NORWEGIAN UNIVERSITY OF LIFE SCIENCES

Preface

This thesis is written on the basis of a case organization within digital advertising and is part of the Norwegian Master of "Business Administration" (siviløkonom). In my thesis I seek to develop a dynamic scorecard for strategic support in decision-making. The choice of subject is related to my interests and specialization. My specialization is "Financial Management" and is supported by "Strategy and Management". The subject of my thesis was therefore a natural choice. The work has been carried out from December 2012 to May 2013.

I would like to give special thanks to my supervisor, Carl Brønn, for inspiration and constructive guidance on the subject. I would also like to thank the employees of the case for their valuable cooperation throughout my work. Lastly, I would like to thank my friends and family for helping me out along the way.

Ås, May 2013

Marta Sundal Fretheim

Abstract

The scope of this research is to develop an instrument for the evaluation and improvement of organizational performance for a digital advertising firm. A review of the most common management instruments was conducted. The balanced scorecard, developed by Robert Kaplan and David Norton in 1992, was chosen for further development. However, limitations have occurred since then, and most of them are related to the actual dynamics of the model. Combining the balanced scorecard and system dynamics methodologies therefore seemed like a good solution in overcoming the associated model limitations.

By the use of system dynamics, a conceptual model was developed and structured in accordance to the perspectives in the balanced scorecard. To gather necessary information, all processes involved in the production of digital advertising were mapped through interviews and internal documents. The conceptual model was meant to give a better understanding of the dynamics and complexity of the organization and support strategic decision-making. The developed model is representing a virtual world developed on the basis of the conceptual frameworks of the organization. It therefore enables testing and analysis of future performance and applicable strategies. The test runs were used to develop a Dynamic Balanced Scorecard strategy map, explaining the objectives and indicators of the organization.

It is important to note that the model entails simplifications of the actual organization and the real world; it is only focusing on key variables that, to some extent, have been based on assumptions. The resulting model has not yet been tested in the real world, the actual effect is therefore somewhat uncertain. However, the model supplies management with a better understanding of the complex relationships between organizational activities and performance, making it easier to analyze strategic decisions as well as determining the strategic direction. The virtual world can improve the learning efficacy and thereby reduce expensive erroneous decisions.

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1 Introduction

In this chapter I will provide an understanding of the research area, namely dynamic scorecards. I will start with the background of the thesis, followed by the problem discussion that will lead to the purpose of this thesis and the research question used to support the purpose. Lastly, the thesis outline will be introduced.

1.1 Background

I was introduced to the case through a friend before my thesis was initiated. I then realized that they did not have any operating management system. My first thought was therefore that the performance could be significantly improved by introducing an instrument for managing and measuring their performance. By implementing their strategy and aligning their entire organization with their strategy I assumed that it would be possible to attain more efficient resource utilization.

Performance management has become a topic of great interest. The most recognized model is the balanced scorecard that originates from a study in the early nineties. The study found that the focus on financial measures were inadequate to create future value through investment in customers, suppliers, employees, processes, technology, and innovation. The focus shifted from looking behind to looking ahead. They realized that more knowledge about the drivers for future success was necessary. In the article, they presented a framework for identifying key process indicators and communicating them throughout the organization. This was meant to create commitment and align action plans for the whole organization. Since then, the balanced scorecard has evolved along with several other emerging performance management models, some more similar than others.

Reviewing the models, balanced scorecards simplicity and focus on underlying structures, the drivers for success, fascinated me and seemed to give managers a fast but comprehensive view of the business. The case organization was small

and driven by non-businessmen, I therefore considered a simple and easily communicated model as important. However, the model was not ready for implementation, adjustments were needed. As I gained more information about the model, I learned about its advantages and limitation. Most limitations were related to its dynamics as a system (Nørreklit 2000; Warren and Langely 1999; Mooraj et al. 1999), and suggested that the causal links needed further investigation.

John Sterman (2000) defines system dynamics as "a perspective and set of conceptual tools that enable us to understand the structure and dynamics of complex systems." System dynamics is an aspect of system theory that focuses on the many circular, interlocking, and sometimes time delayed relationships among its components instead of the behavior of individual components. The causal relations between the objectives are meant to represent such interrelations. The application of both the BSC and system dynamic methodologies therefore seemed helpful in overcoming the balanced scorecard limitations. The final model was to result in a valuable strategic support instrument for the management of the case under study comprehending the dynamics from the environment.

This paper therefore aims to devise a dynamic scorecard model appropriate for digital advertising organization by introducing the system dynamics concept with a focus on the effect of causal relations and the interactions among the key indicators and taking into account the impact of delayed feedback caused by new policy and legislative changes.

1.2 Problem discussion

The increased competition has lead to a need of improved strategies and management systems. With a changing environment, success is now more depending on the organizational ability to adapt and meet the changing needs from the dynamic environment. This has lead to an increased need to evaluate performance from an external perspective, listening to customer, suppliers and other stakeholders.

In both literature and practice, several alternative systems with strategic-performance measurement and management systems are available. These newer developed systems all try to overcome the limitations of the traditional measurement system, the budget. The performance measurement models strive for the best approach, trying to handle the dynamics from the organization and changing environment. In fact, most of them have many similarities, all try to balance the performance measures between different perspectives, create a common language for communication, and try to determine the underlying drivers for success by establishing cause and effect linkages.

The most recognized model, which is also considered as one of the first models, is the balanced scorecard. Many of the performance measurement models today is derived or inspired by the balanced scorecard. The balanced scorecard originates from the field of management accounting, where Kaplan and Norton (1992) believed that the existing performance measures were becoming outdated and inefficient. The balanced scorecard is based on just a few key performance measures derived from the organizational strategy and balanced between organizational perspectives and financial and non-financial measures. The perspectives are normally financial, customer, internal processes, and learning and growth. Like the figure below shows, these perspectives are linked together in a closed loop, proclaiming a dynamic approach.
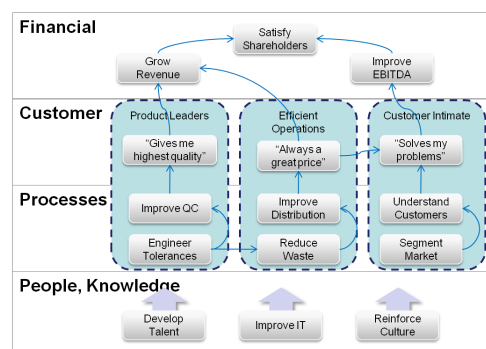
Figure 1.2.1 BSC interrelations

Digging deeper into the theory of the BSC and reflecting upon its underlying concept, some implications have occurred. The strategy map, to the right in the above figure, does not close the loop. In fact it is linear with unidirectional

causality starting at the learning and growth perspective at the bottom and ending with the financial perspective at top. Thus, implying that their financial situation will not affect their decisions in the organization. For example, an organizations access to liquid funds would affect the decisions related to business investments, such investments could affect productivity or customer satisfaction and therefore it would ultimately also affect earnings and costs, closing the feedback loop and affecting all interrelated variables. All parts in the organization is interrelated, changing one aspect affects the entire organization. The causal links in the balanced scorecard are developed on the basis of the management assumptions, and how they counteract is not defined. These causal links are therefore questionable, and what the key performance indicators will result in is unclear. Another weakness related to the dynamics of the model is that it does not include time lags. An example is knowledge management where the effect from the investments often has time lags and may not be visible before a considerable time of period.

System dynamics is a tool for modeling such complex systems. It enables us to understand the structure and dynamics of these systems composed of complex and continuously changing processes. All interrelations are mapped and analyzed in order to determine how the variables counteract and affects the entire system. System dynamics assumes that with correct identification and management of the existing processes effective results can be achieved. Strategic objectives are therefore accessed through the interaction and performance of these complex processes.

By mapping all processes and activities, the interrelations and dynamics over time can be carefully examined. This supplements the balanced scorecard as it gives a better understanding of the actual underlying structures that drives performance. The methodology also indicates the effect of changing one variable on the system as a whole, all in all increasing the learning outcome. Thereby the combination of the two methodologies can supply management with a dynamic and strategic performance management instrument that increases strategic management support and organizational learning.

Applying these two methodological approaches enables the identification of key success drivers and running strategy tests to guide the development of the key process indicators. This is assumed to result in a valuable management model increasing the overall performance for the case.

1.3 Purpose and problem definition

Based on the problem discussion, the purpose of this study is to expand the balanced scorecard to include system dynamics, and thereby enabling sufficient information and efficient management in accordance with the case organization`s strategic path. The development process is also meant to give insight to the application of theoretical framework to the real world and how organizations learn.

I ended up with the following Problem definition: *"Improve performance for the case organization operating in a digital advertising industry by expanding the scorecard model to include all feedbacks without prioritizing any of the perspectives."*

1.4 Objectives

There are two main objectives necessary to answer the research question. First I developed a dynamic scorecard version with the use of system dynamics. Then I demonstrated and tested the model through the case organization. This implied analyzing initial values and testing different strategies. The outcome needs to be analyzed to give an indication of how the performance for the case can be improved.

1.5 Method

The thesis will be based on the case study of a digital advertising organization and the simulation of different applied strategies. Initially, key processes and activities in the organization needs to be mapped. Then these are modeled by the use of system dynamic. The model will then be tested and the outcomes will be analyzed. Finally, this will be used in the development of the dynamic scorecards.

The development will be based on interviews with the management and project manager in the organization and internal documents. The interviews will be qualitative.

1.6 Literature and delimitation

The theoretical framework of this thesis is based on the performance management theory of Kaplan and Norton (1992, 1996, 2004, 2006, and 2008) and system dynamics theory of mainly Forrester and Sterman. Initially some literature on budgeting and performance measures was reviewed to undermine the choice of management model. In this review I chose to focus on the most common strategic performance measures, as there are numerous alternative and a complete review would be too time consuming. I will not focus on their market strategy or future goals, but take this for granted. Nor does this paper aim at discussing the acceptability or efficacy of using the balanced scorecard in linkage with the organizational performance pay systems.

1.7 Thesis outline

The figure below shows the thesis outline.

1	• Introduction
2	• Monitoring organization performance
3	• The Balanced Scorecard
4	• Organizations as systems
5	• Methodology
6	• The case organization
7	• Developing a management model
8	• Analyzing future performance
9	• Applying strategies
10	• Conclusion, limitations, and implications
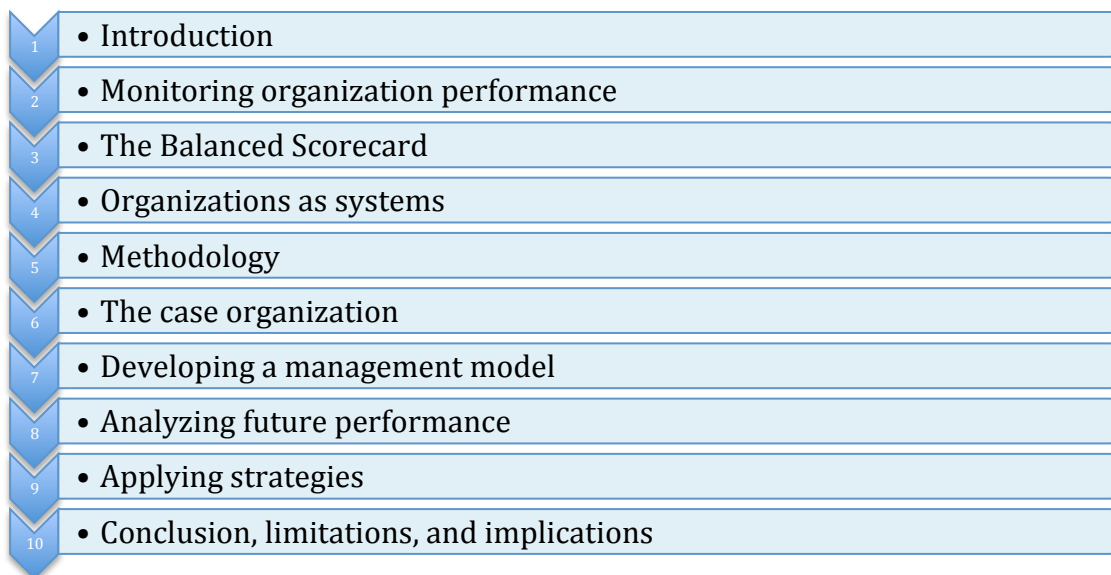
Figure 1.7.1 Thesis outline

The first chapter is an introduction and presentation of the research area. In the second chapter, existing literature on performance monitoring is described and

discussed to illuminate the choice of balanced scorecard and its context. The third chapter describes the balanced scorecard in more detail, this is to get a better understanding of the relevant theoretical approach and its advantages and limitations. On the background of the limitations presented in chapter three, system dynamics is introduced in chapter four. The methodology applied is then described in chapter 5 before the case is presented in chapter six. On the basis of the theory and the case, the dynamic management model is developed in chapter seven. This was then used to analyze the future performance of the organizational in chapter eight. In chapter 9, strategies for achieving the organizational goals were tested. The results are discussed, limitations and implications described, and the final conclusion is presented in chapter 10.

2 Monitoring Organization Performance

In this chapter the most common performance management tools will be in focus. I have ruled out the biggest and most comprehensive systems requiring huge investments, as it is not an option for small business like the case under study. In reviewing the models I have focused on what the practice is and their strengths and weaknesses. This is meant to give a better understanding of the choice of as well as the context of the balanced scorecard.

Management tools have existed for decades in various forms. Whether trying to boost revenues, innovate, improve quality, increase efficiencies or plan for the future, executives have looked for tools to help them (Rigby 2011). The environment is rapidly changing due to globalization and economic turbulence, as a result the complexity of business management is also increasing. According to Rigby (2011), executives need to be more knowledgeable than ever as they sort through the variety of tools. They are left with a challenge and need for management tools to have a requisites variety. William Ross Ashby introduced the term "requisite variety" in 1956, this term tells us that the larger the variety of actions available to a control system, the larger the variety of changes or alterations it is able to compensate. For decision making it can be seen as a simple statement of a necessary dynamic equilibrium condition. Weick (1979:

189) elaborated: "If a simple process is applied to complicated data, then only a small portion of that data will be registered, attended to, and make unequivocal. Most of the input will remain untouchable and will remain a puzzle to people concerning what is up and why they are unable to manage it." Comprehensive and complex organizations therefore need more complex management tools to gain a more holistic overview of the relevant information.

2.1 Budgeting

The word budget originates from the term "bougette", meaning a wallet in which documents or money could be kept. According to an article in the telegraph (2007), budgets emerged in the early 18th century. Budgets can take various forms serving various purposes. Some examples are operating budget, cash/liquidity budget, sales budget, or personnel budget. An operating budget describes all the income-generating activities of a firm whereas a sales budget indicates the business sales in terms of money and units. Operating budgets normally have a life span of one year where it determines the costs and incomes related to the business. A budget will give the manager an estimate of the profit potential in monetary terms. When the budget is approved it can only be changed under specific conditions. The budget is used as both a guideline and framework for the managers and each period the actual financial performance is compare to the budget, the variances is then analyzed and explained.

2.1.1 Relation to strategic planning

According to Anthony and Govindarajan (2006) the budget is a year`s slice of the company`s strategy. From the budgets targets are normally derived, when done correctly, these are broken down to the tactical level. They also state that strategy can involve product line and other programs as well.

2.1.2 Purpose

Budgets are financial documents used to estimate a business or household financial futures. They are meant to assist the understanding of expenses, income, and profits to enable future planning. Below I have listed some of the

most recognized purposes according to Anthony and Govindarajan (2006) and Shim and Siegel (2005):

(1) *Fine-tuning the strategic plan:* gives an overview of the company`s profitability and therefore if its viable or not.

(2) *Coordination:* Business units are given a pointer on the production and therefore the need of various services/goods. Possible inconsistencies are identified and resolved.

(3) Assigning responsibility: clarifies the responsibilities of the managers and distributes resources.

(4) Basis for performance evaluation: The budget is broken down into units, departments etc. and used as a performance measurement. Targets are derived into achievable goals that are meant to motivate and guiding their operations.

It is also worth mentioning that most businesses are in great need of a liquidity budget showing the monthly payments and receipts, and a liquidity budget is derived from a budget.

2.1.3 Budgeting concerns

Although some CEOs like the warm feeling of a positive number from the budgets some also have concerns related to the time spent and the value added compared to the costs, or the relevance of the information as it is represented in fixed absolute term (Wallander, 1999). Over the last few decades this ambivalence has increased and gained more focus. Hope and Fraser (2003) see budgeting as a performance management process including agreement and coordination of targets, rewards, action plans, and resources for the year ahead. They also focus on three main reasons for the emerging concerns:

1. *Budgeting is cumbersome and too expensive:* The budget process is expensive because much time is spent on negotiations for creating a budget even though the benefits are uncertain. Budgeting is neither a value adding activity, nor provides necessary information for making decisions about the future.

2. *Budgeting is out of kilter with the competitive environment and does not meet the needs of the managers:*

   The budgeting is concentrated on internal activities, Hope and Fraser claim that firms must emphasize on adapting to changes in the environment, for instance changing preferences in customer demands and meeting customer needs. Instead, companies spend even more time on budgeting processes.

3. *The extent of "gaming the numbers` has risen to unacceptable levels:*

   Hope and Fraser states that the budget is only used for evaluation of performance once a year and as a control function for managers. Instead of focusing on customers` demand, this encourages game playing with budget numbers in order to meet the targets. The fear of failure or bonus losses can in worse case lead to fraud and manipulation due to sub optimization. In order not to fail managers would ask for lower targets and high awards, make sure they make the bonus no matter what, treat other teams as enemy, always ask for more resources than needed, spend what is in the budget etc.

Hope and Fraser present pretty fierce critics from a consultant perspective. And some of their concerns may be exaggerated. However, a research study from 2007 by Libby and Lindsay, confirms that the general opinion among executives is that the budgets have several drawbacks. Libby and Lindsay (2007) listed some of the drawbacks as too time consuming compared to the value contribution, consists of unsupported assumptions and guesswork, and that it is already out of date when it is ready for use. These have similarities with Hope and Frasers (2003) criticism. According to Ekholm and Walling (2000) and Bogsnes (2009) some multinational companies such as Statoil and Borealis, are operating well without budgets.

2.1.4 Summary

The budgets are still widely used today, and improvements such as reducing the related costs, making it more strategic, and making the process faster, have been

implemented. However, the budgets are still struggling to overcome the fixed performance contract and the dynamics of strategy and rapid market changes. A model supporting the goals of business and liberating the full potential of the organization is necessary to manage a business in the twenty-first century. Even though budgets have become more flexible over the last few decades, I believe that the newer developments are more sufficient in overcoming the emerging complexity and dynamics from the markets. In the next, I will therefore review some of the most common performance measurements.

2.2 Newer developments - performance monitoring

According to Kanji (2002), the first condition to improve and ultimately to achieve, business excellence, is to develop and implement a system for performance measurement. I have therefore given attention to the strategic management and performance measurement systems.

The balanced scorecard method is normally associated with Kaplan and Norton`s (1992) model "The Balanced Scorecard", and according to Hoff and Holving (2002) is also the most widely used template for balanced performance monitoring. The models listed below are all strategic performance monitoring models that attempt to operationalize the organizations strategy. They are also to a varying extent trying to balance the measures between the short-term and long-term; required inputs and outputs; external and internal performance factors; and financial and non-financial indicators (Striteska and Spikova 2010). When breaking down the strategy the models are determining unidirectional cause and effects between the chosen objective as well as key success factors with related key performance indicators. I therefore consider them part of the "balanced scorecard family". I will go through the models in a chronological order.

2.2.1 Tableau de Bord

According to Hoff and Holving (2002), French leaders created a dashboard, named "Tableau de Bord" as a result of the cultures mismatch with a strict financial monitoring. "Tableau de Bord" can be translated as "an instrument panel", like a dashboard it gathers the relevant information to "steer" the

business. The model aims to provide managers with information about the progress in relation to their targets, follow up on delegated authority, management functions where responsibility is split between several people, and to create a platform with information for the whole organization. The information is coordinated according to four perspectives, namely local (its own), vertical, horizontal and the organization in itself. Like other scorecards, key success factors with key performance indicators are customized and the causality between them identified.

According to Epstein and Manzonig (1997), the Tableau de Bord tends to overemphasize the financial measures, become too long and comprehensive, using internal measures instead of comparing performance to the market, and is primarily developed on the basis of the mission and not necessarily the strategy. However, Epstein and Manzonig also gives the Tableau de Bord credit for its specific operative control focus and its ability to adapt to a changing control requirement, align subunits to overall goals, and provides managers with a periodic, brief overview of the performance of the unit to guide decision making. Hoff and Holving (2002) also state that the methodology of Tableau de Bord makes each manager of a subunit define and build their own causal models, identify action variables, and their associated performance indicators for periodic monitoring.

2.2.2 The performance pyramid

In 1990 McNair, Lynch and Cross, presented the performance pyramid in an article called "Do Financial and Nonfinancial Performance Measures Have to Agree?" According to Tangen (2004), it connects the organization`s strategy with its operations by translating objectives from the top down and measures from the bottom up. This enables a two-way communication (Hoff and Holving, 2002). The model is linked to overall strategies where financial performance indicators are complemented with non-financial performance indicators. Lynch and Cross (1992), presented organization in four levels/perspectives (see figure below):

- Corporate vision: The development of the performance Pyramid start with defining an overall corporate vision.

- Business Units: Consist of short-term targets of cash flow and profitability and long term goals of growth and market position.
- Business operating systems: Bridges the gap between top-level goals of growth and market position.
- Department & Work Centers: Finally four key performance measures (quality, delivery, cycle time, and waste) are used at departments and work centers on a daily basis.

Objectives are derived over these perspectives with external effectiveness on the left side and internal effectiveness on the right side of the model. The lower levels are meant to represent the drivers for the results in the higher levels. Critical for this model to succeed is the process of breaking down the vision and strategy to the daily activities.
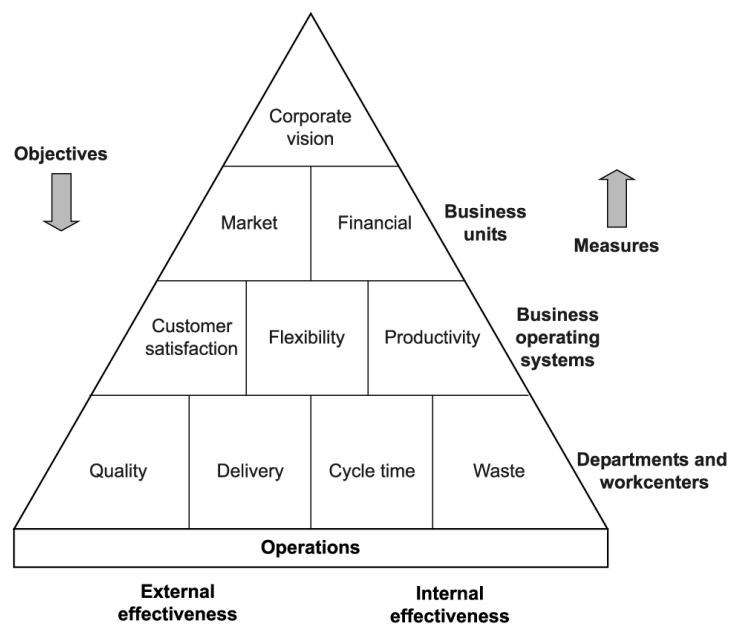
Source: Cross and Lynch (1992)

Figure 2.2.1 The performance pyramid

Ghalayini et al (1996) acknowledges the strengths of integrating the corporate objectives with operational performance indicators. However, they also state that the Performance Pyramid is lacking a mechanism to identify Key

Performance Indicators as well as an integration of continuous improvement. In addition, Striteska and Spikova (2012) note that the form of the measure is not specified. Its strategic link is therefore weakened when using the model strictly, the operationalization of the strategic goals is more dependent on management capabilities and the model lacks a focus on continuous improvements. All of these weaknesses can lead to reduced competitiveness.

2.2.3 Kaplan and Norton's *Balanced Scorecard*

The Balanced Scorecard emphasize that the measures must be part of the information system for employees at all levels, so that even front-line workers understands the consequences of their decisions (Striteska and Spikova, 2012). The financial and nonfinancial measures are derived from a top down perspective going through four main perspectives (Kaplan and Norton, 1996):

- Financial perspective: answers the question "How do we look to shareholders?"
- Customer perspective: Answers the question "How do customers see us?"
- Internal process: Answers the question "What must we excel at?"
- Learning and growth: Answers the question "How can we continue to improve and create value?"

The objectives are linked together in a unidirectional cause and effect relation that is meant to make it a more dynamic model. According to Striteska and Spikova (2012), The BSC fulfills three basic functions in organizations: The measurement system, the system of strategic management, and the tool for communication. The inclusion of the causality linkages is both praised and damned. Most of the critics comprehend the actual dynamics of the model for several reasons. One is due to its a top-down perspective, another is the unidirectional causal links, the prioritization of the financial perspective, and lack of time dimension (Nørreklit 2000). Hudson et al. (2001) also found that there is no mechanism for validating the measure, assuring its relevance to the strategic performance. However, the model has a focus on bridging the gap between different departments within the organization as well as its simplicity

makes it easily understood and communicated. According to Striteska and Spikova (2012), it is also compatible to other models.

2.2.4 EFQM model (formerly known as the European Foundation for Quality Management)

This model has been widely used for business development and need for improvement work. The EFQM model has elements from the balanced scorecard although it is considered a management system with roots from total quality management. The model is focused on processes and identifying strengths and weaknesses in order to set specific goals for improvement. The model has eight foundations for excellence:

1. Result oriented: sustainability is dependent on satisfaction of all stakeholders.
2. Customer focus: customers drive revenue and their satisfaction is crucial for success.
3. Leadership and consistent behavior: creating the right culture and leadership style
4. Leadership through processes and facts: internal processes are understood and systematically managed.
5. Employee development and commitment: increase their potential through values, trust, responsibility and stimulating involvement.
6. Learning, innovation and enhancement
7. Development of partners: an effective partnership is achieved through a mutually beneficial relationship.
8. Social responsibility: long-term goals are more likely to be achieved when business ethics is in line with the society.
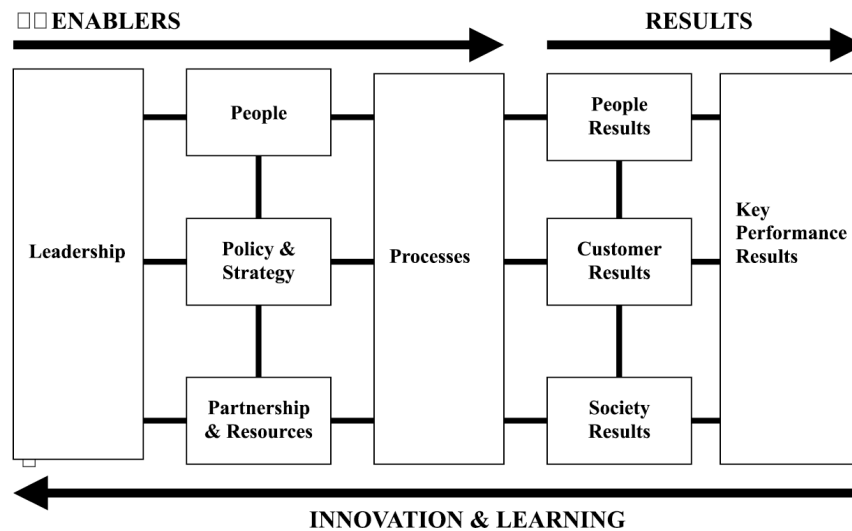
Figure 2.2.2 EFQM model

According to an article by Striteska and Spikova (2012), the EFQM does not provide an answer to what strategic investments should be done, how to set initiatives, or how to allocate resources. Neither is there any prioritizing of measures or causal links. However, the article by Striteska and Spikova also adds that the model focuses on strengths and weaknesses in order to improve the processes, which in turn will strengthen the quality.

2.2.5 The Performance Prism (PP)

The performance prism is one of the latest developments in performance measurement. A team of researchers and consultants in the performance measurement area (Neely et al. 2001) developed the performance prism. Neely et al. describes the PP as a "second generation performance management framework". The developers recognized the importance of taking a holistic approach to stakeholder management in today`s culture of involvement. The model addresses all stakeholders and not just the shareholder. Secondly, organizations have to harmonize and integrate strategies, processes, and capabilities in order to deliver value to its stakeholders. Thirdly and lastly, the relationship between organizations and their stakeholders are reciprocal according to Wu (2009)– on stakeholders expect their needs to be fulfilled, and has to contribute to the organization. Neely et al. (2001) identified five interrelated facets or perspectives:

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- Stakeholder satisfaction: Who are the key stakeholders and what do they want and need?

- Strategies: What strategies do we have to put in place to satisfy the wants and needs of these key stakeholders?

- Processes: What critical processes do we require if we are to execute these strategies?

- Capabilities: What capabilities do we need to operate and enhance these processes?

- Stakeholder contribution: What Contribution do we require from our stakeholders if we are to maintain and develop these capabilities?

Source: Neely *et al.* (2001)

Figure 2.2.3 Performance prism

Though the Performance Prism reflects all stakeholders and their contribution as well as it ensures a strong foundation of the performance measures, the model is, according to Striteska and Spikova (2012), lacking some implementation guidelines and methods. Further on they state that there is no sufficient link between the results and the drivers.

2.3 Summary

Both budgeting and newer developments seek to improve performance and shareholder value, though they differ fundamentally in their methodology. The newer developments have a greater focus on the underlying drivers for success and are more focused on a balanced monitoring throughout the organization

with financial and non-financial measures. There are several performance measures on the market today, all with strengths and weaknesses. However, the balanced scorecard consists of a smaller collection of measures and a simple and intuitive format, making it easily communicated. In addition it can easily be combined with other management tools. The further development will therefore be based on the balanced scorecard. In the next chapter I will provide a deeper understanding of the balanced scorecard.

3   The Balanced Scorecard

This chapter will describe the balanced scorecard, hereby referred to as the BSC, in more detail than the previous chapter did. The structure of the model will be explained by using literature mostly from Kaplan and Norton (1996, 2004, 2006, and 2008) and Hoff and Holving (2002). I will start with introducing the background, its approach, components, purpose and advantages, limitations and end with a summary.

3.1 Background of the Balanced Scorecard (BSC)

In 1987, Arthur Schneiderman developed the so called "Analog devices Balanced Scorecard" that was further developed in 1990 when Kaplan and Norton initiated a study that resulted in what most people considers the first generation Balanced Scorecard. The study was motivated by the belief that the existing performance measures were becoming outdated and inefficient. The critics were grounded in an assumption that financial performance indicators were too historical and could lead to a negative effect on value creation. Instead of looking into the future the financial measurements were simply stating previous numbers, and not the fundaments behind the result, solution or problem. Internal and external changes were therefore not discovered before it was too late.

The research study improving and developing the BSC in 1990`s found following findings:

- 90% of companies fail to execute strategy
- 85% of executives spend less than 1 hour per month discussing strategy
- 60% of companies do not link budgets to strategy
- Only 25% of managers have incentives linked to strategy
- Less than 5% of the workface understand the strategy

The research shows a need of a clear strategy that is easily communicated throughout the company, bringing the executive focus from operations to strategy. This was the purpose of the Balanced Scorecard and through a study of innovative performance-measurement systems and group discussions they came up with what we now know as the "Kaplan and Norton`s Balanced Scorecard". The model is summarized in an article from 1992 in Harvard Business Review "the Balanced Scorecard – The Measures That Drive Performance". The concept was to review the company from four different perspectives: customers, financial, internal process, and learning and growth.
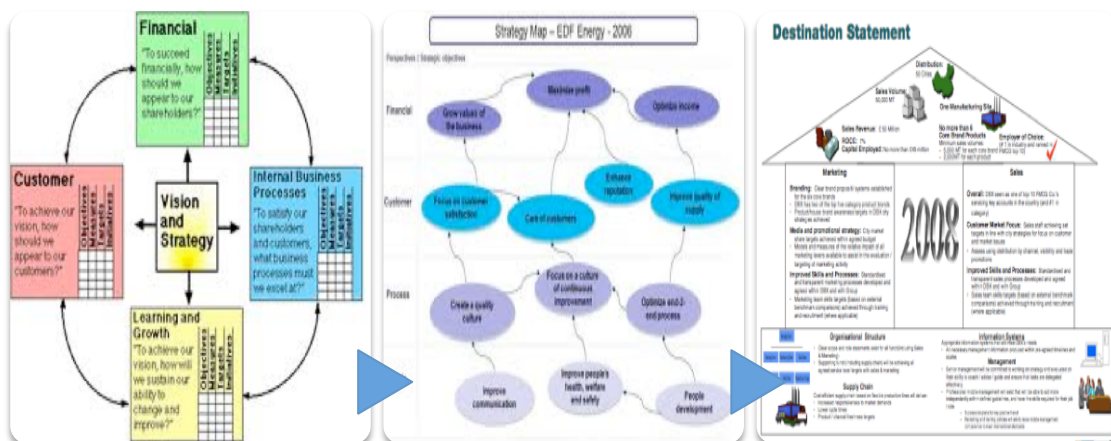
Figure 3.1.1 BSC generations

Since the introduction of the balance scorecard, Kaplan and Norton have introduced two new generations. They quickly discovered that the BSC was widely used to implement the company strategy, in the second generation they

therefore included the implementation by defining strategic objectives and linking them together by the use of a causal "strategy map", this was presented in their book "strategy maps" (2004). The third generation, is meant as an integrated management system. It uses the destination statement as the starting point for choosing strategic objectives, selecting measures and setting targets. In Kaplan and Norton latest book about the BSC "The execution premium" (2008), they describe how companies can establish strong linkages from strategy to operations so that employees` everyday operational activities will support strategic objectives. It is the third generation of the BSC that will be applied in this case study.

The BSC is, as put forth by Kaplan and Norton (2008), considered a critical foundation in a holistic strategy execution process that helps organizations to formulate their strategy into actionable terms, provide a road map for strategy execution, for mobilizing and aligning executives and employees, and making strategy a continual process. In the next chapter, I will explain the perspectives in more details to get a better understanding of their contribution to the overall model.

3.2 The BSC Strategy map and scorecards

A strategy map is according to Hoff and Holving (2002) a visual representation of the organizations strategy expressed through strategic objectives in a cause and effect relations. It is meant to illustrate the strategic path that is chosen to achieve the organizational vision and strategic destination.
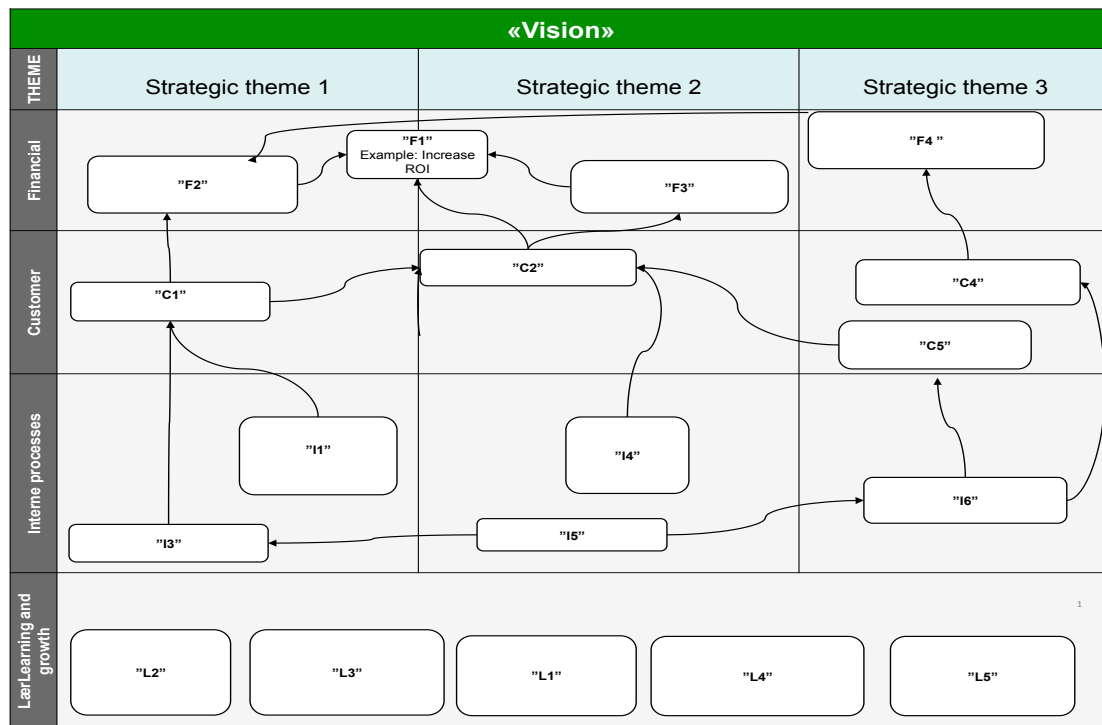
Figure 3.2.1 Strategy map adapted from Hoff lectures jan. 2011

The figure above shows an example of a strategy map. The model starts with a translation of the vision and strategy, into strategic themes. It is therefore important to clarify the strategy and business goals before implementing the BSC. According to Hoff and Holving (2002), the strategic themes are focus areas that are vital in achieve the overall goals.

The perspectives represent the horizontal division of the above strategy map, and are meant to help operationalize the strategy. The perspectives will be described in more detail later on. For each perspective strategic objectives are developed, these tell us what the strategy should lead to or what needs to be achieved. The connections between the objectives shows the cause and effect relation, what underlying drivers needs to be accomplished to achieve the specific objective. Thus, getting a better understanding of the drivers for success. The grouping of the strategic objectives and their causal links represents the strategic themes.

Strategic scorecards are then developed for each strategic objective. Hoff and Holving (2002) made and example of a scorecard consisting of an objective specification, critical success factors, targets and strategic initiatives. The critical

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success factors are determined on the background of the objectives, according to Hoff and Holving, these represents conditions that must be met to achieve the overall goals. From the critical success factors, key performance indicators (hereby referred to as KPI) are developed accompanied with concrete targets. The targets are both financial and non-financial measures that are translated from the critical success factors. The financial measures are meant as a critical summary and are complemented with measures of the drivers for future performance, namely the non-financial measure.

Through strategy maps and scorecard, the strategy is implemented and operationalized. This process is forcing managers to take a stand where definitions are vague. For instance "best in class" can be measured in superior service and superior service can be measured in for instance timely delivery, this gives the employees an underlying understanding of their work effort. To ensure this does not influence the quality of the delivery other measures should be complimented.

3.2.1 The perspectives

Hoff and Holving (2002) define the perspectives as "a representation of the stakeholders most important perception of a given strategy". Their perception is expressed through a set of goals and requirements from the respective stakeholders. All together the perspectives express the company strategy. According to Hoff and Holving, the perspectives are meant to balance the focus and create a complete picture, ensure balanced number of key performance indicators and to make it simple, overlooking and easily communicated.

Kaplan and Norton has developed four perspectives in which the vision statement and strategy is communicated through. I will now go through each of the perspectives.

The Financial Perspective

According to Kaplan and Norton the financial perspective has the uppermost important objectives and tells us the view of the shareholders and how to create value for them. All other measures and perspectives seek to fulfill the financial

perspective and are linked together through a cause-effect relationship, like in figure 3.2.1. However, fulfillment of the non-financial goals does not necessarily imply fulfillment of the financial goals, even though it is normally a good start. For instance, increased productivity does not necessarily lead to increased revenues. The way the financial objective is linked to the strategy will vary depending on the stage of the business`s lifecycle. For instance is growth important in the early stages of the organizations life cycle, sustain is valued where organizations thrive to maintain market position, harvest (cash cows) where the main goal is to maximize cash flow back to the company.

Customer perspective

The market and customer segment is normally identified during the strategy development. Fulfillment of customer needs is according to Kaplan and Norton the source to deliver revenue. In this perspective core customer outcome measures are aligned, such as loyalty, satisfaction, retention, acquisition and profitability. The characteristics of the product/services delivered to ensure loyalty and customer satisfaction in the respective market segments is called the "value proposition". The Value proposition can be categorized in three:

1. *Product/service attributes:* represents the clearly identifiable and rational attributes, such as functionality, quality, price and time.
2. *Image:* reflects the invisible attributes, such as brand building beyond the tangible attributes. For instance: fashion clothing and soft drinks (Red Bull - extreme sport). The image is a way for a company to define itself towards its customers. This way customer can adopt or identify himself or herself with the image, and gain brand loyalty.
3. *Relation:* This dimension regards the interaction between the company and the customer. According to Hoff and Holving (2002) it regards personal relations, company relations, delivery ability and even quality. For service companies the product is delivered at the same time as it is produced so both quality and the way the service is being delivered also affect the customer satisfaction.

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Value	=	Product/Service Attributes	+	Image	+	Relationship

Functionality	Quality	Price	Time
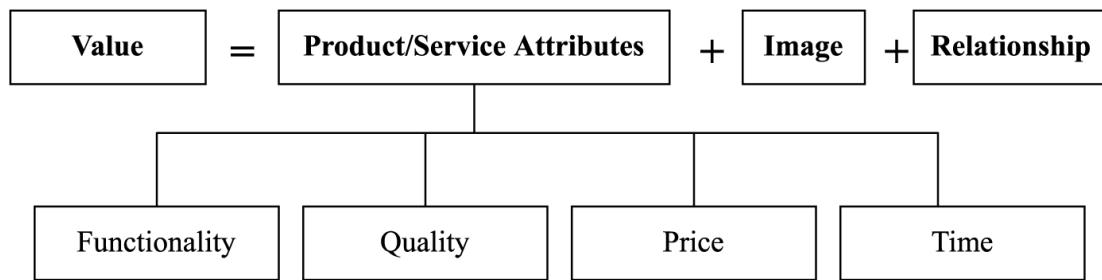
Figure 3.2.2 Value proposition (Hoff and Holving 2002)

The Value proposition is the key driver in explaining the core measurement, namely customer profitability, market share, customer acquisition, customer retention, and customer satisfaction.

Internal-business-process perspective

This perspective addresses what operations within the company are critical in achieving the objectives in the financial and customer perspective, what processes needs to be performed for the strategy to be successfully implemented? Kaplan and Norton are focusing on three internal business processes for creating value:

- *Innovation:* The product or services are created on the background of customer needs. It is important to look ahead to determine the market needs and outdo the competitors. Finding key performance indicators can be challenging as some products take years to develop. Hoff and Holving comment that innovation for some businesses might be appropriate as a perspective itself, especially where innovation is essential and critical for the business.

- *The operations process:* This process starts when a customer order is received and finishes with the delivery of existing products/services to existing customers. The quality and efficiency throughout the production is vital in meeting customer needs. Hoff and Holving (2002) define efficiency for operational processes as the value created or benefit for the customers.

- *Post sale service:* This process includes all after sales activity, such as warranty and repairs, treatment of defects and returns and the payment process. To achieve superior post sales service in accordance with customer needs the key

performance indicators will normally contain non-financial measures regarding time and quality, much like the operating processes above. Reducing the lead-time is an example of improving the post-sale services.

Learning and growth

To succeed in today's competitive market and changing environment future investments are stressed, and not just in equipment and RandD but also in their infrastructure, their people and procedures. Such investments need to give room for learning, creativity and personal responsibility. Olve et al. (1999) states that the organization needs training to understand the environment, relate to other information, analyze according to earlier experiences, document the information, and to be able to measure the learning ability in order to ensure progress. Hoff and Holving (2002) states that a corporate culture needs to give room for learning, creativity, and personal responsibility to succeed in a competitive environment. Knowledge management is therefore important for learning and growth. It focuses on facilitating for continuous learning, keeping the knowledge and experiences within the company when people quite their jobs, and ensuring progress through key performance indicators. Kaplan and Norton focuses on three main categories:

1. *Employee capabilities:* This covers the contribution from the employees, their knowledge and experiences and capability to use it. It's about having the right competency and knowledge to conduct the company`s plans and strategy.

2. *Information systems capabilities:* businesses are depending on fast, accurate, reliable, and easily accessible information in order to make good decisions. According to Kaplan and Norton such information should include customers, internal processes and the financial consequences of their decision. In addition, it should facilitate learning and ensure that knowledge stays in the organization.

3. *Motivation, empowerment, and alignment:* The employee needs to be motivated to act effectively, they need to have incentives and the freedom to take action in accordance to the organizational interests. Satisfied

employees are considered a necessary condition to get satisfied customers and to gain productiveness.

3.2.2 Other perspectives

The perspectives do not have to be one of the above mentioned, but be determined according to the business strategy. The goal of the perspective is as mentioned to balance the focus and ensure complete view of the organization, for some businesses this has meant changing or adding a fifth perspective. If for instance key personnel or suppliers are crucial for success this should be considered as a perspective. Kaplan and Norton started off with innovation and internal effectiveness as a fifth perspective before they subjected it to internal processes. Some businesses, especially in Scandinavia have applied an employee perspective; here the focus is how the employees consider the business. Dependence on knowledge and competencies has made the employees and their contribution to the company a bigger factor in achieving the company goals. Their satisfaction and contribution has an increasing effect on the respective perspectives, and has therefore been subjected as a perspective in itself in many companies. However, Hoff and Holving (2002) argue that this might drive the focus away from the cause – effect of competent employees and for instance their allocation of time.

3.3 BSC development stages

According to Kaplan and Norton (2008) the latest generation BSC consists of multiple planning, control, and feedback processes. I will quickly guide you through the five main stages:

1. Reaffirming the organizations mission, values, and vision and then develop a strategy capable of closing and challenging the value gap.
2. Plan the strategy by translating it into a strategy map organized by several strategic themes. For each strategy map, the team selects measures and targets. The theme owners and teams then select a portfolio of initiatives and obtain approval for the necessary resources required.

3. The organization then aligns its units by delegating the strategy maps and scorecards to the business units.

4. Managers then plan operations by highlighting where improvements are most needed for successful strategy execution.

5. Then the organization implements a new reporting system of operational dashboards and strategy scorecards to inform various management meetings.

6. Finally the strategy is tested and adapted in meetings, this is to allow learning and new information to feed back into the first stage of strategy development.

These stages represent an iterative process that is meant to enable feedback and improve learning. In the next subchapter I will describe the advantages and limitations related to the BSC.

3.4 Purpose and advantages

The BSC was developed to create a more effective control tool as the budgeting and other measurements were starting to get outdated. With a strong linkage to the business strategy, the BSC ended up being widely used as a strategic management tool as well as a control tool. Earlier financial measures were used for tactical feedback and control of short-term operations. With the BSC model performance measures were derived from a top-down process driven by the mission and strategy statement. Breaking down the strategy and vision into operational perspectives would ensure a balance between result measures based on the past and measures that drive future performance. Each perspective had underlying tangible objectives and measures that clarified what was meant by the strategy and translated it into operations. By showing the cause and effect of the operations the entire company could easily see how their work contributed in achieving company goals. Visualizing and translating the strategy into operations easily communicate it to all employees. Even the front line employees would know what their tasks were in order to achieve the company goals. By implementing the strategy in all operations throughout the company, from frontline to senior executives, the goal is to increase strategic effectiveness.

One of the BSC`s advantages is that only a few numbers of performance indicators needs to be described. Few performance indicators are according to Neely and Adams (1998), three to five measures for each of the four perspectives mentioned previously. Simon (1957) Described human decisions as "bounded" due to cognitive limitations. The BSC is forcing the managers to focus on only four business areas and within each area only on the most important performance indicators. This supplies managers with a distinct advantage.

Relating the four perspectives within the organization serves as a bridge between different fields within the organization. The great interest achieved from different fields such as management accountancy (Newing 1994 and Nørreklit 2000), operations management (Neely et al. 1995 and Bourne, et al 2000), and a strategy perspective (Mooraj, et al. 1999, Hudson et al. 2001 and Kaplan and Norton 1996) indicates that it is possible to combine performance measures related to different aspects of a company into a single scorecard.

3.5 **Limitations**

The implementation and use of the BSC has taken various forms. This makes it hard to find any relevant research on the effectiveness. I did find a lot of articles and opinions on the flaws of BSC. Interestingly, some of the advantages mentioned can also be interpreted as disadvantages. I will now go through the most important findings of the BSC limitations.

Warren and Langely (1999) acknowledge that there is little basis in a causal-loop map for estimating the scale or speed of change of key items. Neither is it capturing accumulations or depleting's. Nørreklit (2000) even questions whether there is a causal relationship between the different perspectives of measures. Akkerman (2002) believes that the relationship consists of interdependencies and not bi-directional causality. Another limitation mentioned by Nørreklit (2000) is the lack of time dimension, some cause-and-effect relationships has time lags which is not shown by the BSC where the cause and effects are at the same time of period.

Neely et al. (1995) found that the problem for managers is normally not the identification of measure but the reduction of them. The advantage of checking just a few numbers may become a disadvantage when important fields are overlooked. The advantage that Hudson et al (2001) points out is that there is no mechanism for maintaining the relevance of the measures. If the measures are counteracting the advantage of relating the different fields may become a disadvantage.

Another weakness mentioned by Mooraj et al. (1999), is that the BSC does not identify the performance measurement as a two-way process. For instance does not the financial perspective affect any of the other perspectives; it is a one-way directional cause and effect pattern. In addition, Hudson et al. (2001) adds that there is a lack of integration between the top-level, strategic scorecard, and operational-level measures.

3.6 Summary

The BSC is a great way of visualizing and communicating the organizational strategy. The strategy map breaks then strategy down to an operational level that makes sure all activities are aligned in accordance with the strategy. In addition, the causal links between the objectives are forcing the managers to focus on the underlying drivers for success. However, the model seems to have some weaknesses; it is not enabling time lags or bi directional causality as well as the causal relation may need further investigation. In the next chapter I will therefore introduce another methodology to expand the model and overcome its limitations, namely system dynamics.

4 Organizations as systems

There are several ways of reviewing organizations, Gareth Morgan introduces some in his book "Organisasjonsbilder" (1988). The book is based on the assumption that organizational theory builds on metaphors giving a specific, yet deficient, interpretation of organization. Morgan has several examples where the most common metaphor is a representations of organizations as machines,

human capabilities and characteristics is therefore often neglected. In this Chapter I will introduce the systems perspective on organizations. A system perspective will help illustrate the principles in an organization as well as the amending effects. Thus, gain more insight to how they work. I will start with introducing system theory, organizations and its components, organizations as systems with Policy Structure Diagrams, and then a system dynamic representation of organizations.

4.1 Introduction to System Dynamics

John Sterman (2000) defines system dynamics as "a perspective and set of conceptual tools that enables us to understand the structures and dynamics of complex systems." This definition implies a need to define a system, unfortunately systems can have various meanings. Russel Ackoff (1981) suggests that "A system is a set of two or more interrelated elements with the following properties (Laszlo and Krippner, 1997):

1. Each element has an effect on the functioning of the whole.
2. Each element is affected by at least one other element in the system
3. All possible subgroups of element also have the first two properties

If elements are interpreted as components, the systems can be interpreted of any kind whether formal (e.g. mathematics), existential (e.g. "real-world"), or affective (e.g., emotional, imaginative) (Laszo and Krippner, 1997). The interrelated and interdependent components make out the system. With globalization, economic activity, and technological development, managers are in need of a management support tool when handling dynamic and complex systems. This is where System dynamic comes to play, According to Forrester (1992) system dynamics accepts the complexity, nonlinearity, and feedback loop structures that are inherent in social and physical systems. Sterman (2000) stresses that it is also a rigorous modeling method enabling computer simulations of complex systems and use them to design more effective policies and organizations. The perspective is typically long term and strategic.
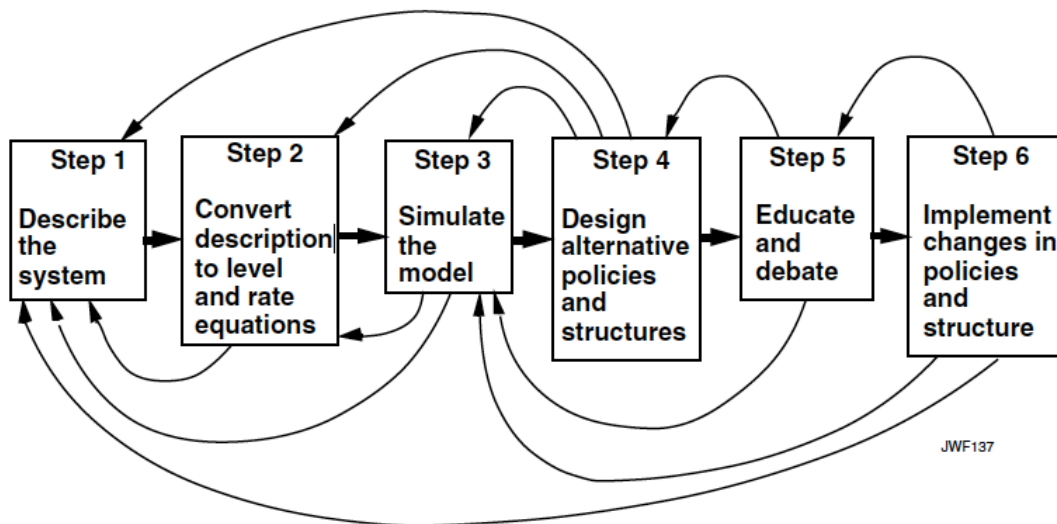
Figure 4.1.1 The system dynamic process (Forrester 1994)

In the figure above, Forrester (1994) illustrates the system dynamics processes in six steps. The first step regards an investigation of an undesirable behavior. In the next step the formulation of the simulation model takes place. Gaps and inconsistencies that are revealed in this step are corrected. When the model is satisfactory, step three starts with its simulation. If the simulation exhibits unrealistic behavior, it is necessary to head back to step 1 or 2. The simulation should show the difficulties in the system. From the simulations policies with great promises are revealed and in step 4 alternative policies are tested. By implementing these, one might have to move back to step 1-3. The next step then, step five, would be to overcome both active and passive resistance for all affected by the implementation. Which leaves us at the last step, step 6, where the changes are implemented. Relevant and persuasive models will make this step a lot smoother.

4.2 Approaches to organizational design

In this section I will take a look at two approaches to organizational design, namely the Organizational chart and a system dynamic approach. The two different approaches gives different insights and have different problems.

An organizational chart, or organogram like Mintzberg phrased it (1980), is meant to portray the structure of the organization in terms of personnel and

their authority and responsibility. The structure represents building blocks responsibility centers (Brønn, 2011). It also shows the communication flow in the organization, who to contact and who to supervise. As for decision making it gives us an indication of where decisions are made. However, it does not give any support in making decisions apart from who to consult with.
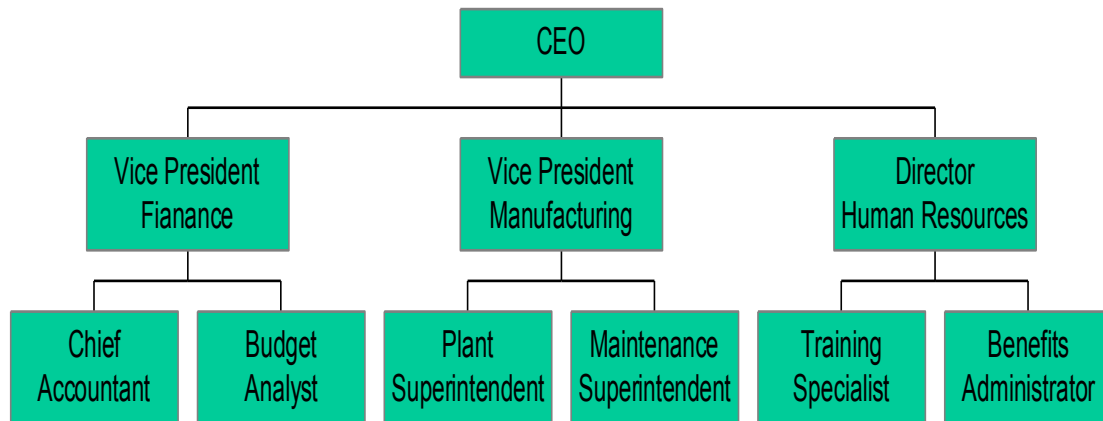
Figure 4.2.1 Typical organizational chart

System dynamics simulation modeling can, according to Morecroft (1984), support decision-making and strategy tool. To support decision-making he remarks that the key is to identify the activities where the human mind is weak and remedy the weakness. According to Keen and Scott-Morton (1978), decision support systems can make the business information more compact and easy to absorb and access. The figure below is gathered from Morecrofts article form 1984 and illustrates the analogy between decision and strategy support. However the strategy development is less dependent on the human mind as it is not relying on human's ability to collect and process information.
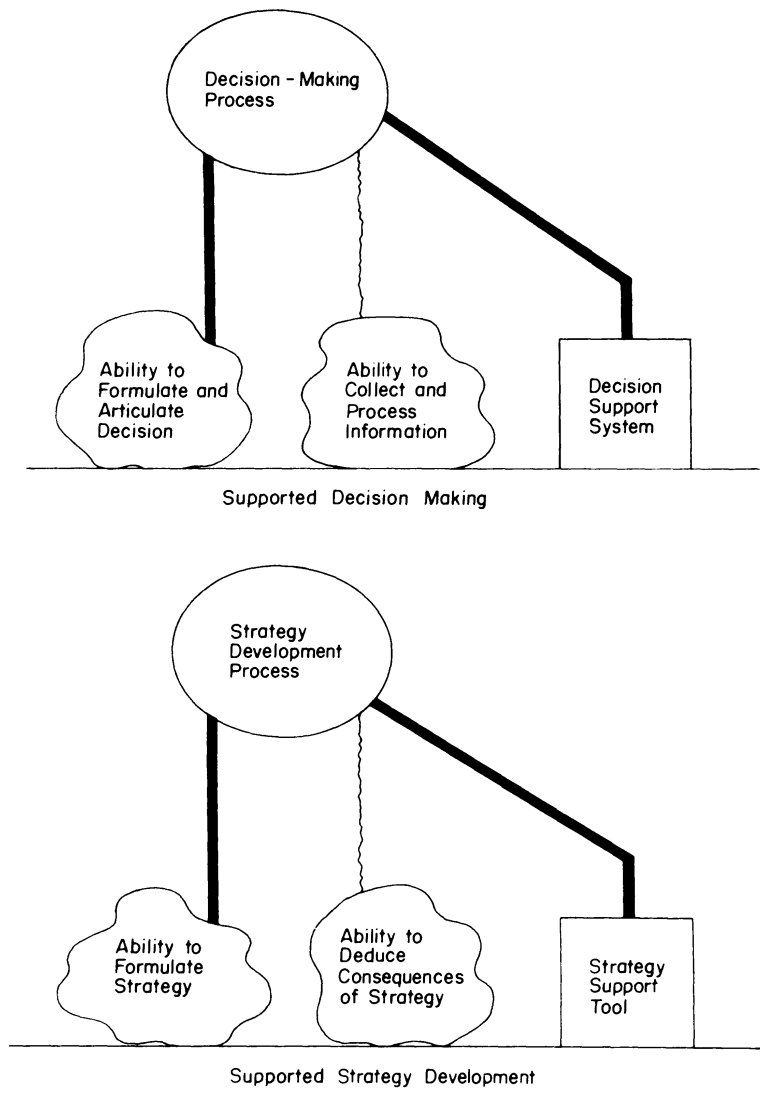
Figure 1. The analogy between decision support and strategy support

Figure 4.2.2 Decision and strategy support (Morecroft 1984)

According to Morecroft (1984) there are numerous reasons to why system dynamics simulation modeling is an appropriate tool for strategy support. One is to provide effective graphic display methods for illustrating the policy structure of an organization. Another is that management teams can easily see the range of interlinked policies that constitute their organization. They can also view the complex network of communication and control that initiatives must filter through to bring about change. Simulation analysis methods of system dynamics can be used to create strategy scenarios to challenge the collective intuition of a management team. According to Probert (1982), simulations create time charts

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of important variables and show the consequences of a policy change, which brings discipline to the subsequent discussion. The effect of a change does not always come immediately, by the use of dynamic simulation modeling one is able to calculate the effect over time, and not just the short-term performance. The long-term performance can be analyzed and necessary strategic change implemented.

4.3 Policy structure diagrams

Policy (decision) structure diagrams are according to Morecroft (1982), diagrams showing the internal structure of a subsystem. Morecroft also states that policies are carefully selected to match the perceptual framework (mental models) of how the organization operates. The basic building blocks of a policy structure diagram are shown in the figure below.

auxiliary   Auxiliary/constant/input/output

stock   stock (state, box, level)

rate   rate variable

Inflow   Stock   Outflow
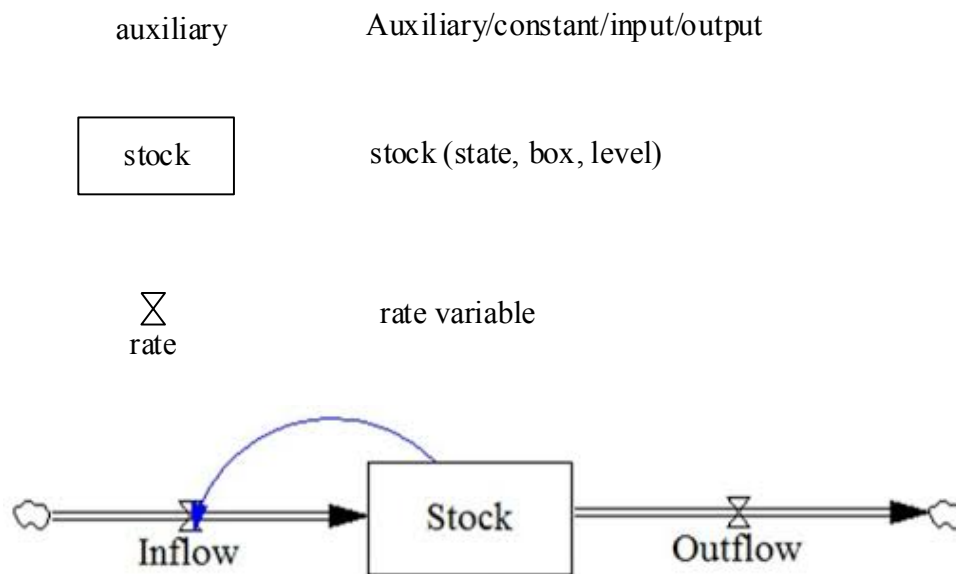
Figure 4.3.1 System dynamic building blocks

The building blocks will be described in accordance with Stermans book "Business Dynamics" from 2000. He describes flows as rates of change, like for instance employee turnover. There are both inflows, filling up the stock, and outflows, that drains the stock. The flows represent the decision function available to managers. They are represented through pipes pointing in and out of the stock. Stocks are accumulated entities, such as inventory or employee head count. They are represented by rectangles, like in the figure above. A stock is

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changed through decisions made via flow variables. A stock can only be changed through decisions regarding the flow variables. Auxiliary variables are functions of stocks and represents constants or exogenous inputs/outputs. For example, interest rate is an auxiliary that affects the inflow of money to a bank account (Stock).

In addition to the above stock and flow structures, and non-linearity, feedback loops determines the dynamics of a system according to Sterman (2000: p12). Sterman defines two kinds of Feedback loops, reinforcing (positive) and balancing (negative) and states that all dynamics arise from these two kinds of feedback loops. A reinforcing feedback loop occurs when an action produces a result which influences more of the same action thus resulting in increase or decline. A balancing loop is a circle of cause and effects that counteracts and oppose change. The figure below shows one reinforcing loop and one balancing loop. Increased customer base increases the word of mouth, which again increases the customer base, and so it goes on. The balancing loop consists of the customer base and the customer loss rate. As the customer base increases, number of customers lost also increases, "balancing" the system.
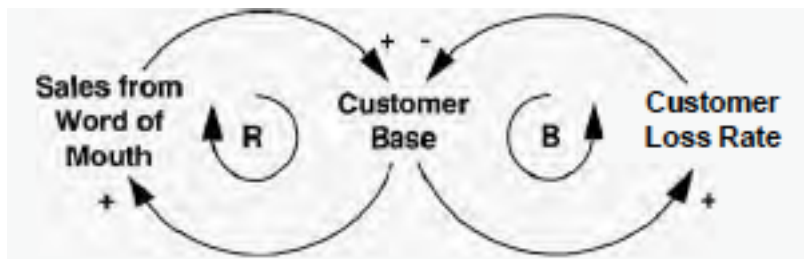
Figure 4.3.2 Interacting feedbackloops in a causal loop diagram form (Sterman 2000)

Morecroft (1982) identified a two-step process in recognizing linkages in a policy structure diagram. The first regards drawing policy symbols, and in the second step the information network is created using policies as nodes. I will now present an example of a policy structure of a subsystem within sales planning.
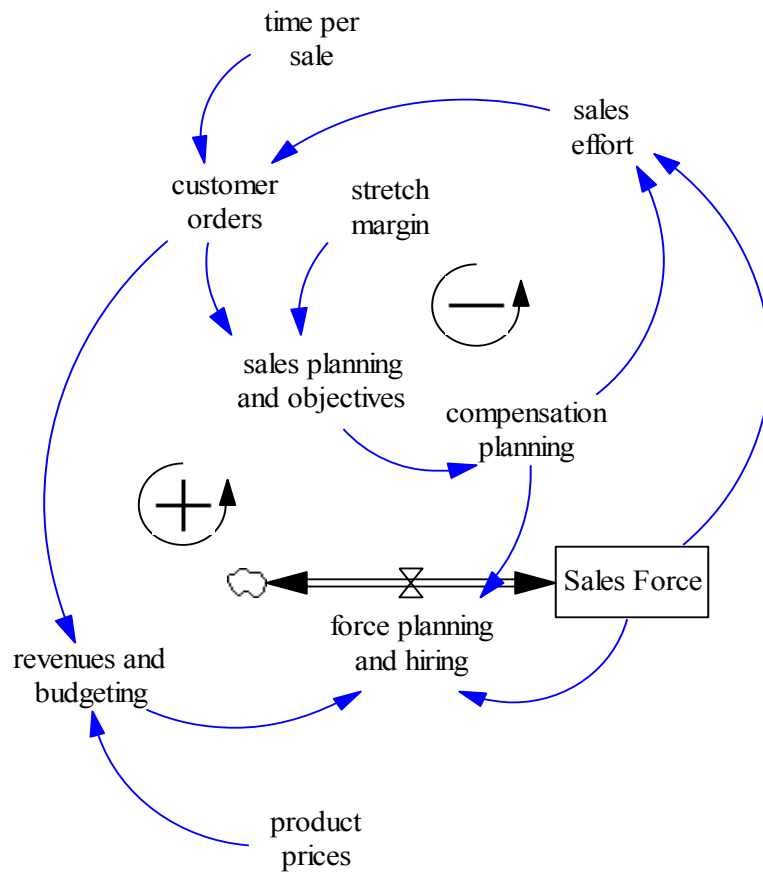
Figure 4.3.3 Policy structure diagram (Morecroft and Hines 1985)

The stock and flow network in the figure above, is relatively simple with force planning and hiring as the flow, draining or filling up the stock Sales Force. However, the information network of auxiliary variables makes it more complex, it is containing a variety of policies. For the sake of simplicity there is only one decision node, the force planning and hiring. The decision is based on four information feedbacks, namely revenues and budget, compensation planning, and the current sales force. However, compensation planning and revenues and budgets are affected by other variables, in fact they are both part of a balancing and reinforcing loop.

Revenues is part of a reinforcing feedback loop, when it increases, hiring will also increase and therefore also the sales force that in turn will increase the sales effort, customer orders and at last revenues will increase even more. Increased compensation planning will increase sales effort and customer orders. However, when the customer orders increase the sales planning levels out, when sales

planning levels out, the compensation planning will also level out. This feedback loop is therefore a balancing loop.

4.3.1 A System Dynamic representation of organizations

In this sub chapter, I will develop a generic organization using system dynamic modeling tools. The model will represent the key activities for a fictive organization, giving a simplified overview of the organization. The variables will be represented through the system language of stocks, flows, and auxiliary variables.
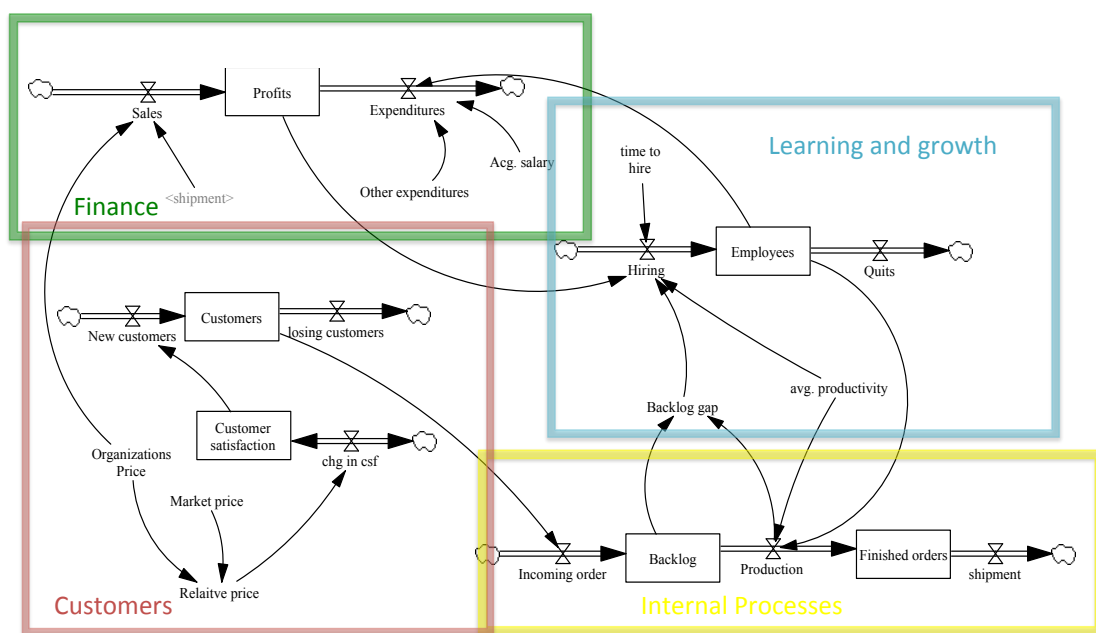
Figure 4.3.4 System dynamic model "Generic Inc"

I have called the organization "Generic Inc.". As we can see from the above model, the components can be grouped into different perspectives. Generic Inc. The following grouping has been made: Finance, learning and growth, internal processes, and customer. The perspectives for Generic Inc. are similar to the perspectives in the BSC by Kaplan and Norton (1996). I will give a short introduction to Generic Incs four perspectives.

For the financial perspective, the model assumes that the shipment of orders (from the internal processes) in combination with their price (from the customer perspective), increases the sales, which increases the profit. On the other hand,

the expenditures reduce profits. Other expenditures and the costs of employees (related to the learning and growth perspective) affect the expenditures.

The learning and growth perspective represents their human resource management: hiring, leaving, and accumulated employees as well as their productivity. Hiring is determined on the basis of the number of backlog orders (from the internal process perspective).

The key internal processes are related to the production of orders. The number of employees and their productivity determines the number of produced orders. Thereby it also affects the size of the backlog (affecting the hiring) and the shipment of orders (affecting the sales). For customers of Generic Inc., the price is the most important factor for satisfaction. If their relative price is low, customer satisfaction increase and the organization gain more customers, and visa versa. More customers means more orders.

As the model presents, all four perspectives are interrelated. However, it is not a unidirectional relation like the BSC suggest, but a multidirectional relations between the perspectives. Also the financial perspective is not prioritized like in the BSC.

4.4 **Summary**

System Dynamic modeling tools supply decision makers with a better understanding of complex systems, and allow observation of organizational behavior over time. The relationship between variables is given a lot of focus and needs to be quantified. Figure 4.3.4 shows the similarities between a system dynamic view on organizations and the BSC, however the figure shows multi direction relations between the perspectives and not unidirectional causality. By combining System Dynamic and the BSC, one can overcome its limitations related to unidirectional causality, time aspects, and the actual influence variables have on each other. Before developing the combined model, I will present the methodology and the case organization.

5　Methodology

In this chapter I will present the research method used in this study. First the research purpose will be described followed by the research approach and research strategy. The chapter continues by discussing the data collection, sample selection, and data analysis. Finally, this chapter will end with a discussion of the validity and reliability of this study.

5.1　Research Purpose and approach

The purpose of research explains why the study is executed. Saunders et al. (2007) describes three main categories of studies, namely exploratory, descriptive, and explanatory. An analytic strategy for research helps in treating evidence fairly, produce compelling analytic conclusions, and rule out alternative interpretations. The thesis seeks knowledge about management models, portrays a situation, and explores causality and outcomes. It therefore contains elements of all three research strategies.

According to Denscombe (2000) there are two main approaches to research methodology that are extensively used within social science, namely quantitative and qualitative research. A qualitative study aims to transform what is observed, reported or registered into written words. It focuses on details, the richness of nuances, and the uniqueness of each respondent. It is often associated with small-scale research and to be an excellent tool when handling complex situation. The purpose of a qualitative study is to gain a deeper understanding of a problem. A quantitative study on the other hand is, according to Jacobsen (2003), based on measuring the research area using methods and instruments aggregating numeric data. I have chosen the qualitative methodology when gathering data. This is because I want a nuanced description of how the internal processes work and interact. In addition the development of a management model requires a deep and thorough insight into the organizational situation, strategy, and direction. The development requires interaction and participation from the organization being studied and their perception and acceptance is essential.

5.2 Research Strategy: Case study

Saunders et al. (2007) describes research strategy as the general plan to answer research questions. The purpose of the study is to develop a dynamic management model for a given organization. A case study can focus on one or a small number of research units. This allows devotion in subtle, difficult, and complex social situations. According to Yin (2003) a case design is appropriate in research regarding how or why. A case study seems to be appropriate in this study encompassing the development of a dynamic management model. A case can be a program, activity, or an event according to Johannessen et al. (2004). It is thoroughly examined in order to retrieve as much information as possible; the goal is to research particularities rather then generalities. By using a case study I gain the benefits of a rich understanding of the context and a deeper understanding of the research area. This research strategy is particular good when researching a complex object and trying to explain, understand or describe social systems that are normally too complex for other strategic approaches. In addition I get a more hands on experience and a closer connection to the real life. Dalland (2000) has criticized this method for not being applicable for scientific generalization as well as letting subjective and questionable evidence influence the results of the study.

5.3 Data Collection: Documentation and Interviews

There are two major sources for information, namely primary and secondary. The researcher gathers primary sources to achieve a certain goal, this data is not interpreted yet. According to Everett and Furseth (2004), secondary sources are gathered and interpreted by someone else and are usually available as books, articles and other assignments. I will start with the secondary data from literature and then move on to the primary data gathered from interviews and meetings.

5.3.1 Literature research

To gain a more complex insight to the management world, I started off with a literature research. When analyzing the qualitative data, according to Grønmo (2004), the researcher conducts a systematic review of the documentation and

categorization of the content as well as registration of relevant data. I have mostly applied secondary sources such as books and articles for the theoretical foundation. First I did some research about the different management models and tools to enlighten and the theory of the BSC and its context. I have applied a dynamic perspective on the management model, and the literature applied consists of academic books given in class as well as articles recommended from my advisor. I have used BIBSYS as a literature search engine, articles from Harvard business review (++), Search engine Google, and Recommendations from my advisor, Carl Brønn. When searching for literature I have used following words: Balanced scorecard, management models, management tools, dynamic strategy, systems thinking, limitations of the balanced scorecard, System dynamic modeling, dynamic BSC.

I gained access to all documents and internal papers prepared by the organization. I got insight to their organizational tool that shows the progress of projects and due dates. In addition I got access to their accounting system so that I could gather the necessary financial numbers.

Some information is written to serve a problem that differs from the research, and doe not fit with the needs of the researcher. Timeliness and relevance is another aspect that can differ. Research and literature is normally developed over a year or more, such data can therefor become outdated and needs to be handled with precaution. I tried to take this into account by looking up recent publications and using recommended literature from my advisor. When possible, I have sought for the original source to ensure the right interpretation of the information. There will always be a certain risk of wrongly interpretations of written literature. I have tried my best to make use of the latest literature.

5.3.2 Interviews and meetings

The primary data in this thesis is gathered through personal interviews and meetings. I recognize interviews as useful to delve into and gain a deeper understanding of the research problem than for instance a field study. Observations require an ongoing study over a longer time of period. With limited time I have chosen not to take use of such methods. According to Johannessen et

al. (2004) there are four ways of shaping an interview. The "unstructured interview", is informal with open questions, the theme is set but the questions are adjusted to the setting. The "semi-structured or partly structured interview" is based on a general interview guide. The theme, sequence, and questions can vary as the interview is conducted. In a *structured interview"* the theme and questions are already formulated and set.

In my research thesis I have chosen the "semi structured interview", where I have prepared an interview guide (see appendix 1) in advance. The interview guide is a list of themes and general questions prepared to guide me through the interview. It is meant to make sure that I cover the relevant themes and is not meant as a questionnaire. According to Johannessen et al. (2004), This structure balances between standardization and flexibility, and allows the interviewee to produce their point of view in an extensive manner.

The interviews and meetings were conducted from January to March 2013. Interviews covered their strategic path, key activities, and several meetings regarding the relation between processes and the dynamics of the business. Four out of five employees were interviewed, these were chosen on the basis of their organizational role. I have sent the question to the interviewees 2-4 days in advance to give them some time to consider the questions.

5.4 System Dynamic Simulation

This section describes the simulation methodology used for strategy and performance testing in this case study.

Models are representations of a complex reality – a theory of how the world operates at some level of aggregation. According to Doyle and Ford (1998), we constantly form mental models as we perceive and make sense of the world around us. In 1957, Simon stated that the human mind is "bounded"; decision makers are not able to comprehend all the information from the complex reality. Mental models are, According to Sterman (2000, P: 37), commonly too narrow and tend to be dynamically deficient, omitting feedbacks, time delays, accumulations, and nonlinearities. The limitations of the BSC are related to the

assumption of "bounded rationality" described by Simon (1957). Sterman (2000) states that the complexity of the reality exceeds our capacity to understand their implications. The BSC is developed on the basis of mental models, illustrated by a strategy map (chapter 3.2 and figure 3.2.1). Sterman also states that simulation is the only practical way to test these mental models. The alternative is learning by doing, which can be very inefficient and expensive. Sterman notes that feedback can be slow and rendered ineffective by dynamic complexity, time delays, inadequate and ambiguous feedback, poor reasoning skills, defensive reactions, and the costs of experimentation. Dynamic simulation allows us to observe the behavior of a modeled system and its response to interventions over time. If the state of the system is known at one point in time, the next point in time can be computed. By repeating these steps a long-term prediction of the future state can be simulated. With a rightful representation of the state of the system, system dynamic modeling can be used to improve our understanding of the problems as a necessary step towards affecting sustainable and effective change.

By gaining a better understanding of the interrelations of variables and dynamic effects over time, System Dynamic modeling can be used to overcome the limitations related to the dynamics of the balanced scorecard described by Nørreklit (2000) and others. Applying System Dynamic Modeling to The BSC can give a more holistic view of the related dynamic complexity. According to Akkermans and Oorschot (2002), System Dynamic modeling in combination with the BSC can supply managers with feedback loops rather than unidirectional causality, separate cause and effect in time, validate qualitative assumptions, link strategies with operations, and broaden the focus by challenging system boundaries.

However, criticism has also emerged as a result of system dynamic modeling. Dreyfus and Dreyfus (1986) and Lane (1994) believes formal modeling can provide quantitative precision within preexisting problem definitions, but argue whether it can lead to fundamentally new conceptions. Sterman (2000) undermines this by focusing on the radical changes to how we interpret the reality as well as speeding up and strengthening the learning process. Sterman

(2000) also mentions critique related to omitting important aspects to preserve tractability or to omit soft variable that has no numerical data. He also confesses that this is indeed a realistic danger. However, he also states that system dynamics was design specifically to overcome these limitations. In the model development I have therefore selected variables with precaution and careful reasoning. By trying to include all soft and hard variables that are relevant for the organization in order to overcome some of its limitations.

To simulate possible strategies for the case organization, a System dynamic model was built. This process was an iterative procedure. First information was gathered and essential features identified. Then this information was translated into a system dynamic representation with stocks and flows. The translation implied a simplification to make it easier to comprehend and model. Awareness of possible implications was thoroughly considered. One perspective was then modeled at a time, tested and reviewed. If the performance of the model did not seam reasonable or the case organization itself had objections, the model was adjusted or redesigned. When all four perspectives were operating satisfactory, they were put together into one complete model. The model was then tested and reviewed and necessary changes were made. When the model was operation satisfactory, different strategies were tested and again necessary changes was made. When the model was complete and the different strategies were tested, this was used to defining the KPI`s for the BSC model.

Given its flexibility and transparency, and increasing recognition of the complex, multi-dimensional nature of organizations, System dynamic modeling provided valuable tools for analysis and future predictions as well as guiding decision-making.

5.5 Validity and Reliability

In this sub chapter I will give a short review of the quality of the research. I have focused on reliability and validity. I will give a short introduction to reliability, the concept and how reliability has been assured in my thesis. Following comes validity.

5.5.1 Reliability

A general definition of reliability is, according to Grønnmo (2004), "The degree of compliance between various collections of data regarding the same phenomenon and based on the same study design". In qualitative studies the data is not structured like in qualitative studies and the findings may vary from time to time and between different researchers. The relevance of reliability has therefor been discussed and some believe the term credibility is better suited (Morse 1994, Thagaard, 2002). Credibility entails that the empirical data is not based on facts and not the researchers subjective opinion or due to coincidences.

Being the researcher I can affect the results of the study, this is called the interview effect. To prevent this I have tried to act neutral and objective in our meetings and through out the study. Inaccurate registration of data will also affect the reliability/credibility. By taking notes and going through the results with the organization, I hope that all possible inaccuracies have been revealed. During the interviews I have tried my best to ask neutral and not leading questions in order to make them speak freely. However, I cannot claim a 100% result certainty from the research design.

5.5.2 Validity

Even though the reliability is good, it does not mean that the validity is. In a qualitative study, validity regards the conformity of the findings and how it reflects the purpose of the study in a rightful way as well as its representation of the reality. According to Grønnmo (2004), there are three main types of qualitative validity, namely competence validity, communicative validity, pragmatic validity. Competence validity regards the competence of the researcher, Communicative validity regards the interaction between the researcher and researches, and pragmatic validity regards the creation of a foundation to act.

The communicative validity is especially central to this study as data is mostly gathered from interviews and meetings. Asking questions and reversing the results could quickly exclude possible misunderstandings. This was sought through interview summaries and discussions. Validity was also retrieved

through meetings with my advisor, as he possesses a great deal of competency within the subject of system dynamic and research. I have also gotten some comments from Kjell Gunnar Hoff on the development of the balanced scorecard as he has played an important role in the Norwegian context. In addition I have had friends and family read through my thesis and make comments.

The pragmatic validity in this study can be divided into two, the organizational actions from the management tool developed and the further development of the balanced scorecard. The study is based on a thorough review of the dynamic system in the organization and the output is a tool that can be used in strategic management. To ensure anchoring of the strategic management tool, active participation has been sought. The rise in operational and strategic awareness did lead to a change in the leadership and strategic path. I hope that the further development of the dynamic scorecard model will be applied at later occasions.

6 "Ads.com" – The case organization

In this chapter I will describe the business and their processes, the digital advertising industry, and lastly their strategy. The case organization is hereby called "ads.com"

6.1 Business characteristics and challenges

In this section I will go through the characteristics and challenges from operating in the digital advertising market, starting with product offering, moving on to core activities, challenges, and ending with organizational structure.

6.1.1 Product offering

Product offering is their range of products and services. Products are meant to deliver value to customers by meeting their needs in a better manner than their competitors. Customer needs are often concerned with attributes, quality/design, and price. Products offered at "ads.com" are as follows:

- Strategy and marketing services
- Campaigns

- Websites
- Apps
- Design services

6.1.2 Core activity

Their core activities are the activities that are critical for success, it is closely linked to a company`s strategy and can be expressed through for instance customer service, marketing, product design etc. For this organization the core activities can be divided into three main categories, namely idea/concept development, production, and customer service.

The development of creative ideas is on of the most important activities in the organization as it determines the whole production as well as the end product. Thus a considerable part of the total value creation takes place in process. The production entails programming, value is added when the programming is done efficiently while remaining true to the original idea. Customer service is established before, during, and after the customer purchases the product. Value is created when customer needs are met. Timely delivery is a prerequisite in attaining customer satisfaction and crucial for success. If an advertisement is delivered late, the timing can be wrong and therefore the less valuable which will reduce the customer`s satisfaction considerably.

6.1.3 Core competencies

Core competencies are the company abilities that cannot easily be imitated. Creativity is something that is not easily imitated, and their unique ability to deliver great ideas and translating them into smart and agile digital solutions represents one of their core competencies. They also have an interpersonal characteristic creating a tight relation to their customers and an internal synergy for creative production. Such intangibles are not easily imitated. However, competencies can vanish if employees quite. A good working environment or/and a competitive salary is therefore crucial in keeping their resources.

6.1.4 Challenges

The organization is facing three main challenges that will be given a short introduction to in this section, namely production planning, market change, and growth.

Their products are produced and developed at the workplace and at meetings with customers. Work starts when receiving a project and ends with the deliverance. Much like in service firms, products cannot be saved and having idle workers can become very expensive as no value is created. They are relying on a constant flow of jobs to keep their employees deployed and income steady. Planning their activities and delegating their tasks is therefore important to maximize productivity. Here another challenge arise, estimating time in a creative industry can be very difficult. An idea can take an hour or twenty to develop; there is no way of knowing how long it will take until it is done. Though the repetition of this process is likely to increase their knowledge and make the estimation as well as the process itself more efficient.

Consumer behavior continues to change in ways that producers find hard to anticipate. The designers need to continuously keep up to date on both design and technology not to fall behind.

Since the foundation in 2010 "ads.com" have experienced rapid growth. Growth can be very beneficial when balancing the variables in the organization, any imbalance can lead to fatal consequences such as for instance employee burnouts or shortfall in cash. Both alternatives will lead to stagnation and maybe even recurrence, as they do not possess the necessary cash to make the investments or the workforce to do the job well. As the company grows, the level of resource also grows and their ability to efficiently manage and allocate these resources becomes a prerequisite for success.

6.2 Finance and management

"Ads.com" has gained profits since the first year of business with an increasing tendency. Starting with only two employees they had to hire temporary external labor to meet the demand. This would reduce both the fixed costs and the risk

related to the business. As they grew they hired three full-time and one part-time (20%) employees. This has lead to a considerable increase in monthly expenses as well as the risk. In this section I will go through their cost and income structure and give a short presentation of their present way of monitoring their performance.

In only one year the organization increased its income considerably, with a total of 50,3 % increase over the last year. However, costs have increased even more, equivalent to 74 %. This can be a result of relocation to offices and training of new recruits. However, it reduces the result. With a considerable increase in sales they need to streamline their costs in order to maintain their operating margin.

Cost control is done on the background of two main measures, namely cash flow and tracked hours. Both control methods in use today have some significant weaknesses. The control of cash flow is structured differently from time to time and person to person making internal communication and analysis difficult. In addition, the cash flow is not necessarily synonymous with performance. Alignment and decision-making becomes harder than necessary, agreeing upon one work sheet using the same terminology and making it more intuitive would help further align the decision-making to their strategy.

In their accounting software, Harvest (http://www.getharvest.com/), the employees are able to track their hours and review the spent hours. The software indicates whether they are in line with the budgeted amount of hours on their projects or not. However, problems occur when hours are not tracked. This leaves the organization with a false picture and is therefore of little help when making decisions.

Their main financial focus is to increase overall profit. To do this they are focusing mainly on receiving larger projects with a greater contribution. This is meant to increase sales and profits. However, there are no plans or targets indicating how to gain more of these clients. Increased sales and contribution are financial measures, and do not cover the actual processes and value creating activities in the organization. To increasing contribution, one can either reduce

costs or increase the price. One should then bear in mind that an increase in price can affect the demand and that reducing the costs can in some cases affect the quality of the product.

6.3 The advertising industry

In this section I will give a short introduction to the industry and its characteristics to get a better overview of the business scope and competition.

Advertising is one of the biggest industries in Norway and according to proff.no there are about 400 different bureaus of which more than 300 are located on the east coast of Norway. For several years the advertising industry was quite stable. Advertisement was created on the background of well-established media technologies and logics. As the Internet, digital medias and interactive advertisements became widely spread the industry made a major shift. The rapidly changing and challenging industry has made room for new creative and innovative companies. A study by Aadland (2012) shows that well-established companies have a tendency to wait before entering new advertising categories. His study also shows that status and reputation does not necessarily adapt when entering a new advertisement category. Aadlands study indicates that there is a scope for new adaptive businesses to enter emerging markets within the advertisement industry.

The industry is based on creativity and up to date- innovative design. The quality of such products is therefore hard to evaluate. When choosing an agency most people review previous materials and the prospective firms status in the market.

According to an advertising revenue report by PWC, Internet advertising is among the top three in Norway with 11,1 % increase in 2011, right after televisions and outdoor advertisement.

6.4 Strategy

A strategic path is necessary in order to lead the way towards organizational goals. However strategy has no affect until implementation, it is the sum of strategy and implementation that creates results.

Results = Strategy + $\boxed{\text{Implementation}}$

The strategy will be the foundation for the development of the management mode, serving mainly as a strategy implementation tool. Though the strategy for "ads.com" has not yet been formally specified, the two owners have had an unwritten and informal idea of where they want to. Lately they have experienced an increase in demand, which resulted in an increased number of employees. Thus, the organization became more complex.

 Michal Porter (1980) has developed four generic strategies on the background of scope and competitive advantages. The organization is seeking to stand out through the deliverance of excellence within a focus market of digital advertising, indicating a positioning within a differentiated focus strategy. They do not emphasize cost leadership but place weight on quality products delivered through smart and agile solutions. Profit is also enhanced through direct deliverance to the final customer. Being a small company with a flat structure, gives them advantages in terms of flexibility and interpersonal relations. By keeping their customers close they are able to map client needs better and thereby achieving customer satisfaction more easily.

At the meetings the values, vision and mission were discussed. I will now go through the findings starting with their values.

6.4.1 Core values

Organizational values are according to Johnson, Whittington and Scholes (2011) communicating the underlying and core "principles" of their strategy and defining the way that the organization should operate. In our early meetings their values were mapped. Through discussion their values were narrowed down to the five most important, namely foresightedness, creative, integrity, Delivery of expertise, and friendly.

In a market characterized by rapid change, foresightedness is in regards to the mapping of future needs and delivering in line with these. Being creative is about finding the best solution to future needs, it is about surpassing the expectations

of the customer and delivering smart and intelligent products. Integrity covers both internal and external actions, it is about being honest and truthful to their stakeholders and avoiding any misunderstandings. By delivering expertise in everything they do they can preserve their integrity and help achieve company goals. Lastly, it is important for them to have a fun and playful workplace and a good relationship with their customers.

6.4.2 Future goals

In order to deliver excellent products within digital advertising and fulfilling their customers' needs, their spectrum of competence needs to grow in such a way that their product offering is complete. For this to happen they are depending on more employees. To serve the increased costs they need to increase sales by gaining more reputable jobs from coveted clients such as for instance Apple and Nike. These will in turn improve ads.com´ reputation. Having a wide range of products in house will also reduce the intermediaries and increase profits.

- 10-12 employees
- Few to non intermediary
- More projects initiated by themselves (20-40%)
- Enhanced reputation
- More coveted clients such as Apple/Nike etc.

Vision and mission

They are seeking to become a more recognized company within the industry by exceeding expectations and gaining more recognition from coveted companies. They want to be the natural choice when invited to submit bids and to be the preferred choice of digital advertising. On the background of this the following vision and mission formulation was established:

By defining the vision the desired future state becomes clearer, what the owners wants to achieve with its business.

"Top of mind in foresighted creative digital experiences".

The mission explains the overriding purpose of the organization, "what business are we in?" and "what would be lost if the organization did not exist?"

Mission: "We strive to deliver superior web solutions through state-of-the-art technology, innovation, leadership, and partnership."

These statements tell us that the organization is seeking to improve reputation through the deliverance of quality products in Norway.

6.5 Summary

The organization is operating in a challenging market with hundreds of competitors. However they have managed to grow considerably over the last two years. Growth has lead to a need for more structure and routines as well as a better management system supplying adequate information in achieving overall goals. The information available today is not sufficient and can be somewhat misleading. Creating a common understanding and conceptual platform will ensure goal congruence and may improve operational efficiency. An increased focus on strategic management can also help in overcoming barriers to growth and achieving sustainability. There is room for improvement and a dynamic balanced scorecard approach is proposed as a management tool that enables them to systematically analyze various strategies for growth.

7 Developing a management model

This chapter comprehends the process of developing a management model for ads.com operating in the digital marketing industry. The data and information is gathered from reviewing and analyzing internal documents, meetings and interviews with employees, and personal observations. The BSC will be used as the central system for the development. The model will be enriched by the use of system dynamic modeling and its simulation functions. By creating a computer based flight simulation tool, the organization gets access to what-if scenario estimations and real time data. This will help overcome the weaknesses of the traditional BSC model regarding the causal links and lack of time perspective.

7.1 The developing stages

Forrester (figure 4.1.1) designed six stages for the development process of dynamic models. This chapter covers the first four stages and the two next chapters will cover the last stages. The four stages have been compressed into three main stages:

1. Pre-design: This process covers Forrester`s (1994) first step "describe the system" and entails gathering and structuring information.
2. Design: Development of a dynamic BSC by the use of system dynamic tools. This process covers Forrester`s step 2, converting the described system into the system dynamic tool.
3. Post-design: Testing and redesign. This process covers Forrester`s step three and four; on the basis of test runs and simulations, new designs and policies have been implemented. However the resulting models test runs are introduced in chapter eight.

In the following, I will describe the three-stage process in detail. Through the case organization, I will illustrate how the combination of techniques can be combined into an applicable and well thought out management model. The pre-design phase regards gathering necessary information from the ads.com. This information was introduced in chapter 6 and will not be repeated here.

After mapping the processes and decisions, the next step is to model it. In the design phase I developed a dynamic BSC using a System Dynamic tool, named Vensim. To ensure the quality of the modeling process, I modeled one of the four perspectives from the BSC at a time. This is mainly because I find it easier to spot errors in a small system compared to a more complex system. When all perspectives were modeled, I added one perspective at a time until all four perspectives were included in the dynamic model. Changes were made all along the way, and tests were run until the system was working as intended. The second and the third step were therefore merged into one iterative process with test runs and continuous improvements.

7.2 Modeling the Perspectives

The perspectives are according to Hoff & Holving (2002) the frameworks for operationalizing the strategy. Managers need to decide on what perspectives to use, what the perspectives shall include, perspective names and how they are interrelated and interconnected. On the background of the information gathered in the previous chapter (chapter 6), the traditional perspectives from Kaplan & Norton seems to represent the most important activity in the value creating processes. Below I will give a description of the four perspectives using the system language of stock and flows. System dynamics simplifies "the real world" in order to understand complex systems, the modeling process will therefore only take the key variables into account.

7.2.1 The Financial Perspective

The organization is creating value to their shareholders mainly through increased profits. The model below shows what processes are conducted and what decisions are made in order to increase their profits.
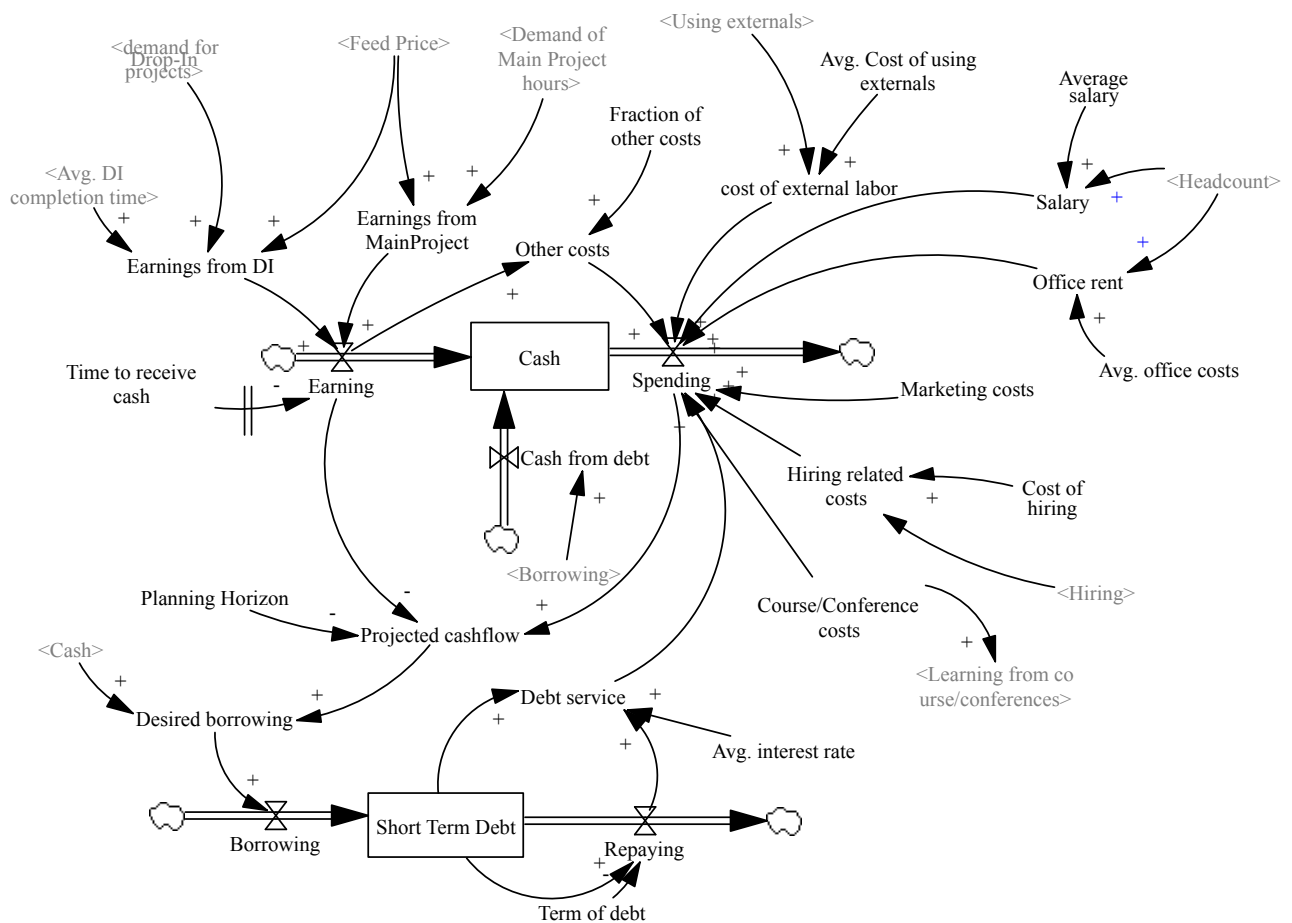
Figure 7.2.1 Financial perspective

The above figure shows the spending's and earnings of the organization. The variables colored in light grey represents interrelated variables from one of the other perspectives. The logic from the above model is fairly simple. The more the organization earns the more cash they receive, the less the organization spends the more cash they retain. However, it becomes more complex when looking at what drives organizational earnings and spending's.

Two main products drive earnings, "drop in (DI) projects" and "main projects". The income from these two products is determined by the project value, which is represented by "Demand in hours" times "Price". Increased price will increase the earnings, however it may also affect the customer base and the demand, which will be explained in more details in the customer perspective. Customers drive earnings, the only decision variable in the financial perspective that can affect "Earnings" is "Time To Receive Cash". This variable acts as a time delay, by

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shortening the time from receiving a project to the actual payment (reducing the due date) they are able to increase their cash reserve.

Spending`s are represented by "Other costs", "Cost of external labor", "salary", "Office rent", "Marketing costs", "Cost of hiring", and "Debt service". "Other costs" is administrational costs and depends on the activity. The "Cost Of External Labor" is the cost of hired personnel for the Drop-In projects. Salary is the total costs for all employees, including taxes. Both "Salary" and "Office rent" is depending on the total "Headcount" which is represented in the Learning and Growth perspective. "Marketing costs" is a decision variable, as we will see later this may affect the customer base and therefore also earnings. Lastly there is "Hiring related costs" and "Debt service".

The policy structure related to short-term debt is fairly simple. If the total of earnings and cash amounts in less than spending`s, the organizations gets a projected shortfall. The projected shortfall is then recovered with a bank loan that will increase cash immediately. However, the related repayment and interest will also increase the expenses.

Financial variables						
Stok/Flow	Cash	Earnings	Spendings	Short-term debt	Borrowing	Repaying
Initial value	*560 000*	*341250*	*357 044*	0	0	0

Table 7.2-1 Financial variables

As we can see from the table above, "ads.com" has a cash reserve of 560 000 Nok. The first month they are earning 341 250 and spending 357 044, decreasing their cash reserve with 15 794 Nok. At the moment, they are debt free.

From this sub chapter I have obtained more insight to the policy structures of Ads.com`s financials. In the next sub chapter I will move on to the customer perspective to get a better understanding of the income drivers.

7.2.2 Customer Perspective

As mentioned in chapter 3, this perspective is about how the organization creates customer value and seeks to stand out from their competitors in a customers view. Their two main factors for customer satisfaction are, according

to Ads.com, price and quality. The System Dynamic model below is meant to capture the value creation for customers.
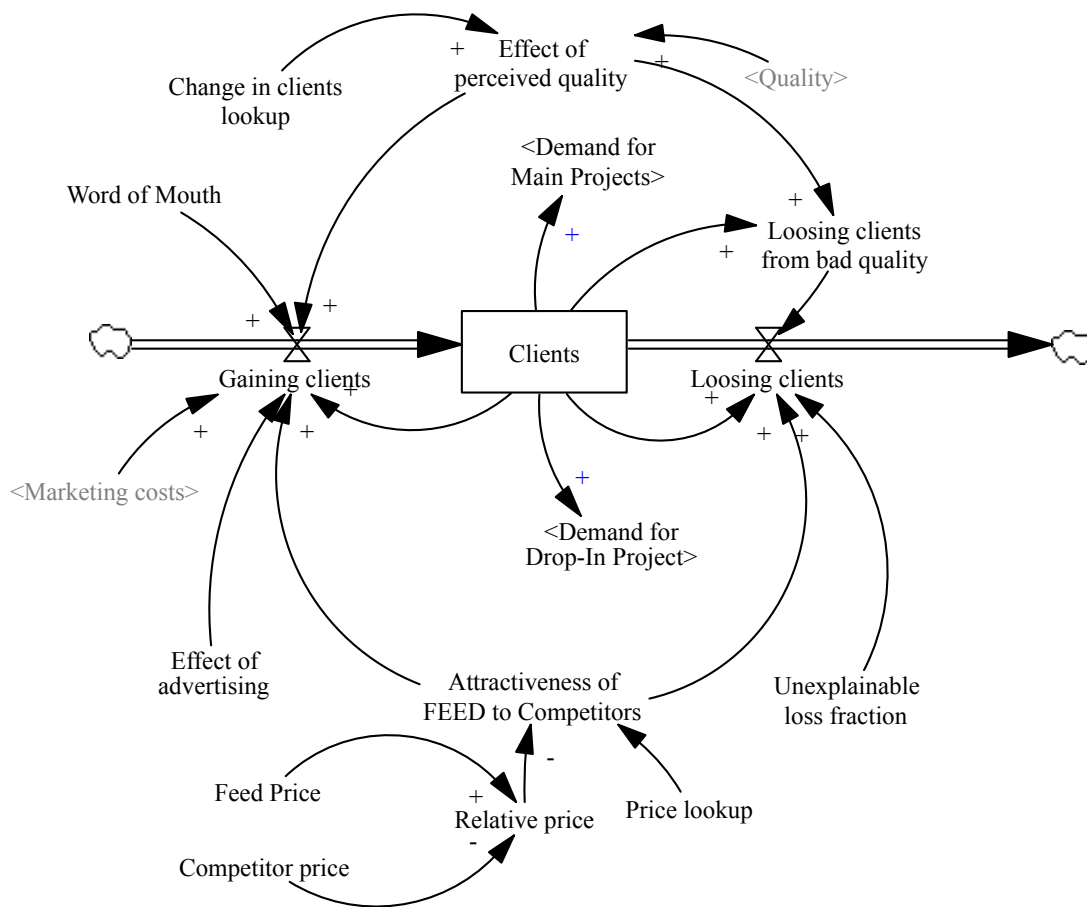
Figure 7.2.2 Customer perspective

Like the figure above illustrates, clients represents the customer base and is changed through gaining and loosing clients. According to Ads.com`s policies, clients can be gained mainly through word of mouth and quality, marketing, and price. To deepen the understanding of their policies, I will shortly go through each alternative. For every 50 000 Nok spent on marketing, they assume that they will gain one client. When attaining good quality (on a scale from 1-100, good is >62), the quality alone can generate maximum one or two new clients. However, this knowledge about the quality needs to be distributed through "Word of Mouth" which is effectively conducted by 30 % of their clients every year (2,5% every month). Here, a reinforcing loop occurs where "Word of Mouth" increases the number of clients, and an increased number of clients increase the

number of clients gained from word of mouth. Lastly, their price has an overriding affect on the total "Gaining clients". Their relative price is 87 % of their competitors giving them an attractiveness of 1.125, "gaining clients" is therefore increased by 12.5%.

On the other hand, quality and price can also result in the loss of clients. If Ads.com`s price becomes lower than their competitors it will slow down the number of gained clients as well as increase the number of clients lost. If the quality goes below 60, Ads.com will start to loose clients (see "change in clients lookup" in appendix 2 for more information). In addition they are experiencing a natural loss of clients that they cannot explain, represented by the variable "unexplainable loss fraction".

Clients are then estimated to have a need of one main project per year and two Drop-In projects per year, equivalent to 1/12 main projects per client per month and 1/6 Drop-In projects per client per month. The below table shows the initial values in the customer perspective and tells us that they are gaining more clients than they are loosing without investing in marketing efforts. The quality level is at the moment just above the critical limit that determines whether the word of mouth outcome is positive or negative.

Key customer variables						
variable	Clients	Gaining	Loosing	price	relative price	quality	Marketing costs
Initial value	15	0.10	0.06	1050	87.5%	62	0

Table 7.2-2 Customer variables

The decision variable in the customer perspective is primarily their price. Other than that it's the quality from their internal processes and marketing budget determining their customer base. In the next we will take a look at their processes and decisions from the internal Perspective. At the moment they are increasing the number of customers every month.

7.2.3 Internal Processes

In the internal process perspective, the critical processes in achieving the objectives in the financial and customer perspective will be represented. The most important processes are the production of the projects.
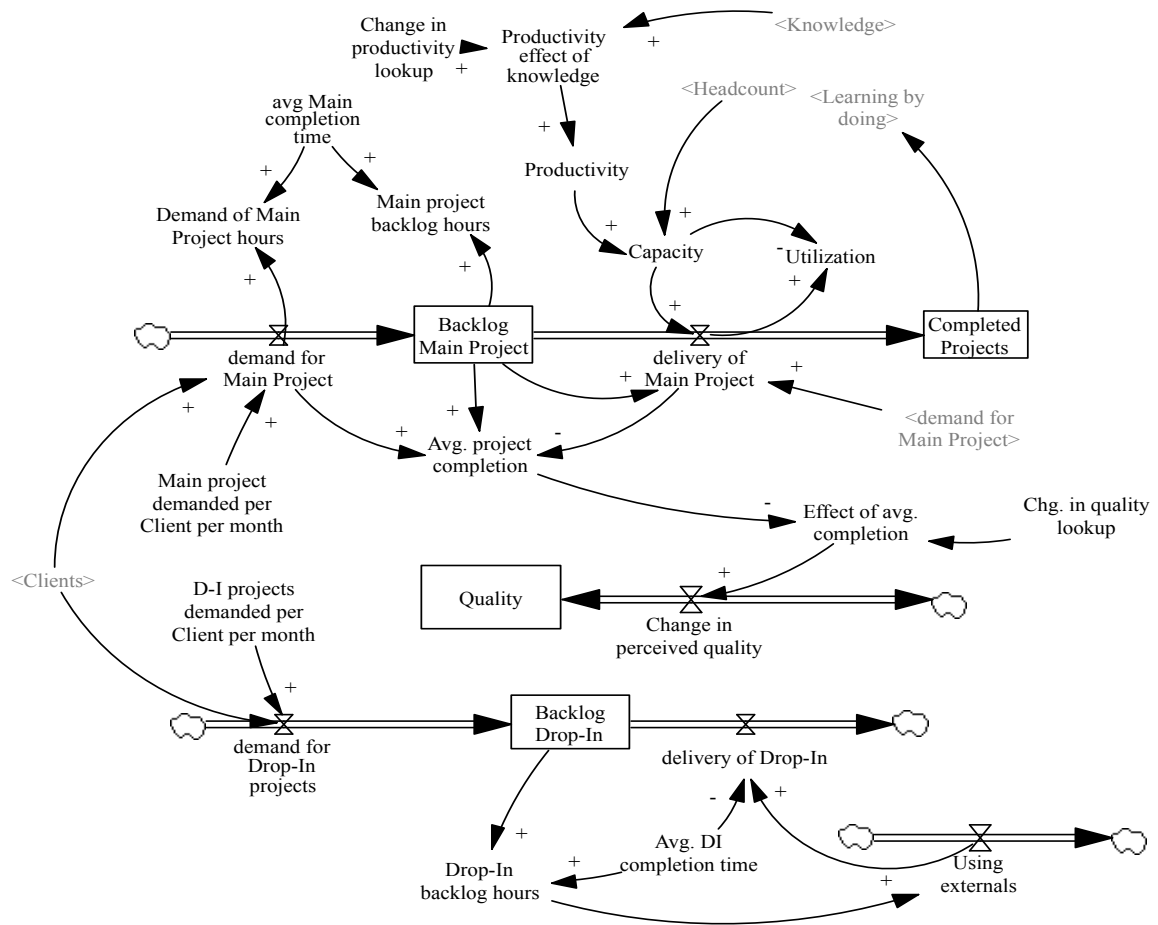
Figure 7.2.3 Internal processes

Ads.com produces two different products, namely Drop-In and Main Projects. The main projects is the most important production process, as this is aggregating the most income and determining most of the customer satisfaction. Drop-Ins on the other hand are more of a strategic process to offer a complete package for their customers. For Drop-In projects, Ads.com primarily makes use of external labor. I will therefore focus on the production of the Main Project.

The demand is generated from the customer base. If the deliverance of main projects is smaller than the demand, the organization will experience an increasing backlog of main projects. The number of workers and their productivity determines the delivery of main projects. Productivity can be increased with increased knowledge (from Learning and Growth perspective). And learning can be increased through the number of main project completed.

To increasing productivity per employee takes time, and will not be sufficient when experiencing a considerable increase in demand. For a faster reduction of their backlog, their policy is to increase the headcount in such a way that the deliverance of main projects is equal to the backlog. However, hiring can also be time consuming process, thus causing some delays for the reduction effort. If the backlog gets too big, the "Average project completion" will be reduced. This variable is the amount of delivered main projects in relation to backlog and demand of main projects. When it is reduced, it means clients has to wait longer. Some waiting is acceptable and enables them to plan their production, but if the waiting becomes too long it is assumed to reduce the perceived quality.

Key Internal Process variables							
Variable	Backlog main	Demand	Delivery	Productivity	Capacity	Utilization	Quality	Chg. In Q
Initial value	2	1,25	2,32	0,44	2,32	1 (100%)	62	2,44

Table 7.2-3 IP variables

The above table tells us that Ads.com is working at full capacity. They are reducing their backlog and improving their quality somewhat. Decisions to improve the performance in the internal process perspective are tightly linked to their size and productivity of the workforce and will be discussed in the next and final Perspective, namely Learning and Growth.

7.2.4 Learning and Growth

In this section I will describe how the organization needs to learn and renew themselves in order to achieve their goals. In the learning and growth perspective, the two stocks "knowledge" and "Headcount" represents the main processes.
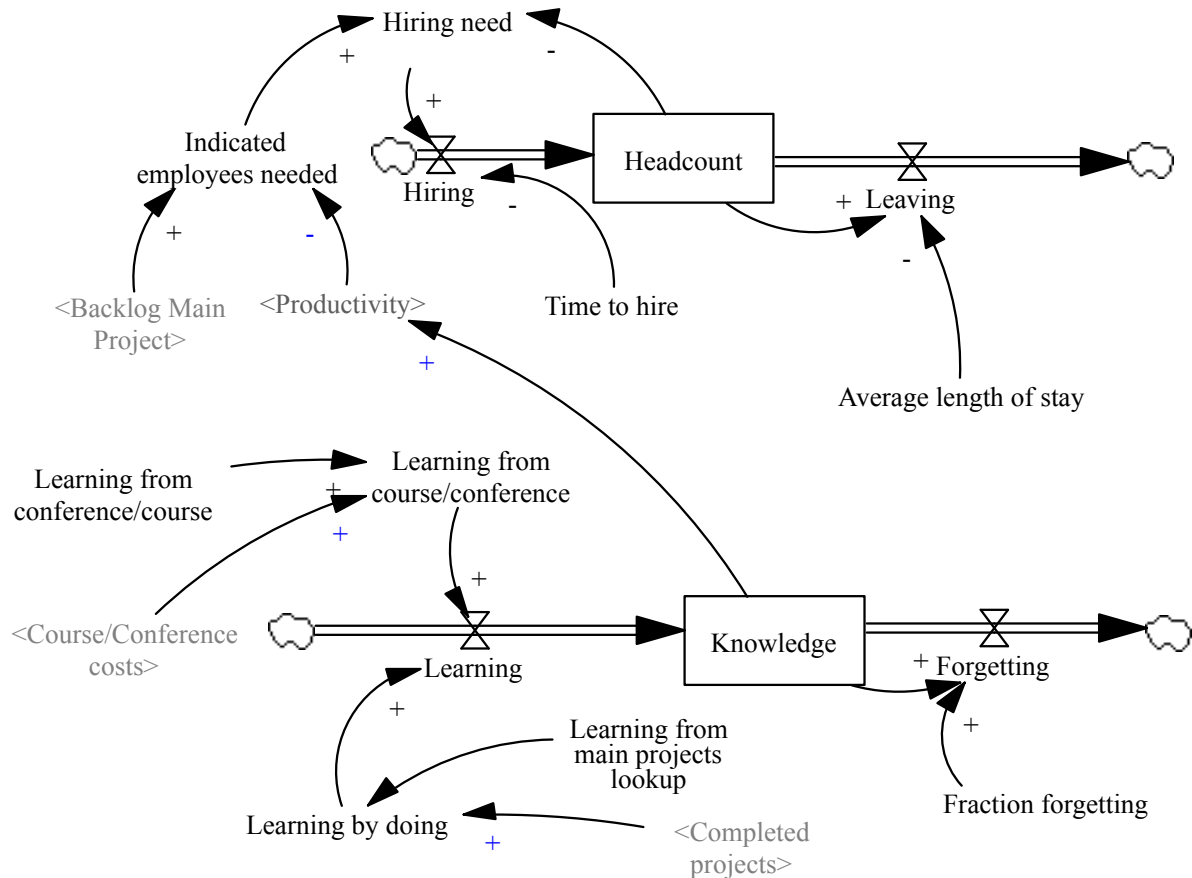
Figure 7.2.4 Learning and growth perspective

The organizations headcount is increased through "hiring", and is reduced through "leaving". Their hiring policy is based on the backlog and the productivity of each employee. When the Backlog increases, the hiring need increases and will after a time delay ("Time to hire"), increase hiring and the total headcount.

Knowledge is the second stock in this perspective and is believed to have a positive affect on the productivity (from the Internal Processes perspective). However, knowledge can also be forgotten, especially when it is not in frequent use. The knowledge stock is therefore drained with a fraction of 5 % per year. To increase knowledge, the organization assumes to have to options, either learning by doing or learning from courses or conferences. Learning by doing is estimated by a proportion of learning from each completed project, the proportion is nonlinear with increasing marginal learning followed by decreasing, marginal learning. The alternative is conferences or courses, which can give them a

quicker form of learning. Another advantage with this alternative opposed to learning by doing, is that they can gain knowledge within a predetermined ability or field.

Having a sufficient amount of knowledgably employees is crucial in delivering quality products in time. Processes and activities related to theses are therefore representing their main focus. However, the disadvantage is that it costs money and needs to be considered in relation to its benefits.

Key Learning and Growth variables					
Variable	Headcount	Hiring	Leaving	Knowledge	Learning	Forgetting
Initial value	*5,2*	*0,09*	*0*	30	0,08	0,125

Table 7.2-4 Learning and growth variables

The above table tells us that the headcount is 5.2 initially and is meant to increase. Knowledge is at the moment being somewhat reduced as forgetting is greater than learning. Reduced knowledge will decrease productivity and finally quality. It is therefore necessary to increase learning either by doing more projects or attending course/conference not to fall behind.

7.3 Integrating the perspectives of the BSC

The representation of key activities and processes within the four perspectives from the BSC has given me more insight into the core operations and the initial values. In this subchapter I will connect all four perspective and describe the interrelations and interdependencies between the perspectives. The represented model will illustrate a more holistic and dynamic perspective of the organization.
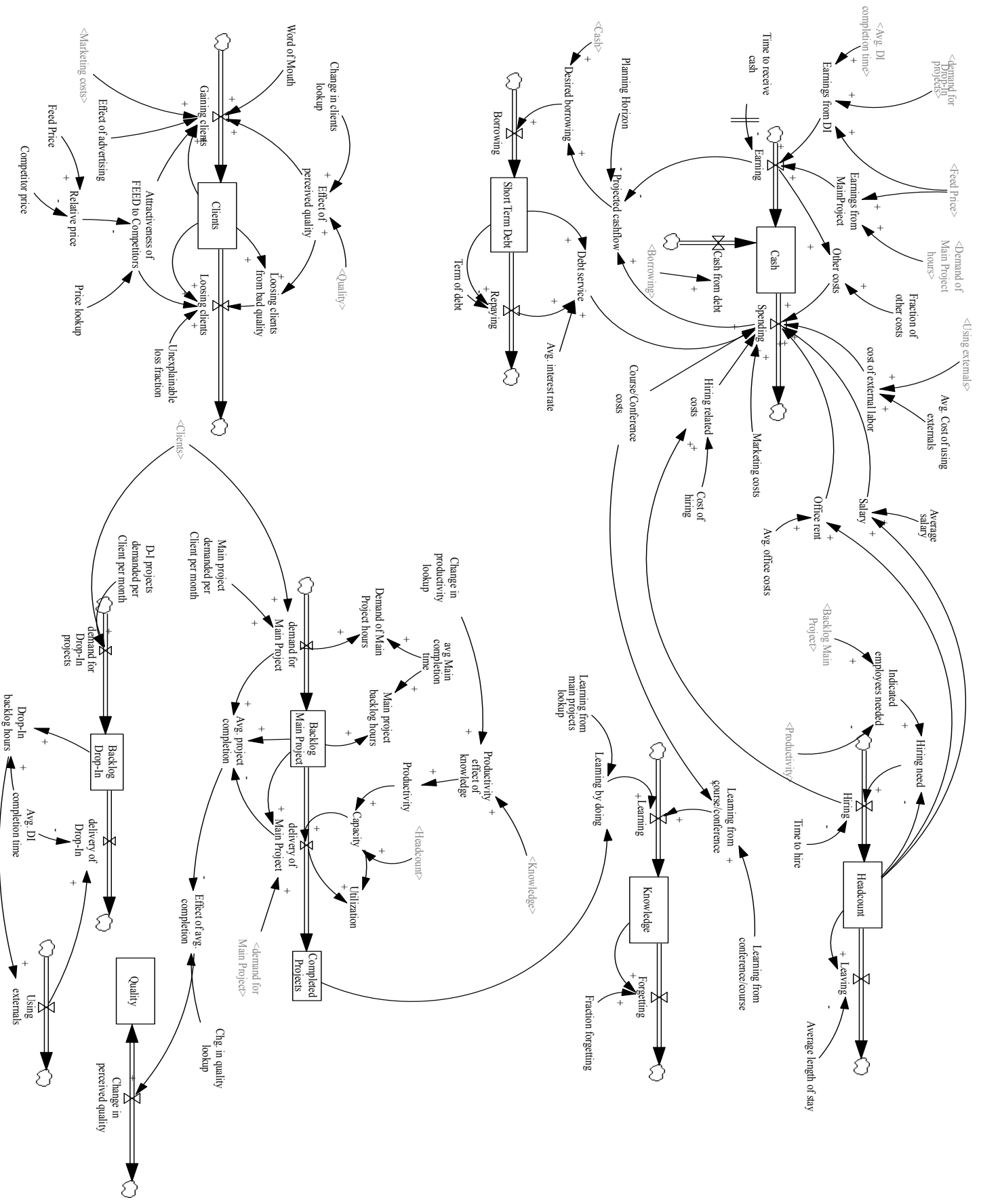
Figure 7.3.1 Dyanmic model

The above model gives us a better overlook of the entire organization, their key activities, and how they are interconnected. I will now deepen this understanding by quickly going through the interrelations between the perspectives.

The learning and growth perspective is directly connected to the Internal process perspective, the financial perspective, and indirectly connected to the customer perspective. The completion (internal process) of products affects the learning and thereby the knowledge which in turn affects the productivity per employee. The productivity times the headcount equals their capacity and therefore also the number of projects delivered. In turn, the delivery of projects affects the quality, which is related to the client base in the customer perspective (through gaining or leaving). The learning and growth perspective is also connected to the financial perspective. Hiring and Headcount affects the costs related to the employees and potential attendances at course or conference also affects the spending's. The policies from the financial perspective can therefore have significant affects on the learning and growth perspective. The internal perspective is closely linked to the customer perspective, their clients determines the demand and therefore the volume of production. However, this is a bidirectional relation as quality also affects gaining and loosing clients. The financial perspective can also affect the customer base by investing in marketing and thereby speeding up the process of gaining clients. A more long-term investment can also be conducted through the learning and growth perspective by improve the internal processes and thereby the quality that is increasing the natural growth of clients. The financial perspective is related to all of the perspectives through the cost of employees, externals, Marketing, ads.com`s price and the demand of their projects. I made a simplified illustration below.
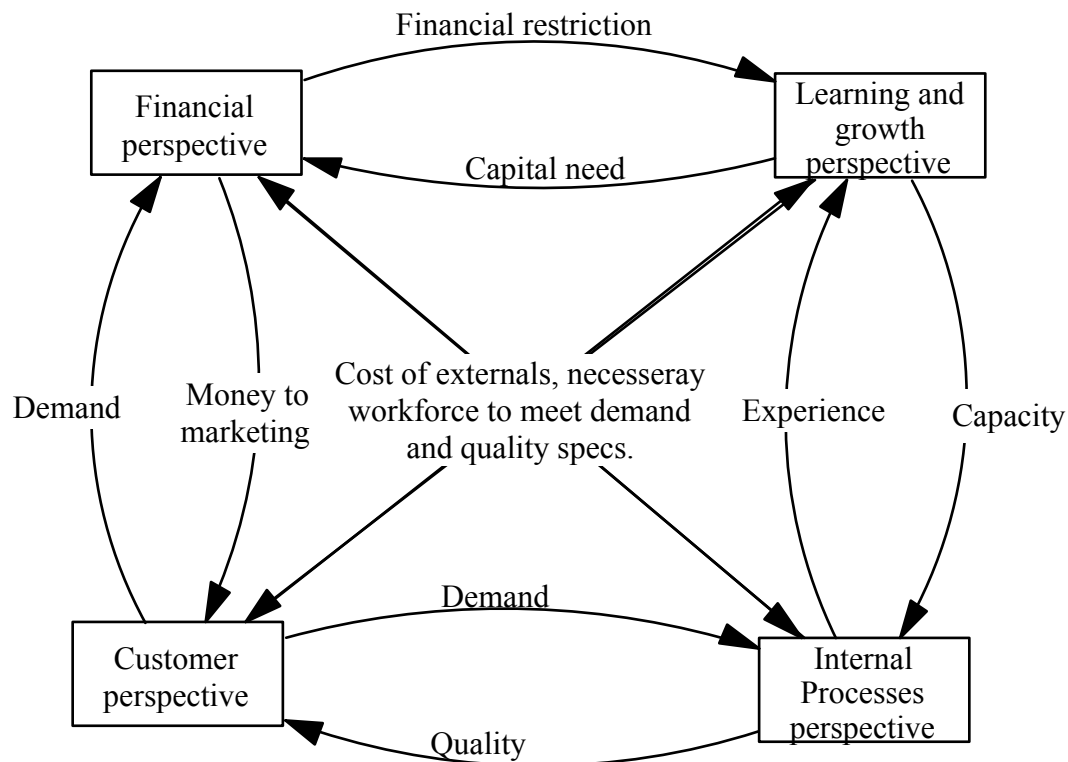
Figure 7.3.2 Interrelated perspectives

The dynamic model presented in figure 7.3.1 is fairly complex and can be hard to understand. The figure above is therefore meant to make a simplified overlook of the interrelations mentioned above.

Ads.com is spending more than they are earning even though they are working at full capacity. However, their customer base is increasing as well as their productivity. It is therefore possible that they can streamline their costs by increasing productivity. With a better understanding of how the organizational operations interact, understating the future outcomes will also be easier understood.

7.4 Finding underlying structures

According to the BSC by Kaplan and Norton (1996), their Strategic objectives are interconnected with underlying key success factors. The interconnectedness relationship can be made more dynamic by translating them into feedback loops that explains the pattern of the KPI`s behavior. Instead of looking at the key success factors from the BSC, I will be looking at the dynamics of key success

loops. In the above figure there are both reinforcing and balancing loops. As the organization seeks better quality and increased profits the key success loops are as follows:

7.4.1 Hiring loop

The hiring process consists of both reinforcing and balancing loops. The reinforcing loop is in regards to increasing the capacity that speeds up the delivery of projects that also increases customer satisfaction through perceived quality. Increased quality will eventually lead to increased demand. With more jobs waiting they organization is in need of more employees and will have to hire more people. The balancing loop regards the reduction of the backlog, through the increased capacity. With a smaller backlog, the need of employees is also reduced and the hiring process is balanced out. It is the magnitude of the two loops that decides the outcome, whether the organization increases in size or balances out.

Their hiring policy is at the moment reactive, they are hiring as the demand increases. This can cause oscillations as there are time delays in the hiring process. The number of employees is crucial for meeting the demand and delivering quality products. With the right number of people with the right combination of knowledge at the right time, they are able to utilize their resources more efficiently and thereby reduce costs.

7.4.2 Knowledge loop

Knowledge is also related to a reinforcing loop and a balancing loop. The knowledge in the organization affects the productivity and the delivery of projects. The more projects they deliver, the more they learn and increase their knowledge. This is reinforcing, however they are also forgetting some of their knowledge. The more they know, the more they forget. However, this balancing loop is less significant than the learning loop and will only slow down the learning speed a little as long as they keep the activity level.

At the moment the organization has a good basis for producing quality products. However, they are lacking important knowledge about managing the business.

Routines related to financial control, planning, management, and coordinating the responsibilities have great improvement potentials. By improving these skills the organization can enable more efficient resource utilization (in this case human resources) and hereby improved profits.

7.4.3 Gaining Clients

More clients lead to increased demand, which leads to increase in the employees and the capacity, eventually increasing the profit. However, the increased capacity increases the perceived quality and therefore also their client base. This positive feedback loop is overruled by the balancing feedback loop related to the effect of an increasing backlog. As clients increase, the demand will also increase. Since there are delays in the hiring process, the backlog will also increase which will reduce the perceived quality. If the perceived quality drops below 62, they will start loosing customers. When they have lost enough clients to supply the demand, the quality will gradually start to build its way back up. However, it recovers more slowly than it bursts.

At the moment there are no direct marketing to bring in sales. As the organization is seeking more reputable jobs from coveted organizations, some sort of marketing effort might influence and increase their future demand of such projects.

7.4.4 Summary

The key success loops mentioned above are all consisting of reinforcing loops that affects the demand, quality, and therefore also the sales and cash balance. The balancing loops presented in these key success loops may limit the growth, or at least slow it down. This is in special regards to the hiring loop as it to together with productivity, determines the capacity and thereby the backlog. A limitation to the growth of employees is equivalent with a limitation of the entire organization as the employees produce the products. In the following chapter I will take a look at what future outcome these feedback loops are causing with the initial values, this will also help determine the scales of these underlying structures.

8   Analyzing future performance

In this chapter I will analyze the current organizational situation. Thus, deepening the understanding of future consequences of` today`s policy structures with possible challenges and advantages.

As we saw in the previous chapter, the cash flow was negative, the organization is at the moment spending more than they are earning. However, this information can be misleading when interpreted in isolation, there are often time lags hindering immediate performance outcome. Thus, analyzing performance over time would give a better understanding of the dynamics and system`s performance. The analysis will therefore start with taking a closer look at the future outcome of today's structure and policies. To structure the analysis and get a better overview of the complexity faced, I will start by looking at one perspective at a time before summing up their affect on each other.

8.1   Financial performance

Figure 8.1.1 Financial performance

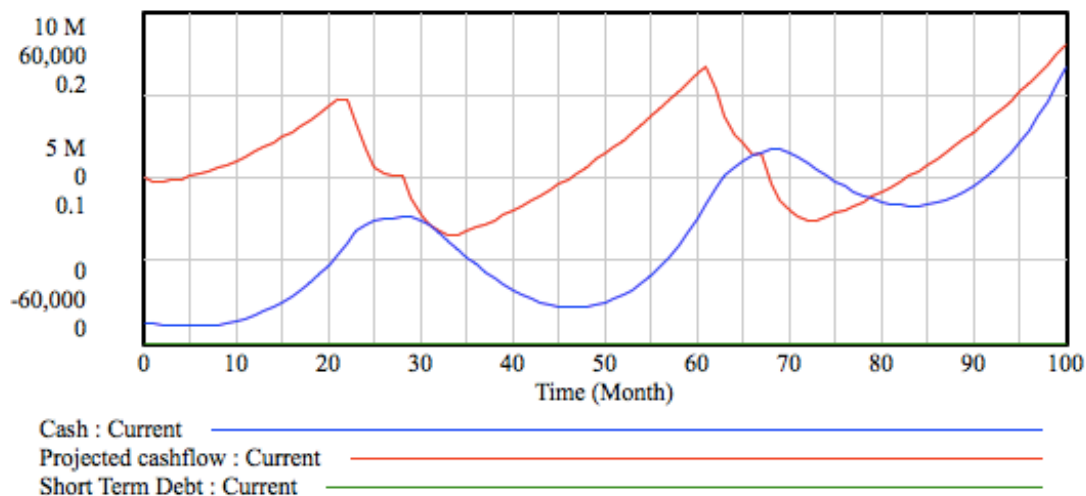As the above figure shows, the cash balance is oscillating with an increasing trend. In fact, the cash balance (without any dividends) has reached 8 millions in less than 9 years. Even though they are experiencing oscillations, they manage to stay debt free. After about five months, they are making more money than they are spending and the cash balance starts to increase. However, the income and

expenses starts to fluctuate after a couple of years. In fact, projected cash flow is negative after about 28 months, forcing the cash level down. After 45 months they are increasing their earnings again and so it goes on. According to Sterman (2000), Oscillations are very common behaviors that are caused by time delays in negative feedback loops. The above graph has similarities with Sterman`s (2000) "s-shaped Growth with overshoot", the negative feedback loops leads to the possibility that the state of the system will overshoot and oscillate around the carrying capacity. However, the carrying capacity seems to be increasing after each overshoot, giving room for increased earnings. Figure 8.1.1 seems to overshoot after 27 and 61 months. In the next, I will seek an explanation from the interlinked perspectives.

8.2 **Customer performance**
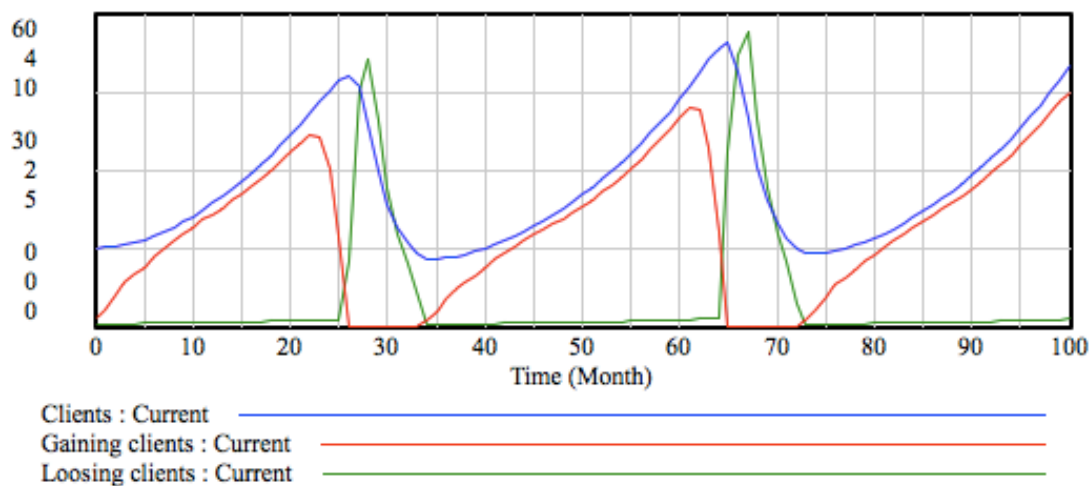
Figure 8.2.1 Customers over time

The above figure regards their customers and shows similar tendencies as the financial cash flow. After about two years, the capacity level is reached and the system overshoots, resulting in a significant loss of clients. Less clients means less demand and can therefore explain the reduction of the earnings in the financial perspective. However, it does not say why the organization will loose clients. Any effect from price or marketing can be excluded as the price is constant and there are no marketing investments. That leaves us with the effect of quality from the Internal Process perspective.

8.3 **Internal performance**

Figure 8.3.1 Backlog, capacity, and quality over time

Figure 8.3.1 is oscillating with the same tendency as the variables in the financial and customer perspective. Figure 8.3.1 tells us that after about 22 months, the backlog of products exceeds the capacity. From this stage they are producing at full capacity, which nee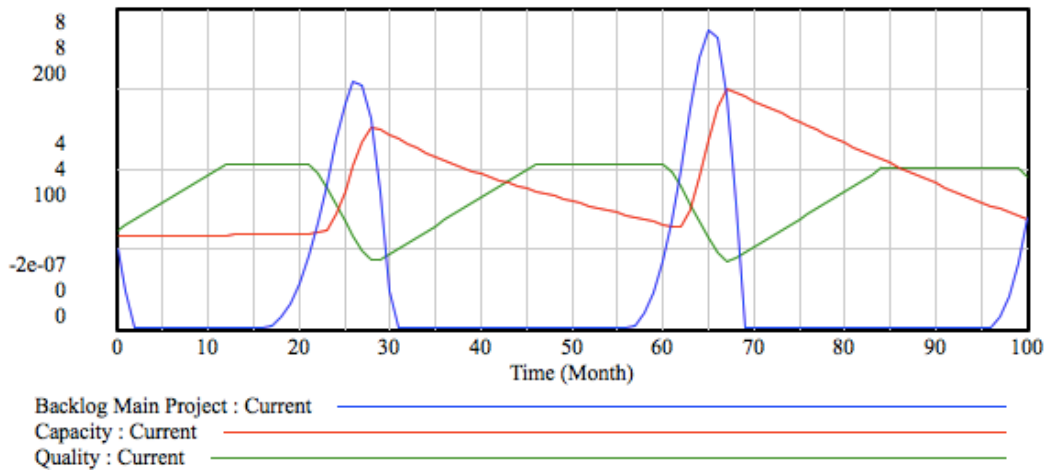ds to be increased to meet the demand. However, the capacity is adjusted with a time lag, making the backlog increase dramatically. As we can see, the increased backlog reduces the quality. In fact, the quality is more then halved. Quality reaches its minimum of the first oscillation in the 28th month, which is just after the backlog is at its first peak. With today`s policy, it takes about 8 months to adjust their capacity to an increasing demand. Which, in turn decreases the perceived quality and results in lost clients. Thus, when they have adjusted their capacity the demand has already decreased and they need to readjust again. The system goes through the whole procedure again, except with increased magnitude. These time delays are causing considerable effects on the system outcome and needs to be dealt with. To get a better understanding of the capacity and its delay, we need to take a closer look at the Learning and Growth perspective covering the productivity and headcount representing the capacity.

8.4 Learning and Growth
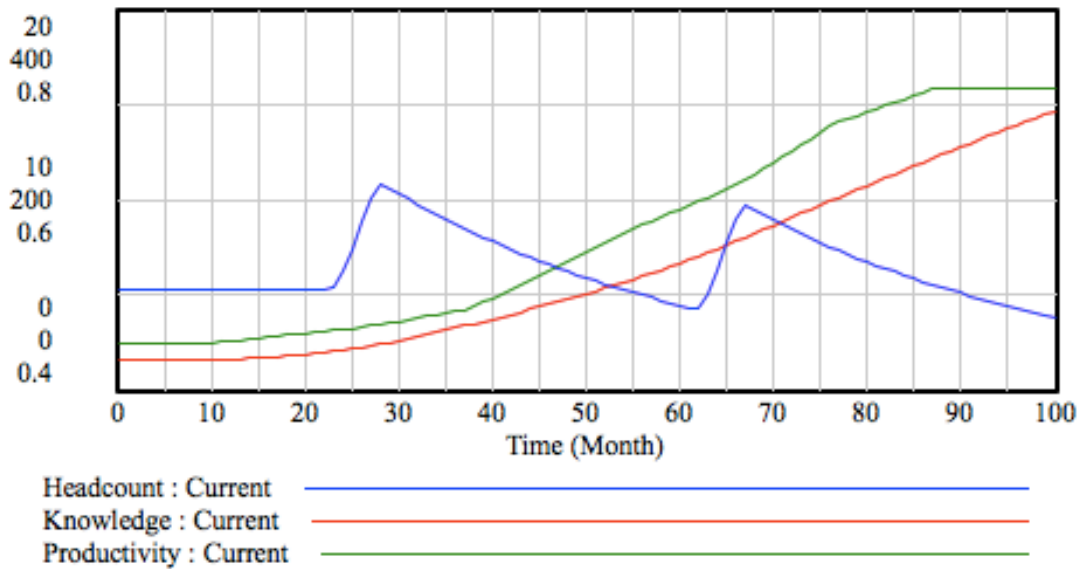
Figure 8.4.1 Headcount, knowledge, and productivity over time
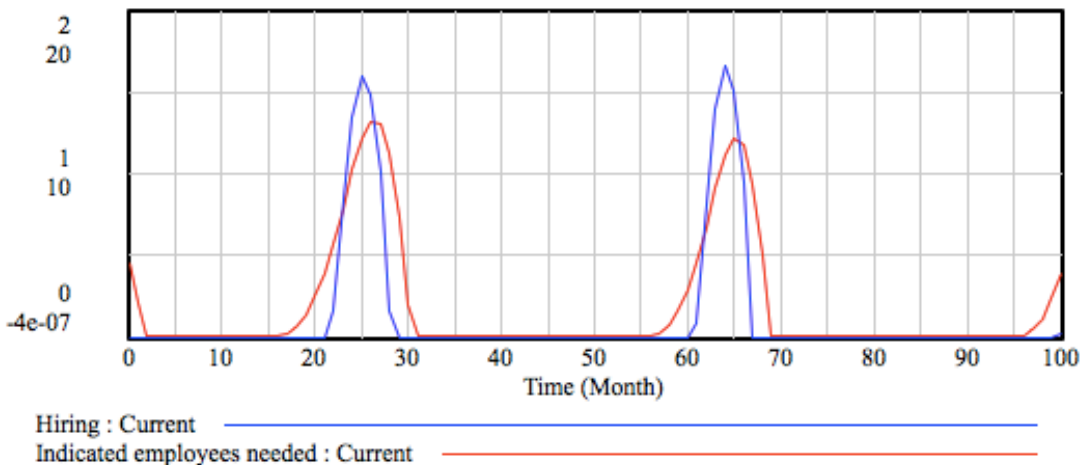
Figure 8.4.2 Hiring and indicated need over time

Figure 8.4.1 shows us that Knowledge is increasing all along the timeline. Productivity is also increasing the first 7 years (84 months), when it seems to reach a maximum level. However, the productivity affect is not significant enough to handle the increase in demand alone. Since productivity and headcount determines the capacity, the problem must lie in the headcount and hiring processes. The hiring processes is illustrated in figure 8.4.2, this figure shows a time delay between hiring and indicated employees needed. This is caused by the auxiliary variable time to hire, delaying the hiring process with 3

months. Like mentioned before, oscillations comes from time delays in a balancing feedback loop, in this case it is the time to hire that is causing most of the oscillations.

8.5 Summary

In the following years, the organization will increase their cash balance. However, they also experience some significant oscillations. The oscillations are affecting all levels of the organization and causing inconsistency and unpredictability for the organization. When the system is oscillating, variables declines at a much faster rate than when it rebuilds and increases, this slows down the growth substantially. It is therefore especially important to reduce the oscillation to maximize both profit and growth. The oscillations are caused by time delays from a negative feedback loop, namely "Time to hire". This time delay is causing production problems in the form of exceeding capacity at times, having too much capacity at other times, decreasing quality at times making their products less attractive, which again decreases profits. The hiring process is one of the key success loops, the oscillation therefore needs to be dealt with in order to create a consistent, controlled, and predictable future for the organization. They are not achieving their desired growth of 10-12 employees, but in fact reducing their headcount. Strategies for handling these oscillations and achieving future goals will be tested and presented in the next sub chapter.

9 Applying strategies

In this chapter I will present different strategies and their affect on the organizational performance. Since there have been identified oscillations, I will test a selection of strategies to get a more consistent growth. In addition I will take the strategy discussed in chapter five into consideration when analyzing the different outcomes. To gain a better understanding of each strategic change, I will implement one change at a time. The changes with the most desirable affect will then be tested in combination with other strategies in order to determine the strategic path with the most beneficial outcome.

9.1 Strategy testing – single change

In chapter six I described the organizations initial thoughts regarding strategy. Like mentioned previously they want to outdo their competitors and enhance their reputation. In addition, the organization would like to increase their price. This will be the basis for some of the strategic changes implemented to the dynamic model. Below is a figure of the initial values of quality, backlog, and cash, this figure will be used to compare the different strategies.
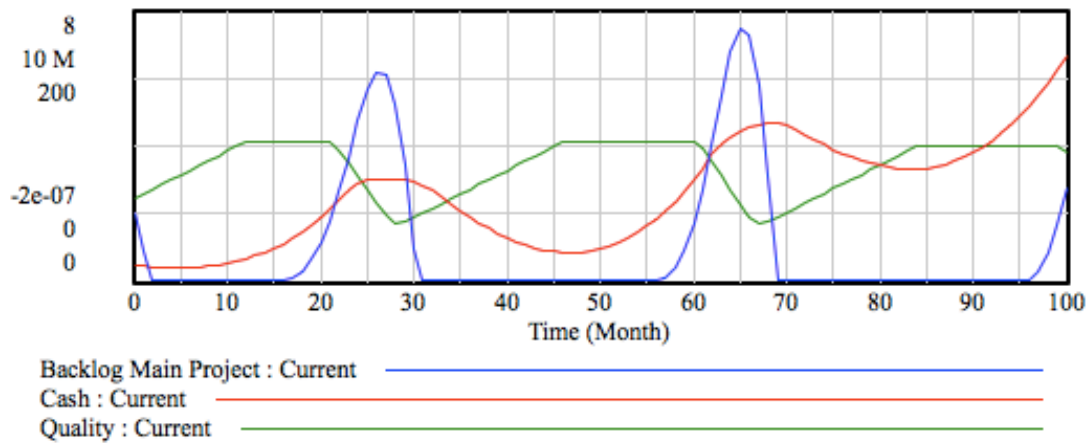
Figure 9.1.1 Backlog, Cash, and quality

9.1.1 Changing the price

In this section I will test the affect of different price levels. The price will be tested and analyzed for three different levels, 850 Nok, 1200 Nok, and 1600 Nok. Even though a reduction in price is not an alternative for Ads.com, I consider this information important in getting a better and more complete picture of the actual impact of the price and its boundaries.
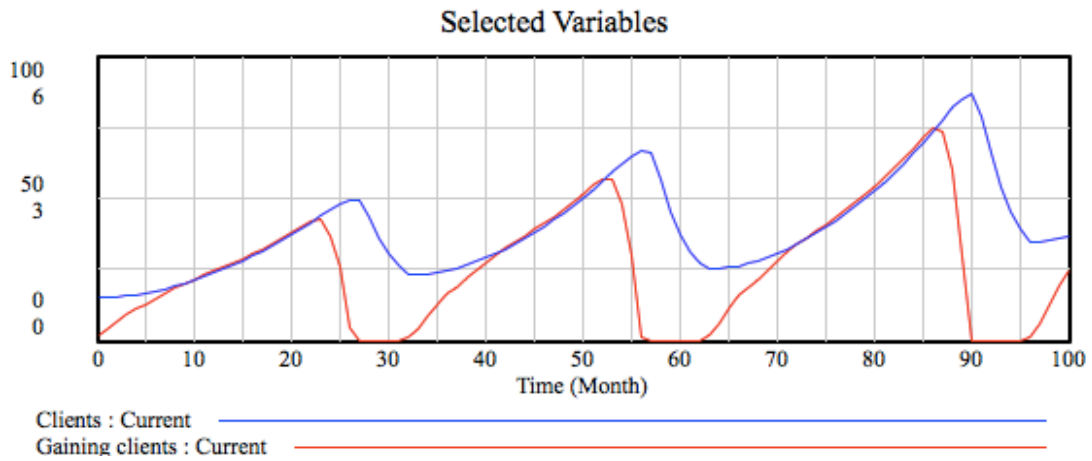
Figure 9.1.2 Initial values – clients over time

Price 850:
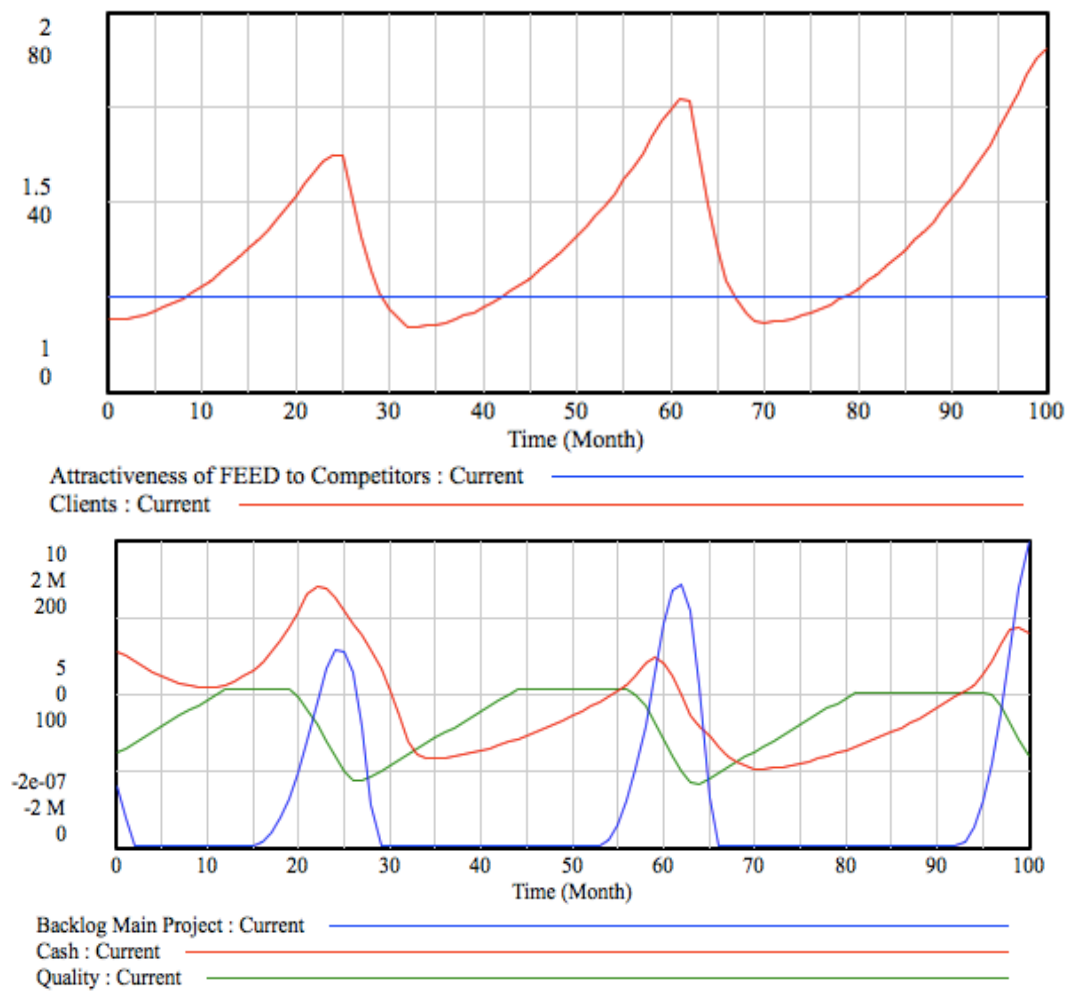
Figure 9.1.3 Reduce price to 850

As we can see from the graphs above, reducing the price with 200 Nok will not change the pattern of the future development, but the magnitude of the outcome values. In the beginning, the organization will loose money and reduce their cash level. The client base is increasing faster and the maximum number of clients also gets higher. When the system overshoots due to demand exceeding the capacity, the organizations needs to apply for a loan to recover. Even though they manage to recover, it is not for long as the oscillations from the backlog is increasing. The prospect is not looking good, by reducing the price the oscillations are becoming more significant and unpredictable due to increased change rate (where as adaptability is unchanged).

Price= 1200:
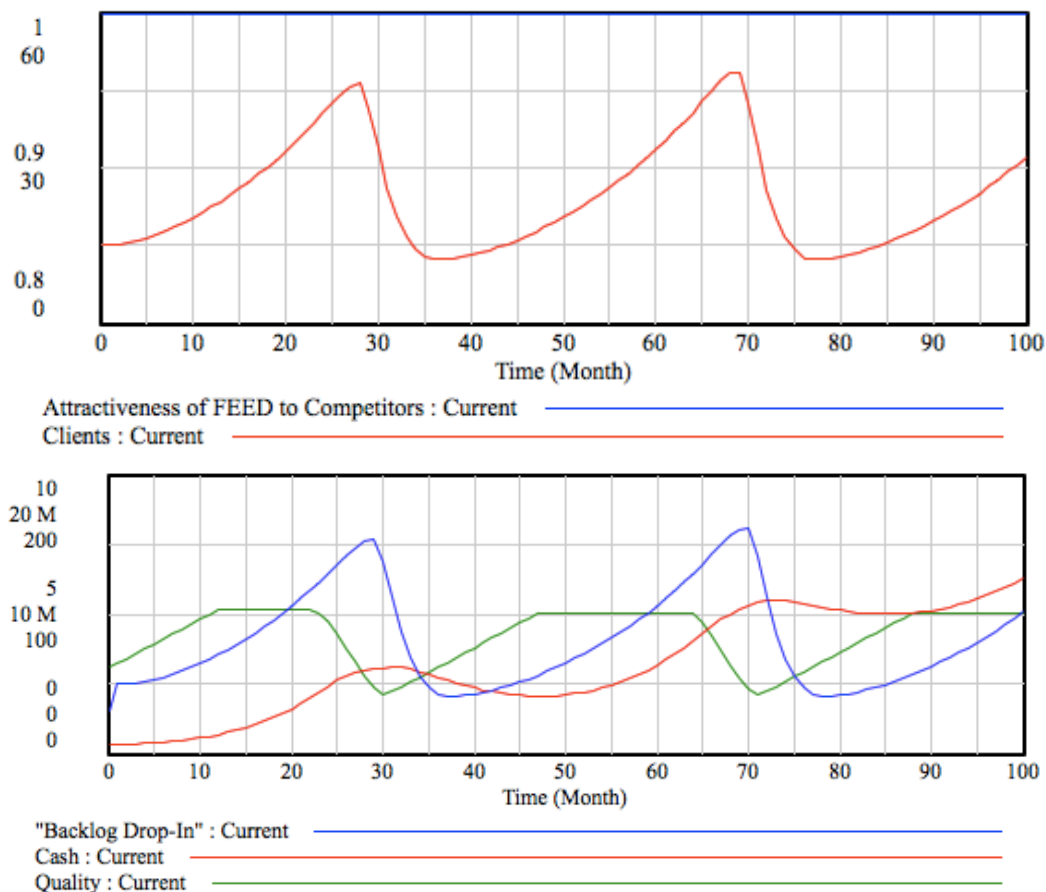
Figure 9.1.4 Increase price to 1200

Increasing the price to 1200 is equal to the market price, this gives them no advantages in the form of price attractiveness. As we can see from the figures above, the client base is increasing more slowly than initially, giving the system more time to adjust. The system is overshooting 2-3 months later (start to loose clients). By increasing their price they are also increasing their final cash level with about 4 millions.

Price=1600
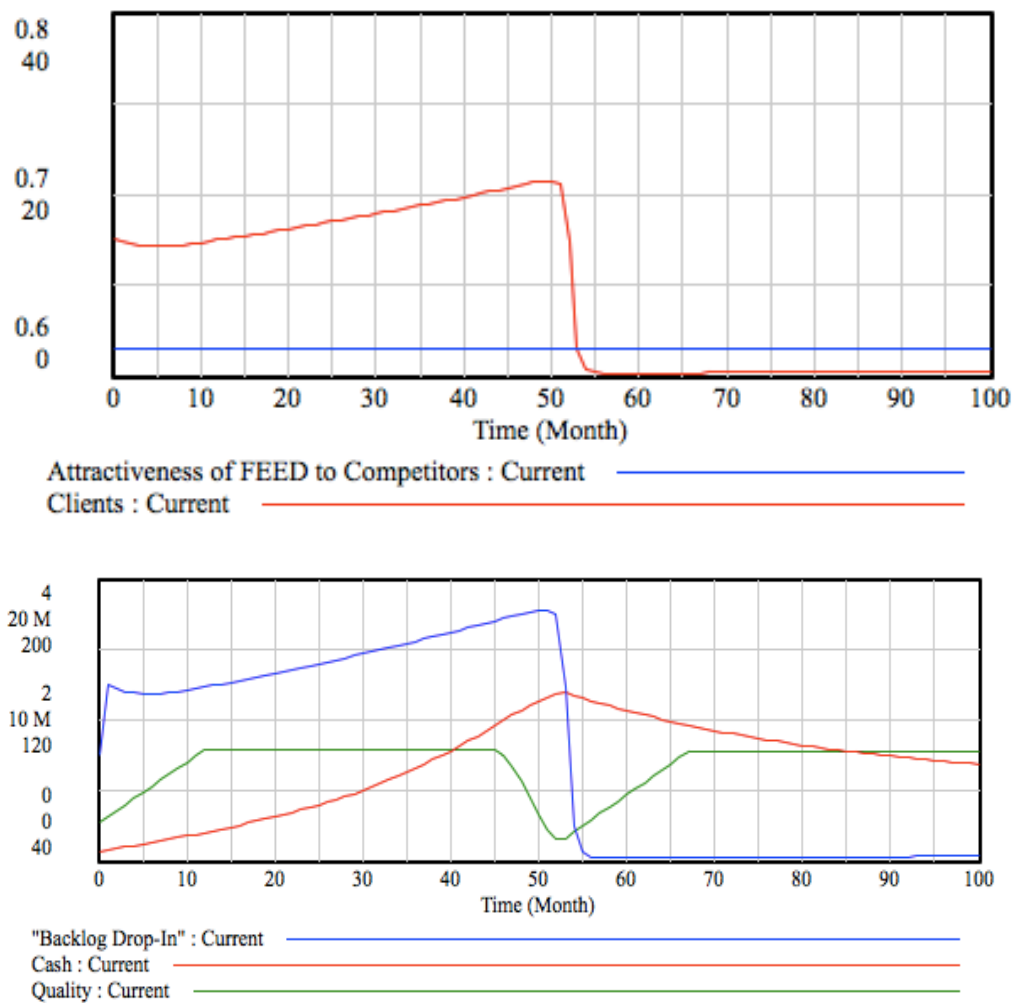
Figure 9.1.5 Increase price to 1600

Changing the price to 1600 Nok is 400 Nok above the market price, this is decreasing their attractiveness from price and slowing down the growth of customers. As we can see from the above figures, something happens after about 50 months. Backlog increases and as a result, perceived quality decreases. At the same time the organization is spending money on increasing their headcount.

Increasing the headcount is taking time and by the time the capacity is adjusted, their customers have already left. With no customers, word of mouth has no effect any longer. Thus, they nothing attracting customers and driving the sales, they will therefore experience great losses. Without any actions to gain back their customers, they will loose money and eventually go out of business.

A reduction in price will increase the customer base and sales significantly, however the oscillations are increased leaving the organization with production challenges from a fluctuating demand. Such circumstances are hard to manage. The more the price increases the more the oscillations are damped out. However, increasing the price significantly will increase the speed and size of an overshoot as the relative attractiveness from price makes the clients switch company more easily. Thus, in a worst-case scenario, this will demolish their client base and force them into bankruptcy.

9.1.2 Investing in Marketing

Today, there are no resources invested in marketing, the organization is relying on their attractiveness from price and quality. In this section I will analyze the affect of investing 100 000 Nok once after 29 and 59 months as well as three months in a row with the same starting months. The months with declining client base are chosen for the marketing investment, at this time they are having free capacity and are in need of more customers. The investments are meant to decrease the fluctuations.

Modeling operationalization: Step function to boost the marketing within specific months.

100 000 Nok to Marketing in month 29 and 65
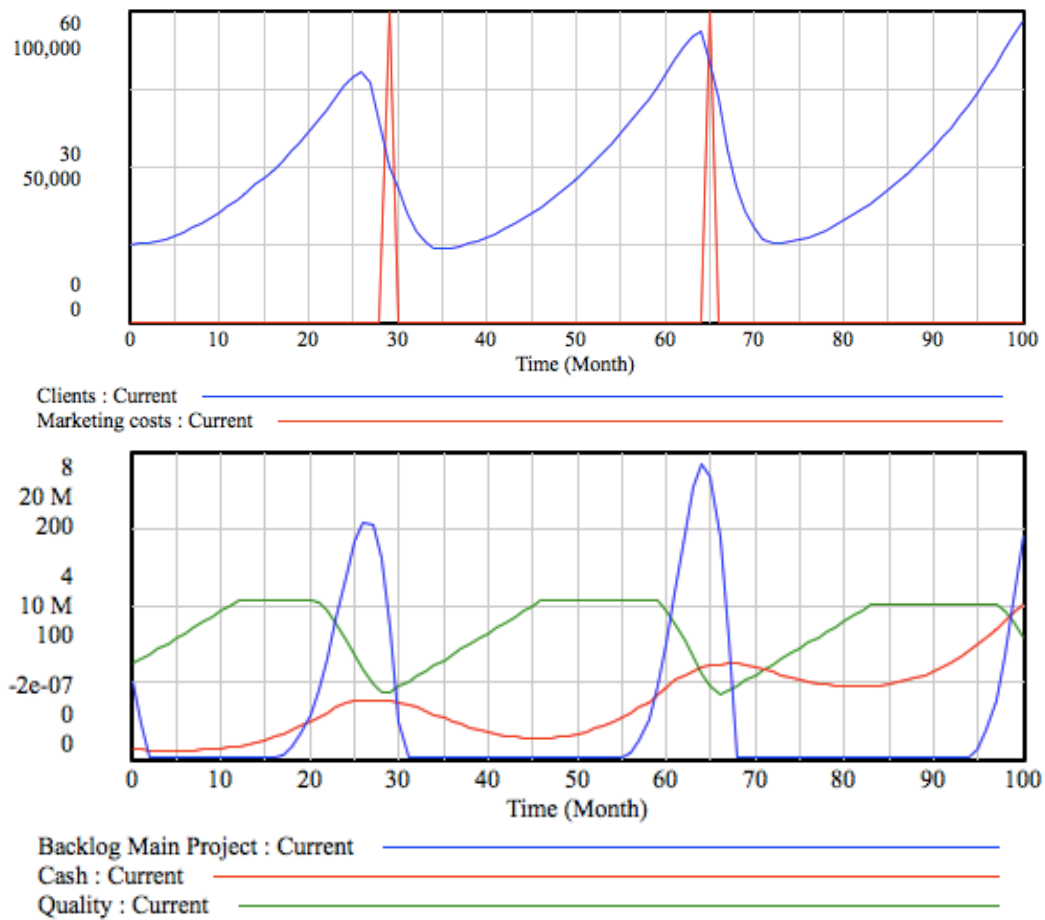
Figure 9.1.6 Investing in marketing 1

Investing in marketing will boost the client base with about 2 clients. However, it is not making a substantial difference, they are still loosing customers due to poor quality. Financially, the cash balance stays positive (no debt is applied) and is relatively higher than initially, even though they are spending money on marketing. This is due to a slight increase in customer base, the margin is however somewhat reduced due to the investments applied.
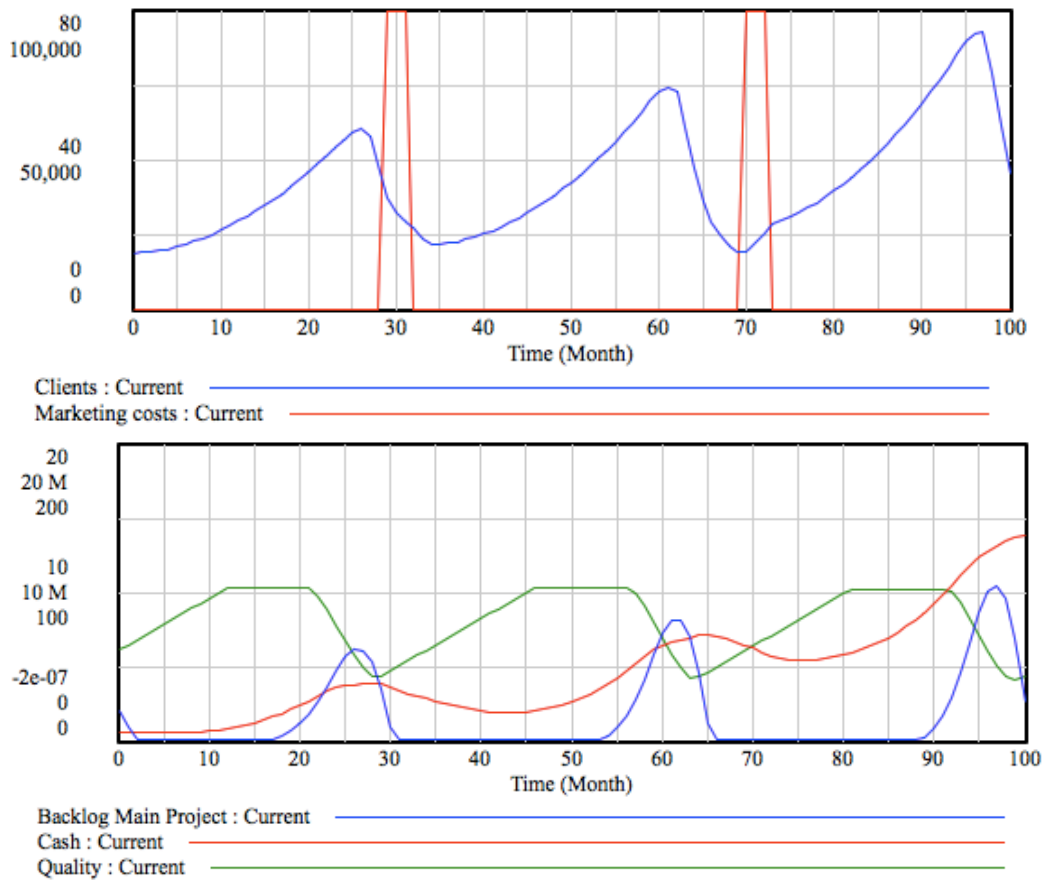
Figure 9.1.7 Investing in marketing 2

Looking at the figures above, the oscillations seems to be somewhat damped out and the total cash level ended up higher than initially, namely at about 14 millions.

Marketing can boost the client base and therefore reduce the oscillations slightly, the more money invested the greater the effect is. This strategy can regain some customers when they are loosing customers or when they are having free capacity. For the fluctuations however, this is a reactive strategy that does not capture the initial problem of the oscillating system, but tries to fix it after the system already has overshot. The system spends more time to build its client base up than it does to reduce it and a strategy that prevents the system to collapse would be more beneficial.

9.1.3 Employee strategies

In this sub chapter I will look at two main strategies, namely changing their hiring policy and investing in conferences/courses.

a) Changing their hiring policy

Since the underlying problem is to match the capacity to the increasing demand, I will try out a new hiring policy to reduce the oscillations.

Initial values:
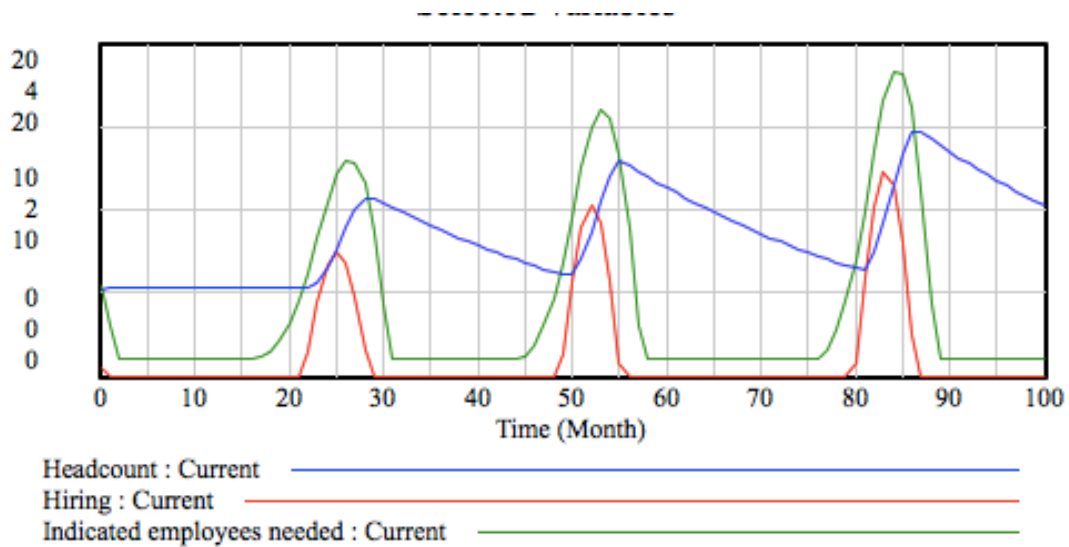
Figure 9.1.8 Initial values hiring, headcount, and ind. employees needed
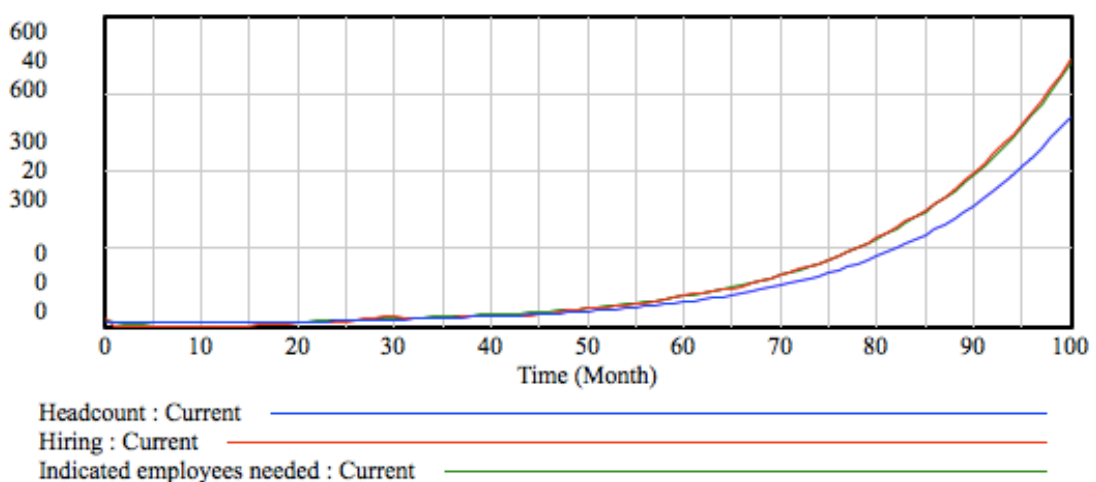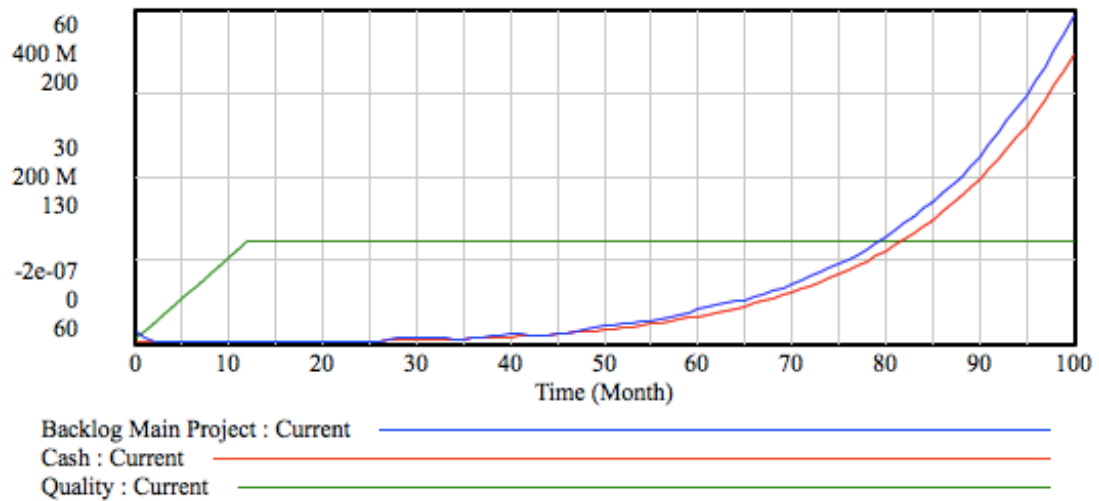
Figure 9.1.9 New values from hiring policy

Modeling change: Make a link between demand and hiring need so that the hiring need reflects both demand and backlog. This is modeled under the assumption of a constantly increasing demand. If the demand were to decline, they would end up with free capacity in the first months since the hiring need covers both demand and backlog. If the demand stops, their capacity will eventually be larger than the backlog.

As we can see from the figure above, the policy change made significant improvements. There are no longer any oscillations and the cash level is 20 times larger after 100 months than initially. Quality has increased to the maximum level after about a year and stays maximized throughout the time of period. The organization is now experiencing a steady but exponential growth.

b) Investing in human resource development
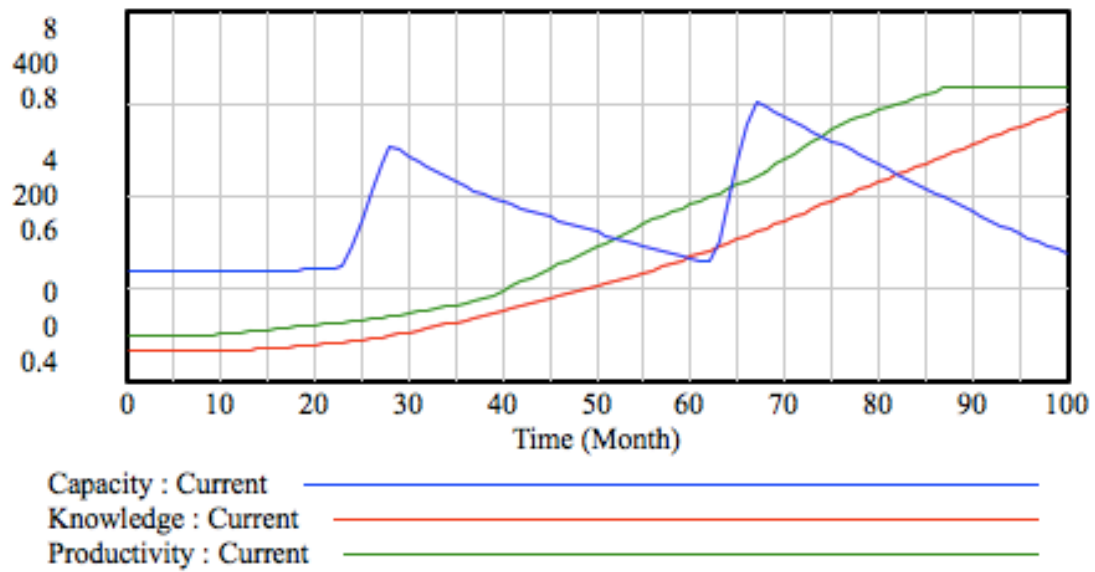
Figure 9.1.10 Initial value for capacity, knowledge, and productivity
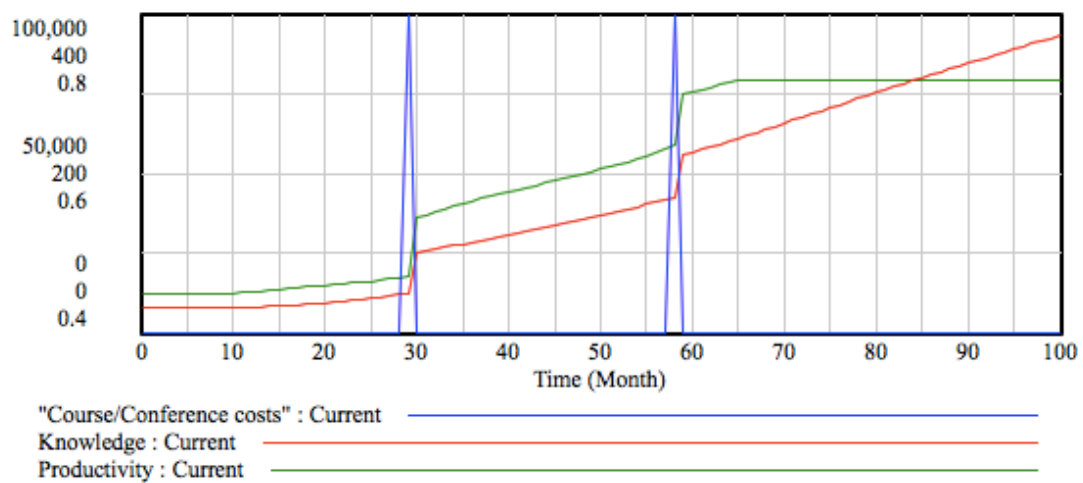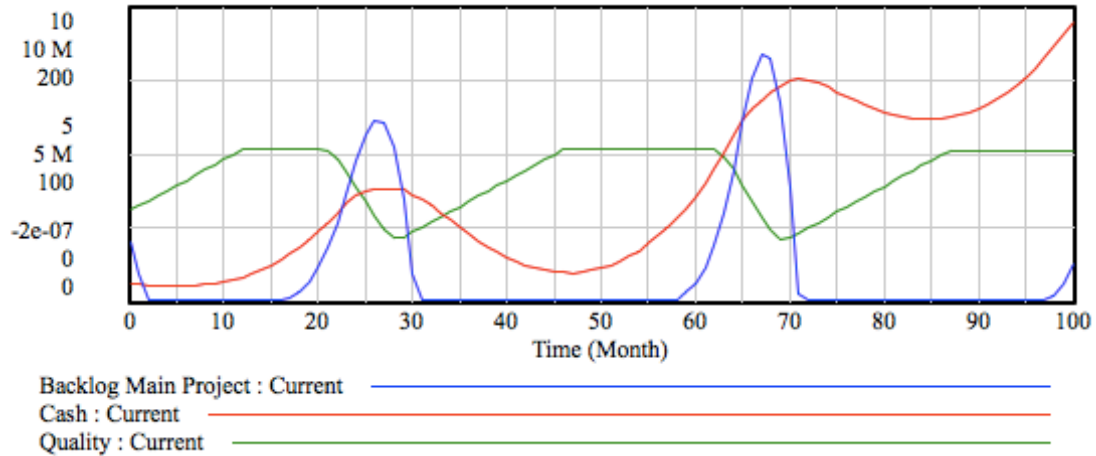
Figure 9.1.11 Investing in human resource development

Modeling change: 0+STEP(100000,29)+STEP(-100000,30)+STEP(100000,58) +STEP(-100000,59)

By Investing in human resource development, they are able to improve their performance by obtaining maximum productivity almost 20 years earlier as well as they improve their cash balance. However, the problem of oscillations still exists, in fact it is even more chaotic then before. Additionally the capacity is lower in the final month due to increased oscillations in headcount.

Both alternatives are related to their employees with a primary goal to improve their capacity in order to improve adaptability. Both alternatives does in fact improve their capacity, though investments in human resources does not reduce the oscillations and only increases the cash balance slightly. Changing their hiring policy is much more efficient as it leaves no oscillations and increases the cash balance significantly. However the hiring policy implies a more rapid growth than desired as their headcount is above 400 employees.

9.1.4 Dropping the Drop-In orders

Drop-In projects are assumed to created distractions for the employees working with the main projects, as decisions also needs to be made regarding the Drop-Ins. It is assumed that the productivity can be increased by 10% if they quit drop in projects. However, it is also assumed that this might have a negative effect on the demand as customers often expect a complete package.

84

Modeling: Productivity momentarily up 10% and reducing the perceived quality by 4%.
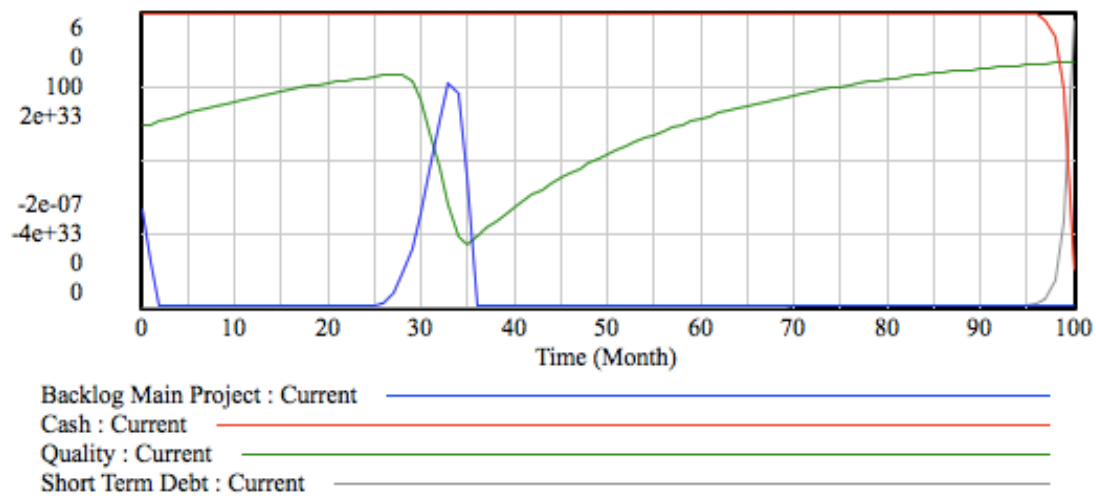
Figure 9.1.12 Dropping the Drop-In

The above figure can be a bit misleading as the borrowing amounts in great values, making it look like they do not leveraged until month 97. They are loosing some money in the start, due to lost income from DI, but are able to work the cash balance back up through increased demand from main projects. At this time they are doing ok, but then they start to build up their borrowings in month 46. As the backlog increases, the quality drops and they are quickly loosing clients and running out of money. In fact they are loosing all of their clients and their reputation becomes too poor to build back up without any marketing effort, as word of mouth is insufficient with no clients. Finally, the debt becomes so big that expenses go through the roof (mostly repaying the debt) and the organization will go out of business. Quitting Drop-Ins can have substantial consequences and should not be dropped without any additional strategy for dealing with these emerging consequences.

9.2 Reviewing the alternatives

To evaluate the different alternatives, I have gathered key information from each single strategy performance. These are assembled in the table below.

Review of single strategies								
Alternative	Projected cashflow	Earnings per delivery	Cash	Debt	Fluctuation	Demand	Capacity	Quality
Initial	48 479	17654	8 340 020	0	9	2,67	2,74	95
Price 1	-13 538	-2418	795 441	34900	10	6,03	5,6	59
Price 2	33 356	12400	12 626 400	0	8	2,68	2,69	100
Price 3	-3 828	-133379	6 863 260	0	9	0,02	0,73	101
Marketing1	49 780	16268	8 730 0030	0	8,5	4,58	3,06	93
Marketing2	-3 133	-717	13 799 500	0	8	3,75	8,046	101
Hiring policy	1 661 050	6708	346 423 000	0	0	251	247	103
HR development	48 479	17693	9 515 860	0	8,5	4,17	2,74	95
Dropping the DI	0	0	-∞	+∞	10	0	0	83

Table 9.2-1 Reviewing the alternatives

The table above shows the future performance from each alternative strategy after 100 months. Marked in red, we find the future performance with the initial values. Reducing the price ("price 1") is not improving the performance in long term, and will therefore not be discussed any further. Increasing the price too much (price 3) can also have critical consequences as a combination with poor quality can diminish their client base. However, some increase can improve the overall performance, especially if the quality and capacity is under control. If the quality drops below 63 points, the marginal decrease of clients is greater than initially. Investments in both marketing and human resource development, is increasing the cash balance but does not have a great affect on the oscillations. Changing the hiring policy is by far the most efficient strategy among the above alternatives. Profitability is more than thirty times greater and there are no fluctuations. The performance of the hiring policy strategy is growing exponentially. However, the growth is initially draining the cash level and it takes 18 months for them to reach a million in cash. The resulting growth of employees from the hiring strategy is also considerably higher than wanted and the margin is lower than initially. The strategy with the best cash flow per delivery is the investments in conferences or courses. This is increasing the productivity and thereby reducing the costs. The strategies have different

advantages and disadvantages, combining some of them might help in overcoming some of the disadvantages related to each strategy.

9.3 **Testing multiple strategies**

In this chapter the combination of the different strategies from chapter 9.2 will be tested and analyzed. Since changing the hiring policy is giving superior results. However, the profitability per job is too low and number of employees too high according to their future goals (they do not want to become too big, but stay relatively small and unique). Strategies will therefore be tested in combination with the hiring policy strategy to align the outcome to the strategy. In addition the growth will be sought at an earlier stage by investing in human resource development and marketing. The results will be compared to each other, the initial value, and the best single strategy, namely the new hiring policy.

9.3.1 **Hiring and Human resource development**

Developing their abilities through courses and conferences is assumed to increase number deliverances and improve the perceived quality of products. In chapter 9.2 we learned that the investment in human resource development would make the organization somewhat more profitable than initially, but also increase oscillations a little. Since hiring reduces the oscillations, I will take a look at the combination of the new hiring policy and investments in human resources development.

Hiring policy: like in chapter 9.1.4 "hiring policy"

Courses/conferences:0+STEP(100000,12)+STEP(-100000,13)+STEP(300000, 24)+STEP(-300000,25)+STEP(1e+06,36)+STEP(-1e+06,37)+STEP(5e+06,49) +STEP(-5e+06,50)+STEP(1e+07,61)+STEP(-1e+07,62)+STEP(1e+07,73)+STEP(-1e+07,74)+STEP(1e+07,87)+STEP(-1e+07,88)
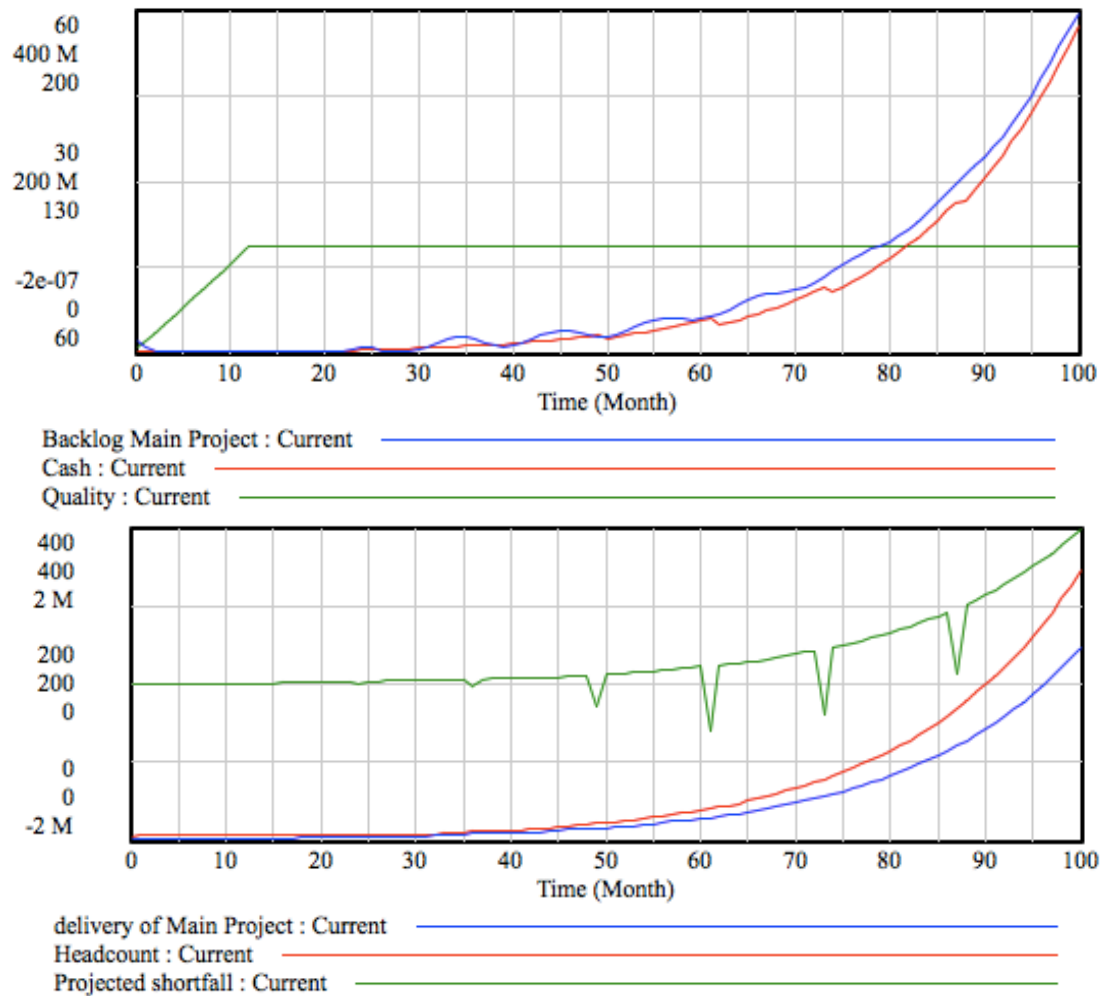
Figure 9.3.1 Human resource development

As expected, some oscillations in the backlog remain though with a decreasing tendency. The increased knowledge leads to increased capacity and thereby reduces the hiring need a little. Thus, also slowing down the hiring process a little while gaining clients is in exponential growth. This is why the system is experiencing some minor oscillations. However, the total cash level has increased compared to implementing just the hiring policy strategy. The earnings per project (see Table 9.4) have also increased and the headcount is reduced by 60 employees. Development of their human resources is important for both employee satisfaction and productivity as it can enable learning within specific fields.

9.3.2 Hiring with marketing investments

By investing in Marketing, I am hoping to reduce the initial decline of cash and expedite the exponential growth. With the hiring policy applied, they are experiencing free capacity the first 17 months. By investing in marketing, I am hoping to increase the demand and therefore also their utilization.

Hiring: like in chapter 9.1.4 "hiring policy"

Marketing: 0+STEP(100000,1)+STEP(-100000,2)+STEP(150000,3)+STEP(-150000,4)
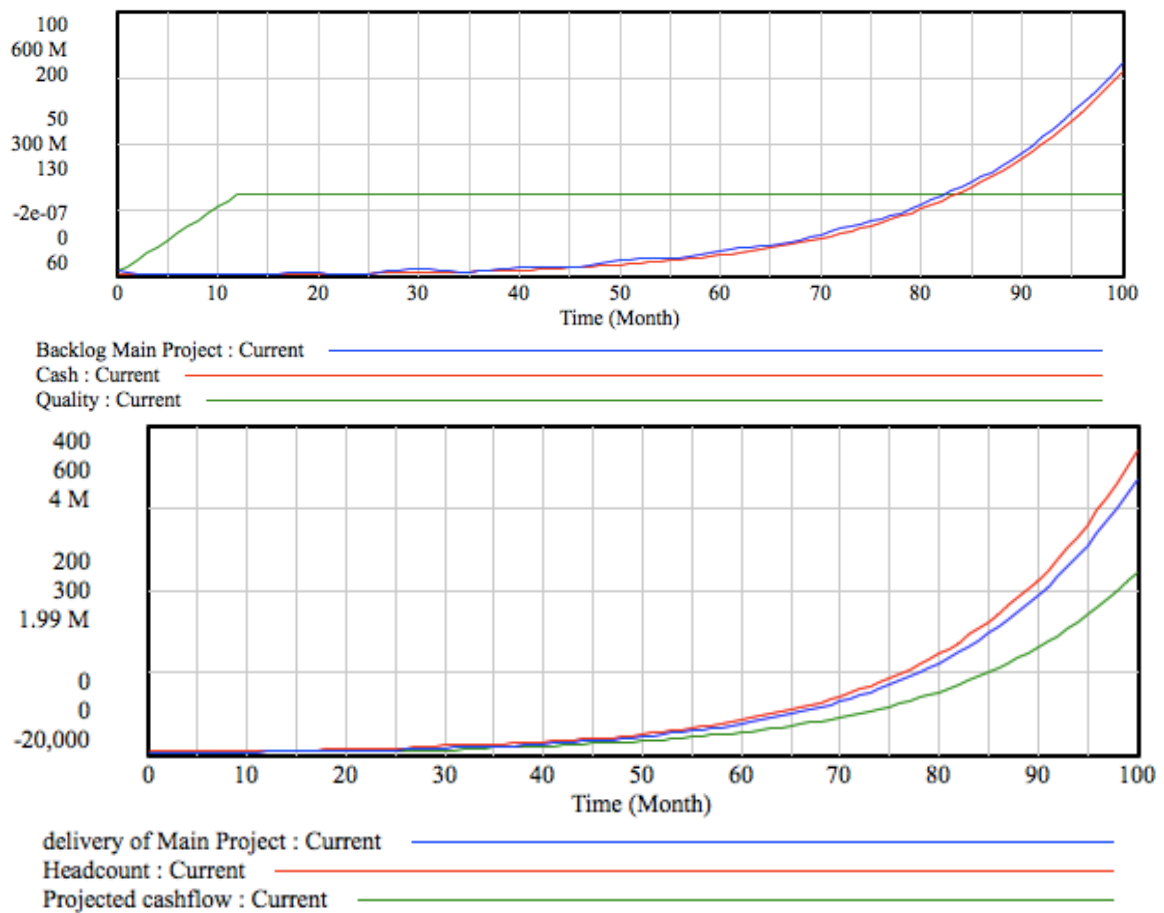
Figure 9.3.2 Hiring policy and marketing

This strategy leads to a cash reserve reaching more than 464 million Nok. The time to reach a cash reserve of 1 million kroner is also reduced by 4 months, to 13 months. The capacity is in full use from month number 13 (see appendix 4). Profit per project is 6 615 Nok which is lower than initially and by just changing

their hiring policy. Investing in marketing will therefore increase profit as it will increase their customer base, but since their expenses are increased, profit per project will decrease.

9.3.3 Hiring policy, marketing and human resource development

Since the previous strategy of combining the marketing and new hiring policy did expedite the growth, I will now test it in combination with human resource development as this also had an positive effect on the strategic performance by increasing profits per project and reducing the headcount.

Hiring policy: like in chapter 9.1.4 "hiring policy"

Marketing: 0+STEP(100000,1)+STEP(-100000,2)+STEP(150000,3)+STEP(-150000,4)

Conferences/courses:0+STEP(100000,12)+STEP(-100000,13)
+STEP(300000,24)+STEP(-300000,25)+STEP(1e+06,36)+STEP(-1e+06,37)+STEP(5e+06,49)+STEP(-5e+06,50)+STEP(1e+07,61)
+STEP(-1e+07,62)
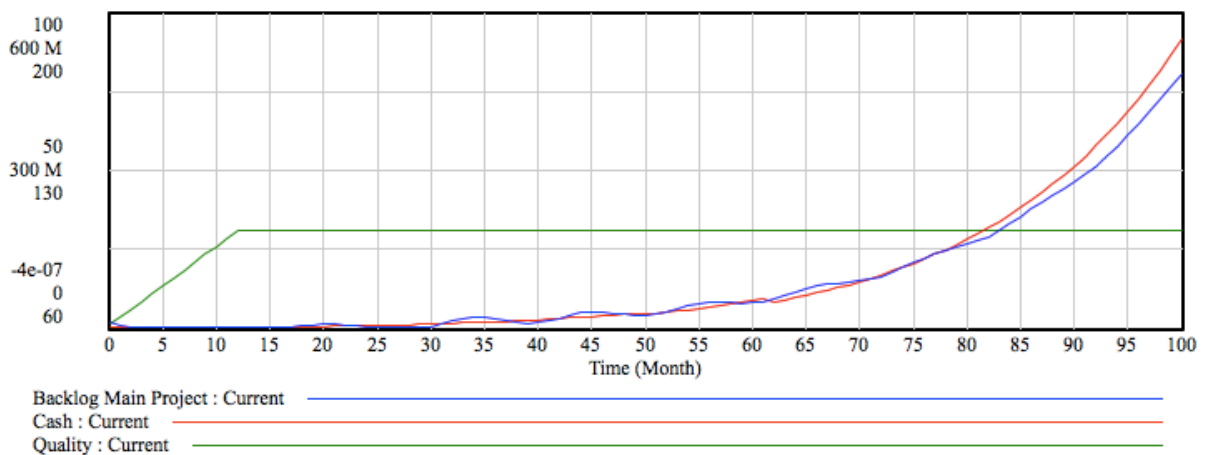
Figure 9.3.3 Hiring, marketing, and HR development

As the above figure shows the investments in human capital is increasing cash flow and therefore also the cash reserves by almost 100 million Nok. Earnings per project is considerable better than by just changing the hiring policy, but it is not better than initially. The utilization in the first years is not improved. This is because the employees are gaining more knowledge and are increasing their

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productivity, this means that the total capacity is increased and the utilization is therefore not improved. All in all the results from adding human resource development is beneficial and recommended.

9.3.4 Hiring, marketing, human resource development, and price

From chapter 9.1.1 I learned that an increase in price could be profitable as long as it is not too significant or as long as the quality is in control. Since the goal is earn more per project and not to attain the largest cash reserve, as this would also mean a considerable increase of the organizational size, the price will be tested in combination with the strategies from chapter 9.3.3. The Price will be increased in two steps, first by 200 Nok after 24 months, and then by additionally 250 Nok after to 36 months, to a price level of 1500 Nok/hour. This is to slow down the growth and increase profits per project. Since the number of employee will be reduced, I will also adjust the investments in human resource development accordingly.

Hiring   policy: like   in   chapter   9.1.4   "hiring   policy"
Marketing: 0+STEP(100000,1)+STEP(-100000,2)+STEP(150000,3)+STEP(-150000,4)
Human resource development: 0+STEP(100000,12)+STEP(-100000,13)+STEP (200000,24)+STEP(-200000,25)+STEP(500000,36)+STEP(-500000,37)
+STEP(900000,49)+STEP(-900000,50)+STEP(1.5e+06,61)+STEP(-1.5e+06,62)
Price: 1050+STEP(200,24)+STEP(250,36)
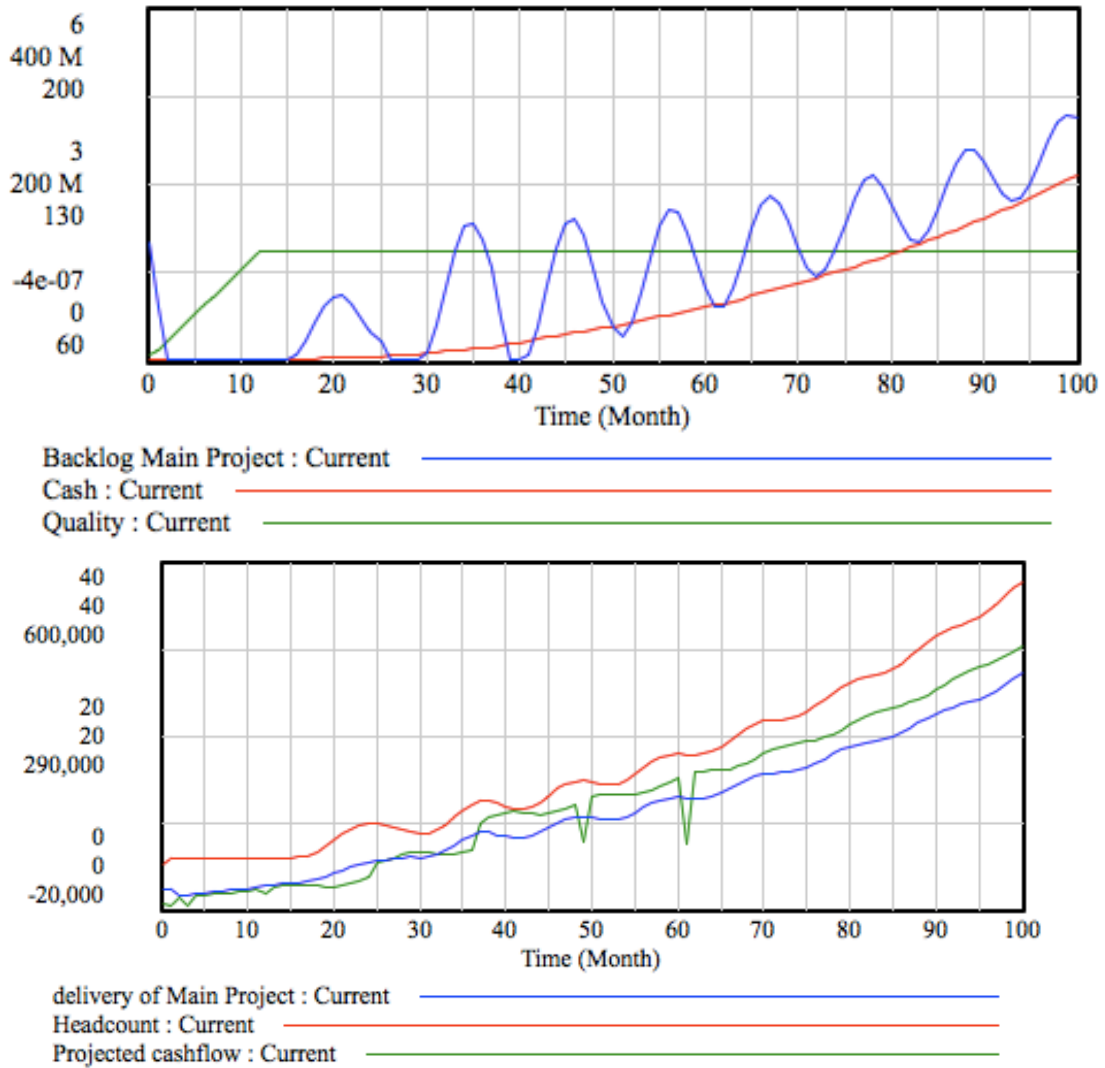
Figure 9.3.4 Hiring, marketing, HR development, and price

The backlog has started to oscillate a little. However, the oscillations are not large enough to make an impact on the quality and the rest of the system therefore stays steady. Their goal of 10-12 employees is exceeded, but is considerably better than by implementing just the hiring strategy. The oscillations are not affecting the quality and it is of no great importance. As we can see, total profit and cash reserve is reduced compared to the previous alternative. Still, a lot larger than the initial values of just above 8 millions. Earnings per project however is greater than the previous alternatives and amounts to 16 629 Nok, only 1 026 Nok less than initially where no investments in human resources or marketing have been applied. The growth is also initiated at an earlier stage.

9.4 Reviewing the multiple strategies

Review of alternatives						
Alternative	Projected cashflow	Earnings per delivery	Cash	Demand	Capacity	Headcount	Quality
Initial	48 479	17 654,00	8 340 020	3	3	4	95
Hiring	1 661 050	6 708,00	346 423 000	251	247	405	103
H+conf	1 987 740,00	8 015,08	380 864 000	251	248	345	103
H+mark	2 216 240,00	6 615,64	464 981 000,00	340	335	555	103
H+mark+HR	1 083 240,00	11 933,90	315 118 000,00	91	91	126	103
H+mark+HR+P	1 083 240,00	40 120,00	210 401 000,00	27	27	39	103

Table 9.4-1 Reviewing multiple strategies

By investing in conferences, they are increasing their earnings per project due to increased productivity. Investments in marketing, enables them to increase their cash balance faster ending up at a higher end balance. However, profit per project is reduced due to increased costs and their headcount is too high. By adding human resources development, they increase their productivity and thereby reduce costs and headcount. However, the headcount is still too big and exceeded the desired future state by more than 100 employees. To reduce the headcount and increase profitability per project additionally, I increased the price. This increased profit per project and reduces the demand and therefore also the indicated hiring need. Instead of having almost between 5-600 employees after 100 months, they now only have 40. The alternative presented in chapter 9.3.5 will therefore be the basis for the development of the dynamic scorecards.

9.5 Dynamic scorecards

The dynamic model has increased our understanding of the underlying structure as well as the outcome from these structures. In addition, the strategy test runs indicates how these outcomes can be handled to manage the organization towards their overall goals. In this sub chapter I will use the information from the previous chapters to develop dynamic scorecards. The dynamic scorecards represents the key information necessary to manage the organization gathered from the more complex (but still simplified) system dynamic model. Much like a data base software, the scorecards are serving as a user interface for the more

complex underlying system dynamic model. This makes the system easier to comprehend and manage.

I have used a system dynamic model instead of the strategy map with unidirectional relations presented in chapter 3. The figure below is based on the initial BSC presented by Kaplan and Norton in 1992. Being a small business they have some advantages related to transparency and flexibility. The total number of objectives and targets has therefore been reduced to a minimum.

Figure 9.5.1 Strategy map

The above model shows the organizational strategy broken down into the four perspectives of the BSC. In the following I will go through each of the respective objectives and make scorecards showing key success loops, key process indicators in these loops, targets, initiatives that needs to be started, the date, and who that needs to participate. These scorecards are meant to help the planning and implementation of their strategy. The data and targets will be based on the findings in the previous chapters.

9.5.1 The financial scorecard

Financial perspective	**Increase Profit**				**Date:** April- May 2013		
Description							
Increase profit supports their strategy by enabling resources for growth and keeping the shareholders happy. In addition it reduces the risk employed as a buffer can be built up.							
Critical Success Loop	**KPI`s**	**Frequens**	**Goal**	**initiative**		**Date**	**who**
▪ Hiring Feedback Loop ▪ Knowledge Feedback Loop ▪ Gaining clients feedback loop	Nok per employee	Yearly	1,3 mill	Routines and standardisations to enable tracking of the goal achievements and access necessary information		May-june	management
	Increase # of reputable projects	Every 6 months	6				
	Increase returns	Yearly	20 %	Change the contribution to include direct fixed costs.		May-june	Winje
	Liquidity ratio 3	Quarterly	>33%				

Figure 9.5.2 Financial scorecard

As we can see from the above scorecard all of the critical success loops are affecting the profit. The key process indicators (KPI) are derived from the critical success loops. Sales in Nok per employee is for instance connected to the hiring feedback loop, and meant to make sure that profit per employee (representing their main cost) is satisfactory. Increased return is connected to the knowledge loop through, the outcome can be as a result of more knowledge leading to more efficient utilization and thereby relatively reduced costs. A financial target for the gaining clients feedback loop is sales from reputable projects.

9.5.2 The customer perspective

Customer perspectiv	**Attract and attain more reputable customers**				**Date:** April- May 2013		
Description							
Attracting and attaining more reputable clients will make them more visible in the digital advertising world as well as give them more challenging projects and thereby increase their experience and knowledge. It can also be linked to the financial objective as large organizations normally have larger budgeted and are more profitable.							
Critical Success Loop	**KPI`s**	**Frequence**	**Goal**	**Initiative**		**Date**	**Who**
▪ Gaining customer loop	# Of reputable customers	Yearly	30	Time for marketing effort needs to be delegated to Hæreid.		May-december 2013	Hæreid
	% Repeat customers	Every 6 months	6				
	# Of gained customers from marketing effort	Yearly	4				

Figure 9.5.3 Customer perspective

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If the hiring policy is changed in accordance with chapter 9.1.3 then increased number of reputable clients will increase both profit and the knowledge learned which in turn would increase productivity. The Key process indicators are therefore focused on the percent repeat customer and the number of reputable customers, representing the natural growth, and the marketing effort that was advised in chapter 9.4. "# Of gained customers from marketing effort" represents the marketing investments suggested, and the " % Repeat customers" represents the word of mouth and quality driver.

9.5.3 Internal processes perspective

Internal process perspectiv	Increase productivity					Date: April- May 2013	
Description							
At the moment the organization is experiencing some inefficient routines. By improving these the organization assumes to enable increased productivity.							
Critical Success Loop	**KPI`s**		**Frequency**	**Goal**	**Initiative**	**Date**	**Who**
• Knowledge loop	Total profit per employee		Yearly	1,4 m	Morning meetings every day where the agenda for the day is discussed	09:00 every day	Everyone
	# of reputable projects per employee		Quarterly	1			
	Tracked and billable hours per employee		weekly	130	Routines for tracking all hours needs to be implemented	May – August 2013	Hæreid and Haldorsen

Figure 9.5.4 Internal process perspective productivity

By increasing their productivity, they are able to reduce costs and thereby increase profits. The key loop related to productivity is knowledge. Total profit per employee is meant to indicate productivity in terms of monetary values, whereas the number of reputable projects per employee is meant to indicating the project productivity, and the number of tracked hours is meant to indicating productivity in terms of time.

Internal process perspective	Improve quality					Date: April- May 2013	
Description							
The organization assumes that the perceived quality is improved as the lead time is reduced. Firstly, they assume that faster delivery implies more value for money and therefore improved perceived quality. Secondly having a capacity that fits the backlog and demand is assumed to improve quality.							
Critical Success Loop	**KPI`s**	**Frequency**	**Goal**	**Initiative**		**Date**	**Who**
• Knowledge loop • Hiring loop	Avg. project completion	Quarterly	= 90 %	Track, estimate and plan incoming orders to make the planning of capacity easier.		May-December 2013	Hæreid
	Quality level	Every year	> 85				
				Hiring plan and conduction of hiring processes		September 2013	Hæreid and Søgaard

Figure 9.5.5 Internal process perspective quality

By improving the quality they improve competitiveness and supports the natural growth of clients discussed above. Both the knowledge and hiring loop is related to quality as the headcount and productivity (increased through learning) determines the delivery of projects. The key process indicators are average project completion and the actual quality level. Average project completion is meant to ensure that the backlog does not increase into uncontrollable amounts. The quality shows how good their products are in terms of customers expectations, and therefore what gap that needs to be closed.

9.5.4 Learning and growth perspective

Learning and growth Perspective	Increase organizational Knowledge					Date: April- May 2013	
Description							
Their employees are their larges resource and the development of them are therefore very important. The goal is to align the employees and create goal congruency amongst them. To enable this, the organization needs to acquire new knowledge within management. However, the industry of digital advertising is in constant change and they might have to develop their skills within design and programming as well.							
Critical Success Loop	**KPI`s**	**Frequency**	**Goal**	**Initiative**		**Date**	**Who**
• Knowledge loop	Strategic meetings	Every 6 months	Monthly	Map delegate and document of all standard routines		April – August	Haldorsen
	Attendance at conferences	Yearly	1 per year				
	Duplication of work	Quarterly	0				
	Goals achieved	Every year	100%				

Figure 9.5.6 Learning and growth perspective

According to the recommended strategy from the previous chapter, specific investments within knowledge management should be conducted. This is due to the productivity results in the internal process perspective. By conducting more strategic meetings they can enable alignment of goals and a better knowledge foundation for their operative strategic decisions. By structuring their standardized work tasks and delegating clear responsibilities they can reduce duplicated work. In addition attendance at conferences is assumed to increase knowledge and therefore also increase profitability (through productivity). The duplication of work and percentages of goals that have been achieved indicates if they have actually increased their knowledge base.

9.5.5 Summary

The previous sub chapters indicated a strategic path for optimizing the organizational performance in line with their strategy. The suggested strategy and the underlying structure of the organization have been used as the foundation to develop a set of scorecards that can be helpful in managing the business. The scorecards concretize the focus by setting key process indicators with related targets. It also guides the implementation process by planning the necessary initiatives. The dynamic scorecards are based on the BSC, which reduces the number of variables compared to the dynamic model. It also balances the measures between financial and non-financial measures and between the different perspectives and key success loops. Its balancing focus, simple, and intuitive design makes it a great interface for managers.

10 Conclusion, limitations, and implications

In this chapter I will reflect on the study`s findings. Until now I have focused on the development of the model and the outcome. In this section I will take a closer look at the advantages, shortcomings, possibilities, and impossibilities that can be further investigated in later studies.

10.1 Overcoming BSC limitations

Previously I mentioned that system dynamics can help overcome some of the limitations of the BSC. In this sub chapter I will show the extent to which the use of a system dynamics model can reduce some of the limitations mentioned in chapter 3.5.

Parts of the critique from chapter 3.5 are related to the unidirectional causality of the BSC strategy map, as they are rarely unidirectional (Nørreklit, 2000 and Akkermans, 2002). In chapter 7.5, I presented the key success loops, showing the dynamics of the variables necessary to improve performance. Feedback loops shows how information returns and affects a given variable, and therefore proving the existence of multi-directional causal relationships. Three key feedback loops were determined, these explains the underlying reason for organizational performance. The links between variables have been carefully examined and reviewed, strengthening the causal validity that has been questioned and criticized by several system thinkers (Warren and Langely 1999, Nørreklit 2000, Hudson et al. 2001).

The identification of critical success loops (feedback loops) also indicates and validates the choice of key process indicators. Through the feedback loops, interactions between the key variables can be determined. Whether variables counteract or not is therefore also specified. For instance would investments in marketing (from chapter 9.1.2) counteract with an increasing backlog (relative to the capacity), as this would increase the backlog additional and therefore reduce the quality. At such a time, investments should be focused on hiring. However, Marketing operates well with the hiring policy (see chapter 9.3.2).

The use of system dynamic modeling, has enabled the separation of cause and effect over time, the BSC does not consider any time lags. The hiring process is an explicit example (See figure 8.4.2), the time lag is causing the capacity to adjust to the demand with a delay (represented as hiring need in chapter 8.4), this will increase the backlog when the demand increases and create production complications. System dynamics separates the cause and effect over time and gives management a more dynamic and correct overlook of the organizational performance. In addition, the graphical representation lets people look at large quantities of data quickly.

System dynamics can also be used to challenge the system boundaries through extreme scenario testing. Applying maximum and minimum values within key success loops, gives a better understanding of the system limits. In chapter 9.1.1, I tested the price boundaries and found values that made the system with initial values collapse. Another advantage with system dynamics is that both strategic and operational measures can be tested, strengthening the link between strategy and operations. Increased quality is for instance one of the key strategic objectives, but to increase the quality operational measures such as capacity (relative to the monthly production need) or number of employees per job are necessary.

10.2 Learning

Today`s market is under constant change with fluctuations and modernization. Managers need to adjust and implement change to stay on top. Implementing change can affect institutions, practices, and beliefs. Decision-making becomes harder as technology, population, and economic activity evolves and the complexity increases. System dynamic is an approach to understand such complex behavior.

Most decision makers base their decision on a mental model. In an organizational context, a mental model is a conceptual model created by management, explaining how the business operates (Sterman 1994). The mental model is based upon the managers' perception of the real world that is gained through interpretation of the received information feedback. Forrester (1961)

stresses that all decisions are based on models, usually mental models. The figure 10.2.1 is denoted "double–loop learning" by Argyris (1985). Information feedback alters decisions as well as mental models. The same information then alters the structure of the system, as mental models change rules for making decision may also change.

If information would float through the "double-loop learning feedback" model immediately, learning would be effortless. According to Sterman (2000) this is seldom the case as feedbacks do not operate well. There are several barriers to learning slowing down the process. In the below model, Sterman illustrates some of these barriers to learning and how a virtual world can help overcome these barriers.
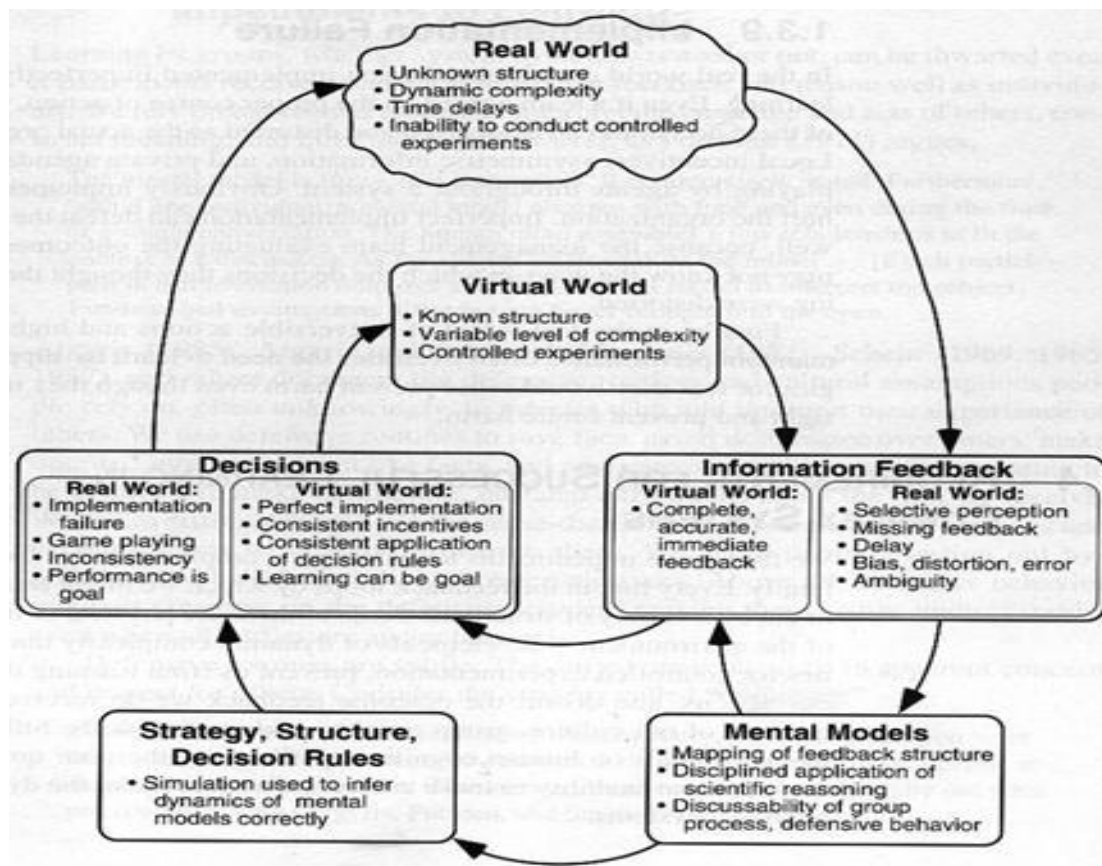

Figure 10.2.1 Learning by Sterman (2000)

The figure above shows how learning can fail through the links of learning feedback from the real world. In these failures, Sterman has included dynamic complexity, imperfect information, confounding and ambiguous variables, poor

scientific reasoning skills, defensive routines, and other barriers to effective group processes, implementation failure, and the misperceptions of feedback that hinder out ability to understand the structure and dynamics of complex systems. Every feedback loop can be weakened or cut by a variety of structures. Sterman stresses that some structures are consequences of our culture, group process, and inquiry skills. Thus restraints from human cognition, the quality of our mental maps, and the inability to make a rightful perception of the dynamic complexity, are fundamental bounds.

To ease the many problems of organizational systems and its interaction with the real world, Sterman has two main recommendations:

1. *Improved mental model work:* By mapping the feedback structures through group discussions based on disciplined application of scientific reasoning.
2. *Creating a "Virtual World":* A virtual world is a formal model in which decision makers can review decisions, conduct experiments, and play. When the structure and complexity is known, feedback is accurate and immediate, and the application is close to perfect, learning can be accelerated through the use of a "virtual world".

The mental models are temporal and spatial bounded due to perceptional limitations. They are not allowing feedback, time delays, accumulations, or nonlinearities. The application of system dynamic allows the modeling of a virtual world and can therefore improve the learning outcome and thereby the effectiveness of the decision-making.

10.3 Simplification

The presented process of the development of the dynamic BSC is focusing on making the mental maps of the employees of the organization explicit as well as aligning and challenging them. The data is partly based on the mental models of the organizations employees and will not be able to represent the real world.

Both the BSC and system dynamics is based on a simplification of a situation in order to improve conceptualization and visualization. Even though the use of

system dynamics is meant to improve the selection of variables through a dynamic perspective, it does not ensure that no critical variables are left out. As the system dynamic model is based on the human cognition of the system, flaws are likely to appear.

Some of the measures may therefore be in concise, however the goal is to indicate the effect and not the real world outcome. Mapping the real world would be time consuming and most likely impossible as all factors cannot be tracked. The applied approaches are meant to support the strategic decision-making processes.

10.4 Focusing on shareholders

The goals have primarily been focused on the shareholder values. Ads.com is a small organization and the respective employees can be included to broaden the focus. For larger organizations, mid-level managers can be included to broaden the focus. However, this leaves us with another shortcoming of the model, namely the overly internal focus. This can be overcome by involving suppliers and customers in the development of the dynamic BSC. According to Vennix (1996) and Akkerman (2001), system dynamics have a good record of building such group models.

10.5 Other methodological approaches

Like discussed system dynamics can help overcome BSC limitations, but it is not the only alternative. I believe that any approach similar to the BSC frameworks but also including effective group communication, visualization techniques for causal linkages and opportunities for quantification and consistency-checking, will imply a considerable improvement of todays strategic performance management theory.

10.6 Possible further research

The purpose of this study is to expand the balanced scorecard to include system dynamics, and thereby enabling sufficient information and efficient management in accordance with the case organization`s strategic path. However, the validity of a single case study is limited. To improve the assessment basis, further

research on similar organizations can be conducted. Insight into the organizations performance in the following years after implementation could also be very useful in determining the value and relevance of the dynamic model. Lastly, a comparison of the applied approach in this research paper could be compared to other emerging dynamic models.

10.7 **Final conclusion**

The balanced scorecard concept is widely used and considered as important in the management field, both theoretically and practically. The study was set out to develop a dynamic BSC that would improve the performance for the case organization operating in the digital advertising industry. The theoretical context, advantages, and limitations of the BSC were therefore reviewed. To overcome the limitations of the BSC, the study has sought to expand the model.

The BSC`s wide appeal is obvious: it facilitates the identification of a few operational factors that drive future success, align their strategic objectives and actions, and can therefore create a long-term competitive advantage. However, I found several limitations from a broad selection of researchers (Nørreklit 2000, Warren and Langely 1999, Neely et al. 1995, Hudson et al. 2001) questioning the dynamics of the model and therefore also its claimed benefits. These researchers have questioned such as the validity of the key drivers and their causality as well as the lack of time perspective. On this background I found that the assumed dynamics of the BSC is not sufficient and that the model needs to be expanded to supply the management with the necessary information to handle the complexity of today`s market and thereby improve performance.

System dynamic methodologies did in fact help in overcoming the dynamic limitations of the BSC`s theoretical foundation and practice. It deepened the understanding of the key drivers for success by focusing on the relations between key variables and determining key success loops instead of key success factors like done in the standard BSC. The test runs implemented supplied us with knowledge of how the variables interact and the effects of time lags on system performance.

The development of a dynamic scorecard on the basis of system dynamics and BSC theory proved to be very beneficial. The dynamic model found underlying drivers for performance, defined as key success loops. These loops turned out to be very useful when determining the strategies to simulate, understanding the outcome of the scenario testing, and when developming of the scorecards. The virtual world enables the simulation of different scenarios, testing the system boundaries, and identifying a strategic path for goal optimization. For Ads.com, the initial oscillations are substantially reduced and they are now able to achieve their goals significantly faster. The simulations, by the use of system dynamics, allow faster organizational learning and therefore also improved performance. By addressing the findings into scorecards from the BSC methodology, the implementation of the strategic path is ensured. The scorecard represents the key success loops, key targets, initiatives, delegated responsibility, and a timeframe for implementation/achievement. These scorecards supply the management with a simple representation of a complex system, providing a great instrument for strategic support.

The model has limitations, especially in regards to the assumptions made and the time spent on gathering information for such a complex system. It is also possible that other combinations of methodologies can be even more beneficial. However, the combination of the two management tools deepens the understanding of the underlying structure and the interrelations and allows more efficient organizational learning. The test runs have indicated significantly improved future outcome and helped determining possible implications and limitations for growth. I have therefore found that the expanded BSC model, includes all feedbacks and that by implementing a multi directional cause and effect relation, any prioritizing of variables are avoided. All in all, improving the organizational performance by supporting the strategic management.

Still, further research should be conducted on similar organizations, on the resulting models effect over time, and on the combination of different methodologies for managing organizational performance.

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Appendices

Appendix 1: Interview guide

1. Hva er bedriftens forretningside?
2. Hva er bedriftens strategi og hvordan oppfatter du den?
3. Hvilke aktiviteter skal strategien støttes opp under? Hvilke områder må fokuseres på?
4. Hva ser du på som bedriftens muligheter og trusler?
5. Hvordan blir bedriftens fremtid dersom dere oppfyller visjonen?
6. Hvem er installasjonsavdelingens kunder, og hvilke markedssegment opererer dere i ?
7. Hva er bedriftens rolle i den digitale reklamebransjen?
8. Hva er deres konkurransefortrinne, hvordan skal dere beholde diss og hvordan skal dere skape nye konkurransefortrinn?
9. Hva er deres overordnede finansielle mål?
10. Bruker dere noen finansielle mål i dag, og hva er deres mål for fremtiden?
11. Hvilke finansielle informasjon mener du er nødvendig for å styre virksomheten?
12. Hva er de kritiske suksessfaktorene for å oppnå de finansielle målene?

13. Hvordan tror du at bedriften må oppfattes av kunden, for å være lønnsom ?
14. Hvilken informasjon er nødvendig for å tilfredsstille deres kunder?
15. Hva er deres overordnede strategiske mål ovenfor kundene?

16. Hvilke interne aktiviteter er viktigs for å oppfylle målene? Både i det finansielle perspektiver og i kunde perspektivet?
17. Hvilke interne prosesser finnes i avdelingen? (Heidi).
18. Hvilke interne prosesser skaper verdi for kunden?
19. Har dere noen oppfølging av disse prosessene, måles de? Hva er i så fall målet?
20. Hva er de viktigste faktorene som må være til stede internt for at man skal lykkes?
21. Hvilke informasjon er nødvendig for å følge opp de interne prosessene?

22. Hvilke utvikling og fornyelse kreves for å være lønnsom?
23. Hvilke kunnskap er nødvendig for å tilfredsstille kundenes behov?
24. Hvordan skal man ta vare på denne kunnskapen?
25. Hva er organisasjonens kjernekompetanse? Blir det målt noe for de ansattes kjernekompetanse?

Appendix 2: Vensim equations

(01)   Attractiveness of FEED to Competitors= Price lookup(Relative price)

(02)   Average length of stay=36

(03)   Average salary= 2.63201e+06/5.2/12

(04)   avg   Main   completion   time=   200
       approximat number, gathered from Harvest

(05)   "Avg. Cost of using externals"= 800

(06)   "Avg. DI completion time"= 30

(07)   "Avg. interest rate"=   6.5

(08)   "Avg.   office   costs"=   348655/12/5.2
       Todays   costs   (after   rental   incomes   is   subtracted)   divided   by   the
       number of employees in whole numbers (5.2 becomes six as they need one extra office
       spot).

(09)   "Avg. project completion"= delivery of Main Project/(demand for Main Project+Backlog
       Main Project)

(10)   "Backlog Drop-In"= INTEG ("demand for Drop-In projects"-"delivery of Drop-In",1.5)

(11)   Backlog Main Project= INTEG (demand for Main Project-delivery of Main Project,2)

(12)   Borrowing= Desired borrowing

(13)   Capacity= Headcount*Productivity

(14)   Cash= INTEG (Earning-Spending+Cash from debt,560000)

(15)   Cash from debt= Borrowing

(16)   Change in clients lookup([(4,-4)-(100,6)],(4.07332,-0.89762),
       (13.85,-0.8),(25.25,-0.49),(32.5866,-0.38381),(42.9735,-0.22),(50.1018,-
       0.151),(57.0265,0.0957),(62.7291,0.285714),(68.2281,0.952381),(71.8941,1.33333),(7
       8.2077,1.61905)(83.9104,1.90476),(90.224,2.09524),(99.389,2.19048))

(17)   Change in perceived quality= "Effect of avg. completion"

(18)   Change   in   productivity   lookup
       =([(0,0)(300,1)],(0,0),(18.3299,0.0428572),(34.2159,0.0761905),(49.4908,0.0904762),(
       67.8208,0.104762),(85.5397,0.138095),(116.09,0.190476),(161.914,0.242857),(200,0.3
       ),(245.01,0.338095),(299.389,0.338095))

(19)   "Chg.   in   quality   lookup"([(-0,-20)-(1,10)],(0,-20),(0.144603,-15.5714),(0.270876,-
       11.8571),(0.395112,-8.85714),(0.5,-
       5),(0.578411,0),(0.645621,1.14286),(0.708758,2.38095),(0.804481,3.2381),(1.00204,3.
       52381))

(20)   Clients= INTEG (Gaining clients-Loosing clients,15)

(21)   Competitor price=1200

(22)   Completed Projects= INTEG (delivery of Main Project,10)

(23)   cost of external labor=Using externals*"Avg. Cost of using externals"

(24) Cost of hiring= 200000

(25) "Course/Conference costs"= 0

(26) "D-I projects demanded per Client per month"= 2/12

Number of DI in 2012 divided by months

(27) Debt service= (Short Term Debt*"Avg. interest rate")+Repaying

(28) "delivery of Drop-In"= Using externals/"Avg. DI completion time"

(29) delivery of Main Project= IF THEN ELSE((Backlog Main Project+demand for Main Project)<Capacity, Backlog Main Project+demand for Main Project, Capacity)

(30) "demand for Drop-In projects"= Clients*"D-I projects demanded per Client per month"

(31) demand for Main Project= Clients*Main project demanded per Client per month

(32) Demand of Main Project hours= demand for Main Project*avg Main completion time

(33) Desired borrowing= IF THEN ELSE(Projected cashflow+Cash<0 , Projected cashflow , 0)

(34) "Drop-In backlog hours"="Backlog Drop-In"*"Avg. DI completion time"

(35) Earning= (Earnings from DI+Earnings from MainProject)/Time to receive cash

(36) Earnings from DI= "Avg. DI completion time"*"demand for Drop-In projects"*Feed Price

(37) Earnings from MainProject= Demand of Main Project hours*Feed Price

(38) Effect of advertising= 50000

Gaining one customer for main project per 50 000 nok spent

(39) "Effect of avg. completion"= "Chg. in quality lookup"("Avg. project completion")

(40) Effect of perceived quality=Change in clients lookup(Quality)

(41) Feed Price= 1050

(42) FINAL TIME = 100 months

(43) Forgetting= Fraction forgetting*Knowledge

(44) Fraction forgetting= 0.05/12

(45) Fraction of other costs= 800000/5e+06

(46) Gaining clients= Attractiveness of FEED to Competitors*((Marketing costs/Effect of advertising)+(IF THEN ELSE(Effect of perceived quality>0, Word of Mouth*Effect of perceived quality*Clients,0)))

(47) Headcount= INTEG (Hiring-Leaving,5.2)

(48) Hiring= Hiring need/Time to hire

(49) Hiring need= IF THEN ELSE(Indicated employees needed>Headcount , Indicated employees needed-Headcount, 0)

(50) Hiring related costs= Cost of hiring*Hiring

(51)   Indicated employees needed=((Backlog Main Project)/Productivity)

(52)   INITIAL TIME = 0 months

The initial time for the simulation.

(53)   Knowledge= INTEG (Learning-Forgetting,30)

(54)   Learning= Learning by doing+"Learning from course/conference"

(55)   Learning by doing= Learning from main projects lookup(Completed Projects)

(56)   "Learning from conference/course"=2000

(57)   "Learning from course/conference"= "Course/Conference c   osts"/"Learning
from conference/course"

(58)   Learning   from   main   projects   lookup([(0,0)-
(1000,10)],(0,0),(16.2933,0.142858),(54.9898,1.38095),(107.943,3.19048),(150.713,4.7
1429),(191.446,5.04762),(232.179,4.95238),(256.619,4.52381),(281.059,3.71429),(307
.536,3.04762),(350.306,2.04762),(400,1.5),(596.741,1.25),(1425.66,0.571428),(10000,0
.0952377))

(59)   Leaving= 0+STEP(Headcount/Average length of stay,24)

(60)   Loosing clients= IF THEN ELSE(Attractiveness of FEED to Competitors<1 ,
(3.5/(Attractiveness of FEED to Competitors))*((Loosing clients from bad
quality)+(Unexplainable loss fraction*Clients)),Loosing clients from bad
quality+(Clients*Unexplainable loss fraction))

(61)   Loosing clients from bad quality= IF THEN ELSE(Effect of perceived quality<0, -Effect of
perceived quality*Clients , 0)

(62)   Main project backlog hours= avg Main completion time*Backlog Main Project

(63)   Main project demanded per Client per month= 1/12

(64)   Marketing costs= 0

(65)   Office rent= Headcount*"Avg. office costs"

(66)   Other costs= Earning*Fraction of other costs

Phone, travel, meetin food, bank, insurance etc

(67)   Planning Horizon= 12

(68)   Price   lookup([(0.1,0)-
(2,10)],(0.10387,2.14286),(0.312831,1.47619),(0.506314,1.353),(0.730754,1.24),(1,1),(
1.21833,0.761905),(1.5,0.4),(2,0.2))

(69)   Productivity= 0.38+Productivity effect of knowledge

76 hours per person per month / 200 hours per projects gives us

0.38 project per person per month

(70)   Productivity effect of knowledge= Change in productivity lookup(Knowledge)

Productivity gained from knowledge

(71)   Projected cashflow= ((Earning-Spending)/Planning Horizon)

(72)   Quality= INTEG (IF THEN ELSE(Quality<100, Change in perceived quality, IF THEN ELSE(Change in perceived quality<0 ,Change in perceived quality , 0)),62)

Quality = meeting customer needs

(73)   Relative price= Feed Price/Competitor price

(74)   Repaying= Short Term Debt/Term of debt

(75)   Salary= Headcount*Average salary

(76)   SAVEPER = TIME STEP

The frequency with which output is stored.

(77)   Short Term Debt= INTEG (Borrowing-Repaying,0)

(78)   Spending=cost of external labor+Debt service+Office rent+Salary+Other costs+Marketing costs+Hiring related costs+"Course/Conference costs"

(79)   Term of debt= 5*12

(80)   TIME STEP = 1

The time step for the simulation.

(81)   Time to hire=3 months

(82)   Time to receive cash= 1 month

(83)   Unexplainable loss fraction= 0.05/12

(84)   Using externals= "Drop-In backlog hours"

(85)   Utilization= delivery of Main Project/Capacity
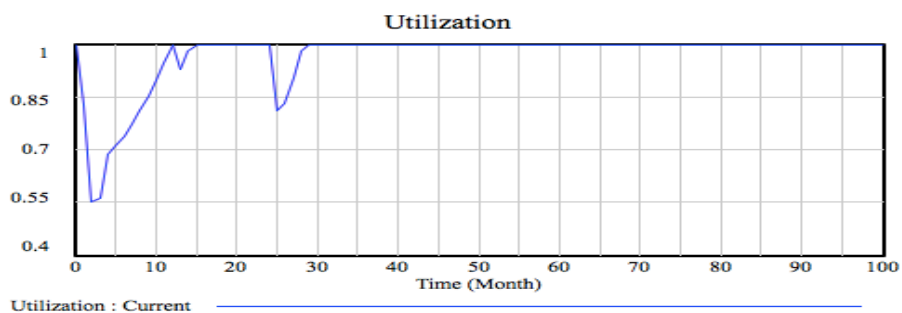
(86)   Word of Mouth= 0.3/12

Appendix 3: Utilization – Hiring policy
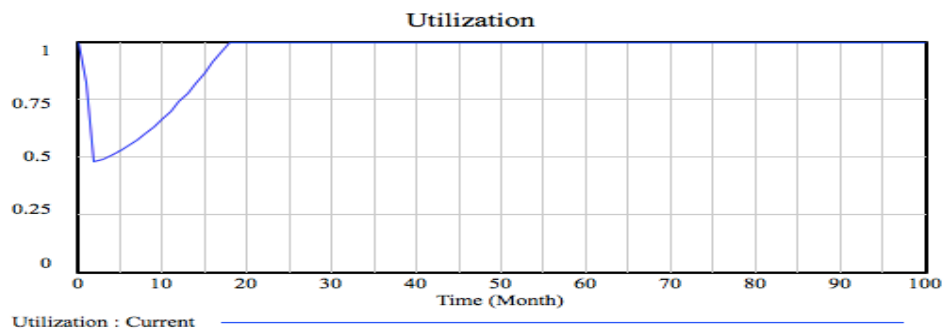
Appendix 4: Utillization, Hiring policy + marketing investments
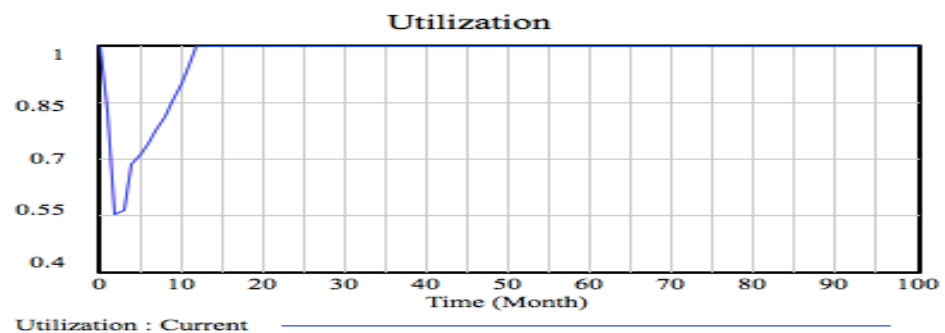
Appendix 5: Utilization: hiring + marketing + conferences/courses

Appendix 6: Headcount: hiring + marketing + conferences/courses

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