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ROLLING FORECASTING IN BUDGETARY SYSTEMS – CASE STUDY

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ABSTRACT

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The purpose of the study was to examine, how rolling forecasting could improve budgetary system and thus decision-making. This study was conducted as a case study in BC Platforms. Case study material was collected by interviewing nine employees from both decision making and user levels. Interviews were divided into two parts: first part focused on the current budgetary system and forecasting process, and second part focused on rolling forecasting and its advantages and disadvantages. Based on the interview results, development ideas were proposed.

The results of this study showed that rolling forecasting could be used to improve decision making in budgetary systems. Additionally, the results indicated that rolling forecasts are implemented alongside fixed budgets to support the planning function in the organization. Rolling forecasting was recognized to improve the proactiveness of decision making by increasing the accuracy of the estimates and providing more visibility. Inadequate cross-functional communication and lack of technical solution were identified causing challenges in forecasting process. Furthermore, the benefits of rolling forecasting can depend on the chosen budgetary system because hybrid form is more often exposed to budget-gaming and inaccuracy.

TIIVISTELMÄ

Tekijä:	Olli Huhtakangas
Tutkielman nimi:	Rullaava ennustaminen budjetointijärjestelmissä-tapaustutkimus
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Tutkimuksen tarkoituksena oli selvittää, kuinka rullaava ennustaminen voisi parantaa budjetointijärjestelmää ja siten päätöksentekoa. Tämä tutkimus tehtiin tapaustutkimuksena BC Platforms yrityksessä. Tapaustutkimusmateriaali kerättiin haastattelemalla yhdeksää työntekijää sekä päätöksenteko- että käyttäjätasolta. Haastattelut jaettiin kahteen osaan: ensimmäinen osa keskittyi nykyiseen budjettijärjestelmään ja ennusteprosessiin, ja jälkimmäinen osa keskittyi rullaavaan ennustamiseen ja sen etuihin ja haittoihin kohdeorganisaatiossa. Haastattelutulosten perusteella ehdotettiin kehitysideoita.

Tutkimuksen tulokset osoittivat, että rullaavaa ennustamista voidaan käyttää päätöksenteon parantamiseksi budjetointijärjestelmissä. Lisäksi tulokset osoittivat, että rullaavia ennusteita toteutetaan kiinteiden budjettien rinnalla organisaation suunnittelutoiminnan tukemiseksi. Rullaavan ennustamisen voitiin todeta parantavan päätöksenteon proaktiivisuutta lisäämällä numerotarkkuutta ja parantamalla näkyvyyttä. Riittämätön organisaation sisäinen viestintä ja teknisen ratkaisun puute havaittiin aiheuttavan haasteita rullaavassa ennusteprosessissa. Lisäksi rullaavan ennusteen hyödyt voivat riippua valitusta budjetointijärjestelmästä, sillä vuosibudjetin ja rullaavan ennusteen yhdistelmä altistuu useammin budjettimanipulaatiolle ja epätarkkuuksille.

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I would like to thank my current employer for this opportunity. Thesis project has been demanding but also very rewarding and I have learned a lot during the process. Especially, I want to thank my colleagues for the flexibility in winter and spring, so I was able to finish the writing.

I would like to thank you my friends and family for the support you have provided. Finally, I want to thank Nea and my parents for encouraging and supporting me during my university years. I can now say that the decision to change school five years ago has been worth it and I am happy that I had the courage to apply to LUT university.

In Helsinki, 24.05.2020

Olli Huhtakangas

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1. Introduction

Budgeting can be identified as one the most important research topics in management accounting (Luft & Shields, 2003). Often, it is referred to traditional budgeting in which companies set and adjust their income and expense plan for the incoming fiscal year based on the previous fiscal year (Asogwa & Etim, 2017). Earlier, budgeting literature has been focusing on investigating, why companies budget. More recent studies have been describing budgeting as a wider concept by combining three functions; planning, control and evaluation (Hansen & Stede, 2004). This concept of budgetary system has emphasized the role of traditional budgeting in control, but also recognized its inadequacy in reflecting the changes in business environment (Hope & Fraser, 1997; Sandalgaard, 2012). As alternatives, researchers have investigated different methods to replace traditional budgeting (Bhimani, Sivabalan & Soonawalla, 2018; Ekholm & Wallin, 2000; Hansen & Otley, 2003). One of them is rolling forecasting, in which budget is updated monthly or quarterly by adding additional month or quarter to the existing forecast (Sandalgaard, 2012).

The uncertainty of the future has increased due to technological changes, competition and globalization of markets, and it has led to changes in budgetary systems (Sandalgaard, 2012). The combinations of traditional budget and rolling forecasting as hybrid systems have become more common, and evidence shows that more and more companies are relying on fragmented budgetary systems, in which new advanced techniques have replaced prior practices (Ekholm & Wallin, 2000; Henttu-Aho & Järvinen, 2013). The changes in practices have affected the role of rolling forecast; it is recognized more as decision-making tool to support

planning function and it has been used more as a compliment for annual budget rather than a replacement (Bhimani et al., 2018; Hansen & Otley, 2003).

According to literature, evidence of the rolling forecast usage and importance can be found, but there are still relatively few case studies covering forecasting in company's budgetary system (Bhimani et al., 2018; Henttu-Aho, 2018). The purpose of this study is to examine why case company's current system is recognized to be insufficient and investigate the role of rolling forecast. Due to rapid growth of the business and uncertainty of healthcare IT and data business industry, case company has recognized a need for new solutions as part of the budgetary system. Company has not used rolling forecasting before, but it has been widely recognized in management that improvements on planning tools should be considered. There is a need to evaluate and examine possible ways to implement new forecasting method in case company.

1.1 Objectives and research questions

The objectives of this study are to examine challenges in budgetary system and decision making and examine how could the implementation of rolling forecast improve budgetary system. Prior research has been focusing to examine forecasting and its usage in companies' budgetary systems (Ekholm & Wallin, 2000; Henttu-Aho, 2016; Henttu-Aho, 2018; Sivabalan, Booth, Malmi & Brown, 2009). Based on the objectives and prior research above, this study aims to find answers to one main research question, and two sub research questions:

1) *How could rolling forecasting improve budgetary system and thus decision making?*

    a. *How is the role of rolling forecast seen?*

    b. *What kind of advantages and disadvantages could rolling forecasting create?*

The purpose of the main research question is to find answers on how the implementation could improve budgetary system. Rolling forecasting has been investigated before (see e.g. Henttu-Aho & Järvinen, 2013; Henttu Aho, 2016;2018; Sivabalan et al., 2009; Bhimani et al., 2018), and this research question continues to enlarge the investigation of the forecasting tool in part of budgetary system. Prior research has emphasized rolling forecasting purpose as a decision-making tool (Bhimani et al., 2018; Sivabalan et al., 2009), therefore it is interesting to examine whether the results of this study are aligned with them.

The first sub question is answering, how the rolling forecast could be utilized in the company and how its role is seen in three budget functions: control, planning and evaluation. Role of rolling forecast has been an investigated topic in current accounting literature, and especially Bhimani et al. (2018), Henttu-Aho (2016), Palermo (2018) and Sivabalan et al. (2009) have been focusing on examining rolling forecasting as part of planning function. The question will be also used to explain case company's purposes towards rolling forecast, and provide comparable results, how this tool could be implemented to the existing system. The second sub question focuses on examining advantages and disadvantages of rolling forecasts. There are

multiple studies describing its (Hill, 2016; Montgomery, 2002; Myers, 2001; Veth, 2007).

1.2 Theoretical framework and delimitations

Theoretical framework is presented in the figure 1 below. Prior literature focuses on studying the reasons, why companies budget. These reasons can be divided to three main categories: control, planning and evaluation. Traditional budgeting has been criticized of not being suitable for these functions, because it excludes the planning and evaluation functions. In this context, this definition refers to a method in which companies set and adjust their income and expense plan for the incoming fiscal year based on the previous fiscal year (Asogwa & Etim, 2017).

Based on the criticism, researchers have proposed alternative methods, such as rolling forecast and beyond budgeting to replace the traditional method (Ekholm & Wallin, 2000; Hansen & Otley, 2003; Hansen & Stede, 2004; Hope & Fraser, 2003). “The changes in budgeting practices” visualizes the change occurred after the received this criticism (Figure 1). According to the literature, there are different budgetary systems that can be identified; Ekholm and Wallin (2000) identify a hybrid system, which has been recognized as popular system among companies in other studies (de With, 2008; Henttu-Aho, 2016; Libby, 2010). In addition to hybrid systems, gradual fragmentation, in which traditional budgeting is replaced with other advanced tools can identified from literature. Especially Henttu-Aho and Järvinen’s (2013) and Henttu-Aho’s (2016, 2018) studies provide new information about the gradual fragmentation of budgetary systems and about the role of rolling forecast.

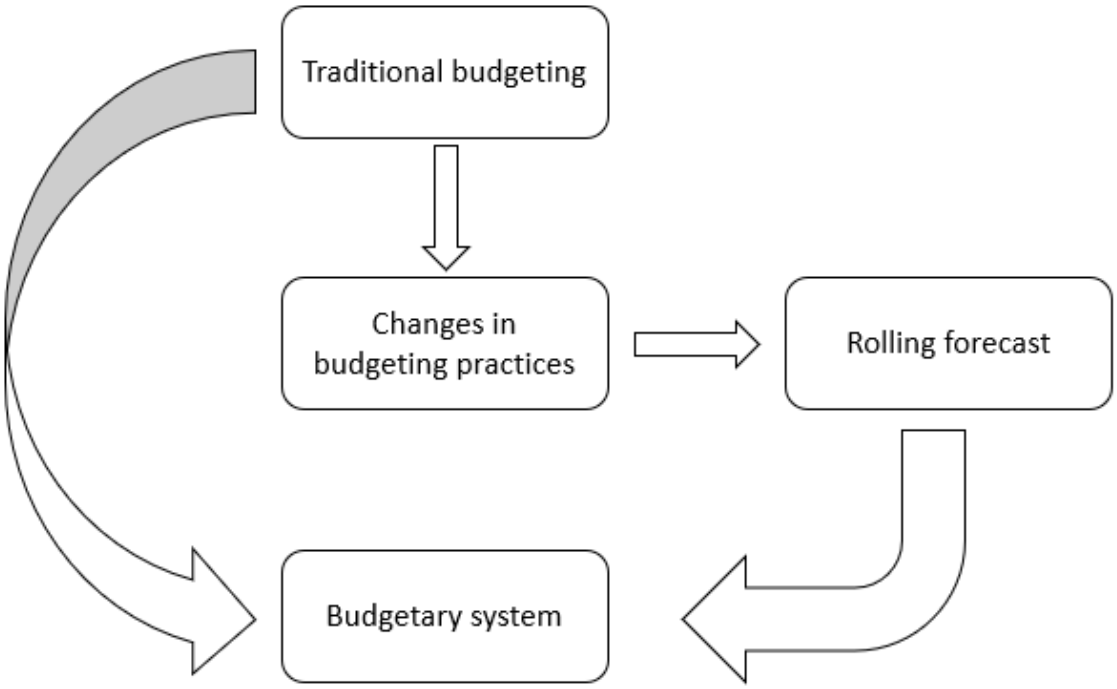

Figure 1 Theoretical framework

The gradual fragmentation of budgetary system enables companies to adopt rolling forecast as part of their systems. Due to uncertainty of business environment and increased need for planning function, companies are utilizing more often these as part of their practices by creating a budgetary system. Forecasting as decision-making tool is especially demonstrated in studies from Bhimani et al. (2018), Henttu-Aho (2018) and Sivabalan et al. (2009).

This thesis has several delimitations. It is observed that authors use different terms such as rolling budgeting and re-budgeting (Bhimani et al., 2018; Haka & Krishnan, 2005; Hansen, 2011; Hansen & Stede, 2004; Sivabalan et al., 2009). In this thesis, the definition of rolling forecast will be used to maintain the consistency throughout the thesis. Additionally, the definition of budgetary system will be used to describe a

wider design of practice developments around traditional budgeting (Ekholm & Wallin, 2000; Henttu-Aho, 2018). Becker et al. (2016), Sivabalan et al. (2009) and Henttu-Aho (2018) have identified and described budgetary system as subdivided system, in which different tools are used to fill various budget functions.

According to the literature, there are multiple different advanced techniques to improve budgetary systems such as activity-based budgeting and beyond budgeting (Hansen & Otley, 2003). Due to the assignment given by case company, the thesis will focus only to rolling forecast and its practical implications. Furthermore, the implementation phase will be excluded from the thesis due to the time limitations. The after-implementation-stage would require a new round of interviews to document all the material.

1.3 Research design

Case study can be defined as qualitative research method, in which single case is researched with different sources of information. Usually, the results of the case study will be applied in practice (Metsämuuronen & Metsämuuronen, 2011). This thesis will be conducted as a case study in chosen case company and the results of this thesis will be presented in the company. Rolling forecasting has been examined in several qualitative studies and most of them have been conducted as case studies (Henttu-Aho & Järvinen, 2013; Henttu-Aho, 2016; Henttu-Aho, 2018).

In this thesis, research material will be collected by using interviews. Interviews are organized with 9 employees, and the interviewees are chosen from different organization levels and teams so that both user and decision-making view are included in the thesis. Three of them are working in finance team, five of the

employees are part of the management team and one interviewee is chosen from the sales team. Interviews are done by using semi-structured method. In this method, discussion focuses on predefined themes to have exact answers to pre-categorized questions and decrease lengths of the interviews (Metsämuuronen & Metsämuuronen, 2011).

1.4 Structure of the thesis

The thesis begins with an introduction chapter that presents the background, objectives and research questions. First chapter introduces the theoretical framework and the delimitations of the thesis are clarified. The second chapter focuses on rolling forecast and its usage in the budgeting system. First, the three functions are explained. Studies related to these functions, led to the rise of traditional budget criticism. However, as a contradiction to the criticism, the findings of the case studies show that traditional budgeting is used mainly for control purposes and many companies have adapt rolling forecasts as part of their budgetary systems to support the limitations of traditional process. Next, the gradual fragmentation is presented, and the role of forecasting is demonstrated. After introducing different budgetary systems, forecasting in the planning function is described. The final chapter of the theoretical part summarizes the advantages and disadvantages of the rolling forecasting.

After the theoretical part, the chosen research method and material are introduced in the third chapter. In this chapter, case company is introduced, and company's current business environment is described. The first part of results focuses on describing the current budgeting and forecasting as well as current challenges observed in these processes. Moreover, results describe company's requirement for rolling forecast and what advantages and disadvantages the implementation could

generate. Based on the results, development ideas are presented. In the final chapter, research results are discussed and compared to previous literature. After discussion, conclusions and answers to research questions are presented. After this, limitations and further research will be introduced.

2. Rolling forecasting

Rolling forecast is widely used budgeting tool in practice (Bhimani et al., 2018). It has been firstly introduced in accounting studies 60 years ago. Apart from its quite long history, companies have understood the usefulness of rolling forecasting during the last 20 years (Clarke, 2007). The transition from studying traditional budgeting to examining new accounting tools can be recognized from accounting literature; over 30% of the studies before year 2000 in management accounting research focused on budgeting, but in the current research, the focus has shifted to explaining importance of planning and control functions (Herschung, Mahlendorf, & Weber, 2018; Luft & Shields, 2003).

2.1 Budgeting functions

To explain the linkage between budgeting and rolling forecast, the budget reasons need to be explained first. As a research topic, budgeting has been problematic to investigate due to the conflicting reasons observed in the studies (Sivabalan et al., 2009). Few researchers have specifically focused on exploring these reasons (Hansen, 2004; Merchant & Van der Stede, Wim A., 2016; Sivabalan et al., 2009). According to these studies budget reasons can be summarized into three budgeting functions: planning, control and evaluation (Bhimani et al., 2018). Because of these findings, the focus of recent research has moved towards investigating these functions. Similarly, Hansen and Stede (2004) have stated that there are two operational reasons why companies budget: planning and evaluation. Moreover, Merchant and Van der Stede (2004) have recognized that purpose of budgeting is also provide information to management oversight as a form of control. The research considering these functions has been acknowledged by other researchers, and this has led to the utilization of functions in more recent studies (Becker et al., 2016;

Henttu-Aho & Järvinen, 2013; Henttu-Aho, 2018; Sivabalan et al., 2009). The budget functions are visualized in figure 2.

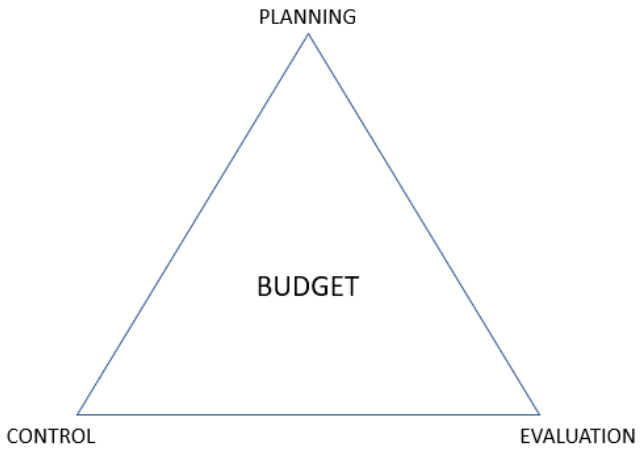

Figure 2 Budget functions (Bhimani et al., 2018; Hansen & Stede, 2004; Merchant & Van der Stede, Wim A., 2016; Sivabalan et al., 2009)

Planning can be described as a tool for resource coordination and for creating action plans. Resource coordination is one of the key elements of planning, because budget creates the constraints of how resources are divided between departments. (Sivabalan et al., 2009) Action planning refers to budget use as a steering mechanism in choosing between competing alternatives (Merchant et al., 2016). Control function can be described as monitoring tool of the board and tool for controlling company costs (Sivabalan et al., 2009). Budget is one of the few formal financial controls of the company, and it is used to monitor company's business by management and board of directors (Baysinger & Butler, 1985; Sivabalan et al., 2009). One popular method is the variance analysis, which is used to compare actual and budgeted amounts (de With, 2008). Evaluation is usually linked to performance evaluation of staff or business (Hansen & Otley, 2003). The linkage between staff evaluation and budget has been extensively studied, and business evaluation is often combined with staff evaluation (Hansen & Stede, 2004).

2.1.1 Traditional budgeting and its criticism

The purpose of the traditional budgeting has been in achieving company's objectives and following the strategy, but several studies have criticized traditional method as being incompetent in the current business environment. Criticism can be divided into three categories: alignment with strategy, business process and organizational capability. The first category is budget and its alignment with strategy. Many researchers have accused that budgets are too much cost-focused and ignore the strategic perspective. Annual budgets are planned for fixed periods, and they are incapable of signaling changes in the business environment. (Hansen & Otley, 2003; Neely, Bourne & Adams, 2003; Sivabalan et al., 2009) Apart from this, traditional budgeting and its usefulness in implementing company's strategy has been criticized in focusing too much on short-term planning and ignoring key measures of company's performance evaluation (Hope & Fraser, 1997). Hansen and Otley (2003) have added that the focus has shifted from value creation and performance evaluation to cost controlling. The link between strategic planning and traditional planning has also disappeared and annual budget can no longer meet the requirements of the modern budgetary system (Hansen & Otley, 2003).

In the second category, budget is seen inadequate for business processes. According to Otley and Berry (1980), budgetary system requires two characteristics to be successful: validated plan for predetermined period and a functioning forecast model to provide updated information for performance evaluation. However, Wallander (1999) states that traditional budgeting is not valid because of its inability to adapt to uncertain business environments. As the uncertainty of environment increases, budget is too infrequently updated and it contains almost immediately outdated information (Hansen & Otley, 2003; Samuelson, 1999). Also, it has been pointed out that the process is time consuming and can take up to 20 % of management's overall time (Libby & Lindsay, 2010).

As the third category, organizational capability refers to employees' experiences towards budgeting. Although, they can be conducted as bottom-up process, traditional budgets are criticized of centralizing the decision-making and impeding employee-level participation in the process. (Ekholm & Wallin, 2000; Hope & Fraser, 1997)

2.1.2 Role of traditional budgeting

Based on the criticism, researchers have conducted studies to learn more about the role of traditional budgeting. Ekholm and Wallin (2000) research results show that majority of the companies have been using traditional budgeting, because it maintains internal efficiency of the company enabling companies to improve the control function. However, it fails in signaling the changes in the business environment, and it is insufficient in serving all the functions. But companies have not been abandoning it totally, because fixed budget is needed for control and monitoring purposes. As a solution, companies have been implementing rolling forecasts to capture the competitiveness of business environment. (Ekholm, 2000)

De With and Dijkman (2008) have investigated budgeting practices of listed companies in Netherlands. According to the survey, annual fixed budgets are strongly used for planning and controlling. It is stated that budget should be a refinement of company's strategy. For controlling, variance analysis is used to compare actual and budgeted amounts. This enables company's management to control the business and react to possible problems detected. It is also observed that staff evaluation and traditional method are linked. Carefully planned fixed budget act as relevant target for managers' and other staff's performance evaluation. Overall, results indicate that Dutch companies have been using traditional budgeting,

although there are alternative methods available. The results also show that companies have been implementing rolling forecasts in overcoming the disadvantages of traditional method. (de With & Dijkman, 2008)

Libby and Lindsay (2010) have investigated budgeting practices in North American companies. The study focuses on comparing the survey results to criticism presented in previous literature (Ekholm & Wallin, 2000; Hansen & Otley, 2003; Neely et al., 2003). According to the results, most of the survey companies (88%) recognize budgeting as important tool for strategy formation. These findings are inconsistent with the previous criticism (Hope & Fraser, 1997; Neely et al., 2003). Additionally, according to Hope and Fraser (1997) and Neely et al. (2003), the process is time-consuming, and numbers are quickly outdated in uncertain business environments. Regardless of the challenges in the process, most companies are still using traditional budgeting. Furthermore, companies have implemented rolling forecasts alongside traditional method to mitigate the observed challenges. (Libby & Lindsay, 2010)

It can be stated that there has been a contradiction between academia and practitioners. Earlier studies have focused on criticizing annual budgets inadequacy to serve all three functions, while in practice, companies have been adopting new tools to complement its limitations. (Hansen and Stede, 2004; Henttu-Aho, 2018) Sivabalan et al. (2009) and Merchant and Van der Stede (2016) state that companies value planning and control functions more when choosing the practice, and traditional budgeting continues in being most important tool for control. However, budgets have limitations in planning; they become quickly outdated and they are not suitable for uncertain business environments (Hansen & Stede, 2004). Despite these challenges, most of the companies have not abandoned traditional method completely, but they have acknowledged that rolling forecast needs to be

implemented in order to capture planning function as part of company's budgetary system (Bhimani et al., 2018). This can be conducted by dividing the previous system into different sections or adding rolling forecast to support annual budget as a form of hybrid system (Ekholm & Wallin, 2000).

2.2 Rolling forecast explained

In Hansen's (2011) research, rolling forecast is defined as "a forecast that maintains a constant forward-looking time horizon, usually between 12 and 18 months". Researchers have used different terms such as rolling budgeting, re-budgeting and continuous budgeting while referring to same kind of forecast (Bhimani et al., 2018; Haka & Krishnan, 2005; Hansen, 2011; Hansen and Stede, 2004; Sivabalan et al., 2009). In this thesis, the term of rolling forecast will be used to maintain the consistency throughout the thesis. Rolling forecast provides an alternative for annual budget to maintain the same forecasting period. It differs from scenario planning by providing only one scenario instead of multiple (Palermo, 2018). In fact, they are often described as realistic views of future. This kind of realistic view refers to forecasting without target-orientation (Henttu-Aho, 2018). According to literature, rolling forecast can be used as complimentary tool to be used alongside other methods or it can be used to replace fiscal year budget (Ekholm & Wallin, 2000; Henttu-Aho & Järvinen, 2013; Sivabalan et al., 2009).

Depending on company's requirements and forecast accuracy, rolling forecast can be generated monthly or quarterly (Sivabalan et al., 2009). According to Bhimani et al. (2018), company's strategy and uncertainty of business environment are two key factors influencing this selection. In this context, uncertainty can be described as the difference between managers' information and the information in the industry. The use of quarterly rolling forecasts in decision-making is not popular among companies

due to its ability to provide accurate and relevant information. (Bhimani et al., 2018) Because of the accuracy level, quarterly updates are used more in external reporting than in internal decision-making (Neely et al., 2003). Monthly updates increase the reviews done for the forecast, which has an impact for its accuracy (Bhimani et al., 2018). Especially in operational planning, monthly rolling forecasts are preferred more often, because of the proactive nature of operational planning (Neely et al., 2003).

Figure 3 visualizes forecasting process in the company, and it represents quarterly updated version. Forecasted quarters are visualized with green, and grey color represents the actual quarters of the fiscal year (Figure 3). Forecasting begins from quarter 1 of the first year, and it contains quarters 1-4. When the first quarter is ending, a new quarter (Y2 Q1) is added to the forecast to remain the same period. This process creates the “rolling” effect for the forecast (Clarke, 2007). The use of periodical updating enables companies in adjusting their financial numbers to reflect changes in business environment (Haka & Krishnan, 2005).

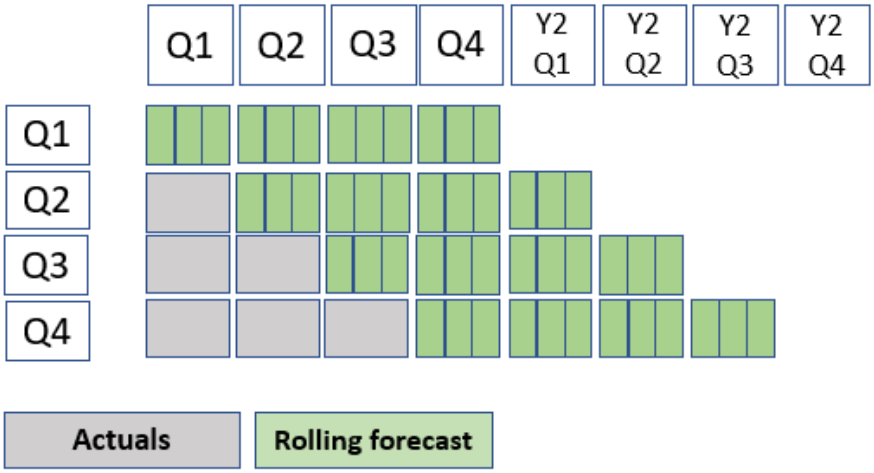

Figure 3 Rolling forecast (Player, 2009)

Companies can have different variations of rolling forecasts. Montgomery (2002) sees it as a higher-level planning tool with summarized information. High-level means that forecasted figures should be produced in entity level compared to function level (Hill, 2016). Hope and Player (2012) describe three different variations of forecasting models that companies should choose based on their suitability: statistical models, mathematical models, and judgmental models. Statistical model is based on the assumptions made from the past and mathematical models are utilizing data of different variables to produce a forecast (Hope & Player, 2012). Judgmental model, however, is based on assumptions of individuals (Player 2009).

2.3 Rolling forecasting in budgetary systems

Budgetary systems can be described as subdivided systems, in which different tools, such as rolling forecasts, are used to fill various budget functions (Becker et al., 2016; Henttu-Aho, 2018; Sivabalan et al., 2009). There are many definitions of budgetary system, such as budgetary control system and budgetary control, but the term budgetary system will be used to describe a wider design of accounting tools used in the company (Henttu-Aho, 2018; Malmi & Brown, 2008). Ekholm and Wallin (2000) recognize three types of systems: traditional fixed budgetary system, a hybrid system, and a fragmented budgetary control. Similar observations have been made in Henttu-Aho (2016) study in which the changes of budgeting practices were investigated in Finnish paper company. Based on the results, three stages of the development of budgetary systems were identified: traditional process, rolling forecast estimates and fragmented budgetary control. Figure 4 combines the observations from Ekholm and Wallin (2000) and Henttu-Aho (2016) studies representing the development of budgetary system.

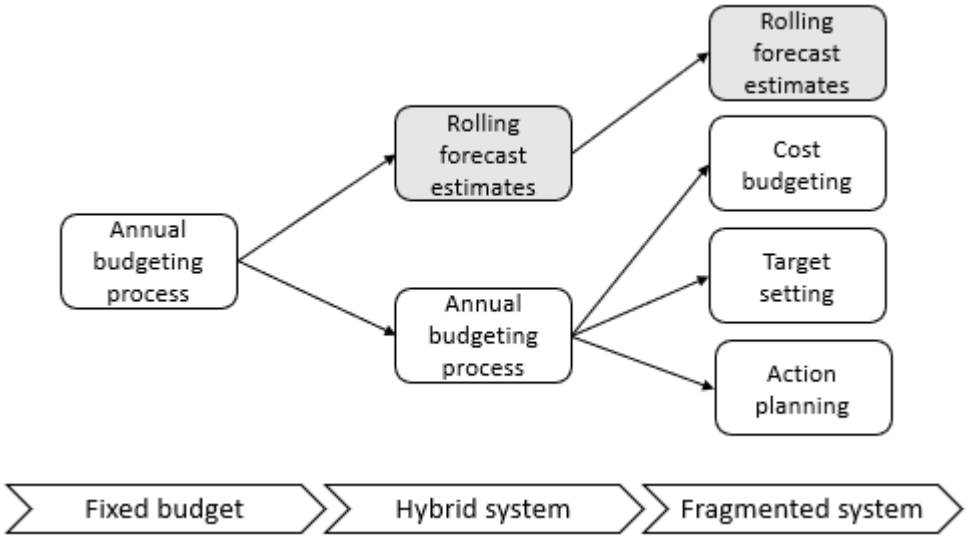

Figure 4 The development of budgetary system (Ekholm & Wallin, 2000; Henttu-Aho, 2016)

The fixed budget - stage represents traditional process, in which income and expenditure are planned for the fiscal year (Asogwa & Etim, 2017). Companies have identified traditional method as the most important tool for control and are not willing to abandon it completely (Sivabalan et al., 2009). This argument is supported by observation from Ekholm and Wallin (2000) research, in which 25 % of the companies have reported traditional process to be adequate for budgeting purposes.

Although many companies have not abandoned fixed budgeting, they have realized its incapability in serving all the three functions. Usually, the transition to adapt rolling forecast alongside budgetary system is due to the challenges occurred in the current planning process. (de With & Dijkman, 2008) If the current planning process is not functioning and generating enough detailed information for decision-making, many companies have identified rolling forecast as a solution. According to Ekholm & Wallin (2000), 70 % of the survey companies were ready to update their budgetary system by adding a forecasting tool.

According to Henttu-Aho (2016), the increased competition in the industry and lack of planning tools can be triggers for implementation of rolling forecast. However, budgetary system upgrades are also dependent of new investments and support of whole organization. Elragal and Haddara (2012) points out that the transition from fixed budgetary system to hybrid system requires an implementation of more advanced forecasting system and improved coordination between organization's departments. These requirements have been identified in Henttu-Aho and Järvinen's (2013) research. It was observed that, the trigger for the case company's transition to hybrid system was key forecasting variables, which other departments started to provide. The creation of new forecasting variables was started because of the new ERP system (Henttu-Aho & Järvinen, 2013). In addition, Adler (1996) has stated that forecasting process is working more efficiently and transparently if the process involves many departments from the organisation.

2.3.1 Hybrid system

Hybrid system refers to a system in which annual budgeting is supported by rolling forecast (Figure 4). This system is based on an idea of implementing forecasting tool to improve the planning function (Figure 4). However, it should be noted that in some hybrid systems, rolling forecasting refers to budget revision during the fiscal year with lacking the "rolling" effect. In this context, rolling effect refers to revision of numbers during the financial year. (Ekholm & Wallin, 2000; Henttu-Aho, 2016)

Montgomery (2002) describes the combination of fixed budget and forecast as integrated planning cycle. In this kind of integrated planning cycle, rolling forecast operates as a supportive link by connecting annual plan and strategic plan of the company. Integrated planning cycle is visualized in figure 5. The integrated planning cycle is based on the idea that forecast converts company's strategic plan into financial metrics, which flow to fixed budget. Process owners can use the information of forecast as a basis of annual plan. The cyclical effect is created when the budgeted financial metrics are compared to forecast. (Montgomery, 2002) In the hybrid system, variance analysis is utilized to compare the deviations (Ekholm & Wallin, 2000). The variance between figures signals management about possible action to be taken to be aligned with the strategic plan (Veth, 2007). In other words, rolling forecast operates as a steering tool for the management (Mundy, 2010).

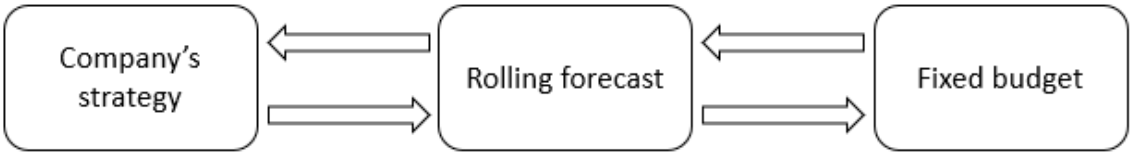

Figure 5 Integrated planning cycle (Montgomery, 2002)

Ideally, rolling forecast should be designed to be more of a high-level estimate. High-level perspective enables companies to integrate annual budget and rolling forecast as part of hybrid system. (Montgomery, 2002) According to de With & Dijkman (2008), companies have been implementing rolling forecasts alongside traditional method to take account the uncertainty of business environment. By developing a hybrid system, companies remain the advantages from both the fixed budget and forecast (Ekholm & Wallin, 2000). Libby and Lindsay (2010) have also added that the more unpredictable the business environment is, the more companies are willing to adopt new resources to improve the predictability. Findings from Sivabalan et al. (2009) research provide support for these observations, because 68% of the case

companies had been using hybrid system in their budgeting. Additionally, larger percentage of listed companies have adapted it compared unlisted companies. Listed companies have more stricter requirements for external reporting, which could support this finding (Bhimani et al., 2018).

Henttu-Aho (2016) has investigated the development of the Finnish case company's budgetary system. Case company's first attempt for improvement was to include estimates alongside static budget. Estimates were created by revising annual figures in the middle of fiscal year and transforming these number into more future-looking estimates. However, too infrequent updating of forecast could be a time-consuming process, and companies can end up in creating too detailed forecasts for the fixed period (Ekholm & Wallin, 2000; Montgomery, 2002). This leads to a situation, where companies have difficulties in separating rolling forecasts from fixed budgets (Hill, 2016). In these situations, company creates a revision with the same amount of efforts spent on the actual process (Montgomery, 2002). Henttu-Aho (2018), Ekholm and Wallin (2000) and Sivabalan et al. (2009) have made similar observations stating that rolling forecast can be also exposed to budget-gaming and decrease the realism and accuracy of the figures.

2.3.2 Fragmented budgetary control

The fragmentation of budget system means that traditional budget is replaced by different management control items such as rolling forecast, fixed cost budgeting, performance measurements, such as balanced scorecard, target setting and action planning. Fragmented system includes characteristics of traditional process; fixed cost budgeting is used for control purposes, target setting, and action planning are performed with other tools. (Henttu-Aho, 2016) Although companies replace

traditional method by other tools, the key functions can be identified from the system (Sivabalan et al., 2009). Implemented tools are used as compliments or substitutes to ensure that planning, control, and evaluation functions are supported in fragmented budgetary systems (Malmi & Brown, 2008).

When considering the role of rolling forecasting, companies tend to separate it from other budgetary controls by ensuring its focus in providing realistic and accurate view of the future. The decoupling of target-setting and forecast creates a more realistic view of the company's future. In realistic view, there is usually a gap between targets and forecast, which signals management about the possible actions needed to meet the targets (Hope & Fraser, 2003). If the gap does not exist, it could indicate management that targets have been set too low. (Henttu-Aho, 2018)

Other studies have also examined the fragmentation and its effects on rolling forecasting. Henttu-Aho and Järvinen (2013) have investigated budgeting practices in Finnish industrial companies, and the results indicate that companies have adapted new management control tools. Furthermore, in most of the companies, fragmentation of budgetary system can be identified (Henttu-Aho & Järvinen, 2013). This fragmentation is visualized in figure 6, which represents three budget functions and how management control tools are divided in them. Figure 6 shows that companies use rolling forecast parallel in control function with cost budgeting, target setting and annual plan. The combination of these tools can be identified as traditional process (Henttu-Aho & Järvinen, 2013; Henttu-Aho, 2016). Forecasting tool is implemented alongside to specifically support the planning function. The findings support the conclusion from Sivabalan et al. (2009) study; companies see different tools as compliments for functions rather than substitutes. Similar finding has been observed in various previous studies (de With & Dijkman, 2008; Ekholm & Wallin, 2000; Henttu-Aho, 2016; Henttu-Aho, 2018).

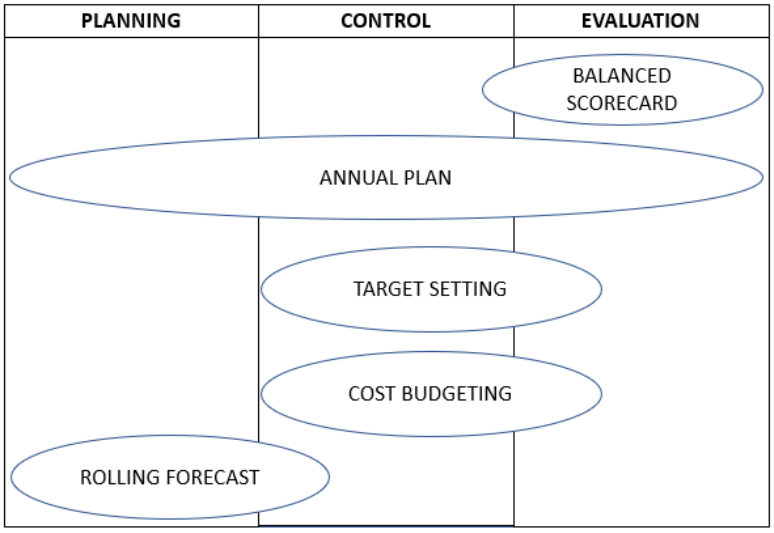

Figure 6 Fragmented budgetary control and budget functions (Henttu-Aho & Järvinen, 2013)

It has been stated that rolling forecasts support planning and control functions and exclude evaluation function (Sivabalan et al., 2009). The finding presented in Henttu-Aho and Järvinen's (2013) study supports this statement, because most of companies have implemented balance scorecard to bear the evaluation function. On the contrary, some researchers have found the linkage between performance evaluation and forecasting. Neely et al. (2003) point out that companies complement balance scorecard by rolling forecasts to improve accuracy of performance measurement. The accuracy of performance indicators can be increased by using a "frozen forecast", which can be used for next year's target setting and incentives (Henttu-Aho, 2018). In performance evaluation, companies prefer monthly rolling forecasts because they provide updated information more frequently with increased accuracy (Bhimani et al., 2018). Often, these are implemented to performance measurement systems to enhance staff evaluation (Haka & Krishnan, 2005).

The changes in budgeting practices emerge gradually. The role of rolling forecast in companies' practices has increased in stages (Bhimani et al., 2018; Ekholm & Wallin, 2000; Henttu-Aho, 2018). It has been widely recognized that the implementation of this forecasting tool improves planning function and modifies budgetary system into more predictive and coordinative direction (Bhimani et al., 2018).

2.3.3 Planning in budgetary systems

The general assumption is that forecasting promotes the proactiveness in the company by improving the interaction between the company's departments and moving the focus from cost control to action planning (Järvenpää, 2007; Ostergren & Stensaker, 2011). On the other hand, few researchers have recognized that the use of rolling forecasts in planning varies among companies. Palermo (2018) recognize two different alternatives methods for planning: reactive and proactive. The main difference between these alternatives is, how company approaches forecasting and its variables. In proactive approach, the variables affecting forecast are being revised effectively to emphasize the proactiveness of planning, and forecasting is based on future trends. Company specific factors and expectations of the future are used to create the latest vision of the world. In contrast, reactive approach refers to forward-looking process, in which the past information is used to create a forecast for the future. Furthermore, reactive planning emphasizes variances between budget and forecast in more formal manner than in proactive approach. (Henttu-Aho, 2018; Palermo, 2018)

Based on these two approaches, Henttu-Aho (2018) has investigated reactive and proactive planning in companies. The findings show that two thirds of the companies are following the proactive approach. The budgetary systems of these companies

are fragmented, and the main role of rolling forecast is to serve the planning function (Henttu-Aho, 2018). Similarly, Ekholm and Wallin (2000) and Sivabalan et al. (2009) have identified that rolling forecast has proactive characteristics, when it is implemented in fragmented budgetary systems.

Companies can also utilize rolling forecasting with the reactive approach. Forecasting tool and annual budget create a hybrid system, which is used to serve specifically planning and evaluation functions. In the company's process, actuals, forecasts, and targets are compared and the deviations are reported. Rolling forecast can be used to inform management about the possible outcomes when the targets are set. This differs from the proactive approach, in which target-setting and forecasting are separated. If forecasting is involved to target-setting, it could mitigate the realism of the forecast. Although, budget-gaming is usually linked to traditional method, it can also affect the reliability of forecast in reactive planning. (de With & Dijkman, 2008; Henttu-Aho, 2018; Oliva & Watson, 2009) If the same information is used to create forecast and annual budget in hybrid system, managements opinions can affect to forecasted figures by modifying them too optimistic, and if the forecast is based more on the opinions rather than hard data, the targets and realism of the forecast can mix (Oliva & Watson, 2009).

2.4 Advantages and disadvantages of rolling forecast

Theoretical part has been focusing on explaining the increased use of rolling forecasting in budgeting practices and describing its functionalities. The purpose of the final chapter is to identify its possible advantages and disadvantages that have arose from the previous studies. Table 1 below represents the observed advantages and disadvantages.

2.4.1 Advantages of rolling forecast

The advantages of rolling forecasting are listed in the table 1. Companies can benefit of rolling forecasting because it enables companies to improve their accuracy of figures by updating figures regularly (Asogwa, 2017; Table 1). Monthly updates increase the reviews done, which has a positive impact for accuracy (Bhimani et al., 2018). Especially in operational planning, monthly rolling forecasts are preferred more often (Neely et al., 2003). Regular updates require continuous communication between departments. In Henttu-Aho's (2016) study, case company's departments started to combine accounting and other business information to create new forecasting variables to capture the uncertainty of business environment. It was observed that improved communication between departments increased the transparency of figures and enhances the accuracy (Henttu-Aho, 2016).

Allocation of resources is one of the key factors, why companies have an interest in implementing forecasts (Veth, 2007; Table 1). Companies can use forecasting to react and create action plans (Myers, 2001). If forecasts are updated frequently, company's management can review the gap between forecast and target more often (Bourmistrov & Kaarbøe, 2013). Therefore, the time spent in resource allocation decreases and gives management the possibility to analyze the figures instead (Myers, 2001). In other words, the planning shifts from being reactive towards proactive planning. On the contrary, new studies have shown that implementation of rolling forecast can still led to reactive planning, because planning can vary in different budgetary systems (Henttu-Aho, 2018; Palermo, 2018).

Rolling forecast can be recognized as flexible budgeting tool (Table 1). In this context, flexibility refers to different ways to utilize rolling forecasting. As a flexible

budgeting tool, the length of the forecasting period, level of detail and update sequences can be adapted according to company specifications. The time horizon remains constant with the rolling-method, but the length of the forecasting period varies. (Bhimani et al., 2018; Player, 2009) According to Hope (2003), multinational car company has been relying on multiple forecasts in their business planning process; two forecasts has served the short-term planning informing about future sales as a form of “flash”-report. Rest of the forecasts have been used for long term planning and future economic trends (Hope & Fraser, 2003). The flexibility enables companies to use rolling forecasts according to their preferences and internal as well as external requirements (Player, 2009).

Rolling forecasting can be used to mitigate budget-gaming in the organization (Table 1). According to de With & Dijkman (2008), budget manipulation is more common in companies utilizing only traditional method. Gaming is mitigated, if fixed budget and rolling forecast are decoupled (de With & Dijkman, 2008). Forecasts do not have targets and they are not typically linked to target-setting. Therefore, management has no incentives to manipulate forecast (Ekholm & Wallin, 2000; Henttu-Aho, 2018). However, Henttu-Aho (2018), Ekholm and Wallin (2000) and Sivabalan et al. (2009) have pointed out that rolling forecast can be affected by budget gaming if the same information is utilized in forecast and in target-setting. Forecasts and fixed budget are decoupled in fragmented system, and therefore the possible budget gaming can be mitigated better than in other systems (de With & Dijkman, 2008; Ekholm & Wallin, 2000; Henttu-Aho & Järvinen, 2013). Ostergren and Stensaker (2011) add that decoupling enables forecasting as an initiative for management to plan corrective action plans.

One of the observed advantages is that rolling forecast is often recognized as a tool to improve strategic planning (Table 1). This means that company’s management

has always updated information about which direction the business is developing and is the direction aligned with company's strategy (Bhimani et al., 2018; Rickards, 2012). If the forecasted direction does not align with the company strategy, management are able to adjust for example coordinating resources better to meet the company's strategy plan (Veth, 2007).

According to several researchers, the use of rolling forecasts is more popular in uncertain business environments and could be used to reduce the uncertainty of environment (Bhimani et al., 2018; Henttu-Aho, 2018; Sandalgaard, 2012). In this context, uncertainty can be described as the difference between managers' information and the information in the industry (Bhimani et al., 2018). Monthly rolling forecasts have a positive relation to uncertainty and strategy meaning that companies could decrease the uncertainty of environment by reviewing it on monthly basis (Bhimani et al., 2018). However, the results from Bhimani et al. (2018) are mixed with Haka and Krishnan's (2005) and Hansen's (2011) results, so it cannot be unequivocally stated that monthly rolling forecasts could reduce the uncertainty. If they are carefully planned, they will provide a powerful tool for both short-term and long-term strategic planning (Hill, 2016; Montgomery, 2002; Player, 2009). Furthermore, few researchers have recognized rolling forecasting more of a strategic opportunity, which can be used as steering mechanism in uncertain environments (Merchant & Van der Stede, 2016; Player, 2009).

2.4.2 Disadvantages of rolling forecast

The disadvantages of rolling forecasting are listed in table 1. The transition to rolling forecasting can affect the motivation of employees (Table 1). This means that organization is required to adjust the roles of controllers or create completely new positions in the organization and accepting the change can be difficult for employees

with ingrained way of working (Player, 2009). Sometimes, the implementation can cause conflicting acceptance. According to Henttu-Aho (2016), some of the controllers did not countenanced the change to rolling forecasting. The adaption necessitates the change of mindset about own work, and some controllers did not appreciate it because of the lacking skills or working preferences (Henttu-Aho, 2016). Therefore, the implementation of rolling forecast requires the support of whole organization to be successful (Player 2009). Bourmistrov and Kaarbøe (2013) have concluded that changes in organization usually demands stretching the previous positions and learning new skills.

The implementation phase usually requires resources from other employees besides controllers and it can be time consuming process for the organization (Hope & Fraser, 2003; Table 1). According to Clarke (2007), a functioning rolling forecast should have one process owner, who will be responsible for its functionalities and updates. Although the finance or business controllers are often process owners, the engagement of other departments is needed to maintain the forecast (Clarke, 2007). These activities allocate resources from responsible employees, and this should be understood by management when considering of implementing multiple forecasts (Hope & Fraser, 2003).

One identified disadvantage can be the technical solution of forecast (Table 1). Player (2009) warns about using spreadsheets in forecasting, because the system is highly exposed for errors and only control mechanism is maintained by the users. In addition, other authors have criticized the use of spreadsheets in forecasting and budgeting. Rickards (2012) states that updating and controlling these forecasts are time-consuming and difficult with low level confidence on the forecasted figures. According to Henttu-Aho (2016), most of the case company's controllers were satisfied by creating rolling forecasts with spreadsheets. However, if there is no

integrated forecasting system available, the prepared forecasts are exposed to input and calculation errors (Henttu-Aho, 2016). On the contrary, Hope and Player (2012) state that forecasting with spreadsheets can be appropriate in local requirements, but large organizations should have integrated systems, otherwise the data consolidation is too time-consuming and complex. Hill (2016) has added that forecasting system should be created as integrated system with automatic dataflows from the chosen databases. Few case studies have showed that in fact the availability of key variables and implementation of ERP system were the most important factors in transition to rolling forecasting (Elragal & Haddara, 2012; Henttu-Aho, 2016).

Company's management can sometimes be confused about forecasting by relying too much on its predictability. In addition, management's expectations towards forecast can be too overwhelming, and Player (2009) points out that successful forecasting is a sum of multiple factors. Expenses are regarded to be more accurate to predict, because they are often authorized through formal process compared to revenues (Myers, 2001; Player, 2009). Predictability of the business relies on multiple factors and that is why rolling forecast should be considered as a latest vision of the world rather than an accurate prediction (Player, 2009; Wallander, 1999)

Sometimes, forecasts are developed to be too sophisticated and complex. It should be taken account that if same level of detail as in annual budget is used in forecast, process can end up being budget revision (Montgomery, 2002; Table 1). Henttu-Aho (2016) and Hill (2016) have added that the purpose of the rolling forecasting is to reduce resources spent on planning, not increasing them. Rickards (2012) also points out that use of multiple forecasts increases the probability of errors and decreases the accuracy if there are not enough resources available. Achieving better accuracy may not require excessive level of detail, but rather focus on the chosen

key variables to forecast sales or variable costs (Hope & Fraser, 2003; Player, 2009). Hope and Player (2012) have concluded that forecasting process should be started from sales, because it is the most time-consuming part in the forecasting process.

Table 1 Advantages and disadvantages of rolling forecast

ADVANTAGES	DISADVANTAGES
+ ACCURACY	- MOTIVATION
+ FLEXIBILITY	- TIME CONSUMPTION
+ DECISION-MAKING	- TECHNICAL SOLUTIONS
+ RESOURCE ALLOCATION	- COMMUNICATION
+ REALISTIC FORECASTS	- RE-BUDGETING
+ COORDINATION	
+ PROACTIVENESS	

3. Case study – BC Platforms

The empirical part of the thesis focuses on examining case company's current budgetary system and the role of forecasting. The structure of the empirical part is following: first, the research method and data collection are demonstrated. After the introduction, the case company and its business environment are introduced. The rest of the empirical part will focus on describing the interview results. After the result are presented, they will be compared to prior literature in the conclusions.

3.1 Research method and material

Rolling forecast has been studied in several qualitative studies and most of them have been conducted as case studies (Henttu-Aho & Järvinen, 2013; Henttu-Aho, 2016; Henttu-Aho, 2018). This study is conducted as qualitative, and case study is chosen as research method for the thesis. Case study can be described as a thick description of the case in which single case is examined with different sources of information (Laine, Laine, Bamberg, & Jokinen, 2015). Usually, the results of the case study will be applied in practice (Metsämuuronen & Metsämuuronen, 2011). The results of this study will be presented in case company and possible actions will be agreed afterwards.

Interview is chosen as data collection method. The use of interviews is seen appropriate to cases in which the answers of interviewee are part of larger concept (Metsämuuronen & Metsämuuronen, 2011). Additionally, interviews enable the interviewer to find out motives behind the answers and ask additional questions to predetermined interview structure (Laine et al., 2015). In this thesis, semi-structured interview method will be used in the interviews. In this method, discussion focuses on predefined themes to have exact answers to themed questions and decrease

lengths of the interviews (Metsämuuronen & Metsämuuronen, 2011). Prior case studies, Henttu-Aho & Järvinen (2013) and Henttu-Aho (2016 & 2018) have used the similar method for data collection. There is no exact amount, how many interviews should be conducted, but Hirsjärvi and Hurme (2015) propose that interviewees should be picked from different levels of organization to collect material from the whole organization. This also enables to modify the questions of the interviews based on the interviewee's position. In this thesis, the interviews are conducted with 9 employees during December 2019. Interviewees are chosen from different positions in the company to capture more comprehensive perspective about the case. The chosen interviewees are presented in the table 2. Every interviewee is given an individual code, which will be used when the interviewee is being referred.

Table 2 Interviews in BC Platforms

Code	Organisation level	Duration	Date
Controller A	Finance team	38 min.	11/12/2019
Controller B	Finance team	32 min.	13/12/2019
Controller C	Finance team	22 min.	18/12/2019
Director A	Management team	40 min.	16/12/2019
Director B	Management team	41 min.	16/12/2019
Director C	Management team	39 min.	20/12/2019
Director D	Management team	25 min.	20/12/2019
Director E	Management team	28 min.	17/12/2019
Sales A	Sales team	34 min.	18/12/2019

The interviews were scheduled to be around 30-45 minutes, and they were also recorded. Interviews can be divided into two categories based on the organization level. The organizational chart is described in the figure 7. The first category is the finance team, which consists of three employees; Controller A and Controller B. Company had also Controller C working during the summer and autumn of 2019. Controller C was part of the budgeting and forecasting project team, and therefore this interview provides useful information and external perspective for the study. The finance team represents the users of systems. In addition to finance team, Sales

team member was interviewed. Sales A is the communication link between salespersons and sales directors in the team.

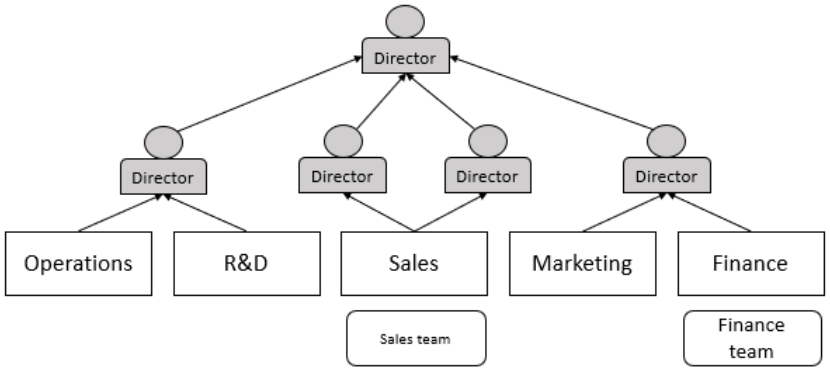

Figure 7 Organizational chart of BC Platforms

The second interview category is the management, and in this research five persons are part of the management team. Both Operations and R&D functions report to one director, and person is responsible for coordinating the resources of both functions. BC Platforms is operating globally, and Sales function is divided to North America (NA) and to Europe, Asia, and Pacific (APAC/EMEA). Both marketing and finance functions report to one director. All members of the Management team report to CEO. The above organizational chart describes the decision-making in the company, and the interview questions are modified to have more comprehensive data about decision-making process.

After the interviews were completed, recorded material was transcribed. Five of the interviews were conducted in Finnish and the material was then translated. The total amount of transcribed material is 20 pages. The transcribed material was divided into themes, which arose from theoretical part. The following themes were chosen; Current budgetary system and budgeting process, challenges in the current budgeting process, forecasting process and current challenges, need for rolling forecast as part of budgetary system and possible advantages and disadvantages.

All the themes are divided into two perspectives: practical and decision-making perspective. The full interview questions and structures are presented in Appendix 1.

3.2 Case company and business environment

BC Platforms is an international company focusing on providing genomic data management and analysis solutions in precision medicine and healthcare information technology industries. Company's platform offers access to genomic and clinical data, which consists of over 5 million samples from global biobanks' network. BC Platforms was founded in 1997, and since then the company has grown to 50+ employee company with offices in Switzerland, Finland, United States, United Kingdom and Singapore. Company has customers in 30 different countries mainly from Life Science- and Healthcare-sectors. BC Platforms is a growth company with revenue approximately 5$ million dollars in 2019. Company is committed to be one of the world leaders on providing genomic data management and analysis solutions, and to support this vision, BC Platforms announced its collaboration with IQVIA and closing of 15$ million financing round in 2019. (BC Platforms, 2020)

BC Platforms is operating in relatively new business industry. In fact, precision medicine sector was emerged only 5-6 years ago, and the industry is constantly evolving, and new competitors are joining. The competitors in the industry can be divided into two main categories; companies, which have operated in the academia before, such as BC Platforms, and companies, which are new start-ups with often using artificial intelligence and machine learning. The industry is global, and all the competitors have comprehensive resources and are well capitalized. From the continent perspective, US market can be identified as the current leader, but Asian market is constantly growing and gaining more capital from investors. (Director A,

2019) Director E (2019) has summarized the nature of current business environment.

> *"Our current business environment has multiple dimensions, it is competitive, immature and differentiated. Differentiated means that some of the customers are from public healthcare and from private side as well…immature meaning that there is no market standard, so it is not commoditized. This means that market is not easy to predict." (Director E)*

Because of the relatively new industry BC Platforms is operating, budgeting and accurate forecasting are challenging. BC Platforms' business is based on long-term agreements with customers, usually between 3 – 4 years, and the negotiation periods can vary from 6 -18 months. The biggest variances between budget and actuals are related to the difficulty of estimating the closing dates of sales deals (Director B). Therefore, accurate sales forecasting is seen as the most important factor in improving the visibility for the future. It is concluded that company is currently lacking a comprehensive rolling forecast, which would be used as future indicator for the sales. This information would be required to indicate possible direction of the future (Director A).

3.3 Budgeting in case company

BC Platforms has grown from 15 employee to 50+ employee company in 5 years. The growth has also affected to company's budgeting process during the last few years. The most important change was the dataflow in the process.

> *"There were major changes made to budgeting two years ago. Previously, it was made as a top-down process, which is common for micro entities. But as the company has grown, the budget numbers need to come from owners." (Director B)*

The shift from top-down process to bottom-up process enabled that budget owners from different company functions were able to provide their figures for the management team. These changes modified the process and some of the manual phases were automated.

> *"…the budgeting model has become more simple and easier to use in recent years, and efforts have been made to automate it. Slight changes are usually made every year, but the basic concept has stayed the same for few years." (Controller B)*

The previous improvements made to budgeting model have also automatized some of the tasks and decreased the time consumed in entering data into the model. Minor automatizations have been done yearly, but any radical changes have not been done since the newest version of the model.

3.3.1 Current process and challenges

The budgeting cycle in BC Platforms starts in autumn, usually after Q3 closing. The original idea is that different functions can already start preparing their next year's budget before Q4, which is the busiest quartal of the fiscal year. It is done as bottom-up process, which enables function leaders to oversee their own figures in respect of defined constraints.

> *"So, we are using fixed budget…In the current model, it is done by cost center, led by team leaders. The basic set up has been to focus on the current year and use the previous budget for the next financial year. (Controller A)*
>
> *"Well, in practice, next year's budgeting starts with looking at the previous year's version and adding changes with the help of my team. This provides a solid basis that can be fine-tuned. When the budget is ready for us, it is sent to the management team that approves it. Sometimes we still need to make some changes at this point." (Director C)*

Usually, prior year's budget operates as the basis for the next year. Team leaders coordinate the process for their functions and adjust the figures according to the requirements. The proposed function budgets are then approved by management, and they are consolidated into company level. The finance team has the role in combining the final version of next fiscal year budget.

> *"The budget serves as the target. The management team will set the targets and the budget for the coming year will be adjusted accordingly." (Controller A)*

Budget is serving as target for the fiscal year, and the future revenues and costs are matched appropriately to target expectations. Cost budgeting is identified as more simple process, because a variety of costs are recurring. Sales budgeting in BC Platforms creates a challenge because the upcoming revenue is based on long-term agreements with customers, usually between 3 – 4 years, and the negotiation periods can vary from 6 -18 months.

> *"Overall, cost budgeting is much simpler than sales because the cost base is mainly fixed…they are based on salaries, especially on the software development industries." (Controller A)*
>
> *"Our customers are large institutions, so finding the right people is extremely important in the customer organization. The entire organization must be convinced before a decision is made." (Director A)*
>
> *"I think we have the right budgeting process, but the biggest challenge is the customer journey from prospect to closed won deal. Every customer is different, so there no is certain model for that…we don't have playbook so to say, for example that these are the six stages which needs to be completed in order to close certain deal." (Director D, 2019)*

Every customer is specific, and length of negotiation processes have an impact for the accuracy of sales budget. The new sales, which come from closing new deals is

currently approximately 70-80% of the annual revenue target. The first two quarters seem to be more predictable, but the major challenge is the fact that large amount of new deals is closed in the second half of the fiscal year.

> *"In our fiscal year budget, first quarter is accurate, but rest of the year is in a way guessing…no one has the crystal ball so especially Q4 is more or less trying to have best guess." (Director E)*

In addition to new sales in budget, company's Operations -function is responsible for the implementation of solutions. Usually this process is divided to milestones and the revenue recognition and invoicing is based on the agreed milestones in the contracts. However, the actual project delivery time and budgeted delivery do not meet quite often.

> *"When we enter into an agreement and know the type of project, we know in practice how much longer the project delivery time is than the milestones in the agreement. Each new contract has milestones, which are based on the agreement… but the duration of the project often extends due to the resources available." (Director C)*

As the annual budget's role is operate as target, the realistic view of future is lacking. Although the sales budgeting is identified challenging, the overall feedback towards current process is at adequate level.

> *"The current budgeting process is working, but with some unnecessary manual tasks." (Controller A)*

> *“Sales are budgeted in quite detail level at the moment, which is good…and in terms of costs, cost center allocation is used.” (Controller C)*

Finance team combines the final version of annual budget. Sales are planned in high-detail and it is the most time-consuming part. However, the used detail-level in sales is seen necessary. The actual process is done with spreadsheets, and it includes few manual tasks that which decreases the effectivity and increases the probability of calculation errors.

3.3.2 Forecasting process

The current forecasting process has been in development since 2019. There have been challenges in combining the data from different sources. The current forecast available is a latest estimate (LE) for the fiscal year, which includes only company’s orderbook converted to revenue based on the estimated project timelines.

> *“Concept of the forecast was started in the last summer and LE was created based on that… so it converts the closed deals to recognized revenue and tracks the cash flows. This is a simple tool now and used only by finance team to control the invoicing of projects.” (Director B)*

The conversion is based on revenue recognition rules and it shows the latest estimate of fiscal year revenue excluding new sales. Latest estimate has been mainly used internally by finance team to plan the invoicing of current customers.

> *"Latest estimate was useful, of course…but since not all revenue comes in the same way, which poses challenges in predicting revenue and its timing. This adds a bit of inaccuracy to the estimate but, overall, it reflected the estimated revenue for the financial year." (Controller C)*

Overall, finance team felt that LE was working in satisfactory level. Latest estimate is maintained by finance team, and it is reviewed and adjusted on monthly basis with company's project managers, who have the latest information about project statutes. This information is then converted to sales estimates based on revenue recognition rules. The purpose of LE has been to create a functioning tool to provide accurate figures for reporting. It has been designed to include latest estimates for at least 18 months forward.

> *"It (LE) has been only used for one financial year, but it was built so that it could be used over the financial year…So, the rolling effect has already existed but has not yet been utilized. It would also be possible to develop it further, for example, to the needs of the cash flow forecast…but it would also be necessary to add the expense side to the forecast." (Controller C)*

The time horizon of latest estimate has been extended only to fiscal year period, though it could have been used as rolling estimate. Although, LE is approved and used by finance team, it has not been used as holistic tool for forecasting in the company.

3.3.3 Challenges in current forecasting

The interviews provided new insight about the challenges occurred in current forecasting. Interviewees were asked to list challenges that they have observed in current forecasting in the company. The first challenge has been the lack of visibility.

> *"Poor visibility about the actuals, because the actuals are not visible enough to figure out, how the targets will be met. This becomes a huge problem in second half of the year, because we are trying to chase a moving target and we do not know the precise estimate." (Director E)*
>
> *"The visibility of the future has been a challenge but has gone better…we know our targets from top line standpoint, so the idea is to plan how do we get there, so which specific customers we need to focus and win. We have the pipeline ready, but it is not converted." (Director D)*

Some of the management team has felt that they have not been provided enough detailed figures about the latest estimates. Moreover, the lack of visibility makes the resource allocation more difficult because the sales pipeline conversion does not exist. Three of the management team members criticized that there has not been customer specific information available in the estimate. It was also observed that employees were using different names of estimates during the interviews. Actuals, estimates, and forecast were often meaning the same thing. This could create a confusion especially between departments and decrease the quality of communication.

The second challenge has been the lack of systematic solution in creating the estimates. There has not been a single system to combine the information from variable sources. This has also affected to forecasting process and made it more manual and more prone to errors.

> *"Solid methodology and clear assumptions are needed to create working forecast process. Now, the information is in many parts…so more systematic solution is needed…the main question is how the pipeline could be converted to a sales forecast. Visibility is needed because the information is used for many purposes." (Director B)*
>
> *"Visibility is lacking, because there is no individual system that helps tracking those numbers." (Director E)*

The forecasting tool LE (latest estimate) has been developed in spreadsheets and then modified so that users are able to review and update the forecast in online. After the estimated numbers are reviewed, they are uploaded to company's CRM system for visualization and reporting purposes. The adjustments in the tool are mainly done manually and one employee is responsible for updates and fixing possible discrepancies in reported numbers. The fact that system has been maintained by only one employee decreases the visibility and trust for the reported numbers. The need for more sophisticated and systematic forecasting tool was clearly observed during the interviews.

The third challenge observed was that the forecasting tool has not included sales pipeline. In this context, sales pipeline refers to all possible customers and new deals that have been added to CRM-system. Therefore, forecast has been recognized more as a latest estimate of how orderbook will convert into revenue.

Moreover, it has been widely recognized in company that sales pipeline data should be used in forecasting tool. Few years ago, company tried to create a forecast based on the sales pipeline.

> *"Forecasting was tried a couple of years ago, but number of cases was too small, and it couldn't work back then…the biggest problem was related to accuracy of the forecast." (Director B)*

The number of deals in pipeline was identified as the problem, and it decreased the accuracy of the forecast. Sales pipeline has multiplied since then, and the historical data of deals can be used today more comprehensively to improve accuracy of forecast. According to interviews, the current problem is more related to timing and recognition of sales deals.

> *"Everything starts with sales forecasting. Especially the forecasting of closing sales deals is the key element. In our case, the importance of recurring revenue is still small. The most important single factors are sales cases and their predictability… it should also be understood that closing contracts can be a slow process." (Director B)*
>
> *"Closing probability for cases is around 10 – 15%...Typical business cycle for one business case is between 6 – 18 months." (Director E)*

According to Director A (2019), accurate forecasting of new sales is seen as the most important factor in improving the visibility for the future. The new sales currently cover approximately 70-80% of the annual revenue target. The length of business case is difficult to predict, and the closing probability needs to be acknowledged

when the forecast is created. Often the agreements with customer are signed with long-term contracts, and the deal value consists of multiple parts.

> *"A typical deal consists of three main parts: sales of the licenses, meaning as product sales, services, and the third part is SLA (Service-level-agreement)" (Director E)*

License part gives access to product, 'Services' refer to implementation of the product and service-level-agreement (SLA) starts running once the implementation is completed. One of the new alternatives is SaaS (Software-as-a-Service), a software licensing model that company provides. In SaaS solutions, the license and maintenance are often combined. SLAs and SaaS are counted as recurring revenue, however the impact for this revenue type is small, approximately 20 %, but growing yearly. Although, recurring revenue part is seen as prominent part of business, the current forecasting faces the challenges in estimating closing of new deals. The timing and revenue recognition can be identified as the biggest causes for this challenge.

3.4 Current budgetary system

BC Platforms' strategy usually consists 3 years, but after closing the latest financing round in 2019, two additional years were added to the strategy. The idea of planning, control and evaluation tools is that they would always adapt to company's strategy and push company towards its vision.

> *"How the planning calendar works, is that management team meets twice a year to see how the strategy is being implemented, and the annual planning focus will be shifted in the fall more towards annual budgeting. The idea is that we ensure timely approval of the budget for the following year." (Director A)*
>
> *"Company's strategy is cascaded down to business plan and this is again cascaded down to fiscal year budget." (Director B)*

In addition to strategic planning and adapting annual budgets to be in line with strategy, BC Platforms implemented a new methodology for target setting in 2018. Company is using OKR-methodology (Objectives and Key Results) for target setting. In BC Platforms, OKRs include both quantitative and qualitative objectives.

> *"One year ago, the semi-annual review switched to the so-called OKR method, which sets targets quarterly. In the first quarter, there is always a goal setting for all different functions, both financial and non-financial." (Director A)*

Fiscal year budget and defined OKRs are operating as target for the fiscal year. In addition to target setting, they are used for controlling and monitoring purposes in the organization.

> *"The quarterly targets are reviewed and the targets for the rest of the year are revised. In addition, the management team meets monthly before the Board meeting. The aim is to understand the deviations and to understand their causes." (Director A)*
>
> *"Budget gives us a tool for oversight and tracking of different functions. In our reports we have the variances against the budget, where we can see where the costs are, and which items are lagging." (Director B)*

Annual budget is used as lagging indicator to review variances between budgeted and actual numbers. Based on the variances observed, the management team plans corrective actions if needed. For the planning purposes, management team uses the information of latest estimates and the sales pipeline from Customer Relationship Management (CRM) -system.

> *"For the future indicator, the pipeline of incoming sales deals is used to indicate possible direction of the rest of the year." (Director B)*

Additionally, it was observed that fiscal year budget has a bigger role in control and evaluation functions. The planning function in BC Platforms consists of three elements: fiscal year budget, latest estimate, and sales pipeline, which is maintained through CRM-system. The impact of latest estimates to planning has been very low due to challenges in combining the information from various sources.

3.5 Rolling forecasting in budgetary system

The current forecasting process has been facing challenges, and therefore a need for rolling forecast has been identified in the company. One of the interview themes focused on this area, and in one of the questions, interviewees were asked that is there a need for rolling forecast. In addition, interviewees were also asked to describe what kind of forecasting and improvements would be needed.

> *"There is a clear need for sales forecasts…in practice, a 4 + 1 forecast or a 12-13-month forecast would be needed. A separate forecast would be needed, and figures should be reviewed monthly. (Director A)*
>
> *"…there would be a need for a rolling forecast, and I wish we had a 12 + 3 style forecast or a similar one with rolling effect added to the forecast." (Director C)*
>
> *"We would need leading indicators for the future, for example a revenue indicator…rolling forecast would be needed, but bit of a challenge is that targets are set as annual terms, although company's success is measured on long term…Some of the information should be only updated quarterly. Sales forecast and latest estimate need to be tracked monthly to react proactively to these changes." (Director B)*
>
> *"Rolling forecast could be needed, but it needs to be understood that sales executives' targets are linked to fiscal year budget. But of course, a better visibility of the future is required. Also, information about costs should be linked." (Director D)*

All the interviewees agreed that the time horizon of forecast should extend over one fiscal year. Two of interviewees proposed that company should adapt to 12 +3 or 4 + 1 model, which means that forecast should have a 15-month time-horizon. For the type of forecast, the need for accurate sales forecast was recognized as the most crucial part of information needed. According to Director A (2019), rolling forecast should combine company's latest estimate and sales pipeline. Cost side was not seen as important as sales, and costs could be added in the later development phase when sales forecasting is working. Moreover, it was suggested that forecast should include at least one additional quarter or month, which would be always added to the end of forecast. Monthly reviews and updates were also considered the most suitable update frequency.

Some of the interviewees also pointed out that if company's targets are set on yearly basis and forecast is extended over a year, it could cause confusion in the company. However, Director B highlighted that planning should always include both short- and long-term perspective. This means that the objective of rolling forecast needs to be clear for all employees to avoid misinterpretations. Interviewees were also asked about its role in the system and could it replace annual fixed budget.

> *"It couldn't replace because all of the targets are linked to fiscal year budget." (Director E)*
>
> *"The budget serves as a goal setter ... It would be good for us to create forecast on a quarterly or monthly basis. This could be used as a planning tool alongside a fixed annual budget." (Controller A)*
>
> *"Cannot be replaced because annual budgeting is needed to maintain the goals for the financial year…but why not extend the forecast beyond the financial year? Rolling budgeting could also be considered...sales would be challenging to execute as it is very*

detailed, but in terms of costs, rolling budget could be utilized." (Controller C)

According to interviews annual fixed budget has a clear role in target-setting, and employees did not see that rolling forecast could not replace the fixed budget. However, one of the interviewees pointed out the possibility of implementing rolling budget. The benefits could be that it divides the process throughout the year compared to traditional process. Company has been using high-level detail in sales, therefore rolling budgeting could be more time consuming, if it would be done multiple times in a year. But as costs have been mainly fixed, it could be utilized from the cost perspective.

3.5.1 Possible advantages and disadvantages

In the interviews, employees were asked to list possible advantages and disadvantages that they would see if rolling forecast would be implemented. The observed advantages and disadvantages are listed in table 2. In most of the interviews, term visibility was mentioned.

"The benefit would be that it would give us an immediate view about next year, so basically how the current situation would look like…but then targets are linked to fiscal year budget…so I'm not sure, would it help or just create unnecessary confusion between budget and forecast figures. And would it create more work, or would the resources spent pay off later?" (Director E)

Management would have access to see realistic view of next year, which could also have an impact for planning purposes. However, separating forecast from fiscal year budget could be difficult and the objective of rolling forecast could be obscure for employees. Sales A (2019) also mentioned that if sales targets are linked to fiscal year budget, the sales team's motivation towards forecast could create a challenge to maintain a functioning forecast.

Some of the interviewees suggested that forecast could be used for multiple purposes. One alternative would be a "frozen forecast", which means that rolling forecast could be used as a basis for fiscal year budget. Second proposed alternative was that cash flow estimate would be linked to sales forecast so that both forecasts could be maintained through one process.

> "…*you could always take a snapshot of the forecast situation and look at how much resources the different units are using, for example. I would also like the budgeting discussion to be based on the forecast and increase the debate on where more resources are needed." (Director C)*
>
> *"For example, the forecast could be used as a basis for next year…it could reduce the time spent on the actual budgeting process" (Controller A)*
>
> *"It would also be possible to further refine the forecast, for example, to the needs of the cash flow forecast, but it would also be necessary to add the expense side to the forecast." (Controller C)*

The multiple purposes of rolling forecast could increase some of the employees' workload. If it is created as combination of many forecasts, it would allocate more

resources in maintaining these forecasts. Although, the time used in budgeting process could diminish, forecasting could consume more resources from the user perspective in the beginning.

> *"It would certainly be difficult in the beginning, because we should get it working properly, but in the long run, it would certainly be useful and easier…it would eliminate unnecessary time spent in information collection, which is currently very time consuming. And in this case, communication between teams should work as well because we are in any case dependent on getting the information from other teams." (Controller B)*

Because rolling forecast has not been adopted before, it could require more resources at first place, and new tasks could be emerged. This could mean that the workload of users should be redirected. It was also mentioned that once the process is functioning properly, it would mitigate the time spent in maintaining and updating. However, one of the interviewees pointed out that communication should be well-organized, because the information flow is key element for successful forecasting.

Most the interviewees highlighted the importance of rolling forecasting as planning tool. The current latest estimate has been criticized about the lack of visibility and rolling forecast could be is seen as solution. It was also mentioned that the most important task of the management team is resource allocation, and this type of forecasting could enhance the proactivity in planning. Additionally, it could be also utilized in function level planning.

> *"Our company is growing, also the tools used in budgeting need to be updated…adding a forecast would also help sales executives to create proactive action plans for the future…but we would need a working system to combine the pipeline and financial figures." (Sales A)*

In sales team, sales team members are evaluated based on yearly targets. Therefore, better visibility about future could provide sales executives information about which sales cases to focus on. Sales team members could benefit of this because they would have access to a realistic forecast.

Table 3 Possible advantages and disadvantages

Advantages	**Disadvantages**
+ Visibility	- Accuracy
+ Proactiveness	- Technical solutions
+ Planning	- Resources
+ Flexibility (multiple purposes)	- Motivation
+ Realistic forecasts	- Communication
+ Resource allocation	
+ Decision-making	

3.5.2 Development areas in forecasting

Company recognized rolling forecast as an opportunity to implement a new advanced planning tool to support the decision-making. However, some development areas were also recognized during the interviews. As mentioned earlier, previous forecasting has been widely criticized in lacking sales pipeline and therefore sales pipeline conversion was identified as one of the most important developments needed. However, it was pointed out that due to nature of business and business environment, converting sales pipeline to realistic forecast is difficult. If a well-functioning solution could be found, it could improve the accuracy of the forecast.

> *"…we'd need a solid methodology, how this pipeline would be converted into sales forecast. Pipeline and sales forecast need a little bit of intelligence how they can be linked properly." (Director B, 2019)*
>
> *"When creating a forecast, you also must consider the technical solution, for example how it will be implemented. Alternatively, there could be a compiled database that would direct the data to the BI tool." (Director C, 2019)*
>
> *"Communication is important in creating a forecast, and the figures it produces need to be understandable, in this case especially the role of financial administration in the process is highlighted." (Director A, 2019)*

According to the interviews, more business intelligence would be required so that the pipeline conversion into forecast could be done. Without one systematic solution in forecasting process, the information will be still in different parts. Completely new technical solution was also suggested. Database could storage the scattered

information and data could be then automatically directed to forecasting tool. In addition, Director A highlighted the role of finance team in the process. This is due the reason that team would be the process owner of the forecast and responsible for providing understandable forecasts based on the information available. Finance team pointed out that timing and revenue recognition create the biggest challenges for successful forecasting.

> *"Rolling forecasting could be useful, but the challenge is communication and timing of closing deals. For revenue recognition, timing is also a challenge, depending on the duration of project implementation." (Controller A)*
>
> *"…the duration of the project often extends to the resources available. In other words, an estimate of how the project will be implemented would be needed. This could be done through variables." (Director C)*

If the finance team is not shared with the latest information proactively, forecast could be missing realism and give misleading reports to the management. Director C (2019) pointed out that almost always contract's milestones are not relevant, and the time spent on project should be based on calculation. The second development area was the communication in the organization. Company has multiple project managers and sales team members, which means that the information is scattered throughout the organization.

> *"In order to produce a forecast, communication between the various teams must work to make them aware of its importance. Predefined contact persons would be needed to gather the necessary information." (Controller A)*

> *"Communication has been a bit of challenge or at least it is quite time consuming…It would be easier if we had only one contact who could provide status updates of the projects and new sales. Contract related communication should also be improved ... it is often unclear that whatever the contract entails, so more accurate reporting could also make it easier for finance." (Controller B)*

Finance team has been responsible for collecting the information and converting the information into reported figures for management team. Finance team recognized that information collection can be sometimes time-consuming, but this could be solved by defining single contact persons from sales and operations team. To make this work, information needs to be coordinated first in both teams. Communication related to new contracts was also recognized as challenge, because sometimes the reported contract values in CRM-system can be confusing and could create misunderstandings when forecast is being updated.

3.6 Development ideas in case company

Case company's budgetary system has faced changes during the past few years, and the budgetary system has evolved from traditional closer to fragmented budgetary control. The growth has been forcing case company to update their fiscal year budgeting process. Sales budgeting has been challenging because negotiation periods are long and most of the sales deals are closed in the second half of fiscal year.

3.6.1 Budgetary system

The implementation of latest estimate and objectives and key results (OKRs) have modified system into more hybrid form and increased the gradual fragmentation. It needs to note that usually OKRs and other performance measurement tools (i.e. balanced scorecard) are recognized as part of fragmented budgetary control. Case company's budgetary system has consisted of fixed budget, latest estimate, and performance indicator. Observation is in accordance with Ekholm and Wallin's (2000) definition of hybrid system and partially in accordance with Henttu-Aho's (2016) definition of fragmented budgetary control. However, the key difference between fragmented and hybrid system is the existence of fixed budget (Ekholm & Wallin, 2000; Henttu-Aho, 2018), and therefore it can be stated that case company's budgetary system has modified into hybrid system, while containing few characteristics from both traditional and fragmented systems.

The findings showed that company has had challenges in forecasting, and management has been unsatisfied with current information available for decision-making. Therefore, rolling forecasting has been recognized as solution, and it could be utilized as a separate planning tool alongside fixed budget. Planning has been

previously dependent mainly on sales pipeline and variance analysis, and advanced forecasting tool would provide more accurate information for both short- and long-term planning. Figure 8 displays the proposed budgetary system in case organization.

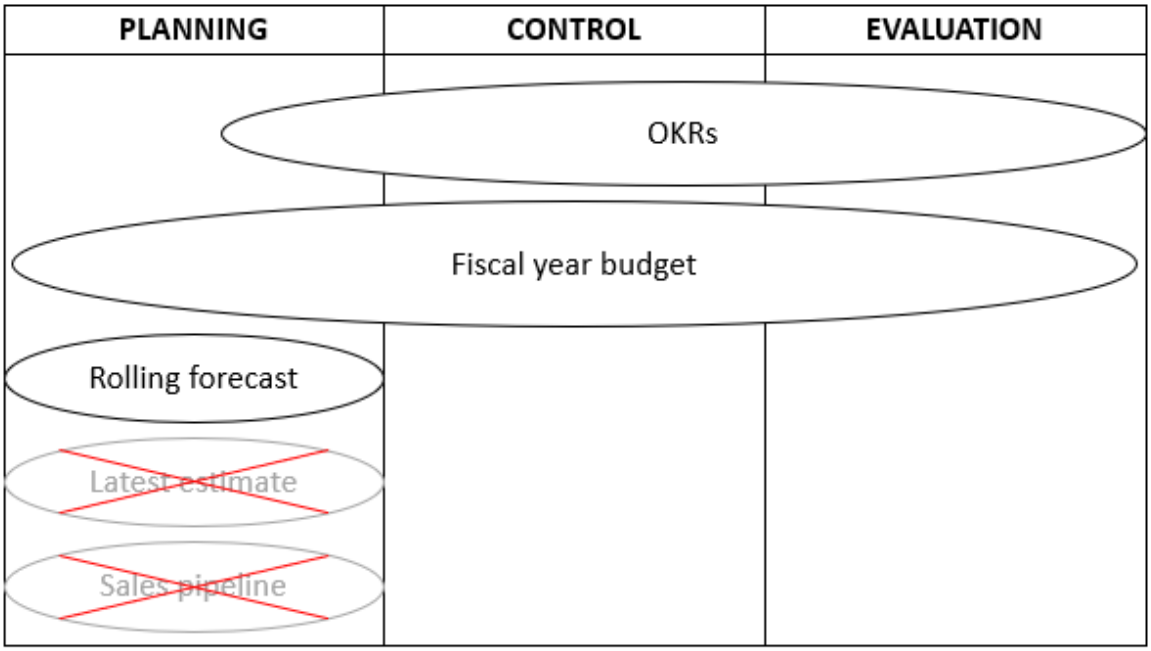

Figure 8 Proposed budgetary system

It can be observed that both fixed budget and company's performance indicator OKRs are operating in all functions (Figure 8). Planning function has consisted of fixed budget, OKRs, latest estimate and sales pipeline, but according to the results, rolling forecasting could be used as a replacement for latest estimate and sales pipeline. Although changes in budgetary systems usually requires investments, it can be stated that company has grown during the few years and is well capitalized, which means that there are more resources and capital available for development projects as before.

3.6.2 Rolling forecasting

It can be suggested that company should focus on creating a high-level sales forecast, because the visibility of future sales is lacking. In addition to sales, cash flow forecast should be also included as part of forecast. BC Platforms is a growth company, and the accurate status about the cash flow would be needed for decision-making. It needs to be noted that rolling forecast is flexible in terms of time-horizon, which means that case company can choose the update frequencies and time-horizon based on its preferences. It was also pointed out that “frozen forecasts” could be used as the basis of sales budget.

To have a functioning forecast, the lack of integrated technical solution and cross-functional communication were observed to be causing challenges. The first technical solution that case company tried, was to combine spreadsheets to CRM-tool to create a more automatized system. However, this was seen impractical because it involved too much manual work. Based on the case company results, it can be proposed that the earlier technical solution can be utilized with additional investments. Investments could be used to improve the automatization to decrease the time spent in updates and mitigate the possibility of calculation errors.

Second crucial factor to technical solution is the calculation part, which is currently done with spreadsheets. The use of spreadsheets affects the reliability of forecast and it can provide inaccurate information for decision making. On the contrary, it is possible to maintain accurate forecasting with current process, but it is time-consuming for the process owners. It can be suggested that company could use the current spreadsheet-model to develop a functioning process. In the next phase, this solution should be replaced by integrated forecasting process that could be maintained through single system.

The second challenge for the successful forecasting has been the cross-functional communication. Information has been divided throughout the organization, and therefore especially cross-functional communication has been slow and time-consuming. Based on the observations, it can be proposed that every functions of the organization should have one contact person who would participate in the forecasting process. The contact persons would be then responsible for collecting the necessary information in the functions. This solution would enable more systematic communication for the forecast. It is also proposed that internal communication could be improved by implementing new tools for project tracking purposes. By using project management tool, the information would be easier available for employees and it would also improve the transparency of ongoing projects.

It can be concluded that apart from the observed challenges, a functioning forecast can be developed. Successful forecasting requires the support of whole organization, and the objective of forecasting should be clarified to employees. With the support of organization, rolling forecast can be used as a decision-making tool in uncertain business environment.

4. Summary and conclusions

The final chapter is divided into two parts. The first part summarizes the findings of this study and compare them to prior research. The focus is on discussing the case study results around the following topics: forecasting in budgetary systems, and advantages and disadvantages of rolling forecasting. The second part introduces the conclusions of the study. First, the research questions are answered, and then limitations and further research of study are presented.

4.1 Summary of the results

4.1.1 Forecasting in budgetary systems

Based on the findings of this study, rolling forecasting was recognized as potential improvement in budgetary system by providing more visibility towards future. It could be used to create action plans to close the gap between budget and forecast, and to decrease time spent on resource allocation. Bourmistrov and Kaarbøe (2013) have stated that companies can benefit by implementing rolling forecast, and Myers (2001) points out that forecasting tool can decrease management's time in allocating the resources and gives possibility in analyzing the figures instead.

Results of this study showed that traditional budgeting failed to operate as a planning tool. Fixed budget figures were considered unreliable and almost immediately outdated. Frequent updates and rolling method of the forecast could lead to more realistic dataflow and improve the efficiency of decision-making. This is in accordance with Henttu-Aho (2018) who states that rolling forecasting can be used to support the planning function. Other research has also considered rolling

forecasting with multiple advantages in budgetary systems (Montgomery 2002; Veth 2008; Player 2009; Henttu-Aho 2013; Hill 2016). However, the findings showed that if forecasting process is not designed as rolling, the benefits in decision-making can be mitigated. Ekholm and Wallin (2000) and Henttu-Aho (2016) have pointed out that these types of forecasts can be exposed to re-budgeting and add only little value to budgetary system.

The implementation of rolling forecast increases the fragmentation of budgetary system. The fragmentation enables different budgetary tools to be used in parallel and decrease the tension between forecasts and targets. The case results showed that fixed budget has been used as a target, and rolling forecasting was recognized as solution to mitigate fixed budget's role in planning. Malmi and Brown (2008) and Henttu-Aho and Järvinen (2013) have stated that multiple accounting tools enable companies to improve their budgetary systems.

It was observed that forecasting was integrated to fixed budget creating a hybrid system. According to Montgomery (2002), hybrid system can be described as an integrated planning cycle, in which rolling forecast operates as a steering wheel by connecting annual budget and strategic plan. Furthermore, case company results have similarities with de With and Dijkman's (2008) study, in which, it was observed that rolling forecasts are implemented to have a realistic comparison to fixed budget.

Rolling forecasting can be stated to promote the proactiveness in planning (Jarvenpaa 2007; Ostergren & Stensaker, 2011). However, the level of proactiveness can vary depending on company's approach to planning. Based on Henttu-Aho's (2018) classifications, case company's planning was recognized to have more reactive characteristics. Action planning focused around variance analysis, and forecasting was done as a joint process with fixed budget. Palermo

(2018) has made similar conclusions by stating that planning process, which utilizes calculated deviations to create action plans, can be recognized as reactive approach to planning. Becker et al. (2016) have added that decoupling of forecast and target-setting has been identified as important factor in classifying reactive and proactive planning. In hybrid systems, rolling forecasting is more often used as a unified process utilizing the same information as in annual budget. The results of this study indicated that fixed budget and forecast could be decoupled in hybrid system. Results are only partially in line with Henttu-Aho (2018), Ekholm & Wallin (2000) and Sivabalan et al. (2009), because the decoupling of target and forecast is more common in fragmented budgetary systems.

4.1.2 Advantages and disadvantages

Case company results indicated that rolling forecasting was expected to produce realistic figures to be used as part of decision-making. Case company understood that to reach this objective, the forecast should be designed as a separate tool from fixed budget without having a separate target. The decoupling of targets and forecast has been recognized as important factor in improving the quality of information (Henttu-Aho, 2016; Hope & Fraser, 2003).

According to Becker et al. (2016) companies operating under uncertainty are more often implementing rolling forecasting to improve their decision-making. Case study results showed that rolling forecasting was recognized as a tool to navigate in competitive business environment. This is in accordance with Hill (2016), Montgomery (2002) and Player (2009), because they highlight rolling forecasting as part of decision-making process. However, it should be noted that the linkage between rolling forecast and uncertainty is mixed (Bhimani et al., 2018; Haka & Krishnan, 2005; Hansen, 2011). Therefore, it cannot be stated that rolling forecasting

would reduce the uncertainty, although it is more popular in uncertain business environments (Sandalgaard, 2012).

According to Hope and Player (2012), especially large corporations have been utilizing multiple forecasts. Forecasting tool can serve multiple purposes, such as sales forecasting, cash flow estimation and target-template. In case organization, the need for cash flow forecast was pointed out, because a more accurate status of cash flow could provide more comprehensive overview about the future direction. Hope and Fraser (2003) have pointed out that forecasting is often utilized in cash planning. In addition, case study results indicated that rolling forecasting could be used as an evaluation tool for next year's fixed budget by taking a "snapshot" of forecast. According to Neely et al. (2003) and Henttu-Aho (2018), companies can utilize "frozen forecasts" as a basis for evaluation or incentives. In case organization, the possible use of "frozen forecasts" was related to efforts in decreasing the time and resources consumed in the actual budgeting process. It was considered that they could be used as the basis for target-setting in fixed budget. This in accordance with Henttu-Aho's (2018) research, in which it is stated that because of the realistic view, they are often used as year-end target-setting templates.

Case company results showed that forecasts prepared by spreadsheets decreased transparency of the process and mitigated the credibility of the figures. These problems can cause skepticism towards development of new forecasts. Additionally, it was stated that a sophisticated system could increase the reliability of figures and improve the motivation of organization. According to Player (2009), the use of spreadsheets or similar manual tools should be avoided in forecasting, because then forecast is highly exposed for errors and only control mechanism is maintained by the users. Rickards (2012) has also pointed out that updating these forecasts is time-consuming and difficult with low level confidence on the forecasted figures. In addition, the results are in line with Hill (2016) who proposes that forecasting should

be based on integrated system, because it enables automatic dataflows from the chosen databases. Elragal and Haddara (2012) also add that successful forecasting requires the implementation of more sophisticated system.

The findings showed that if sales forecasting is based on judgmental model, the results could be too inaccurate to use in decision-making. Myers (2001) points out that successful forecasting is dependent on multiple factors especially when it comes to revenue. Player (2009) adds that revenue estimation is more difficult than estimating expenses, and that is why the objective of the forecasting needs to be communicated.

Case study results showed that estimates should extend over fiscal year, because this would improve forecasting accuracy. Player (2012) have pointed out that there is no precise time horizon for forecast, and therefore it should be based on assumption, how far they can forecast with reliable accuracy. Furthermore, case study results indicated that if forecasts are be updated monthly, company could be able to react quicker to possible changes required in business. Bhimani et al. (2018) have added that monthly updates are preferred if company is using rolling forecasting in operational planning.

Player (2009) points out that focusing on a few key factors on the forecast, such as sales or variable costs, can create a better and more accurate end-result to support decision-making. Case company recognized that there is a need for sales forecast with the “rolling”- effect. By focusing only to sales, the process was seen less time-consuming, and was expected to provide more accurate estimates. According to Veth (2007), choosing only sales as the basis of rolling forecast mitigates probability that case company ends up re-budgeting. Ekholm and Wallin (2000) and

Montgomery (2002) state that threat of re-do is usually bigger if the forecast is updated too infrequently.

Budget gaming has been identified as a challenge in creating accurate forecasts. Moreover, prior literature has showed that forecasts and targets are more often linked in hybrid system, which means that forecast is more affected to number manipulation (de With & Dijkman, 2008; Ekholm & Wallin, 2000; Henttu-Aho & Järvinen, 2013). In case organization, fixed budget and forecasting were identified as separate activities, and therefore the gaming was not identified as problematic as in prior literature. However, one risk for budget-gaming was observed in case organization, because if same information is used in fiscal year plan as in forecasting, the process can be affected by number manipulation.

If forecasting is based on too optimistic assumptions, the accuracy of the forecast could decrease. Due to these risks, it was pointed out that forecasting should be based on the data and variables instead. Oliva and Watson (2009) have made similar conclusions about the information related to forecast; if the forecast is based more on the opinions rather than hard data, the targets and realism of the forecast can mix. On the other hand, Hope and Player (2012) have pointed out that statistical forecasting can be considered if there is demands and prevailing trends available. If every customer has specific needs, statistical forecasting cannot be utilized, and therefore the forecasting should be based on understanding business environment and good judgment (Hope & Player, 2012).

Successful forecasting requires efficient communication flow in the organization. If information is scattered throughout the organization, collecting the necessary information can be very time consuming. Therefore, the information flow should be enhanced. Henttu-Aho (2016) has stated that communication between departments

increases the transparency of forecasting figures and enhanced the accuracy of the forecast. It was also observed that gaps in communication can lead to confusions and misinterpretations. Case company's previous forecast has been described more of a latest estimate than a forecast, though it has already included the "rolling"- effect. According to Ekholm and Wallin (2000), latest estimates are sometimes referred as rolling forecasts, although the estimate would not extend over the fiscal year. This observation was partly done in case company, and it seemed that sometimes different terms were used from latest estimates and rolling forecast. Lack of communication can lead to confusions, and that is why the definitions of terms need to be communicated throughout the organization.

Additionally, the findings showed that implementation of rolling forecast was time consuming, and it could lead in decreasing the motivation of users. In Henttu-Aho's (2016) study, new controller positions were established during the implementation phase. Bourmistrov and Kaarbøe (2013) have also added that changes in organizations can modify the previous positions and demand learning new skills. Case results also indicated that the implementation could affect some of the positions. However, it was observed that the motivation towards forecasting tool was in high-level throughout the users. The implementation will also require acceptance from whole organization because a functioning forecast is dependent on the information from other departments. It was also observed that maintaining the forecast will require updating the data more often. Therefore, the increased workload could decrease the motivation towards forecasting process if the objective of forecast is not clearly communicated in the organization. According to Player (2009), implementation of rolling forecast includes significant changes in organization and the acceptance of employees can be sometimes reluctant.

4.2 Conclusions

The focus of prior literature has been changing from investigating different methods to replace traditional budget by implementing advanced tools as part of budgetary systems (Henttu-Aho & Järvinen, 2013; Henttu-Aho, 2016;2018; Bhimani et al., 2018). Moreover, budgeting has been described as wider concept including three functions; planning, control, and evaluation, which all have different roles (Hansen & Stede, 2004; Sivabalan et al., 2009). The role of rolling forecasting as part of budgetary systems has been increasing and it has been recognized in enhancing the planning and decision-making (Henttu-Aho, 2018). However, there have been only few case studies covering the use of rolling forecasting.

This thesis was conducted as case study in BC Platforms, and the data was collected by using interviews. Interviewees were chosen from decision-making and user levels to collect data more comprehensively around the topic. The case company results were divided to two parts: the first part introduced current system and budgeting in case company and described the current forecasting process. The second part introduced rolling forecast as part of budgetary system and what kind of advantages and disadvantages the implementation could have. Finally, the observed development areas were described. Based on the findings, development ideas were proposed to the current budgetary system and forecasting process.

The objectives of this study were to examine challenges in budgetary system and decision making and examine how rolling forecasting could improve budgetary system. The main research question was used to examine how rolling forecasting could improve the budgetary system.

1) *How could rolling forecasting improve budgetary system and thus decision making?*

It can be concluded that the implementation of rolling forecast can improve budgetary system by modifying the planning function into more proactive form. Moreover, rolling forecasting can be recognized to improve decision-making by increasing the accuracy of the estimates and providing more visibility. Findings are in line with Bourmistrov and Kaarbøe's (2013) and Henttu-Aho's (2016;2018) results. In addition, it can be concluded that the benefits of rolling forecasting can vary in different budgetary systems. Rolling forecasting is exposed to budget-gaming and inaccuracy more often in hybrid systems, and therefore the decoupling of fixed budget and forecasting can be recognized as important factor in mitigating these challenges. Conclusion is line with Ekholm and Wallin's (2000) and Henttu-Aho's (2018) findings concerning the decoupling in budgetary systems. The first sub research question of the thesis was used to investigate how the role of rolling forecast is recognized:

a. *How is the role of rolling forecast seen?*

It can be concluded that rolling forecast's role is to serve the planning function. This conclusion is in accordance with de With & Dijkman (2008), Ekholm & Wallin (2000) and Libby and Lindsay (2010) observations concerning forecasting in budgetary systems. Furthermore, the findings of this study showed that fixed budget is emphasized as the most appropriate tool for control and evaluation, and therefore rolling forecast was mainly seen as a complement in the system. The conclusion is line with de With & Dijkman (2008), Sivabalan et al. (2009) and Libby and Lindsay (2010). On the contrary, the findings of this study showed that the role of rolling forecasting can be extended to operate in the evaluation function. The similar

conclusions have been done in studies from Neely et al. (2003), Bhimani et al. (2018) and Henttu-Aho (2018). It can be concluded that the role of rolling forecasting should be determined based on the requirements of the organization, and therefore it cannot be categorized unambiguously into certain functions. The second sub research question focused around the advantages and disadvantages of rolling forecast:

b. *What kind of advantages and disadvantages could rolling forecasting create?*

Based on the results, four themes were identified: decision making, flexibility and technical solutions, visibility and forecasting accuracy, and communication and motivation. It was observed that visibility towards future was improved if forecasting could be extended over fiscal year. Rolling effect enables to prepare more accurate estimates for decision-making. Conclusions are consistent with previous studies from Veth (2007) and Hill (2016). Moreover, the findings showed that rolling forecasting is recognized as flexible tool to be used in revenue and cash flow estimation. The similar findings have been done in Hope and Fraser's (2003) and Player's (2009) studies.

Technical solution of process can be recognized as key factor for successful forecasting, and the lack of integrated solution can lead to failure in forecasting and mitigate the motivation of the organization. Player (2009), Elragal and Haddara (2012) and Rickards (2012) have stated that accurate forecasting would require a sophisticated system to be functioning. Therefore, it can be concluded that investments are required to develop successful forecasting process. Finally, the results of this study showed that key element for successful forecasting process is adequate cross-functional communication, because efficient information flow enhances the transparency of the process and decreases the time spent in data

collection. This is in line with Henttu-Aho's (2016) findings concerning the improved communication between organization's departments.

4.3 Limitations, reliability and further research

Although the thesis was conducted as case study, the results of the study can be generalized in the rolling forecasting research area. The results can be especially comparable in similar case studies concerning budgetary system changes and role of rolling forecast in small and medium sized companies. However, there are several limitations observed. First, it should be noted that the observed advantages and disadvantages can differ between different companies. Secondly, case company was operating in relatively new business industry that should be noticed when comparing the results of the study. Additionally, the development of budgetary system was still in progress that should be considered when making comparisons. In more traditional industries, rolling forecasting can be recognized as more predictable due to historical data and trends available. This information can affect the design of the forecasting tool as well.

In case studies, the number of interviews is affecting the reliability of the study. In this thesis, the results can be considered as reliable, because 9 employees were interviewed for the study. This is equivalent to 18% of total employees at the time of interviews. The interviewees were chosen from different organization levels, management team and different functions of the company, finance and sales team. By choosing interviewees from different company levels, the subjectivity of the results decreased. Two different set of interview questions were created to capture a comprehensive data about the research area. Overall, it can be stated that by choosing interviewees from different company levels provided different perspectives and opinions, and therefore case study results can be considered as reliable.

This study provided new information about changes in budgetary systems and role and design of rolling forecasting. Due to the time limitations, the implementation phase was excluded from the study. The implementation phases can be long lasting, and it would have required a new set of interviews. As further research, it would be interesting to conduct a new study concerning the implementation phase and compare these results to this study. Additionally, there are not many studies concerning budgetary systems and rolling forecasts, therefore a similar study in other healthcare or technology company would provide comparable results and information to this study.

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Appendices

Appendix 1 Interview structures

Interview structure – Management team

1. **Describe current business environment**

2. **What kind of information is used in decision-making?**
    - How do you see the role of budget in this?
        - Variances, actuals vs. budgeted
    - Is there enough visibility/transparency about business?
    - How do you feel about budget accuracy? Is there enough detailed information?
    - What kind of challenges is observed?
    - How could the budgeting be improved?
    - How the budget data is used during the year?
    - What kind of information would be needed for decision-making?
        - Is there a need for rolling forecast?

3. **How could the forecasting be used in company?**
    - Do you feel forecasting in some form would be needed?
        - What kind of information would be needed?
        - How accurate should it be, e.g. revenues & expenses?
        - How often would it be updated and monthly or quarterly?
    - What kind of impact would it have for decision-making and planning in company?
        - What challenges would it have?

Interview structure – Sales and Finance

4. **What kind of current budgeting system is used in company?**
    - How are you involved in the process/how much time used?
    - How do you rate the importance in budget functions; control, evaluation and planning? (in this question, I need to explain what these functions mean)
    - How do you feel about budget accuracy?
    - What kind of challenges is observed?
    - How could the budgeting be improved?

5. **How could the forecasting be used in company?**

- Are there any forecasting tools available at the moment?
- Do you have any previous experiences about rolling forecasts?
- How do you see the role of rolling forecast in budgeting system?
  - Could it replace traditional budgeting?
- Do you feel that rolling forecast in some form would be needed?
  - How accurate should it be, e.g. revenues & expenses?
  - How often would it be updated and monthly or quarterly?
- What kind of impact would it have for decision-making and planning in company?
  - Would it increase the proactiveness?

6. **What advantages and disadvantages could the implementation of rolling forecast could create?**
   - Do you feel that it would have an effect on your work?