager explained why Supply Chain is very important for Company B: 'The Supply Chain department is important for Company B, since a large amount of costs is spent on the outbound transport. The outbound transport is the transport of animals from the farms to the factories. The Supply Chain department receives the expected sales forecasts and has to make their own rolling Supply Chain forecast, to optimize the costs'.

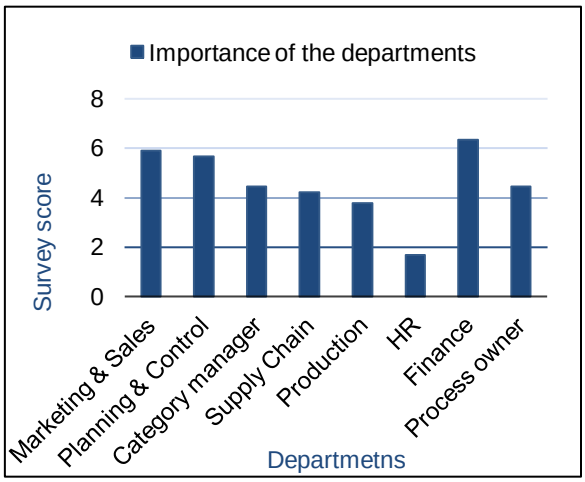

Figure 38: Survey scores importance per department

Thus, depending on the goal of the forecast, the importance of departments involved changes. A last relevant insight is given in an interview with Company F, where the type of company is named as a factor determining the importance of departments: 'The type of company is important in determining the importance of departments. Company F, for example, is a real "marketing-company". Most of the sales are done in combination with promotional activities, organized by the Marketing department. Therefore, this department has an important role in the process'.

With abovementioned statements, it can be concluded that involvement of the right departments is a critical success factor for rolling forecasting. Furthermore, the importance of independent departments varies per company, depending on the goal of the forecast and the surrounding factors.

4.3.5.7 Capabilities & Competences

The capabilities & competences factor had one of the highest average score in the survey results, with an average of 5.8. Asked which competences where most important in the forecasting process (n = 9), most respondents (56%) answered business knowledge. Specific analytical skills were valued little less important (33%) by the respondents, and the financial background was valued least important (11%).

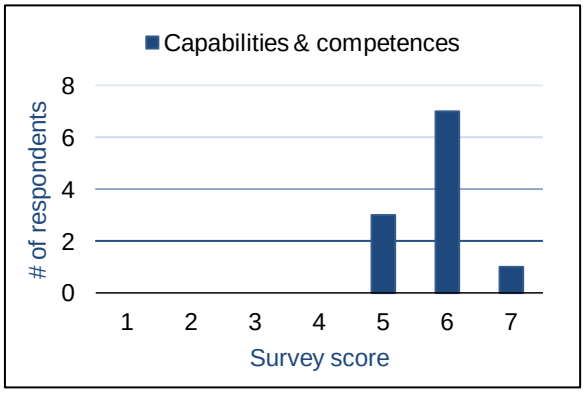

Figure 39: Survey scores capabilities & competences

When considering business knowledge, a good example is given by a manager of Company C: 'There are a lot of different employees and departments involved in the process, which need business knowledge, for example to make good assumptions. The recent crisis within Europe had negative influence on the on-premise sales (in bars and restaurants). More people tend to stay at home. The business controller needs to understand that and have the knowledge and analytical skills to determine the impact on the assumptions made.

A second example is given by the financial director of Company B, when discussing the accuracy of the rolling forecast: '(…) it often happens that high deviations occur due to unpredictable circumstances. If China closes its borders tomorrow or an animal disease outbreak occurs, the rolling forecast output will have a low accuracy. The question to be asked is thus: Why does the deviation occur? It is crucial that enough business knowledge is available to interpret and understand the forecasting accuracy. This knowledge must be available in all levels of the organization, since the forecasting output is evaluated at each step'.

Besides business knowledge, several departments need analytical skills and a statistical background. The manager Purchasing & Planning of Company D explains why he always selects at least one employee with a statistical background in his team: 'Company D employs high educated planners, with at least one employee that has feeling for statistics. That is important, because someone needs to understand the statistical model used. One of the employees is now studying for a forecasting tool in Excel. If this employee would have no „feeling" or interest with statistics, he will not spend a lot of time studying these topics, while it is important for Company D that someone does'.

Thus, based on the survey outcomes and the interview statements, the capabilities and competences factor is a critical success factor for rolling forecasting. Especially business knowledge and an analytical background are valued as most important.

4.3.5.8 Throughput time

The survey results of the factor throughput time give a mixed picture. Clearly, respondents are not unanimus of the importance of this factor, with scores ranging from "3" to "7". The average score was 5.7. However, the interview results make clear that the factor throughput time is an important factor in the success of rolling forecasting.

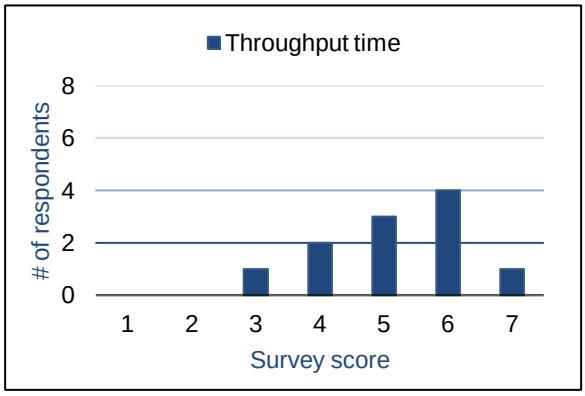

Figure 40: Survey scores throughput time

A respondent of Company A explains why in his opinion, throughput time is very important: 'If the throughput time is too long, the risk of making an outdated forecast increases, due to the fast changing circumstances. For example: the budgeting process of Company A starts in June, for a budget window starting 6 months later. With the recent Euro-crisis, the budget is already partly outdated. The difference between a throughput time of one and two months can be very important'.
Another respondent explained that Company B maximized the throughput time in the design phase to four weeks, and made choices to make sure the whole rolling forecasting process could be finished in this period: 'To keep the throughput time shorter than four weeks, choices in the design had to be made. Company B choose to make the rolling forecast in less detail, to save time. First, the rolling forecast is only produced for 60 line-items instead of the 150 line-items that are used in the budget cycle. Second, the rolling forecast is produced on product group level, instead of product or SKU level. Third, Company B produces a separate forecast for the most important customers, while the smaller customers are forecasted per group'.

This point of view is confirmed by another respondent of Company A, who explained that an ideal throughput time will never be reached: 'An ideal throughput time would be 5 working days. To realize that,

processes should work optimal and tools need to support it. However, a rolling forecast which is produced in five working days cannot have the same level of detail as a forecast with a longer throughput time'.

Thus, the throughput time of a rolling forecast partly depends on the design choices made by the company. If a company chooses to forecast on more dimensions, add more departments or expect more detailed results, the throughput time increases. However, the results also show that Company B stated a maximum throughput time, which indicates that the company is "managing" this factor.

It is not possible to make conclusions regarding the best throughput time for a company. The ideal throughput time will depend on the goal of the forecast, the industry of the forecast and the market characteristics. A rolling forecast in which the short term production planning is aligned will need a shorter throughput time in comparison with a rolling forecast for the long term sales volume. However, the statements also indicate that a shorter throughput time leads to more accurate forecast output in comparison with the same rolling forecast with a longer throughput time. The shorter process decreases the change of producing an outdated forecast. It is clear that throughput time has significant influence on the result of the rolling forecast. Therefore, this factor is a critical success factor for rolling forecasting.

4.3.5.9 S&OP process

The survey results for the factor S&OP process vary from a "3" to a "7" with an average score of 5.6. The interviews make clear that without a good working S&OP process, rolling forecasting is not possible.

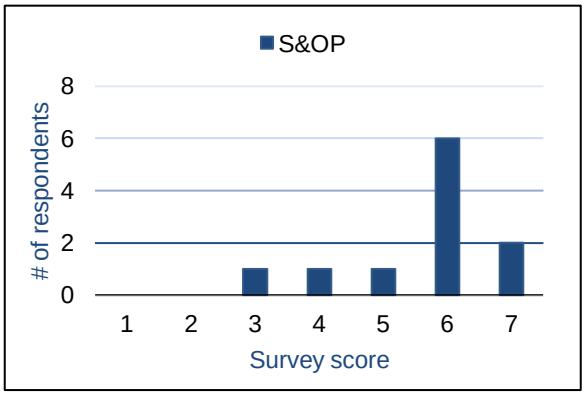

Figure 41: Survey scores S&OP

The best example is given by Company C, where a manager explained that not having a good working S&OP process, was one of the reasons not to implement rolling forecasting: 'The S&OP process and the rolling forecasting process are very closely related and that the S&OP process has to be well organized in advance, before rolling forecasting can be implemented. Rolling forecasting will not work, if the S&OP system is not organized well. S&OP requires a well organized process where all important departments are involved. The sales department has to give input for the planned promotions. Important information is the timing of promotions, the expected volume of the promotions and the specific SKU's that will be promoted. Another important input is the innovation process. When new products are developed, the impact on sales has to be predicted and taken into account'. Company C is currently implanting an S&OP process in 70 OpCo's worldwide.

This point of view is confirmed by respondents of Company A, Company D and Company F. These results make clear that a good workign S&OP is very important for rolling forecasting. Therefore, it can be concluded that S&OP is a critical success factor for rolling forecasting.

4.3.5.10 Complexity of the process

All given survey scores for the complexity of the process lie between the "4" and the "7", with an average of 5.7. This indicates that this factor is important for the success of rolling forecasting.

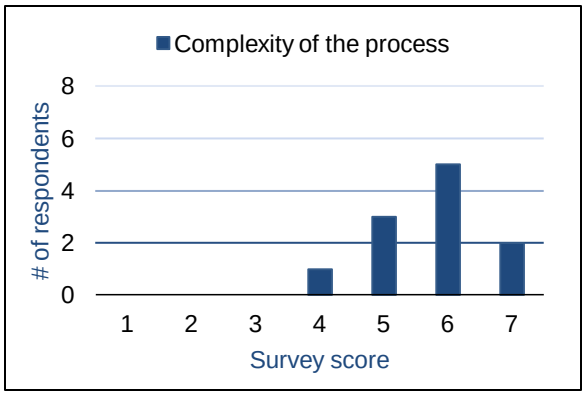

Figure 42: Survey scores complexity of the process

All respondents in the interviews stated that choices are made to reduce the complexity of the rolling forecast. Company B, for example, reduced its number of line items and made choices in the dimensions: 'Company B made choices to limit the complexity of the process. Instead of the full 140 line items, the rolling forecast is prepared for only 60. Furthermore, not all customers are forecasted individually, but mostly on group level. Of the 1000 customers of Company B, only the 90 most important are forecasted individually, the rest is forecasted per product/market combination. These choices are made to reduce the complexity, and thereby the workload of the process'.

The reason for reducing the complexity is explained by one of the respondents of Company A: 'In every step of the rolling forecasting process, mistakes can be made that influence the accuracy. The more process steps there are, the more employees involved, the more departments involved, the bigger the chance that mistakes are made. And mistakes ultimately lead to a less accurate forecast. The aim for Company A is to make the process as lean as possible, with in the meantime incorporating all important departments and employees'. A respondent of Company A states that his company needs to find a balance between these two components.

A last interesting point of view is given by the respondent of Company D, who states that the process of Company D is not as complex as the process of Company C, due to the small size of Company D. All important stakeholders are 'under the same roof', which makes it easy to discuss relevant issues. With Company C, its parent company, much more has to be organized in fixed processes, which increases the complexity of the process.

Based on these statements, the conclusion can be made that the complexity of the process is a factor influencing the success of rolling forecasting. A more complex process leads to an increased risk of making mistakes. However, the complexity is solely determined by other factors in this research. Partly, the complexity of the process is determined by the complexity of the organization. More complex organizations have a more complex process, since more products have to be forecasted, more employees are involved, or the process is spread over more countries.

Furthermore, the complexity is influenced by the design choices of a company. The design choices of Company B, in which less line items and only the most important customers are forecasted, make clear that these choices are made deliberately to decrease the complexity of the process. The same reasoning can be found by Company A, where one of the respondents argued that forecasting not all countries in detail would make the process much easier to organize.
Therefore, the conclusion is that the complexity of the process is very important for the success of rolling forecasting, but an outcome of several other factors in this research. The company can only manage the complexity by managing other design choices. This factor is not a critical success factor, but an indicator for rolling forecasting.

4.3.6 Output

4.3.6.1 Quality of the monthly report

The survey scores show that most of the respondents tend to value the quality of the monthly report as important. All scores range from “3” to “7”, with an average of 5.1. The interviews support this finding.

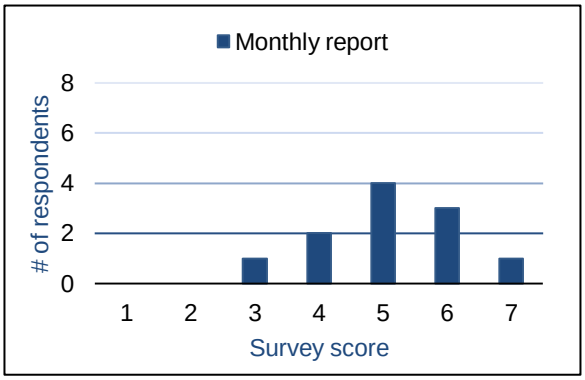

Figure 43: Survey scores monthly report

The respondents state that the report is an important factor in the discussion of the rolling forecast. One of the respondents of Company F explained how a report should look like: ‘It is very important that the reports are as simple and as much visual as possible. It is much better to have one simple graph, than to use several sheets with over 50 numbers. With a large report with more than 50 numbers, it is difficult to get to the right discussion. People will start discussing the correctness of unimportant numbers, which drags away the attention from the important discussion. Consider a manager who has to take decisions on 23 product categories. With large tables full of numbers and a room full of discussion on different issues, it is hard to make good decisions’.

It is surprisingly that the other interviews all mentioned the same characteristics. A report should be as simple as possible, with a visual display of the information. Therefore, the conclusions is made that the quality of the report does influence the use of rolling forecasting. This factor can be considered as a critical success factor.

4.3.6.2 Management focus in the review meeting

The survey outcome makes clear that the focus of management in the review meeting is a critical factor determining the success of rolling forecasting. With all scores between a “5” and a “7”, this factor is valued as one of the most important. The average score of 5.9 was the highest average score in this review.

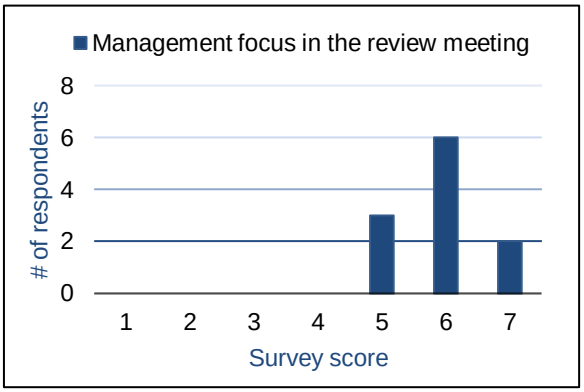

Figure 44: Survey scores management focus in the review meeting

The importance of a good review meeting is expressed by a respondent of Company A, who stated that preparing a rolling forecasting without discussing the outcome, has no value.
However, not all respondents agreed on the question whether most of the time in the meeting should be spent on forward looking issues, or not. One of the respondents of Company A explained: ‘Most of the time should be used to discuss the issues that require attention. Since you cannot change the past, it is not useful to discuss the past results. However, this starts with the focus of the management because ‘corporate’ determines what the agenda is for the meeting and what the business groups have to present’. This point of view is confirmed by a respondent of Company B.

Another respondent of Company B does value discussing the past and the future as equally important: 'The management determines the agenda and the discussion. Therefore, strong leadership is important. Within the meeting, it is important that both the future of the company and the past of the company are discussed. The results of the company can include useful learning's for the future'. The same respondent state that the high percentage of time spent discussing other issues is not beneficial. In normal meetings, the time spent discussing other issues is around 80%.

Based on the findings, the conclusion can be made that the focus in the review meeting is a critical success factor for rolling forecasting. The statements indicate that the rolling forecast output cannot be optimally used when the rolling forecast is not discussed. The management determines what the focus is during the review meeting, and thus to what extent the rolling forecast output is used.
However, not all respondents agree that most of the time should be used discussing the rolling forecasting output. At least, it can be stated that a significant portion of the time should be used to discuss the future of the company, and that meetings should be primarily used to discuss the report with actuals and forecasts. Thus, the management focus in the review meeting is an important denominator for the forecasting use of the rolling forecast.

4.3.6.3 Measuring the forecasting accuracy

Most of the survey respondents value the accuracy of a rolling forecast as important for the success, with a majority of scores ranging from "5" to "7" and an average score of 5.0. The respondents asked to explain their high scores stated that measuring accuracy is done to assess the quality of the forecasts.

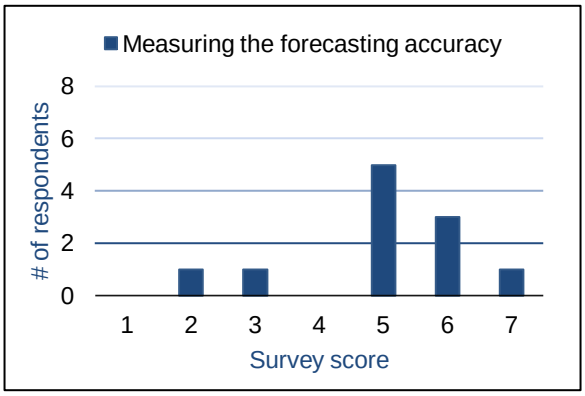

Figure 45: Survey scores measuring the forecast accuracy

One of the respondents explained: 'Accuracy must be measured in order to know how good the forecasts are. If the organization knows that the forecasts are good, it gives rest in the organization. Furthermore, the inventory can be lowered, the time to deliver can be shortened and the safety margin on several items can be lowered. That leads to financial benefit for the company'. Furthermore, the same respondent explained that the forecast is used within Company D to improve the process. Deviations in the forecast are tracked back to the cause, to make visible which part of the process can be improved. This point of view is confirmed by other respondents.

Another interesting point of view is obtained from the interview with a manager Supply Chain of Company F: 'Company F systematically measures forecasting bias and forecasting accuracy. The outcome partly determines the focus in the review meeting. If the bias of a certain product category is high in the previous months, managers will spent more time to discuss the drivers of the bias'.

Thus, knowing what the accuracy of a company is, is not only functioning as thermometer for the quality of the process, it also, determines the focus of the management in the review meeting. Based on these findings, the conclusion can be made that measuring accuracy is good for the rolling forecast. Partly because it enables the organization to improve the weak spots in the rolling forecasting process (and thereby improving the accuracy of the forecast), partly because it improves the rolling forecasting use by determining on which categories the rolling forecasting output cannot be used.

The respondent which valued measuring accuracy with a “2”, a participant of Company E, explained that the importance of measuring accuracy is dependent on the type of forecasting In the case of the 2 times per year relatively high level financial Full Year update as AN currently uses it, there are many factors impacting on the relatively long period for the rest of the year and there is not always a direct correlation between the quality of the forecast and the accuracy in terms of difference between forecast and actual outcome. Measuring accuracy in a more frequent, S&OP like rolling forecast as defined in this research is seen as very important, due to service levels, stock level and working capital. For the latest estimate used by Company E, measuring accuracy is far less important.
A last useful insight is given by the respondent of Company D and regards the use of forecasting accuracy: ‘In the market of Company D, the accuracy of a forecast must always be a key indicator of its success. That is, because customers expect that Company D products are always available. If Company D is not able to produce and deliver products, it costs sales directly. Therefore, a reliable forecast, and the alignment with production planning, is very important.
But forecasting accuracy in the car industry is less important. Customers expect that a car is not directly deliverable and are willing to wait a several months. An accurate forecast is therefore less important’.

While not confirmed by other respondents, this point of view is interesting. Since this research focused on Consumer Packaged Goods businesses, it is not possible to compare the value of measuring accuracy over different industries. This leaves the conclusion that for the consumer packaged goods business, measuring accuracy is a critical success factor. Measuring accuracy is not only an assessment of the quality of the rolling forecast, it is the starting point for improvements in the process.

4.3.7 Act

4.3.7.1 Decision making process

The survey scores indicate that the decision making process has important influence in the success of rolling forecasting. The average score was a 5.5 and individual scores ranging from “4” to “7”. However, the type of decisions seems to vary between the companies. Two of the respondents asked to explain their score, stated that the rolling forecast is especially used to make decisions on a tactical level, or produce a gap analysis. Both companies apply a window which is longer than one year.

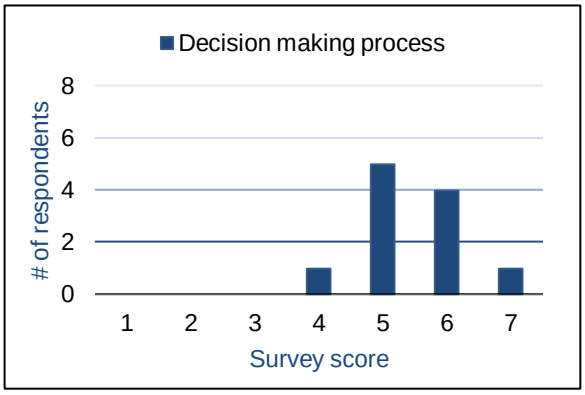

Figure 46: Survey scores decision making process

Two other respondents explained that the rolling forecast is used to align the operational planning. The respondent of Company D explained: ‘Since the rolling forecast of Company D is an operational forecast, the output is used to determine the production planning and the amount of purchases. Therefore, the result of the rolling forecast is translated back in the supply chain process’.

A last interesting point of view is given by a respondent of Company F, responsible for the short term forecast: The rolling forecast use is of good quality. The short term forecast has a weekly transfer of information with the factories to ensure the information is up-to-date. Furthermore, Company F introduced an ABC system for products and customers, which indicates the importance of the customer or product.

Customers in the A group are most important, while customers in the C group are less important. With these categories the factories know how to focus'.

Based on these results, the conclusion can be made that the decision making process is critical importance of the success of rolling forecasting. However, the right decision – and the right process – depends on the goal of the forecast. Therefore, optimal forecast use is influenced by the decision making process of the company.

4.3.7.2 The ability to change the process

The last factor in the list with predefined success factors is the ability to change the process. Again, the survey results are clear. With all scores ranging from "5" to "7" and an average score of 5.6, respondents agree that changes in the process can improve the success of rolling forecasting. In the interviews, all respondents agreed that evaluating and changing the process would be beneficial for the success of rolling forecasting.

Differences exist in the way changes are made. Some organizations have a structured process in which possible improvements, based on the forecasting accuracy, are discussed, like Company A or Company F. A respondent of Company F explains: 'It is important that the process is continuously improving. Within Company F, there is a standardized process of improving the forecasting bias. This is done each month, based on the latest results. If a bias is too high for specific customers, the manager has to take care of the process of the specific customer and make sure it improves. Furthermore, changes are made to make the rolling forecasting process simpler'.

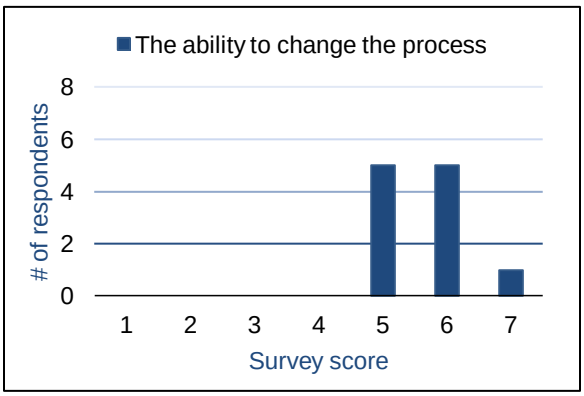

Figure 47: Survey scores the ability to change the process

In other companies, the process of improving is less structured as with Company F, A respondent of Company B explains how improvements are organized in his company: 'There is not a structured process of improving the rolling forecasting. Incidentally, the process is reviewed by the finance departments, but the businesses are not involved. Involving the business would give relevant insights in possible improvements. It would be good if Company B organized one moment per year to evaluate the whole process with all involved stakeholders'.

These statements make clear that the possibility to improve the process is a factor determining the success of rolling forecasting. A structured process of improving the rolling forecast can be beneficial for both the forecast accuracy and the forecast use. Therefore, this is a critical success factor.

4.3.7.3 Management support

With an average survey score of 5.5 and most of the scores ranging between "5" and "7", it is clear that management support is a critical success factor for rolling forecasting. The interviews validate this finding, and give explanation why management support is both important in the implementation phase and in the deployment phase.

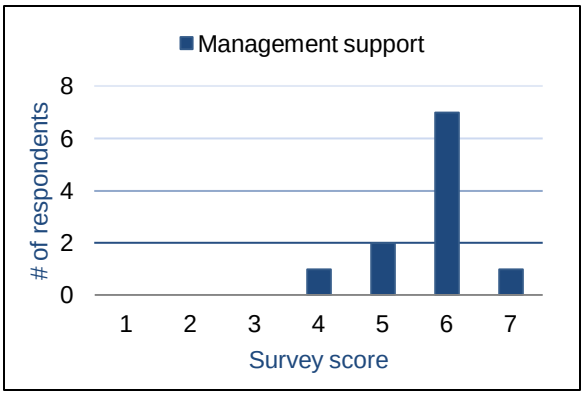

Figure 48: Survey scores management support

One of the respondents of Company B explained why management support is crucial in the implementation phase: 'The change process towards rolling forecasting has to start at the management level. If the management is not willing to support rolling forecasting, the process will not be a success. The reason is that the changes that need to be supported can be classified as 'very important'. That also includes a change in culture, with more forward looking. If they support rolling forecasting, the rest of the company will follow their leads. If the management does not support rolling forecasting, it can never be a success.'.

Another respondent explained why management support is important in the deployment phase, and how management can support rolling forecasting: It is important to show that management feels the importance of the rolling forecasting process. That can be done by asking questions, spending time in the review 'meeting and keep repeating the message how important it is. It is clearly not enough to make a statement once in the employee magazine. When the management board is not asking for the rolling forecast, the process will lose its value. Employees will think that apparently there is no need for this information'. These points of view are confirmed by the other respondents who are asked to explain their score for management support.

These findings make clear that management support is a key issue determining the success of rolling forecasting. Without this support, both the implementation and the deployment cannot be successful. Management support is therefore labeled as a critical success factor.

4.3.8 Other factors

The predefined list with factors, of which the results are discussed in the paragraphs 4.3.1 until 4.3.7 was useful in this research. The factors helped to structure the research and to focus on the important topics while analyzing the results. However, as Yin (2009) stated, focusing on theoretical propositions includes the risk of overlooking factors which are not defined as factors. This paragraph outlines three factors which are not defined as factors, but are mentioned by respondents in the interviews as factors influencing the success of the rolling forecast.

4.3.8.1 Goal of the rolling forecast

Several respondents stated that design choices of the rolling forecast are not only based on the surrounding factors of the company, as was expected in this research, but also on the goal of the forecast. A respondent of Company F, explained that the window of the rolling forecast should not only depend on the market characteristics, but even more on the purpose of the forecast. A rolling forecast aimed at providing a capacity planning should have a longer window in comparison with a rolling forecast aimed at short term production alignment.

Furthermore, a respondent of Company A explained that the goal of the forecast is an important denominator of the importance of the involved departments. These examples made clear that the goal of the forecast is an important choice for a company that determines the design of the rolling forecast.

Although the goal of forecasting is discussed in sales forecasting articles (Zotteri and Kalchsmidt, 2007), the factor was expected to be not important for rolling forecasting. Based on the article of Tanlu (2007) rolling forecasts were expected to serve only as a tool for strategically forecasting. The influence of the goal of the rolling forecast can be subject of further research.

4.3.8.2 Efficiency

The framework used in this research incorporated two indicators that can measure the success for rolling forecasting: forecasting accuracy and forecast use. However, during the interviews, several respondents explained that choices made in the process or the design of the rolling forecast were based on an indicator which was not taken into account in this research: the efficiency of the rolling forecast. It appeared that an optimal accuracy and use of the forecast is not the only goal managers strive for in rolling forecasting. Resources which can be used to improve the accuracy are evaluated on its added value in the process.

Two interviews gave interesting insights in the thoughts of companies regarding this factor and the considerations between the amount of resources available and the success of rolling forecasting.
The first insight is given by a respondent who struggled with the question whether more resources should be made available for the sales department or not: 'The accuracy within Company D is good. An accuracy benchmark learned that. Despite the fact that the accuracy was good, the feeling existed that the process could be improved and a higher accuracy was possible. I asked the sales department in which way a higher accuracy could be achieved, what led to a discussion about the number of employees available within the sales department to produce the forecast. The conclusion of the discussion was that a better accuracy seemed possible, but more resources had to be made available. This discussion led to a managerial question: is the increased accuracy worth the investments? With calculating the perceived increase of accuracy and the economical benefit that was possible in inventory and a safety margin, Company D tried to make the increase in accuracy „financial". The conclusion of the calculation was that Company D will make more resources available'.
The second insight is derived from an earlier discussed topic. Company B has, instead of applying two separated process, merged the process for rolling forecasting and budgeting, with the result that gaming issues might occur in the rolling forecasting process in one of the rolling forecasts per year. With this deliberate choice, the amount of resources spent in the process is limited, whilst knowing that the accuracy of the forecast can be lowered by the connection with the target setting process.

These parts of the interview lead to the conclusion that more resources available have a positive influence on the success of rolling forecasting. Nevertheless, in practice, companies tend to take the efficiency of the process in consideration while making the design of the forecast. Unlimited available resources can lead a company to an optimal design and process to achieve the best possible forecast accuracy. In practice however, the resources of the company are constraint and trade-offs are made between adding more resources to increase the accuracy, and spending these resources on other issues. The efficiency of the processes is therefore an important indicator of the success of rolling forecasting.

Producing an effective sales forecast or budget seems not to be a topic of prior research. Possibly, the importance of effectiveness increases whenever the tool requires a more regular allocation of resources.

4.3.8.3 Method

Different companies are found to use different methods for forecasting. The respondent of Company D explained that his company partly uses statistical models to produce a rolling forecast. Furthermore, a

respondent of Company F expressed that the method of forecasting was a factor she missed in the list with factors and in the interview: ‘The method used to produce a forecast is a factor influencing the rolling forecast. Company F, for example, uses statistical models to determine the base volume. The base volume is the standard volume. The base volume is adjusted with the promo-volume which is planned with manual input and the experience of the planners. The statistical tools prevent human errors within the planning process and bring rest within the companies’.

This factor is missed in the preparation of the list with factors. Although discussed in several articles on demand forecasting, it was expected that the method used would be not important for rolling forecasting. Therefore, additional research is needed to find out how important the method of forecasting is for the success of a rolling forecast.

4.4 Analysis

4.4.1 Rolling forecasting model

Based on the conclusions of all individual factors, as discussed in the previous paragraphs, it is possible to provide a more in depth analysis of the factors determining the success of a rolling forecast.

The division of factors in categories (critical success factors, surrounding factors influencing the rolling forecast, and non-critical success factors) makes it possible to graphically display the findings of this research. Figure 49 shows all factors influencing the success of rolling forecasting.

All factors displayed in orange are found to be the critical success factors of rolling forecasting. The factors in grey are the surrounding factors, divided in internal and external surrounding factors. The blue factors are the indicators of the rolling forecast. These include the two components used in the rolling forecasting framework: Forecast accuracy and forecast use.

Two factors are added as indicators (complexity of the process and efficiency of the process), which will be discussed below. Three of these indicators lead to the ultimate indicator of rolling forecasting: success of the company, which is displayed in green.

The next section will discuss each of the components of the rolling forecasting model, based on the mean scores.

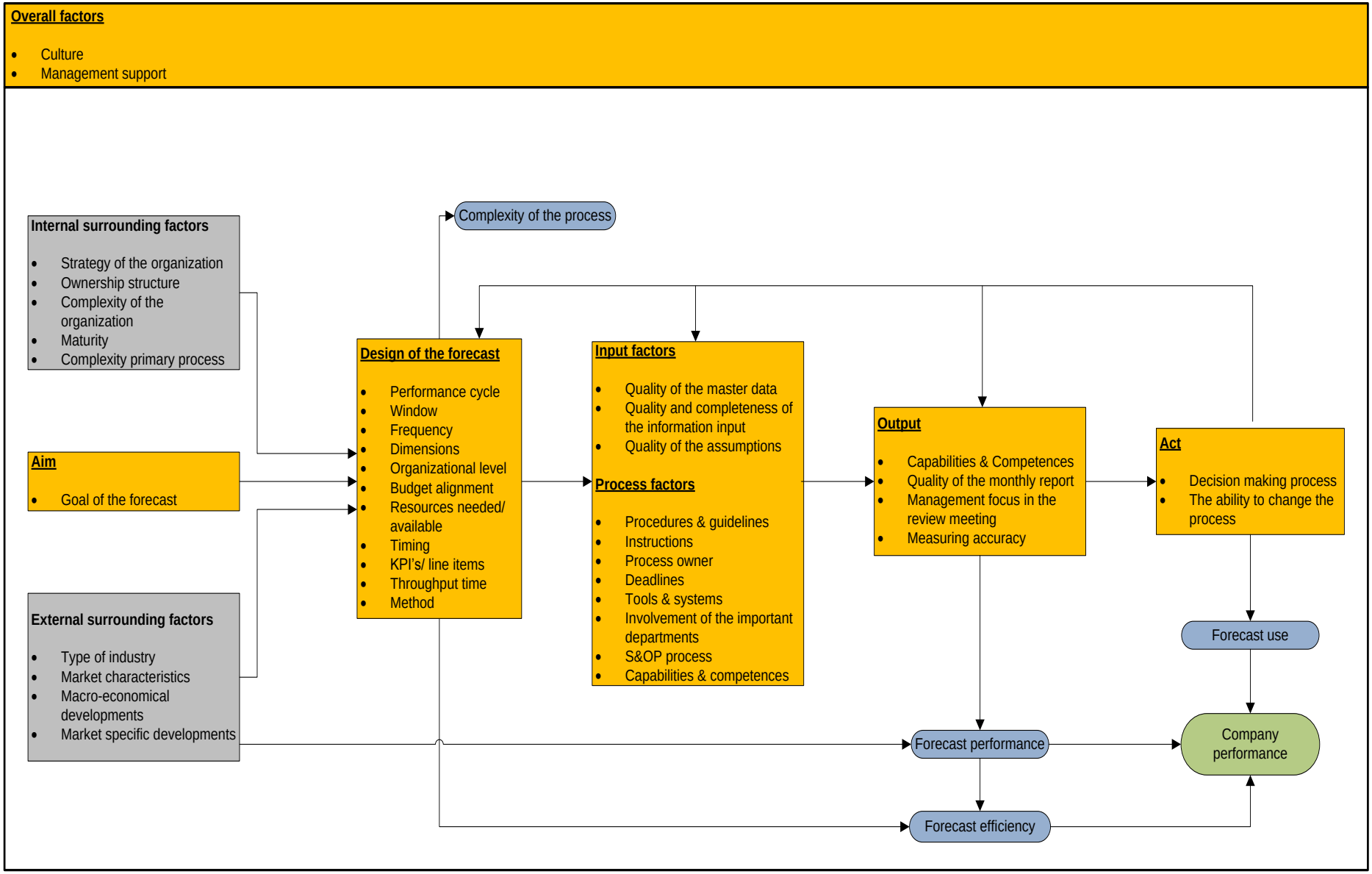

Figure 49: Critical Success Factors model

4.4.2 Mean scores

The analysis above resulted in a model which displays the relations between surrounding factors, critical success factors, indicators and the company performance. A last question that can be asked is the questions which are the most important issues for rolling forecasting. Table 11 shows the mean scores for all factors found critical for the success of rolling forecasting. All factors in the table are relabeled to the components of the critical success factors model. The factor management support for example, was originally proposed as a factor in the act component. The results showed however that management support is important in the whole process. Therefore, this factor is placed in the component general.

Nr.	Component	Factor	Mean Score
1	Output	Management focus	5.9
2	Process	Process owner	5.9
3	Input	Master data	5.8
4	Process	Capabilities & competences	5.8
5	General	Management support	5.7
6	Design	Organizational level	5.7
7	Input	Assumptions	5.7
8	Process	Tools & systems	5.7
9	Act	The ability to change the process	5.6
10	Input	Information input	5.6
11	Process	Involvement of all departments	5.6
12	Process	S&OP	5.6
13	Act	Decision making process	5.5
14	Design	Resources available	5.5
15	Design	KPI's/ line Items	5.4
16	Design	Dimensions	5.3
17	General	Culture	5.3
18	Design	Throughput time	5.2
19	Output	Report	5.1
20	Design	Timing	5.0
21	Output	Measuring accuracy	5.0
22	Design	Window	4.9
23	Design	Frequency	4.9
24	Design	Performance cycle	4.9
25	Process	Deadlines	4.9
26	Process	Procedures & guidelines	4.8
27	Process	Instructions	4.6
28	Design	Budget alignment	4.2

Table 11: Mean scores of the critical success factors

This list reveals two important findings of this research. Firstly, the most important factors cannot be assigned to one or two components of the model. The six factors with the highest mean scores encompass factors from the design, input, process, output and general component. However, the table does show that most of the important factors are related with the functioning of actors in the process, instead of design choices. The quality of the focus of management, the process owner, the capabilities

and competences and management support do all relate to actions of the management or employees. The most design choices, on the other hand, are marked as critical success factors, but clearly not the most important. Ten of the eleven critical design factors are ranked in the bottom half of the list.

Secondly, the factors related to specific forecasting issues are not scored higher than factors applicable for other business process. Specific forecasting factors are for example the management focus in the review meeting, use of assumptions and the window of the forecast. These are market grey in the table, while the factors applicable for general business processes are white. Factors like appointing a process owner, management support or the culture within the company have its impact on the whole organization. The table shows that both the factors for specific forecasting issues as the factors applicable for general business processes are listed throughout the whole list.

4.4.2.1 General

Two factors which are labeled under different components in the preliminary list with factors are found critical for rolling forecasting since these factors influence the whole rolling forecasting process. These factors are management support and the culture of the organization. Both factors are found critical since these factors influence the general attitude of the organization towards rolling forecasting. A company without a culture of 'doing it together' and sufficient management support will not have the right mind-set to make rolling forecasting to a success. These factors influence all components of the rolling forecasting framework: from the design of the tool to the decisions taken. Both factors are assumed to influence most of the business processes in an organization.

4.4.2.2 Design

The design factors are found to have an important impact on the success of rolling forecasting. Out of the 28 critical success factors for rolling forecasting, 11 are related to this phase. Moreover: in total 9 of the design factors are found to be related to specific forecasting processes, which is more than half of all specific forecasting factors. Nevertheless, these factors are not marked with the highest mean scores, which results in the fact that nearly all the design factors are ranked on the bottom half of the list.

Nearly all design factors are found critical because the fit with the goal of the rolling forecast and the surrounding factors influences the success of the rolling forecast. The window and the frequency of the rolling forecast, for example, must relate to the goal of the forecast and the characteristics of the market. If the rolling forecast is not updated frequently enough, the management of the company cannot take decisions on the latest information, which decreases the forecast use. A rolling forecast which updates too frequently will cost a lot of resources, and thereby results in an inefficient rolling forecast.

The critical success factor ranked last in the list is the factor budget alignment. This factor has a low mean score because the importance is determined by the goal of the rolling forecast. The importance largely varies among companies.

One design factor was found critical for different reasons: the resources available. This research found that the amount of resources available is an important critical success factor, since it determines the success of many other components. The amount of resources determines the quality of the systems used the capabilities and competences of the employees and the number of employees available for rolling forecasting. More employees available for rolling forecasting will in general lead to a more accurate rolling forecast.

4.4.2.3 Input

The input factors are all marked as relative important for the success of rolling forecasting, with rankings of number 3, number 7 and number 10. Furthermore, two of the three factors are assumed to be specific forecasting factors.

These factors are found to be important since the quality of the input factors largely determines the quality of the output. If a company uses incomplete master data, incorrect information input and poor assumptions, the quality of the rolling forecast cannot be good. The quality of the design or the processes of the rolling forecast are not able to compensate for the poor input quality.

4.4.2.4 Process

In total, eight process factors are considered critical success factors for rolling forecasting. However, only one of these eight is assumed to be a specific forecasting factor. The seven others do influence the success of rolling forecasting, but are applicable for many other business processes.

Several factors, like deadlines, procedures & guidelines and instructions, are considered to be important because they organize the processes. However, these factors are ranked 25th, 26th and 27th of the 28 critical success factors, which clearly indicates these factors are not the most important. A reason can be found in the nature of these factors. Instructions or procedures and guidelines, for example, are used to further improve the forecast accuracy. To be able to improve the process further, the basis of rolling forecasting must be correct. The basis is found in other factors.

The rest of the factors are considered more important. The involvement of a process owner, capabilities and competences and tools and systems has, for example, direct influence on the result of the rolling forecast. A process owner coordinates and organizes the process and the tools and systems are found to be a key issue in obtaining an accurate forecast result. Therefore, these factors are far more important.

4.4.2.5 Output

The three output factors found critical for rolling forecasting are all considered specific forecasting factors. However, the importance of the factors varies. The factor management focus in the review meeting has the highest mean survey score. This factor is found important since it determines the attitude of the management and the use of a rolling forecast. If a management team is mostly forward looking, the rolling forecast will be the main item discussed in the review meeting. However, when most of the time is used to discuss other issues or the past of the company, the rolling forecast will not be optimally used. This factor is probably ranked as very important, since all other factors become unimportant if the management of the company does not discuss the output of the rolling forecast.
The two other output factors are seen as less important. The quality of the report is a denominator of the quality of the discussion, but not more than that. A good rolling forecast process with an accurate accuracy will still be relative effective if the report is not of optimal quality. The same reasoning is applicable for the measurement of the factor measuring accuracy. Companies who know the accuracy of the forecasting process are able to benchmark the quality of the process and indicate factors of improvement. However, this factor is only important if it is obvious that it is more important to optimally use the rolling forecast than to be able to measure the quality of the rolling forecast.

4.4.2.6 Act

Both act factors are ranked in the middle of the list with critical success factors, indicating that these are not the most important factors. The factor decision making process is important since it has direct influence on the success of forecast use. The ability to change the process however, has indirect influence on the success of rolling forecasting. The quality of this factor can result in a better forecast accuracy or forecast use in one of the following processes.

4.5 Most critical success factors

4.5.1 Introduction

Based on the mean survey scores and the interview outcomes, it is possible to determine the four most important groups of factors. These groups encompass several factors, but characterized as crucial for companies that are planning to implement rolling forecasting.

4.5.2 Design

Although not the highest ranked factors in the list with mean scores, the design component encompasses an important part of the discussion regarding the most important critical success factors. Out of the 28 factors found critical for rolling forecasting, 10 belong to the design component.

There are two reasons for the perceived importance of the design component. Firstly, the design component has to fit with the surrounding factors – both internal and external – and the goal of the rolling forecast. The individual factors where the fit with the surrounding factors is found to be most important, are the organizational level, KPI's/line items, dimensions, throughput time, timing, window and frequency. A close connection with the characteristics of the industry and the market is crucial to make the rolling forecast useful. A respondent of Company F explained the choice for a monthly frequency, by stating that a quarterly forecast would not give enough information. The market of Company F changes too frequently, what means that the output of a quarterly process cannot be accurate enough. A rolling forecasts which updates too frequently, will provide insufficient new information to make the added costs of valuable. For Company F, a weekly updating process will cost too much time for relative less new information, which makes the process inefficient. The same reasoning is applicable for the window of the rolling forecast. A window which is too short, will not provide enough new information, and can therefore not be optimally used. A window which is too long cannot be forecasted with enough precession and will become inaccurate. The timing of the rolling forecast is important for companies producing a seasonal product, like ice-creams or paints. These characteristics of the industry need to be incorporated in the rolling forecast to provide new forecast information at the right time. Company E needs an update right at the start of the summer, when sales are usually highest. A wrong timed forecast can be accurate, but might not be optimally used.

The dimensions and KPI's/line items of a rolling forecast have to reflect the business drivers of the company. In order to make optimal use of the forecast output, companies should carefully choose the KPI's forecasted. A forecast for a KPI's which is not optimal can be very accurate, but will not provide the management of the company with information that can result in optimal rolling forecasting use. Furthermore, the interviews revealed that the rolling forecast should be prepared by the business, which reflects the choice for organizational level. According to the respondents in this research, the business has the best knowledge to make an accurate outlook for the future. Companies should prevent rolling forecasting to be a 'finance-party'. With only the finance department involved, the rolling forecast would

be filled with 'required' numbers, instead of 'expected' outcomes. Which departments should be involved and should be most important, depends on the characteristics of the industry and the market.
The second reason for the perceived importance of the design factors is the need to limit the complexity of the rolling forecast. The choices made in the factors KPI's/line items, dimensions, throughput time, and - to a lesser extent - timing result in the degree of complexity of the rolling forecast. With making the rolling forecast for more KPI's or a higher level of detail within the dimensions, more process is needed to produce the rolling forecast. One of the respondents explained that each KPI added to the rolling forecast, leads to an exponential increased amount of work to produce it. Furthermore, a central opinion in the interviews was that a higher level of detail in the dimensions (for example: produce the forecast on product level instead of product group level) gives the false impression of producing a more valuable forecast. Managers think that more detail provides more information and leads to better decisions. However, the respondents in this research stated that more details can mostly not be used for effective decisions making and makes the process unnecessarily complex.
A more complex process has two important downsides. Firstly, a more complex process needs a longer throughput time to produce the rolling forecast. A longer throughput time will make the process inefficient, since more time is spent for the limited added value, and increases the change of producing an outdated forecast. Secondly, the change of making mistakes increases in a more complex process, which results in a less accurate rolling forecast.

4.5.3 Input

The factors relating to the information used to produce the rolling forecast are all ranked relative high on the list with mean scores. The master data, assumptions and input information are ranked respectively 3th, 7th and 10th.

The relative high positions on the list can be declared by the explanation of a respondent of Company D, who stated that using wrong or incomplete information, directly leads to an incorrect bottom-line result. The quality of the input largely determines the quality of the output. The highest ranked input-factor, master data, is used as input for the statistical systems. The quality management of the data is hindered by continuously changing products. The respondent of Company C explained that every month, new SKU's have to be placed in the system.
Furthermore, the information used to produce the rolling forecast and the assumptions are great denominators for the overall success of the method. Incomplete information from the important departments in the process, like marketing and sales, or insufficient quality of the assumptions means that a forecast will be inaccurate. The example of Company F, where a planned promotion was insufficient incorporated in the rolling forecast clearly explained the importance. Due to wrong assumptions and ineffective communication, ice-creams turned out of stock, which led to high costs for flying in ice-creams from Turkey. Overall, it can be stated that the quality of the input information used is one of the most important denominators of the accuracy of the rolling forecast.

4.5.4 Support in the process

In order to optimally process the input information into output information, sufficient support is needed. Support is needed from a process owner, tools & systems, an S&OP process and sufficient resources available, which are ranked 2nd, 8th, 12th and 14th.
Firstly, a good working S&OP process is labeled as a very important precondition before implementing rolling forecasting. S&OP functions as the basis for rolling forecasting, by providing departments and actors with a process of aligning the demand and supply within the organization. Without this basis, Company C did not want to implement rolling forecasting.

With this basis, an effective process is needed to obtain an accurate output. The tools & systems used, and the role of the process owner are valued as very important. The process owner is able to bring actors together for a discussion and to control the progress, by making sure deadlines are kept and sending instructions. Tools & systems are used in facilitate information transport. Not only would it be impossible to produce a rolling forecast without tools or systems, the quality of the tools and systems used largely determines the quality of the output. The example of Company Cs subsidiary in Finland, where a large amount of money was used to implement a new system was striking. Due to the level of detail of the program and the large amount of 'process' which was needed, more accurate results were obtained by the old systems. Furthermore, the amount of stand-alone tools seems to be an important denominator of an inaccurate process.

In order to make the process function effectively, with enough employees and good quality tools and systems, enough resources are needed. This research shows that the amount of resources largely determines how accurate the rolling forecast is. A tool might not be fixed, or insufficient employees might be available, if management fails to make available enough resources.

For all these factors is applicable, that without its presence, rolling forecasting cannot be accurate. Most likely, rolling forecasting would not even be possible. The process owner has such a key role in the process that his absence would result in chaos. Furthermore, imagining a rolling forecast for a company with the size of the participants in this research without tools or systems, an S&OP process or resources, is not possible.

4.5.5 Capabilities and support of the employees and the management

The fourth group of factors which can be labeled as most important critical success factors encompasses the functioning of the people. This includes the factors management focus, capabilities & competences, management support, culture and – although also discussed in support in the process – the process owner. When looking at the list with mean scores, it is evident why this group of factors is seen as very important: the factors ranked 1st, 2nd, 4th, 5th and 17th in the list of 28.

The mean scores make clear that a successful rolling forecast is not possible without success in this group of factors. Without the knowledge of employees to interpret forecast outcomes, specific data is meaningless. Furthermore, without management focused towards the future in the review meeting, it has no value producing a rolling forecast.
The factors culture and management support affect the whole rolling forecasting process and determine to a large extend the success of the implementation and deployment of the method. According to the interviews, management has to create a culture in which employees feel free to share information. Only with complete and correct information, accuracy can be high. Above that, the support of management is perceived as crucial for successful rolling forecasting. The respondents state that without full and continuous support of the management, it is not possible to make the crucial design choices. Furthermore, the availability of resources and the drive for employees to perform at their utmost will depend largely on the support of the management.

Both the ranks of the survey scores and the explanation of the respondents make clear that this group of factors is very important for successful rolling forecasting.

4.6 Conclusion

The goal of this chapter was to show the results of this research. The findings of this research show that 28 of the factors can be named as critical success factors. Nine factors are considered to be surrounding factors which do influence the success of rolling forecasting.

Out of all critical success factors, four groups of factors are found to be most important. First, the design of the rolling forecast is found to be very important. The design has to fit with the surrounding factors, the goal of the rolling forecast and be designed in such a way that the complexity is as low as possible. Only then, the rolling forecast can be accurate and optimally used. Secondly, the input factors determine to a large extend the quality of the output of the rolling forecast. Master-data, assumptions or input information which is incomplete or incorrect directly leads to an inaccurate rolling forecast. Thirdly, the support in the process encompasses the ability to effectively and efficiently transform the input data into output data. Without sufficient support, rolling forecasting cannot be organized. Fourth, the functioning of the people in the process, which includes both the employees and the management are found to be crucial for successful rolling forecasting.

Furthermore, this research found that rolling forecast accuracy and the rolling forecast use are not the only two indicators that can be used to measure the success of rolling forecasting. Companies in this research also used the efficiency of the rolling forecast – the accuracy of the rolling forecast in relation with the amount of resources used - to judge the performance of the method.

Chapter 5. Conclusion

5.1 Introduction

In the previous chapters, the factors determining the success for rolling forecasting have been assessed for six companies. The results, which are outlined in chapter four, provide an answer to the main question of this research:

"What are the critical success factors for a best fitting design, implementation and deployment of rolling forecasting within the Consumer Packaged Goods business and how do these factors influence the success of rolling forecasting?"

This chapter will show the conclusions of this main research question. First, the general findings will be discussed. Secondly, the results of this research will be outlined, in which the individual factors are discussed first and the most important factors are discussed second. This chapter will end with the limitations and topics for future research.

The conclusions of this chapter are based on the definition of critical success factors given by Leidecker and Bruno (1984, page 24) for successful firms. In this research, critical success factors are those characteristics, conditions or variables that when properly sustained, maintained and managed, can have significant impact on the success of rolling forecasting. With this definition in mind, it is important to state that a factor can influence the success of forecasting, without being a critical success factor. The difference can be found in the expression 'sustained, maintained and managed', which all include actions. Factors which influence the accuracy of the rolling forecast, without possible actions of the company cannot be seen as critical success factor.

5.2 Conclusion

5.2.1 General findings

When assessing the gathered data of this research, several findings are noted which are not directly related to the research question. Nevertheless, these findings are useful for understanding and valuing rolling forecasting as a concept and the results of this research in particular.

First, when comparing the designs of the companies that do use rolling forecasting, it appears that all companies use rolling forecasting differently. Tanlu (2007) stated that different companies use rolling forecasting in different ways, but only expressed the use of a different frequency or window. In practice however, rolling forecasts differ per company in more characteristics. Company B has designed their rolling forecast in close alignment with the budgeting cycle, where other companies have separated these processes. The output of the rolling forecast of Company D is not made financial, where the output of Company A's rolling forecast is. Company B's rolling forecast is prepared for a relative short period to align the production planning. The economical result of the rolling forecasting output is not calculated. Within Company F, three rolling forecasts are prepared for several goals, where Company A is planning to use one rolling forecast. Besides these examples, the companies choose to apply different windows, frequencies, forecast different KPI's, and use different dimensions. The reason for variety on rolling forecasting designs can be found in the goal of the rolling forecast – a factor which is not yet discussed in the rolling forecasting literature and not incorporated in this research. The goal of the rolling forecasts of

Company B, Company F, and Company A - to steer the company on the mid-long term and provide a gap-analysis with the targets – made it necessary to have a 'financial' output of the rolling forecast. Company D's goal to align the short-term operation planning does not result in a need for financial results. The goal of the forecast of Company D leads to involvement of different departments and a different process.
The same reasoning is applicable for the choice of window, dimensions or KPI's. If a company wants to produce a CapEx planning or capacity planning, a forecasting window of 3 quarters will not be sufficient, since decisions cannot have enough power.
These examples make clear that the goal of the rolling forecast has important influence on choices made in the design phase of the company.

A second finding of this research is related to the definition of success of rolling forecasting. The construct used in this research is based on Zotteri and Kalchsmidt (2007), who define the success of sales forecasting as a result of forecast performance, measured in accuracy and forecast use. The concept forecast use is broadened by Mentzer and Kahn (1997), stating that the way the forecast is used, influences the success of the forecast. The results of this research did not find indications that this construct cannot be used for rolling forecasting. Most companies actively measure the accuracy of the rolling forecast, sometimes benchmarking with other companies. Furthermore, companies agree that the decisions taken with the rolling forecasting output determine the success of the forecasting. The success of both forecasting performance and forecasting use should determine the success of the company (Zotteri, & Kalchsmidt, 2007). However the results of this research indicate a third component influencing the success of a rolling forecast for a company. Company D investigated the financial value added of increased forecast accuracy when more resources were made available for the sales department. Furthermore, Company B merged the processes of budgeting and rolling forecasting to increase the efficiency of the processes, whilst knowing that gaming behavior might decrease the forecast accuracy. These two examples show that companies do not only value the success of rolling forecasting by the forecast accuracy and the forecast use, but tend to consider the efficiency of the process as important third characteristic.

At last, it must be noted that not all critical success factors are important for all companies. The importance of several factors, like the influence of instructions, budget alignment or the strategy of the company is found to be highly dependent on the goal of the forecast and the surrounding factors.

5.2.2 Internal surrounding factors

For the component Internal surrounding factors of the rolling forecasting framework, eight factors were defined that might influence the success of rolling forecasting. However, it was expected that these factors were not manageable by the company. The results learned that two factors are nevertheless critical success factors for rolling forecasting:

- IS.3 Performance cycle
- IS.6 Culture

The performance cycle turned out to be a critical success factor for rolling forecasting. When rolling forecasting outcomes are used to define targets for managers or employees, the risk increases that gaming behavior occurs.
The last critical success factor is the culture of the company. The results of this research show that the success of the rolling forecast will be higher in companies with an open culture, where information is shared amongst all important departments and problems are solved by cooperating departments. The

factor performance cycle belongs to the design component, while the factor culture affects the whole process.

Besides the factors that can be characterized as critical success factors, several factors which are investigated turned out to be not. These factors can be divided into two categories. The first category incorporates the factors which do influence the success of rolling forecasting, but cannot be actively sustained, maintained or managed by the company. These factors are:

- IS.1 Strategy of the organization
- IS.4 Complexity of the organization
- IS.5 Maturity
- IS.7 Ownership structure
- IS.8 Complexity primary process

The strategy of the organization is found to be important for the success of some of the companies using rolling forecasting. However, the strategy has to be reflected in the KPI's and line items of the rolling forecast. The strategy itself will not be influenced due to rolling forecasting.
For the companies that choose to use rolling forecasting to steer the company on the mid-long term or gap-analysis, the strategy of the organization is influencing the rolling forecast. Without alignment between the strategy of the company and the rolling forecast, the forecasting output cannot be optimally used. For companies applying the rolling forecast for different purposes (e.g. short-term production planning), the strategy alignment appeared to be not important.
The complexity of the organization, maturity of the organization and complexity of the primary process all influence the complexity of the rolling forecasting within a company. The results of this research show that larger companies with more products or a more complex primary process need a more complex process to organize rolling forecasting. Furthermore, high mature companies will be better able to organize its processes, use the right tools & systems and have the right focus to deploy rolling forecasting. These four factors are all labeled grey in the model, indicating that there is influence on the success of rolling forecasting, but cannot be managed by the company.
The results show that the ownership structure of the company can unburden the implementation of rolling forecasting. A public listed company with many shareholders can hinder the implementation process when the management is forced to focus on short term results, whereas a private owned company is active in a more quite environment.

The second category includes one factor which has no direct influence on the success of rolling forecasting:

- IS.2 Structure

The results of this research show that this factor is not a critical success factor. The structure is perceived as important when organizing the rolling forecasting process, but has no direct ties with the success of rolling forecasting.

5.2.3 External surrounding factors

Initially, six factors were defined for the component external surrounding factors, of which none can be defined as critical success factors. The list with factors can be divided in three categories. The first category includes the factors which do not directly influence the success of the forecast, but the decision to use rolling forecasting:

- ES.1 Type of industry
- ES.2 Market characteristics

The results indicate that the type of industry and the characteristics of the market determine the need for a company to use a tool like rolling forecasting. A tool as sophisticated – and difficult to maintain – as rolling forecasting will only be applied in industries where increased expenses in a tool like rolling forecasting has enough benefits. Both factors furthermore influence the design of a company. Depending on the industry and market, companies have to adjust their window or frequency.

The second category encompasses the factors influencing the success of rolling forecasting, without the possibility to be managed by the company:

- ES.3 Market specific developments
- ES.4 Macro-economical developments

The results show that changes in the market or macro-economy have serious influence on the accuracy of the outcome. A company can use the right data and have the best processes, but an unexpected decrease of the raw material prices or a development in the world economy will lead to a decreased accuracy of the forecast. It speaks by itself that a company cannot influence the market developments or the macro-economy. Therefore, these factors are labeled as surrounding factors.

The last category includes the factors which are not labeled as critical success factors and have no influence on the success of the forecast:

- ES.5 Laws & regulations
- ES.6 Influence of external stakeholders

The results clearly show that changes in the laws and regulations have no influence on the success of rolling forecasting. Since this research focused on companies in the consumer goods business, influence might exist in other industries. The results for the last factor, influence of external stakeholders, gave no pattern of evidence. The contradictory statements cannot be explained by other factors. Therefore, no conclusion can be drawn for this factor.

5.2.4 Design

For the design component of the rolling forecasting framework, eight factors are defined that could influence the success of rolling forecasting. The results of this research show that all factors can be labeled as critical success factors:

- D.1 Frequency
- D.2 Window
- D.3 Dimensions
- D.4 Organizational level
- D.5 Alignment with the budget
- D.6 Resources available
- D.7 KPI's/line items
- D.8 Timing

The right choice within these factors in the design phase turns out to be critical for the success of rolling forecasting. The window and the frequency of the rolling forecast must fit with the goal of the rolling forecast and the surrounding factors. A window which is too long or a frequency which is too high will result in an inefficient process, since an update is prepared without significant added value. If a window is too short or the frequency is too low, the rolling forecast cannot be effective. If a company wants to use rolling forecasting to make a capacity planning (closure or opening of factories) and define a window of two quarters the output cannot be optimally used. Furthermore, if a rolling forecast is used in a rapid changing environment, a quarterly frequency instead of a monthly frequency will lead to a lower accuracy. The same reasoning is applicable for the dimensions of the forecast. All companies in this research actively made choices in the balance between the level of detail in the dimensions and the complexity of the process. More details in a rolling forecast automatically leads to a more complex process and a longer throughput time, which decreases the chance to produce a successful forecast.
The results of the factor organizational level made clear that the place in the organization where the forecast is prepared has significant influence on the success of rolling forecasting. In general, it can be stated that a rolling forecast should be prepared at the organizational level with the knowledge of the business. If a company chooses to produce a forecast on a level without full knowledge needed to prepare the forecast, lower forecast accuracy will be obtained.
The importance of the fifth factor of the design of the rolling forecasting framework gave mixed results. Some companies, which use the forecast to give an update on the budget or prepare the budget and the rolling forecast with the same process, valued the alignment as real important. It makes sense that companies, who prepare the budget and the rolling forecast with the same process, make sure that, for example, the same KPI's are forecasted. Other companies valued the factors as not important and stated that both tools should have separated processes. Therefore, the conclusions can be drawn that the importance of this critical success factor depends on other choices made.
The factor resources available turn out to be a critical success factor for all companies. The results show that when fewer resources are made available directly leads to a less accurate forecast. Resources can be made available in FTE for preparing the rolling forecast and tools to support the process.
Enough evidence is found which supports that the factor timing is a critical success factors. Discussing a forecasting output in holiday period, preparing a forecast at the moment actuals are not yet available or *not* preparing a forecast at the top sales moment of a product category are good examples of wrong timing of rolling forecast obtained by this research. Wrong timing will lead to a forecast use which is not optimal.
The last factor of the design category is the choice for KPI's/line items. The results indicate that the choice for KPI's and line items is a critical success factor and depending on the goal of the forecast. When defining the wrong KPI's, the rolling forecast not fit with the goal of the forecast and the forecasting use will be lower in comparison with companies with the right KPI's.

5.2.5 Input

The results of the input factors of the rolling forecasting framework indicate that most of the input factors can be labeled as critical success factors:

- I.1 Information input
- I.2 Assumptions
- I.3 Master data

The first critical success factor for the input component is the information given by the operational departments. A marketing manager who does not communicate the impact of a planned promotion will result in a lower accuracy.

Furthermore, the results show that the quality of the assumptions is critical for the success of rolling forecasting. Wrong assumptions for growth in market share, raw material prices or exchange rates can have significant influence on the bottom-line result of the rolling forecasting.
The master data is used in most companies to produce the rolling forecast. Company D and Company F use statistical data to produce the forecast. The results show that correct data of the historical sales volume are very important. Incorrect data or of less qualitative master data will cause troubles with using the statistical models, and thereby the forecast accuracy.

- I.4 Budget

The results of this research did not find evidence to support that the quality of the budget is important for rolling forecasting. Most respondents explained that the budget and the rolling forecast are separated processes. The quality of the budget should (ideally) have not influence on producing the rolling forecast.

5.2.6 Process

The process component of the framework consisted out of ten factors. The results made clear that nine of these factors can be labeled as critical success factors:

- P.1 Procedures & Guidelines
- P.2 Instructions
- P.3 Process owner
- P.4 Deadlines
- P.5 Tools & systems
- P.6 Involvement of all departments
- P.7 Capabilities & competences
- P.8 Throughput time
- P.9 S&OP process

The results of this research indicate that procedures and guidelines can be beneficial to facilitate the process of rolling forecasting within companies. A clear process is also obtained by sending instructions. The majority of respondents did value the instructions as important, since deadlines, assumptions and responsibilities are communicated. The same reasoning is applicable for the role of the process owner. A process owner can keep control over the process and facilitate discussions. Furthermore, having deadlines (and meeting them) is valued as critical for successful rolling forecasting. In all companies in this research, rolling forecasting is valued as a tightly planned process, in which small delays can cause serious problems. Meeting deadlines is crucial in that regard.

The results indicate that the tools & systems component are critical for successful rolling forecasting. Good guidelines and instructions are useless if the quality of the tools and systems are not good enough to facilitate the process or aligned with the process. Too many stand-alone tools and not using a special demand forecasting tool are considered to be weak spots in the tooling for companies.
The involvement of important departments is also considered as a critical success factor. The involvement of departments tends to vary among companies, based on the goal of the forecast or the surrounding factors. One of the companies values the importance of Supply Chain more important, since a large amount of costs is spent in the supply process. The involvement of Marketing & Sales, Planning & Control and Finance are considered important for all companies.
The results indicate that organizing rolling forecasting without having a good working S&OP process in place is not possible. The S&OP process facilitates the process of alignment between the operational

departments within a company. If the departments purchase, sales and production are not able to discuss and align their planning, producing a rolling forecast cannot have an accurate outcome.
The eighth critical success factor for rolling forecasting is the factor capabilities and competences. The results show that the quality of employees has significant influence on the success of the process. Most respondents value business knowledge and analytical skills as most important. Business knowledge is required to interpret the expectations, while analytical skills are needed to understand statistical models used.
The last critical success factor of the process component is the throughput time of the process. The results show that companies make deliberate choices to reduce the throughput time. The throughput time should ideally be as short as possible, since it mitigates the risk of producing an outdated forecast. However, companies have to balance the interest in producing a forecast with a short throughput time, and the interest in adding more dimensions or a higher level of detail. The choice for the required throughput time is, or should be, made by companies in the design phase. Therefore, this factor is included in the design component in the model.

The tenth factor in the process component is influencing the success of rolling forecasting, but cannot be labeled as critical success factor:

- P.10 Complexity of the process

The results make clear that the complexity of the process has influence on the success of the rolling forecast. Furthermore, the complexity of the process can be managed by incorporating more or less dimensions or departments, or using the right tools. However, this includes that the complexity of the rolling forecast is a direct result of other choices made, as forecast accuracy is, amongst others, the result of using the right frequency and the availability of enough resources. Therefore, the complexity of the rolling forecast is not a direct critical success factor, but an indicator for the quality of the process.

5.2.7 Output

The results show that the three factors made for the output component can all be labeled as critical success factors:

- O.1 Quality of the report
- O.2 Management focus in the review meeting
- O.3 Measuring accuracy

The quality of the monthly report is the leading document for the discussion in the review meeting. Most mangers of large companies have, or make, no time to read thick reports with large amounts of numbers. Therefore, and in order to facilitate the review meeting optimal, respondents state that the report should be as simple as possible, and as much graphically displayed as possible.
The second factor determining the success of the output component is the focus of management in the review meeting. The results show that the focus of the management is important. Managers should spent at least spent 50% of the time discussing the rolling forecasting output, instead of discussing the past of the company.
At last, measuring accuracy tends to be critical for the success of rolling forecasting. Not only functions the accuracy as measurement tool for the quality of the rolling forecast, which an essential condition for improving the process is, it also helps management to value the output in the discussion and to focus on the most important categories. Management can take different decisions for categories with a relative low accuracy.

5.2.8 Act

The last component of the rolling forecasting framework was the act component, encompassing the actions taken with the rolling forecast output. All three factors turned out to be critical success factors:

- A.1 Decision making process
- A.2 The ability to change the process
- A.3 Management support

The decision making process is valued as critical success factor for the success of rolling forecasting. However, the type of decisions varies among companies, based on the goal of the rolling forecast. The second factor is the ability to change the process. The results show that the ability to change the process is critical for the success of rolling forecasting. Rolling forecasting is perceived to be a process of continuous improvements. Where the practice in companies regarding structured improvement processes varies, all respondents agree that having such a process is beneficial for the success of rolling forecasting on the long run. At last, management has to create an open and transparent culture and consistently emphasize the importance of rolling forecasting.

5.3 Most important factors

To provide an answer to the main question of this research, the list with critical success factors from table 11 is used. This table shows the factors found critical for rolling forecasting ranked by the mean survey score. The blue marked factors are found critical for specific forecasting processes, where the unmarked factors are applicable for most of the business processes.

Nr.	***Component***	***Factor***	***Mean Score***
1	Output	Management focus	5.9
2	Process	Process owner	5.9
3	Input	Master data	5.8
4	Process	Capabilities &competences	5.8
5	General	Management support	5.7
6	Design	Organizational level	5.7
7	Input	Assumptions	5.7
8	Process	Tools & systems	5.7
9	Act	The ability to change the process	5.6
10	Input	Information input	5.6
11	Process	Involvement of all departments	5.6
12	Process	S&OP	5.6
13	Act	Decision making process	5.5
14	Design	Resources available	5.5
15	Design	KPI's/ line Items	5.4
16	Design	Dimensions	5.3
17	General	Culture	5.3
18	Design	Throughput time	5.2
19	Output	Report	5.1
20	Design	Timing	5.0

21	Output	Measuring accuracy	5.0
22	Design	Window	4.9
23	Design	Frequency	4.9
24	Design	Performance cycle	4.9
25	Process	Deadlines	4.9
26	Process	Procedures & guidelines	4.8
27	Process	Instructions	4.6
28	Design	Budget alignment	4.2

Table 11: Mean scores of the critical success factors

Out of the 28 factors which are labeled as critical for rolling forecasting, several groups of factors can be identified as the most important factors.

5.3.1 Design

One of the most important critical success factors is the design of the rolling forecast. Companies should organize the design and the process of rolling forecasting based on the surrounding factors and the goal of the rolling forecast. The results of this research show that a good fit between these surrounding factors, the goal of the forecast and the rolling forecast increases the accuracy of the forecast and make sure the rolling forecast is optimally used. The window of a rolling forecast should, for example, be a careful consideration between the goal of the forecast and the characteristics of the market. Companies in a volatile market will have to limit the window to where decisions have power. Valuable time is wasted if the rolling forecast is prepared for a longer window, if the projections are not accurate enough to base decisions on. Nevertheless, a window which is too short will not be sufficient to meet the goal of the forecast. A window of 9 months will encompass insufficient information for a tactical plan, which limits the forecast use.

Furthermore, companies planning to use rolling forecasting should limit the complexity of the process as much as possible. The statement 'less is more' is clearly applicable for rolling forecasting. This research found that the success of rolling forecasting is partly determined by the choices made in the dimensions and the KPI's. Companies tend to add more and more details to the rolling forecast to feel secure. However, the opposite seems to be true. Each dimension or KPI added to the rolling forecast results in an exponential increased amount of work and complexity of the rolling forecast. A more complex process and more work significantly decrease the chance of making an accurate forecast.
Most of the respondents in this research argued that the rolling forecast in their company included dimensions which are not needed for the goal of their rolling forecast. These statements make clear that designing the rolling forecast is a difficult process. Stakeholders throughout the whole organization try to influence the design by adding important KPI's for their part of the business. The difficulty of this step increases even further if a rolling forecast has to be designed for a company in different countries or regions. KPI's do not only vary among departments or business units, but also between the operations in different geographical regions.
To cope with these challenges, a key role is reserved for the management of the company. If the management does not support the implementation of rolling forecasting or is not decisive enough to limit the KPI's and level of detail within the dimensions, wrong choices will be made. This means that the implementation of rolling forecasting cannot be organized completely bottom-up. Such a process will result in an extensive package of KPI's and dimensions. Therefore, difficult top-down choices need to be made to ensure a lean process.

5.3.2 Input information

This research clearly shows that the quality of the input largely determines the quality of the output. This means that the quality of the three input factors – master data, information input and assumptions – are of critical importance for successful rolling forecasting. The master data and information input are crucial to determine the expected volume of the rolling forecast. Master data serves as input for the statistical systems used to derive a rolling forecast. Incomplete or incorrect information directly leads to incorrect output, and thus to a lower forecast accuracy. Information input from departments is needed to obtain the latest information needed to derive the forecast. Missing information directly leads to an inaccurate output. One of the clearest examples is missing information from the marketing department. The influence of a promotional campaign on the expected volume is in most companies high, which makes it crucial that the latest information is included.

To conclude, it can be stated that the input information used is of great importance for the success of rolling forecasting.

5.3.3 Support in the process

Another component with great impact on the overall outcome of the rolling forecast is the level of support for the process. The input data must result in an accurate output. This research shows that the way this process is organized and supported determines to a large extend how accurate the rolling forecast is. Tools and systems are for example not only indispensible for the rolling forecast, but also a great denominator for the quality of the output. Too many stand-alone tools or systems that do not fit with its environment cause serious damage to the accuracy of the forecast. Another good example is the S&OP process. A good working S&OP systems seems to be the basis on which rolling forecasting is build. Without such process, involved departments will not share the right information, which causes incomplete input information.

To ensure a good working process, with good working tools and systems and enough employees available, enough resources must be available. An insufficient amount of resources will result in tools which do not work optimal and not enough employees leads to a shortage in information.

Overall, the quality of these factors relates to the support in the process component. With a well organized process, good quality input information leads to accurate output. However, an insufficient organized process will result in a less accurate forecast.

5.3.4 Capabilities and support of employees and the management

The last important group of factors is the people-side of rolling forecasting. This research confirmed findings in sales forecasting that the support of the management, the role of the process owner, the capabilities and competences of the employees and, to a lesser extent, the culture of the company are considered critical for successful rolling forecasting. Even with an outstanding design, a fluent process and up-to-date input information, the rolling forecast cannot be accurate if the employees are not able to interpret the data or the management does not support the method. The capabilities and competences of employees have great influence on the processing of information. Insufficient business knowledge might cause problems interpreting output. Furthermore, the process owner is important in controlling and facilitating the process. By bringing departments together and making sure deadlines are met, this role is valued as very important. At last, the focus of management in the review meeting and the support of management in implementing and using the rolling forecast are valued as crucial. Without their support, employees will not feel the need to spent valuable time in producing the forecast. Furthermore, the value of producing a forecast diminishes if the management does not spent time discussing the outcomes.

To conclude, this research found that without the quality of the people in the rolling forecasting process, the rolling forecast cannot be accurate and cannot be optimally used.

5.4 Discussion

5.4.1 Evaluation of the completeness of the critical success factors

The results of this research encompass 28 factors found critical for rolling forecasting and 9 surrounding factors influencing the rolling forecast. The question can be asked with what certainty this list can be called “complete”. In other words: how large is the risk that a critical success factor is unfairly ignored in this research.

This question cannot be answered by stating that there is no risk of having missed a factor. The design of this research, relying on theoretical propositions – the preliminary list with factors, includes the consequence that other factors receive less attention. However, a design without preliminary factors includes an even larger risk of obtaining an incomplete picture.

Despite the fact that there is a risk of having overlooked a critical success factor, this risk can be characterized as very small. Three design conditions lead to this conclusion.

Firstly, the preparation for this study was extensive and consisted out of a critical evaluation by several experts. This review was done by experts in the field of rolling forecasting and revealed several factors which were not found in the literature review.

Secondly, all respondents were asked which factors were not listed in the survey. Nearly all participants have great experience in rolling forecasting, which means that if any factor was overlooked, it should be noticed in this discussion. The participants added two more factors and concluded that the list was comprehensive and mostly complete.

Thirdly, the results of this research are tested during a round table meeting where practitioners and other participants of interested companies joined a discussion on the research outcome. The conclusion of partitioning companies was that the list with critical success factors was complete.

Based on these three design conditions it can be stated that the risk of having overlooked a factor is small. If a factor is missed in this research despite the three rounds of validation, the specific factor will have only minor influence on the success of rolling forecasting.

5.4.2 Implications

With the results and the conclusions of this research discussed in the previous paragraphs, a few words on the implications of this research might place this study in perspective. For partitioning companies, the rolling forecasting model provides a clear overview of all factors that influence the success of rolling forecasting. The managers responsible for implementation of rolling forecasting can use this model as a checklist. Before implementing a rolling forecast, all 28 critical success factors should be extensively discussed within the implementation-team in order to deliver a good working design. However, this research does not provide companies with a readymade design or blueprint of a rolling forecast. Therefore, managers should design the rolling forecast based on the surrounding factors and the characteristics of the company.

The four main conclusions of this research –design, input information, support in the process, and capabilities and support of the employees and the management – provide the management with clear directions for the most important components regarding the implementation of rolling forecasting. Managers can use these results to focus attention in the design and implementation process.

The same framework can be used as checklist for improvement for companies currently using rolling forecasting. With consequently validating the quality of the 28 critical success factors and its relations with the success of rolling forecasting, companies can find areas of improvement with which better forecasting performance can be achieved.

At last, researchers can use the outcomes of this study to conduct further research on the topic rolling forecasting. Recommendations for further research are discussed in paragraph 5.4.4.

5.4.3 Limitations

Although this research was carefully prepared and executed, there are several limitations and shortcomings that should be mentioned.

First of all, this objective of this research was to map the factors that influence the success of rolling forecasting and describe the relation between the factor and the success of the method. Due to the limited time available for conducting this research, it was not possible to conduct research on the question how the critical success factors should be organized obtain the best output.

Second, this research focused on companies active in the consumer packaged goods business, which means that the possibility that conclusions are slightly different in other industries cannot be ruled out. The research findings show that the rolling forecast design and process differs per company to cope with other internal and external surrounding factors. Companies in other industries might value the importance of several factors on the success of rolling forecasting differently, due to other surrounding factors.

Third, structuring this research with the factors helped to bring focus in the interviews and structure the analysis of results. However, the risk increased that focusing on these factors has drawn away the attention of factors which are failed to notice in the desk research. To limit this risk, all participants were asked at the end of the interview whether they missed any factors in the survey or in the interview. This resulted in valuable input, but cannot guarantee that a factor is not taken into account in this research.

Fourth, some notes have to be made regarding the reliability of this research. One of the downsides of qualitative research is the dependency on a relative small number of respondents. The results of this study are based on findings of eleven respondents. By including six different companies in different stages of rolling forecasting and employees and managers in different roles in the process, this shortcoming is attempted to be minimized. Nevertheless, additional research encompassing a larger number of respondents might provide even more reliable results.

5.4.4 Recommendations for future research

The conclusions of this research provide useful information for ConQuaestor to start a new proposition. Furthermore, the proposed model with factors influencing the success of rolling forecasting provides a useful framework for rolling forecasting for further research. Several areas are particularly interesting.

Firstly, as is mentioned in the limitation paragraph of this research, this research does not provide an answer on the question how companies have organized or should organize the critical success factors in order to achieve an optimal rolling forecasting performance. Further research is needed to find which configuration leads to an optimal output. In a successive study, the practices of companies regarding each factor could be examined. This study on critical success factors could function as start-up for such research.

In a later stage, the definition of best practices could be of great help for companies that struggle with achieving optimal forecasting results and companies trying to design a rolling forecast.

Secondly, more research is needed to find more regarding the efficiency of rolling forecasting. Earlier researchers used the efficiency of forecasting solely to describe the efficiency of incorporating new information. The efficiency of the process, which is based on the forecast performance and the resources made available, is not yet discussed. More research to the impact of the factor efficiency is needed to understand the choices managers make in real-life business.

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In alphabetical order:

www.searchcrm.com

www.conquaestor.com

Appendix 1: Complete list with factors

Internal surrounding factors	External surrounding factors	Design	Input	Process	Output	Act
Strategy of the organization (IS.1)	Type of industry (ES.1)	Window (D.1)	Information input (I.1)	Procedures & guidelines (P.1)	Quality of the report (O.1)	Decision making process (A.1)
Structure (IS.2)	Market characteristics (ES.2)	Frequency (D.2)	Assumptions (I.2)	Instructions (P.2)	Management focus (O.2)	The ability to change the process (A.2)
Performance cycle (IS.3)	Market specific developments (ES.3)	Dimensions (D.3)	Master data (I.3)	Process owner (P.3)	Measuring accuracy (O.3)	Management support (A.3)
Complexity of the organization (IS.4)	Macro-economical developments (ES.4)	Organizational level (D.4)	Budget (I.4)	Deadlines (P.4)		
Maturity (IS.5)	Laws & regulations (ES.5)	Alignment with the budget (D.5)		Tools & Systems (P.5)		
Culture (IS.6)	Influence of external stakeholders (ES.6)	Resources available (D.6)		Involvement of all departments (P.6)		
Ownership structure (IS.7)		KPI's/line items (D.7)		Capabilities & competences (P.7)		
Complexity primary process (IS.8)		Timing (D.8)		Throughput time (P.8)		
				S&OP process (P.9)		
				Complexity of the process (P.10)		

Appendix 2: Rolling forecast designs of the respondents' companies

Companies	Phase	Window	Frequency
Company E	Not using	-	-
Company A	Planning	4 quarters	Quarterly
Company C	Not using	-	-
Company F	Using	8 quarters	Monthly
		3 months	Weekly
Company B	Using	4-5 quarters	Quarterly
Company D	Using	3-6 months	Weekly

Appendix 3: Online survey

1	What is your name?	Open vraag (klein)

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2	What is your function?	Vraag (single response)

- CFO
- Vice- President/ Director/Manager Finance
- Vice- President/ Director/Manager Financial Accounting & Reporting
- Vice- President/ Director/Manager Planning & Control
- Corporate Controller
- Business Unit Controller
- Financial Controller
- Controller (Other)
- Financial Employee
- Financial Analyst
- Director/ Manager Sales
- Account Manager
- Account Employee
- Director/ Manager Marketing
- Marketing/ Product Manager
- Marketing Employee/ Analyst
- Director/ Manager Supply Chain
- Operations Manager
- Supply Chain employee
- Other, please add job title

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3	Please add your workexperience.	Selectbox (1 regel)

- 0-5 years
- 6-10 years
- 11-15 years
- 15-20 years
- 21-25 years
- > 25 years

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4	How long is your company applying Rolling Forecast?	Selectbox (1 regel)

- 0-2 Years
- 3-4 Years
- 5-6 Years
- 7-8 Years
- > 8 Years

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5	Which planning tools does your company use?	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Budget
- ☐ Forecast
- ☐ Rolling Forecast
- ☐ Other1:
- ☐ Other 2:
- ☐ Other 3:

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6	Is your rolling forecast: (or in case of design phase are you planning)	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Regularly updated (e.g. with actuals)
- ☐ Horizon not limited to fiscal year
- ☐ Not used for performance evaluation
- ☐ Made in less detail then the budget

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7	Is your company strategy aligned with the rolling forecast (or in case of design phase are you planning)? If aligned the strategy will result in a number of key success factors and key performance indicators and therefore the rolling forecast is made on financial and non- financial KPI's, which fit to the strategy chosen.	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Yes
- ☐ No

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8 How would you rate the complexity of your company?
1 = not complex 7 = very complex

Tabelvraag (single response)

Minimaal aantal vinkjes: 150

In # of products, productgroups, SKU's	○	○	○	○	○	○	○
In # of brands	○	○	○	○	○	○	○
In # of markets served	○	○	○	○	○	○	○
In # of countries served	○	○	○	○	○	○	○
In # of Suppliers	○	○	○	○	○	○	○
In # of Customers	○	○	○	○	○	○	○

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9 What organizational structure does your company have?

Vraag (single response)

- ○ Divisional organization
- ○ Functional organization
- ○ Matrix organization

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10 Which choice did your company make regarding the frequency of the rolling forecast?
(or in case of design phase are you planning)?

Vraag (single response)

- ○ Weekly
- ○ Monthly
- ○ Quarterly
- ○ Other

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11 Which forecasting window has your company chosen? (or in case of design phase are you planning)? — Vraag (single response)

- ○ (Fiscal) year- end
- ○ 5 Quarters
- ○ 6 Quarters
- ○ 8 Quarters
- ○ Other

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12 On which financial reporting line items and KPI's is the rolling forecast prepared? (or in case of design phase are you planning)? — Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Full P&L
- ☐ Part of the P&L
- ☐ Full Balance sheet
- ☐ Part of the Balance sheet
- ☐ Working Capital
- ☐ CapEx
- ☐ Market shares
- ☐ Volume
- ☐ Other:

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13 On which dimensions is the rolling forecast prepared? (or in case of design phase are you planning)? — Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Productgroup
- ☐ Product
- ☐ SKU
- ☐ Corporate
- ☐ Business Unit
- ☐ Operational Company
- ☐ Department/ Team
- ☐ Brandgroup
- ☐ Brand
- ☐ Country
- ☐ Region
- ☐ Customer
- ☐ Group of customers
- ☐ Other 1:
- ☐ Other 2:
- ☐ Other 3:

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14 Do you think that the investments made available (time spend, # of employees, systems) for rolling forecasting are enough? — Vraag (single response)

- ○ Yes
- ○ No
- ○ If no, why?

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15	Which input data is collected in order to form the rolling forecast? (or in case of design phase are you planning)?	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Sales volumes
- ☐ Sales prices
- ☐ Volume discounts
- ☐ Price discounts
- ☐ Trade and marketing initiatives
- ☐ External information (macro- economic)
- ☐ Competitor information
- ☐ Supplier information
- ☐ Customer information
- ☐ Production planning
- ☐ Cost prices
- ☐ Latest Estimate
- ☐ Budget
- ☐ New Product Development
- ☐ Other 1:
- ☐ Other 2:

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16	Which of the input information do you value as most important?	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Sales volumes
- ☐ Sales prices
- ☐ Volume discounts
- ☐ Price discounts
- ☐ Trade and marketing initiatives
- ☐ External information (macro- economic)
- ☐ Competitor information
- ☐ Supplier information
- ☐ Customer information
- ☐ Production planning
- ☐ Cost prices
- ☐ Latest Estimate

☐ Budget
☐ New Product Development
☐ Other 1:

☐ Other 2:

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17	On which items does your company make assumptions? (or in case of design phase are you planning should be made)?	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

☐ Prices of raw materials
☐ Margins on products
☐ Sales prices
☐ Cost prices (product efficiency, personnel costs, other.)
☐ Growth in market shares
☐ Growth of the total market
☐ Exchange rates
☐ Other 1:

☐ Other 2:

☐ Other 3:

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18 How do you value the importance of the assumptions? 1 = Not important 7 = Very important — Tabelvraag (single response)

	1	2	3	4	5	6	7	We do not make assumptions for this item
Prices of raw materials	○	○	○	○	○	○	○	○
Margins on products	○	○	○	○	○	○	○	○
Sales prices	○	○	○	○	○	○	○	○
Cost prices (product efficiency, personnel costs, other)	○	○	○	○	○	○	○	○
Growth in market shares	○	○	○	○	○	○	○	○
Growth of the total market	○	○	○	○	○	○	○	○
Exchange rates	○	○	○	○	○	○	○	○
Other 1	○	○	○	○	○	○	○	○
Other 2	○	○	○	○	○	○	○	○
Other 3	○	○	○	○	○	○	○	○

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19 How do you value the quality of the source information for: — Tabelvraag (multi response)

Minimaal aantal vinkjes: 0

	Low quality	Medium quality	High quality
Last actuals	☐	☐	☐
Departemental information	☐	☐	☐
Assumptions	☐	☐	☐

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20 How do you value the completeness of the input information? Tabelvraag (multi response)

Minimaal aantal vinkjes: 0

	Not complete	Complete
Last Actuals	☐	☐
Department specific information	☐	☐
Assumptions	☐	☐

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21 How complex is your rolling forecasting process (or in case of design phase are you planning to make your rolling forecasting process)? 1 = Not complex 7 = Very complex Tabelvraag (multi response)

Minimaal aantal vinkjes: 0

	1	2	3	4	5	6	7
# of employees involved	☐	☐	☐	☐	☐	☐	☐
# of departments involved	☐	☐	☐	☐	☐	☐	☐
# of process steps	☐	☐	☐	☐	☐	☐	☐
# of reporting line items or KPI's to be rolling forecasted	☐	☐	☐	☐	☐	☐	☐

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22	Can you give an indication of the number of employees involved in the rolling forecasting process (or in case of design phase are you planning)?	Vraag (single response)

- 0-10
- 11-20
- 21-30
- 31-40
- 41-50
- 51-60
- 61-70
- 71-80
- 81-90
- 91-100
- >100

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23	How long is the throughput time of your rolling forecast process? (If a company is in the design phase, how long would you prefer the throughput time to be?)	Vraag (single response)

- 1 week
- 2 weeks
- 3 week
- 4 weeks
- 5 weeks
- 6 week
- > 6 weeks

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24	Which departments are involved in the process? (If a company is in the design phase, which departments are you planning to be involved?)	Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Marketing & Sales
- ☐ Planning & Control
- ☐ Category Managers
- ☐ Supply Chain
- ☐ Production
- ☐ HR
- ☐ Finance
- ☐ Other:

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25	Which department is coordinating/ leading the rolling forecasting process? (If a company is in the design phase, which department are you planning to be incharge?)	Vraag (single response)

- ○ Marketing & Sales
- ○ Planning & Control
- ○ Category Managers
- ○ Supply Chain
- ○ Production
- ○ HR
- ○ Finance
- ○ Other:

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26 How important is the role of these departments in the process? 1 = Not important 7 = Very important (If a company is in the design phase, how important are you planning to be these departments?) — Tabelvraag (single response)

	1	2	3	4	5	6	7	This department has no role in the rolling forecasting process
Marketing & Sales	○	○	○	○	○	○	○	○
Planning & Control	○	○	○	○	○	○	○	○
Category Managers	○	○	○	○	○	○	○	○
Supply Chain	○	○	○	○	○	○	○	○
Production	○	○	○	○	○	○	○	○
HR	○	○	○	○	○	○	○	○
Finance	○	○	○	○	○	○	○	○
Other (as stated in the previous question)	○	○	○	○	○	○	○	○
Process coordinator/leader	○	○	○	○	○	○	○	○

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27 Which systems and tools are used in the rolling forecast process? (If a company is in the design phase, which systems and tools are going to be used?) — Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Excel (Templates)
- ☐ ERP
- ☐ Forecasting systems
- ☐ Consolidation package
- ☐ Other

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28 How do you value the quality of the tools and systems used? Vraag (single response)

- ○ Very low quality
- ○ Low quality
- ○ Medium quality
- ○ High quality
- ○ Very high quality

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29 What is the content of the instructions and guidelines for the rolling forecasting process?
(If a company is in the design phase, how long would you prefer the content and guidelines to be?) Vinkvraag (multi response)

Minimaal aantal vinkjes: 1

- ☐ Activities
- ☐ Deadlines
- ☐ How to handle assumptions
- ☐ Other 1:
- ☐ Other 2:
- ☐ We do not send instructions for rolling forecasting

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30 How do you value the quality of the instructions and guidelines for the rolling forecasting process? Vraag (single response)

- ○ Very low
- ○ Low
- ○ Medium
- ○ High
- ○ Very High
- ○ We do not send instructions for rolling forecasting

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31 Do you select or train specific competences & capabilities for the employees involved in the rolling forecast process?
(If a company is in the design phase, are you going to?)

Vraag (single response)

- ○ Yes
- ○ No

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32 Which competences & capabilities are important in the rolling forecasting process?

Vraag (single response)

- ○ Analytical skills
- ○ Financial background
- ○ Knowledge of business, products, markets and customers
- ○ Communicative skills
- ○ Other:

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33 In the periodic review meetings of the management, how much time is spent on discussing 'budget vs actuals', the '(rolling) forecast' and other issieus?
Please fill in the number of percentages that is on average used to discuss the topic

Puntenverdeel vraag

Aantal punten te verdelen: 100

Budget vs actuals

(Rolling) forecast

Other issues

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34 In which meetings is the rolling forecast being used and discussed? (If a company is in the design phase, in which meetings are you planning that the rolling forecast should be used?) — Tabelvraag (multi response)

Minimaal aantal vinkjes: 0

	Corporate level	Business unit level	OpCo level	Rolling forecasting is not used in this meeting
Directors meeting	☐	☐	☐	☐
Business review	☐	☐	☐	☐
Monthly business review	☐	☐	☐	☐
Quaterly review	☐	☐	☐	☐

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35 How critical to the success of rolling forecast do you judge the following factors:
Remember: success of rolling forecast is measured in forecast accuracy (difference between actual performance and rolling forecasted performance) and forecasting use (the way the forecast is used by the management). 1 = Not critical 7 = Very critical — Tabelvraag (multi response)

Minimaal aantal vinkjes: 0

	1	2	3	4	5	6	7
Alignment rolling forecast with the corporate strategy	☐	☐	☐	☐	☐	☐	☐
Decoupling targets and the rolling forecast	☐	☐	☐	☐	☐	☐	☐
The complexity of the organization	☐	☐	☐	☐	☐	☐	☐
Maturity growth phase of the company	☐	☐	☐	☐	☐	☐	☐
The type of culture of the company (Power, role, task or person culture)	☐	☐	☐	☐	☐	☐	☐
The structure of the organization	☐	☐	☐	☐	☐	☐	☐

(divisional, functional, matrix)								
Complexity primairy process	☐	☐	☐	☐	☐	☐	☐	
Type of industry/business	☐	☐	☐	☐	☐	☐	☐	
Complexity market characteristics (competition, saturation)	☐	☐	☐	☐	☐	☐	☐	
Changes in laws & Regulations	☐	☐	☐	☐	☐	☐	☐	
Changing macro-economical circumstances (turbulence)	☐	☐	☐	☐	☐	☐	☐	
Changing market specific developments	☐	☐	☐	☐	☐	☐	☐	
Influence external stakeholders (shareholders, banks, etc.)	☐	☐	☐	☐	☐	☐	☐	
Frequency (choice)	☐	☐	☐	☐	☐	☐	☐	
Forecasting window (choice)	☐	☐	☐	☐	☐	☐	☐	
The number of dimensions applied	☐	☐	☐	☐	☐	☐	☐	
Organizational level on which the rolling forecast is made	☐	☐	☐	☐	☐	☐	☐	
Alignment rolling forecast with budget	☐	☐	☐	☐	☐	☐	☐	
Enough resources available	☐	☐	☐	☐	☐	☐	☐	
Quality of the masterdata	☐	☐	☐	☐	☐	☐	☐	
Quality and completeness of the information input	☐	☐	☐	☐	☐	☐	☐	
Quality assumptions	☐	☐	☐	☐	☐	☐	☐	
Quality of the budget	☐	☐	☐	☐	☐	☐	☐	

Complexity of the rolling forecast process	☐	☐	☐	☐	☐	☐	☐	
Meeting deadlines if these are set	☐	☐	☐	☐	☐	☐	☐	
Quality of the instructions	☐	☐	☐	☐	☐	☐	☐	
Quality of the procedures & guidelines	☐	☐	☐	☐	☐	☐	☐	
Involvement of all important departments	☐	☐	☐	☐	☐	☐	☐	
Coupling with S&OP	☐	☐	☐	☐	☐	☐	☐	
Installment of a process owner	☐	☐	☐	☐	☐	☐	☐	
Using the right Tools & Systems	☐	☐	☐	☐	☐	☐	☐	
The capabilities & competences of the employees	☐	☐	☐	☐	☐	☐	☐	
Throughput time rolling forecast process	☐	☐	☐	☐	☐	☐	☐	
Management focus in review meetings	☐	☐	☐	☐	☐	☐	☐	
Quality of the monthly report	☐	☐	☐	☐	☐	☐	☐	
Measuring the forecast accuracy	☐	☐	☐	☐	☐	☐	☐	
Management making the right decisions with the rolling forecast	☐	☐	☐	☐	☐	☐	☐	
The ability to change the process, if that improves the rolling forecast	☐	☐	☐	☐	☐	☐	☐	
Management support in the process	☐	☐	☐	☐	☐	☐	☐	
Ownership structure of the company (public/private owned)	☐	☐	☐	☐	☐	☐	☐	

Timing of the forecast	☐	☐	☐	☐	☐	☐	☐	
Number of KPI's/ line items of the forecast	☐	☐	☐	☐	☐	☐	☐	

Appendix 4: Interview questions

Project:	**Graduation assignment – Critical success factors for rolling forecasting**
Subject:	Interview rolling forecasting
Location:	<<Insert place>>
Date:	<<Insert date>>
Time:	<<Insert time>>
<<Insert company>>	<<Insert name respondent>>
ConQuaestor:	Caspar Doeven, Bas Taminiau
Objective:	To test the list with Critical Success Factors with <<Insert company>> and find an answer to the question how each critical success factor influences the success of rolling forecasting.

Definitions:

Definition CSF:
"Critical Success Factors (CSF) are all characteristics, conditions or variables that when properly sustained, maintained and managed can have significant impact on the success of Rolling Forecasting".

Definition successful Rolling Forecast:

A factor is critical when it can have significant positive or negative impact on the rolling forecasting performance (measured by forecast accuracy) or rolling forecasting use.

Definition forecasting accuracy and forecasting use:

Rolling Forecast Performance= Rolling forecast accuracy = average forecast accuracy of the number of forecasts prepared per period and per forecast (1- ((actual performance- rolling forecasted performance)/ actual performance)).

Forecasting use is in what way the rolling forecast is used, where the usage for management decisions and actions is the most important way.
Successful forecasting use = optimal efficient and effective management decisions with the output of the rolling forecast.

Background interview:

Introduction:

1. Discuss the background of the research and expected findings:
    a. The goal is to find critical success factors for rolling forecasting;
2. Discuss the design of the interview :
    a. The interview exists out of three parts:
        i. General questions;
        ii. Highest scores on CSF list;
        iii. Lowest scores and other items.
    b. Per topic, questions will be asked to find:
        i. An explanation for the given score;
        ii. An example that clearly shows why the score is high/low;
        iii. Sometimes additional questions regarding the process, practices or opinions.

Interview questions:

Topic 1: General

1. What is the goal of your rolling forecast?

Topic 2: Internal surrounding factors

Strategy alignment – Score:

Q7: *<<Insert survey scores>>*

1. Why did you gave this score?
2. Can you give an example of the importance of strategy alignment?

Ownership structure– Score:

3. Why did you gave this score?
4. Can you give an example of the importance of the ownership structure?

Performance cycle – Score:

Q6: <<Insert survey scores>>

5. Why did you gave this score?
6. Can you give an example of the importance of the performance cycle?

Complexity of the organization – Score:

Q8: <<Insert survey scores>> *# of products* *# of brands* *# of markets served* *# of countries served* *# of suppliers* *# of customers*

7. Why did you gave this score?
8. Can you give an example of the importance of the complexity of the organization?

Maturity – Score:

9. Why did you gave this score?
10. Can you give an example of the importance of the maturity?

Culture – Score: -

11. Why did you gave this score?
12. Can you give an example of the importance of the company culture?

Organizational structure – Score:

Q9: <<Insert survey scores>>

13. Why did you gave this score?
14. Can you give an example of the importance of the organizational structure?

Complexity primary processes – Score:

15. Why did you gave this score?
16. Can you give an example the influence of the complexity of the primary process?

External factors

Type of industry – Score:

17. Why did you gave this score?
18. Can you give an example the importance of the type of industry?

Complexity of the market characteristics – Score:

19. Why did you gave this score?
20. Can you give an example of the importance of market characteristics?

Changes in laws and regulations – Score:

21. Why did you gave this score?
22. Can you give an example of the importance of laws and regulations?

Macro-economical developments (Greece) – Score:

23. Why did you gave this score?
24. Can you give an example of the importance of macro-economical developmens?

Market specific developments (raw material prices) – Score:

25. Why did you gave this score?
26. Can you give an example of the importance of market specific developments?

Influence external stakeholders – Score:

27. Why did you gave this score?
28. Can you give an example of the importance of the influence of external stakeholders?

Plan

Frequency - Score:

Q <<Insert survey scores>>

29. Why did you gave this score?
30. Can you give an example the importance of the right choice for frequency?

Forecasting Window - Score:

Q 11: <<Insert survey scores>>

31. Why did you gave this score?
32. Can you give an example of the importance of the right choice for window?

Dimensions – Score:

Q 13: <<Insert survey scores>>
Q12: <<Insert survey scores>>

33. Why did you gave this score?
34. Can you give an example of the importance of dimensions?

Organizational level – Score:

35. Why did you gave this score?
36. Can you give an example of the importance of organizational level?

Coupling with the budget – Score:

37. Why did you gave this score?
38. Can you give an example of the importance of the coupling with the budget?

Resources available – Score:

39. Why did you gave this score?
40. Can you give an example of the importance of the resources available?

Timing – Score:

41. Why did you gave this score?
42. Can you give an example of the importance of the right choice of timing?

KPI's/line items – Score:

43. Why did you gave this score?
44. Can you give an example of the importance of the KPI's/line items?

Input

Quality of the master data – Score:

Q 19:	
Actuals	*<<Insert survey scores>>*
Departmental information	*<<Insert survey scores>>*
Assumptions	*<<Insert survey scores>>*

45. Why did you gave this score?
46. Can you give an example of the importance of the quality of the master data?

Quality and completeness of the information input – Score:

Q 15: <<Insert survey scores>>
Q16: <<Insert survey scores>>

47. Why did you gave this score?
48. Can you give an example of the importance of quality of the information input?

Assumptions – Score:

Q17: <<Insert survey scores>>

49. Why did you gave this score?
50. Can you give an example of the importance of the quality assumptions?

Budget – Score:

51. Why did you gave this score?
52. Can you give an example of the importance of the quality of the budget as input factor?

Process

Complexity of the rolling forecasting process – Score:

Q 21: <<Insert survey scores>>
- *# of employees involved*
- *# of departments involved*
- *# of process steps*
- *# of rep. line items*

53. Why did you gave this score?
54. Can you give an example of the importance of the complexity of the primary process?

Instructions – Score:

Q29: <<Insert survey scores>>
Q30: <<Insert survey scores>>

55. Why did you gave this score?
56. Can you give an example of the importance instructions?

Deadlines – Score:

57. Why did you gave this score?
58. Can you give an example of the importance of deadlines?

Procedures and guidelines – Score:

59. Why did you gave this score?
60. Can you give an example of the importance of procedures and guidelines?

Involvement of all important departments – Score:

Q 24 and Q 26: <<Insert survey scores>>

- *Marketing & Sales:*
- *Planning & control:*
- *Category managers:*
- *Supply chain:*
- *Finance:*

61. Why did you gave this score?
62. Can you give an example of its importance?

Installing a process controller – Score:

Q25: <<Insert survey scores>>
Q 26: <<Insert survey scores>>

63. Why did you gave this score?
64. Can you give an example of its importance of the process owner?

Tools and systems – Score:

Q27: <<Insert survey scores>>
Q28: <<Insert survey scores>>

65. Why did you gave this score?
66. Can you give an example of its importance?

Capabilities and competences of the employees – Score:

Q 31: <<Insert survey scores>>
Q 32: <<Insert survey scores>>

67. Why did you gave this score?
68. Can you give an example of the importance of the capabilities and competences?

Throughput time – Score:

Q 23: <<Insert survey scores>>

69. Why did you gave this score?
70. Can you give an example the importance of throughput?

Output

Management focus in review – Score:

Q33: <<Insert survey scores>>
- *Budget vs actuals:*
- *(rolling) forecast:*
- *Other issues*

Q34: <<Insert survey scores>>
- *Directors meeting*
- *Business review*
- *Monthly business review*
- *Quarterly review*

71. Why did you gave this score?
72. Can you give an example of the importance of the right management focus in the review?

Quality of reporting – Score:

73. Why did you gave this score?
74. Can you give an example of the importance of good reporting?

Measuring accuracy – Score:

75. Why did you gave this score?
76. Can you give an example of the importance of measuring accuracy?

Act

Management support – Score:

77. Why did you gave this score?
78. Can you give an example of the importance of management support?

Decision making process – Score:

79. Why did you gave this score?
80. Can you give an example of the importance of the right decision making process?

Changes in the process – Score:

81. Why did you gave this score?
82. Can you give an example of the importance of making changes in the process?

Topic 3: low scores

<<Insert low survey scores>>

To conclude

- Are all items discussed, that have significant influence on the success of rolling forecasting?
- Which components do you miss in this discussion?