KEMI-TORNIO UAS

Balanced Scorecard's Suitability for Knowledge-Intensive Organization

Case Centre for Wireless Communications

Timo Äikäs

Master's Thesis of the Degree Programme in International Business Management

Master of Business Administration

KEMI-TORNIO 2011

ABSTRACT

Äikäs, Timo. 2011. Balanced Scorecard's suitability for knowledge-intensive organization. Case Centre for Wireless Communications. Master's Thesis. Kemi-Tornio University of Applied Sciences. Business and Culture. Pages 65.

In this thesis a qualitative case study method is used. The aim of the thesis is to study if Balanced Scorecard (BSC) is a suitable instrument for performance measurement and strategic management in the case organization, Centre for Wireless Communications (CWC). In addition, the aim is to find out what CWC can accomplish by adopting BSC-framework and identify factors that may cause problems for performance measurement or to implementation process of Balanced Scorecard.

There are several advantages of implementing Balanced Scorecard framework. BSC supports CWC as an organization in achieving its strategic planning and control functions. BSC clarifies and translates strategy into action, it helps in communicating strategy through the organization and it aligns both CWC's and individual's goals to the strategy. Besides these, BSC can assists CWC's managers in evaluating capability and efficient use of resources, complete allocated tasks acceptably, prioritize the responsibilities and allocate needed resources to execute detailed strategy. The use of BSC improves management, leadership and also quality of working life, which will lead to higher performance of the employees and finally higher performance of the CWC. The primary problems that may hamper the performance measurement are related to the organizational culture, organization and managerial practices in competitive environments and lack of employee participation

The conclusion is that the Balanced Scorecard is a suitable tool for measuring the case-organization's performance and for strategic management. Improving the performance of CWC, so that it can better serve its customers, employees and stakeholders, is the definitive aim of implementing a performance measurement system.

Keywords: Balanced Scorecard, BSC, strategic management, knowledge-intensive organization, performance measurement, SWOT, success factors

LIST OF FIGURES

CONTENT

1 INTRODUCTION

Knowledge-intensive organizations in academic environments are facing new challenges in their efforts to improve the quality of performance measurement and strategic management. Traditionally, these organizations have laid emphasis on academic and financial measures. However, these traditional measures are insufficient for guiding and assessing above-mentioned organizations' paths through competitive environments. Financial measures can be considered as lagging indicators, which fail to catch much of the value that has been created or destroyed by managers' actions in the present accounting period. The financial measures tell something, but not the full story about the organizations past performance, because financial measures are insufficient for supporting the actions to be taken in the present and future situations to produce upcoming financial value. (Kaplan & Norton 1996a, 24.)

There are many different performance measurement systems presented in the literature and some of them are commonly used. Balanced Scorecard (BSC) has been developed by Robert Kaplan and David Norton in the 1990's as a performance measurement framework, which adds strategic non-financial performance measures to traditional financial metrics. Today's 3rd generation Balanced Scorecard is more than a measurement system. BSC can be described as a customer-oriented strategic planning and management system and is used widely all around the world in business, government and also in nonprofit organizations. BSC aligns business actions to the vision and strategy of the organization, improves internal and external communications and monitors organization’s performance against strategic goals. (The Balanced Scorecard Institute 2011.)

Balanced Scorecard is not like conventional performance measurement systems, which focus on financial measures, because Balanced Scorecard (see Figure 1) will eventually translate the mission, values, vision and strategy into performance objectives and metrics, which an organization can use to measure its achievements (Niven 2008, 105). Balanced Scorecard is a vital part of the mission recognition, strategy formulation and process implementation (Chan 2004, 205). Balanced Scorecard balances the financial measures with operational measures on customer satisfaction, internal processes and the organization’s innovation, learning and improvement actions – operational measures that are the drivers of future financial performance. Balanced Scorecard provides a

framework to describe, communicate and manage mission and strategy. (Kaplan & Norton 1996a, 25.)

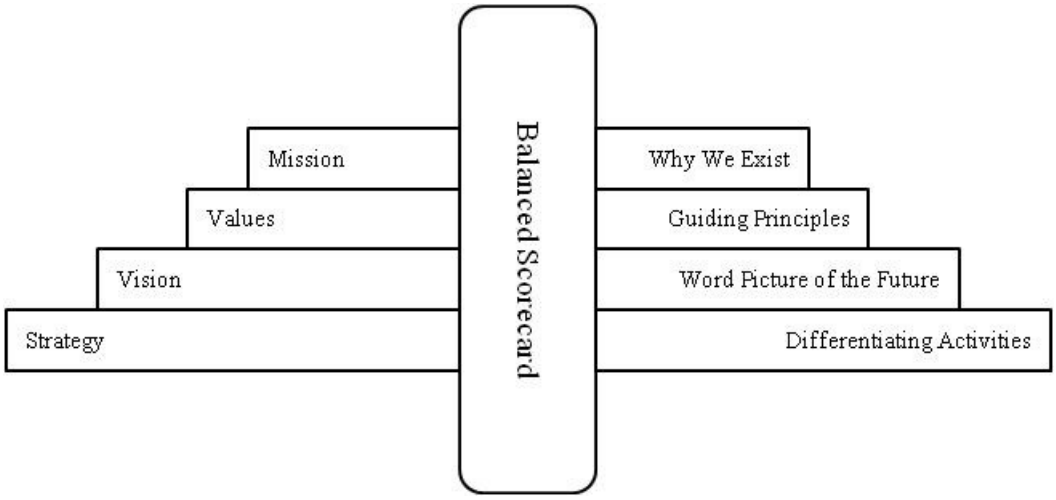

Figure 1. The Balanced Scorecard (Niven 2008, 106).

Lönnqvist (2001, 5) states that performance measurement researchers common opinion is that using certain comprehensive measurement system is the best technique for measuring organizations' performance. The performance measurement system can assist organization and its managers to estimate better resource allocation processes in order to resolve how resources can be better controlled and distributed to the right channel.

In a knowledge-intensive organization, intangible assets, such as employee's expertise, customer relationships or innovations, create the value for the organization. Intangible assets differ from the tangible assets, since intangible assets may not have a direct impact on financial results and those are not easy to measure with typical financial measures. (Niven 2005, 7.) As Niven (2005, 75) points out, knowledge is the driver of the success in the economy.

1.1 Aim of study

The Centre for Wireless Communications (CWC) is a professionally managed project-funded research group operating in conjunction with the Telecommunication Laboratory at the University of Oulu. CWC aims to be one of the leading institutes of wireless communication systems research in the world. Today academic institutions also need to

measure how well they are performing in order to survive through competitive environments.

The aim of this thesis is to collect, analyze and summarize existing literature about the Balanced Scorecard (BSC) and on the basis of theory evaluate, if BSC is suitable instrument for performance measurement and strategic management in the case organization. In addition, the aim is to find out those benefits what CWC can accomplish by adopting BSC-framework and identify factors that may cause problems for performance measurement or to implementation process of BSC. Finally, this thesis aims to increase author's knowledge about the topic and also present understandable and reliable answers to the research questions discussed below.

1.2 Justification of topic

Performance measurement and strategic management are relevant and current topics, when organizations are trying to improve their quality, productivity and efficiency. Besides financial situation, organizations require also information about their customers, competitors, internal and external processes and developments of the markets. If organization neglects some of these, there is a big risk that organization will be in trouble (Lönnqvist (2001, 5.)

CWC’s current measurement system reflects mainly the financial side of performance, for example meeting the allocated budget. However, it is crucial that CWC also keeps track of non-financial performance besides traditional financial performance. Even though financial measurements are the most used and best-known measurements, the truth is that the financial measures are insufficient for guiding and assessing CWC's paths through competitive environments. Traditional financial measures are not measuring CWC's success factors like internationalization, knowledge sharing, competencies or employee and customer satisfaction. Balanced Scorecard however has been developed for measuring and managing an organization’s performance from four different perspectives. Besides better measurement system, there is also need for strategic planning and management system in the CWC.

The reason why I chose the Balanced Scorecard as a theoretical framework model is that BSC is the most commonly and widely used from all performance measurement systems presented in the literature. The other reason is that "the 3rd generation BSC" offers a framework that not only provides performance measurements, but assists managers recognize what should be made and measured. It enables executives to truly execute their strategies (The Balanced Scorecard Institute 2011). The BSC method has been proved to be useful tool to both public and private organizations, it offers a framework for any type of organization to monitor and influence the effectiveness of its strategies. BSC makes possible executives to actually accomplish their strategies. (Lankhorst 2009, 14.) As Kaplan and Norton (1996, 21) state: “If you can’t measure it, you can’t manage it”.

1.3 Research questions

In this thesis, the primary question or the research problem can be formulated as follows: What is Balanced Scorecard and is it a suitable tool for performance measurement and strategic management in the case organization?

The secondary research questions are:

1. What are the benefits and the possible pitfalls of Balanced Scorecard’s implementation?
2. Should Centre for Wireless Communications adopt Balanced Scorecard? Why or why not?
3. How can Centre for Wireless Communications implement Balanced Scorecard?

1.4 Research design

According to Patton (2002, 39), the purpose of a research strategy is to set a comprehensive and coherent framework for the decisions made about how to conduct the research and treat the results. Research can be divided into the main strategies: qualitative or quantitative research. The main difference between these two is in the aims: the objective in qualitative research is to understand the phenomena while

quantitative research aims to make statements that are predictive (Stainback & Stainback 1988, 8). Qualitative research, on the other hand, is concerned with collecting and analyzing information in as many forms, mainly non-numeric, as possible (Blaxter & Hughes & Tight 2006, 64). According to Colwell (2006, 271), qualitative approaches come with various names and descriptions: case or field study, ethnographic research, naturalistic, phenomenological, interpretive or just plain descriptive.

A qualitative explanatory case study strategy is used in this research. According to Yin (2003, 5), a relevant situation for case study is when a “how” or “why” questions are being asked. A case study documents or records the operational activity of an organization (Westbrook (1995, 8). This research also includes some features from archival analysis, because the form of the primary research question is “what” (Yin 2003, 5). Case study is advantageous to use when the study investigates a contemporary phenomenon within its real-life context (Yin 2003, 13). According to Myers (2009, 70), case study shows that the theory has a practical application and bring the subject matter to life. This study investigates if the Balanced Scorecard theory and framework can be applied in the case organization, so the context to real-life is remaining.

As Yin (2003, 83) states, data or evidence for a case study can be collected from six sources: documents, archival records, interviews, direct observation, participant observation and physical artifacts. In this study, evidences have been collected through participant observation, CWC’s internal documents (agendas, minutes of meetings etc) and archival records (diagrams, other charts and data bases). According to Blaxter et al. (2006, 74), the advantage is that data of the case study is drawn from people’s experiences and practices and so it is seen to be strongly realistic. Case studies also allow generalizations from a specific instance to a more general issue.

According to Social Research Methods (2011), "participant observation often requires months or years of intensive work because the researcher needs to become accepted as a natural part of the culture in order to assure that the observations are of the natural phenomenon". I have been working over eighteen years in the case organization, therefore I have a good understanding of present and past situation of the performance measurement, strategic management, organizational culture and management styles within the organization. As a staff member of the case organization, I have admission to events or groups, which could otherwise be inaccessible to scientific investigation.

2 KEY CONCEPTS AND DEFINITIONS

This chapter reviews related literature concerning key concepts. It starts with an overview of the varying definitions of knowledge-intensive organizations, performance measurement, continuing to strategic management, critical success factors and intellectual capital, which all are connected to Balanced Scorecard one way or the other.

2.1 Characteristics of knowledge-intensive organizations

Knowledge-intensive as a term imitates economists' labeling of firms as capital-intensive or labor-intensive. In labor-intensive organizations labor has greater importance in production inputs than capital has. If organization is labeled as knowledge intensive, it implies that knowledge has more importance than other inputs. (Starbuck 1992, 715.) In knowledge organizations, the majority of employees, i.e. knowledge workers are highly qualified and highly educated professionals, whose work consists mostly of translating information to knowledge (Sveiby 1997, 19). According to Edvinsson and Malone (1997, 9-10), knowledge-intensive organizations have the following characteristics and special features:

- Knowledge-intensive organizations are flexible, adaptive, and they have low organizational hierarchies.
- Knowledge-intensive organizations create tailored products and services together with their clients, suppliers and strategic partners.
- Intellectual capital is knowledge-intensive organizations most important asset, physical assets such as equipments, are less important.

Alvesson (2000, 1101) defines knowledge-intensive firms (KIFs) as companies, where most work can be said to be of an intellectual nature and where well-educated, qualified employees form the major part of the workforce. According to Kirjavainen (2001, 174), KIFs are strategically dependent on knowledge. A key differentiator of KIFs is reliance on intangible assets or intellectual capital to create market wealth (Swart & Kinnie & Purcell 2003, 7). A large number of the employees of KIFs usually have an academic degree and relevant experience (Alvesson 2004, 17). Knowledge-intensive organizations have many specific situations in how work is managed and organized,

including a deep dependence on self-determination, downplaying of a single, one-dimensional hierarchy, the need for extensive communication for coordination and problem solving (Alvesson 2000, 1102).

According to Alvesson (2004, 18), professional service and R&D firms are the two major groups of KIFs. The difference between these groups is that professional firms deal very much in intangibles and most of its professionals interact directly with customers, while R&D companies interact with customers through marketing units (Alvesson 2004, 18). Research organization, like CWC, is a typical example of knowledge-intensive organizations. There are certain features, which are typical for research organizations: type of ownership and organizational structures, legal status, mission and major part of these organizations are public funded, non-profit organizations. Besides these, science and technology policy are strongly affecting to organization's mission and aims. (Leitner & Warden 2004, 34.)

Alvesson (2000, 1103) points out that a particular problem for many knowledge-intensive organizations is to ensure that they sustain their key personnel making commitment and loyalty significant. Despite attracting new personnel, keeping and developing competent personnel is a common problem for all organizations. This issue becomes amplified for knowledge-intensive organization and is a result of two situations:

1. Personnel is the most significant, sometimes the only significant resource of the company. Capital and equipment are normally of less importance. (Alvesson, 2000, 1103.)

2. In many cases, an established organization may risk entire groups leaving their employers and forming new companies, trying to bring the old clients with them, thus emptying the former companies not only of important personnel but also of clients. (Alvesson, 2000, 1103.)

According to Alvesson (2004, 21), knowledge-intensive companies are characterized by factors such as:

- Very competent individuals doing knowledge-based work, using intellectual and symbolic skills in work.

- A quite high level of autonomy and the downplaying of organizational hierarchy.
- The use of flexible, ad hoc organizational forms.
- The need for widespread communication for coordination and problem-solving.
- Personal client services.
- Information and power asymmetry.
- Subjective and uncertain quality assessment.

Sydänmaanlakka (2000, 24-25) points out that there are also other characteristics related to knowledge-intensive organizations: To be successful organization must gather and apply new information, their business environment changes very quickly, which forces organizations to adjust strategies accordingly. The dominant factor in knowledge-intensive firms is human capital (Alvesson 1995, 6) and these organizations have only some intangible assets, which are much more precious than their tangible assets (Sveiby 1997, 19).

According to Sveiby (1997, 53), there are four major employee groups in the knowledge organizations: the professionals or experts (knowledge workers), the managers, the leaders and the supporting staff. Sveiby (2003) points out that the knowledge workers i.e. experts are focusing on their tasks, professions and especially finding a solution to the problem. Managers can be described as “people appointed by superiors to lead an organization towards a defined goal, within a given frame of reference and with given resources” and managers are supervising other people's (expert’s) work (Sveiby 2003).

In the knowledge organization, the former expert i.e. knowledge worker is quite often comprised of the group's leader. It is important that leaders can give enough creative freedom for the experts, without letting the organization turn into dependent on them. (Sveiby 2003.) The supporting staff can also be described as knowledge workers, however they are in the lower level compared to experts, and the basic function of supporting staff is to assist experts and managers (Sveiby 2003).

2.2 Performance measurement

Performance measurement is a process of quantifying the efficiency and effectiveness of purposeful action (Neely & Mills & Gregory & Richards & Platts & Bourne 1996, 11). According to Jungman, Okkonen, Rasila and Seppä (2004, 182), performance measurement deals with the strategy implementation. Harbour (1997, 7) explains performance measurement as a process, which measures accomplishments and output of the work. The basis of measuring performance is to be able to manage it (see e.g. Kaplan & Norton 1996).

Performance measurement presents common information that can be exploited for decision-making purposes, both for management and all levels of employees. In this capacity, the performance measurement system can turn into the instrument which is needed to replace the "rearview mirror" approach presented by the traditional accounting system-based measurements. (Andersen & Fagerhaug 2002, 7-8.) The goal of any performance system is to provide the right people with the right performance-related information at the right time (Harbour 1997, 8). Simons (2000, 7) describes performance measurement system as follows:

> "Performance measurements system assists managers in tracking the implementation of business strategy by comparing actual results against strategic goals and objectives. A performance measurement system typically comprises a systematic method of setting business goals together with periodic feedback reports that indicate progress against those goals. Performance goals may be either short term or long term. Short term performance usually focuses on time frames of one year or less. Longer-term performance goals include the ability to innovate and adapt to changing competitive dynamics over periods of several years."

Simons (2000, 5) compares organization's performance measurement to the controls of the car: "The steering, accelerator, and brakes allow the driver to control direction and speed; instrumentation on the dashboard provides critical information about actual speed and early warning about potential problems with the cars key operating system."

According to Drucker (2006, 104), an organizational performance measure is an indicator, connected to critical success factor (presented in chapter 2.4) and a strategic objective and is used to evaluate the functioning of a detailed process. Organizational objectives are measurable results that need to be reached. These objectives are resulting straight from the critical success factors and realistic milestones. (Drucker 2006, 104.) Due to behavior-altering facility, defining performance measures is one method of implementing strategies and policies. For each component of a strategic plan, key performance measures can be defined and these measures can be broken down into performance measures. (Andersen & Fagerhaug 2002, 10.)

2.3 Strategic management

The starting point for strategic management is the clarification of purpose or mission (Sadler 2003, 51). According to Morden (2007, 14-15), strategic management is related to critical decisions of organization's present and future situation, management planning and decision-making for the medium to long-term future. The strategic management process (illustrated in Figure 2) is applied when organization's mission, objectives and strategies are to be created. (Morden 2007, 15).

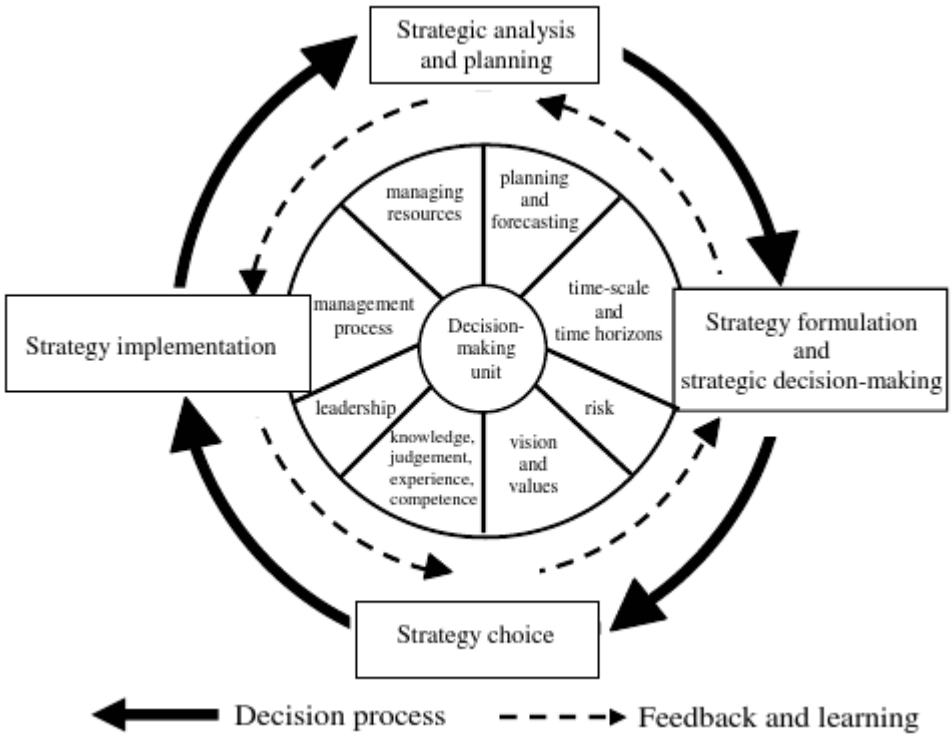

Figure 2. The Strategic Management Process (Morden 2007, 17).

Koteen (1997, 20) states that strategic management highlights a current process, which combines strategic planning with other management systems. According to Morden (2007, 17), strategic management has four processes as follows:

1. Strategic analysis and planning.
2. Strategy formulation and strategic decision-making.
3. Strategic choice.
4. Strategy implementation.

According to Koteen (1997, 26), strategic management is future oriented, a way of thinking and behaving to make a difference and it sets a framework for guiding other phases of management. Besides these, strategic management should be continuous and recurring and it is not easy to perform; it is difficult and demanding (Koteen 1997, 27). Strategic management aims at providing strategic direction, guiding priority use of resources, setting standards of excellence, coping with environmental uncertainty and change and providing objective basis for control and evaluation. (Koteen 1997, 29).

2.4 Critical success factors and intellectual capital

Critical success factors are the limited number of areas in which acceptable results will guarantee successful competitive performance for the individual or organization (Mard & Dunne & Osborne 2004, 116). According to Rampersad (2006, 103), an organizational critical success factor is one in which the organization must outshine in order to stay alive or one that has dominant meaning to the success of an organization. The link between success factors and BSC is that critical success factors are connected to the four perspectives of Organizational Balanced Scorecard (OBSC) and therefore form an important part of shared ambition. The critical success factors form the link between the organizational mission, vision and core values and the remaining OBSC elements. Examples of organizational success factors are: financially strong, healthy and a stimulating working environment, well-motivated and skilled employees, teamwork, customer orientation and customer's service. (Rampersad 2006, 103.)

Intellectual capital (IC) is generally recognized as the significant source of true and sustainable competitive advantage and intellectual capital is one the most important organizations success, not only for knowledge-intensive organizations, but also for most

other types of organizations. According to Edvinsson and Malone (1997, 11; 34-37), the intellectual capital of an organization is divided into three basic forms:

1. Human capital.
2. Structural capital.
3. Customer capital.

All individual capabilities, skills and experiences of employees and managers are included under the term human capital. It also includes the creativity and innovativeness of the organization. Structural capital is described as the supportive infrastructure of human capital. It includes, for example, databases and patents of the organization. Customer capital includes, for example, customer relationships. Sveiby (1997, 8-13) also states that the intellectual capital of an organization can be classified as a family of three entities: employee competence, internal structure and external structure.

3 THEORETICAL FRAMEWORK - BALANCED SCORECARD

In the early 1990s, when Kaplan and Norton introduced the Balanced Scorecard, they were seeking answers to basic measurement problem. How managers can avoid the dependence on traditional financial metrics and also recognize the growing value of knowledge-based assets? Kaplan's and Norton's solution was the use of a balanced set of measures in four different perspectives: Financial, customer, internal processes and employee learning and growth. (Niven 2005, 63.)

Today's Balanced Scorecard is more than a measurement system, it is a strategic planning and management system that aligns business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals (The Balanced Scorecard Institute 2011). As a concept, balanced performance measurement is interesting, but in practice it is very difficult. In Balanced Scorecard, an organizations performance is typically observed from four perspectives (Kaplan & Norton 1996a, 8).

3.1 Balanced Scorecard

Chan (2004, 205) points out that Balanced Scorecard (BSC) is a vital part of the mission recognition, strategy formulation and process implementation. According to Kaplan and Norton (1996a, 10), Balanced Scorecard translates an organization's mission and strategy into a tangible objectives and measures. Moreover, Balanced Scorecard balances the financial measures with operational measures on customer satisfaction, internal processes and the organization's innovation, learning and improvement actions – operational measures that are the drivers of future financial performance (Kaplan & Norton 1996a, 25). According to Niven (2002, 12), Balanced Scorecard is a "carefully selected set of measures derived from an organizations' strategy." Balanced Scorecard (illustrated in Figure 3.) explicitly addresses four value drivers of organizational performance: financial, customer, internal business process and learning and growth.

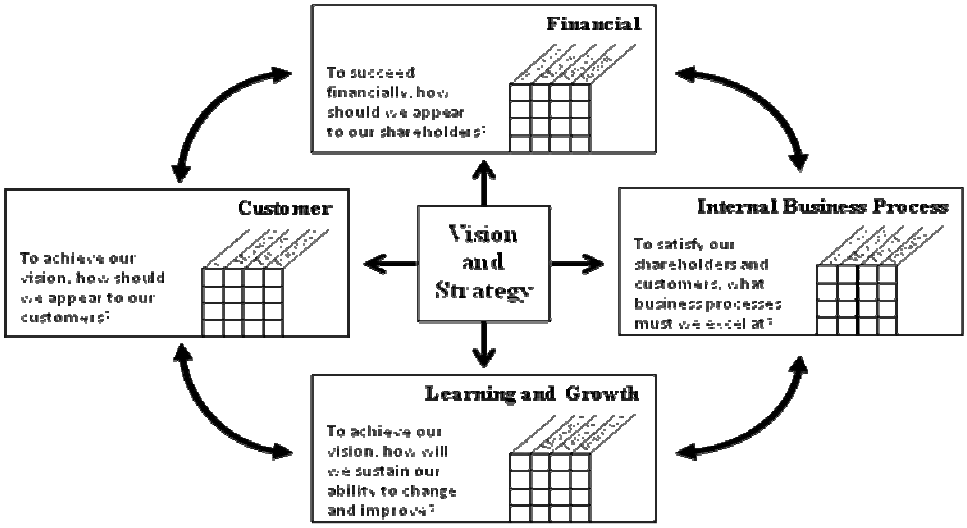

Figure 3. Original Balanced Scorecard (Kaplan and Norton 1996, 9).

The BSC framework provides a framework to look at the strategy used for value creation from four different perspectives:

1. Financial. The strategy for growth, profitably and risk viewed from the perspective of shareholder. How do we look to our shareholders? (Kaplan & Norton 2001, 23.)

2. Customer. The strategy for creating value and differentiation from the customer perspective. How do our customers see us? Focus on this perspective is on customer satisfaction. (Kaplan & Norton 2001, 23; The Balanced Scorecard Institute 2011.)

3. Internal business processes. The strategic priorities for various business processes, which create customer and shareholder satisfaction. What must we excel at? (Kaplan & Norton 2001, 23).

4. Learning and growth. The priority is to create a climate that supports organizational change, innovation and growth. How can we continue to improve and create value? (Kaplan & Norton 2001, 23). Focus on this perspective is related to both individual, like employee training and corporate self-improvement i.e. corporate cultural attitudes (The Balanced Scorecard Institute 2011).

According to Kaplan and Norton (1996a, 47), “the scorecard should tell the story of the strategy, starting with the long-run financial objectives and then linking them to the sequence of actions that must be taken with financial process, customers, internal processes and finally employees and systems to deliver the desired long run economic performance”. The concept of the Balanced Scorecard is portrayed in Figure 4. The logic of the Balanced Scorecard is that learning and growth capacity develops internal processes. Improved internal processes in turn develop customer value. Improved customer value improves financial results and improved financial results give cash flow to invest in learning and growth. (Kaplan& Norton 1996b.)

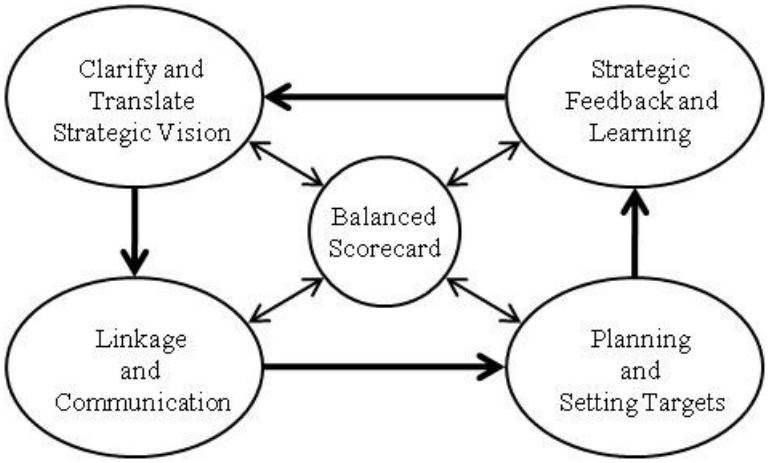

Figure 4. The Concept of Balanced Scorecard (Northrup 2004, 94).

Strategy-focused organizations recognize well the significance of engaging and aligning all of their employees to the strategy. It is essential to communicate strategy intensively because strategy will not be understood otherwise.

3.2 Strategy map and Balanced Scorecard SWOT

A Balanced Scorecard strategy map (Figure 5) offers a framework to illustrate how strategy links intangible assets to value-crating process (Kaplan & Norton 2004, 30). A strategy map presents the illustrated structure for joining the organization's objectives in the four perspectives of Balanced Scorecard. It demonstrates the cause-and-effect relations, which link chosen outcomes in the customer and financial perspectives to exceptional performance in important internal processes. (Kaplan and Norton 2004, 55.) Olve, Petri, Roy & Roy (2003, 126) states that a strategy map should answer two related

questions:

1. How does this organization intend to succeed?
2. How can we recognize whether this organization is succeeding?

Financial perspective describes the tangible outcomes of the strategy in traditional financial terms. Lagging indicators like profitability, revenue growth and ROI shows whether the organization's strategy is succeeding or failing. In the customer perspective the value proposition for targeted customers is defined. Both financial and customer perspective describes the desired outcomes from the strategy. (Kaplan and Norton 2004, 30.)

The internal process perspective categorizes the vital few processes that are expected to have the maximum impact on the strategy. Intangible assets, which are most important to the strategy, are identified in the learning and growth perspective. The objectives in this perspective categorize which jobs (human capital), which systems (information capital) and what kind of atmosphere (organizational capital) are necessary to maintain the value-creating internal processes. (Kaplan and Norton 2004, 30; 32).

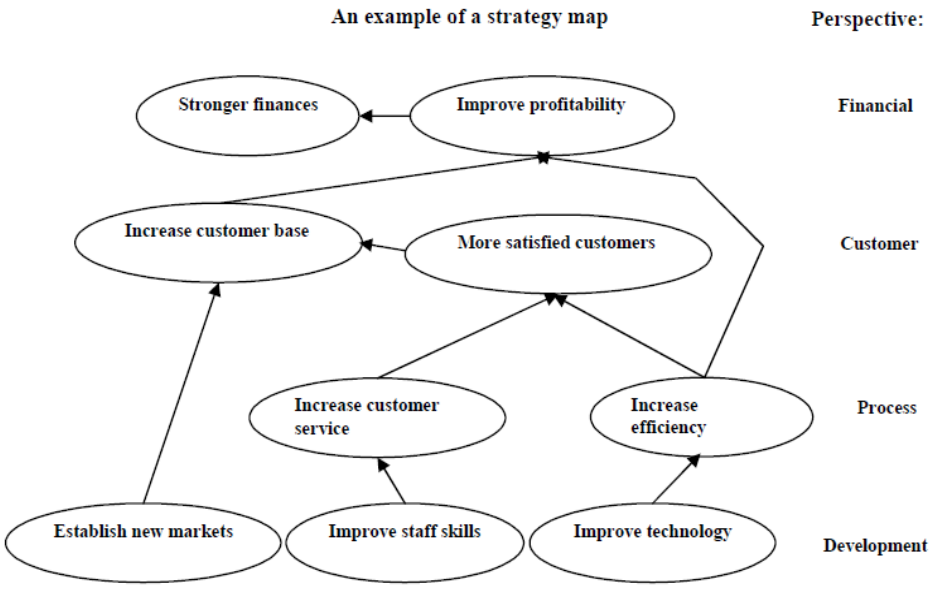

Figure 5. An example of a Strategy Map (Olve et al. 2003, 18).

The strategy map describes the logic of the strategy, showing clearly the objectives for the critical internal processes, which create value and the intangible assets required to

support them (Kaplan and Norton 2004, 52). According to Olve et al. (2003, 126), strategy maps fulfill several purposes:

- They allow discussions about cause-effect relationships when facing strategic decisions and about potential strategic actions.
- They support in finding and selecting metrics to monitor activities.
- The completed map can be used to communicate strategies and their inherent logic.

According to Kaplan and Norton (2004, 10-13), the strategy map is based on several principles: strategy balances contradictory forces, strategy is based on a differentiated customer value proposition, value is crated through internal business processes, strategy consists of simultaneous, complementary themes and strategic alignment determines the value of intangible assets.

An organization should decide a strategy and the strategy map should be customized for the organization. The designing of a strategy map should start with defining the objectives of an organization and then carry on to the means for reaching the objectives. The defining of the objectives begins with recognizing the reasons i.e. mission for an organization's being. The next step is that the management of an organization defines the vision and the strategy. After the vision and strategy have been defined, the next phase is to demonstrate the critical objectives of an organization and the relations between these objectives in line with the four perspectives of the Balanced Scorecard. The perspectives should be handled in the following order: financial perspective, customer perspective, internal process perspective and learning and growth perspective. (Kaplan & Norton 2000, 170-176.)

The SWOT (strengths, weaknesses, opportunities and threats) analysis is the major contribution into the strategy development process. According to Friend and Zehle (2004, 85), SWOT combines the results of the analysis of the organization (internal), the environmental analysis (external) and the portfolio analysis, therefore it can be used to carry out a quick strategic review of the organization. A SWOT-analysis should be short and simple; besides these it should be understood and communicated without problems. Because SWOT-analysis engages discussion among managers or key people in an organization, the process of creating a SWOT-analysis is important (Friend & Zehle

2004, 85.) Lee and Ko (2000, 68) point out that SWOT analysis can be linked to Balanced Scorecard in which case an organization's strengths can be balanced against its competitions' weaknesses and its opportunities within the market be optimized. This can be done with Balanced Scorecard SWOT (BSC SWOT) developed by Brown, Bush, and Norberg in 2001. According to Brown, Bush and Nordberg (2001), the organization's strengths, weaknesses, opportunities and threats are combined with the four perspectives of Balanced Scorecard and finally transfer the SWOT findings to the Balanced Scorecard strategy map.

3.3 Clarifying and translating mission, vision and strategy

According to (Niven 2005, 13), Balanced Scorecard's implementation begins with translating organization's vision and strategy into performance measures. Therefore Balanced Scorecard differs from traditional performance measurement systems, which focus mainly on financial measures. A clear understanding of the organization's vision and strategy is a requirement for implementing a Balanced Scorecard. According to Rampersad (2006, 97), Organizational Balanced Scorecard (OBSC) includes the overall organizational mission, vision, core values, critical success factors, objectives, performance measures, targets and improvement actions, which are divided according to the four basic perspectives of BSC. However, before a strategy is formulated or implemented, the organization must consider its mission, core values, vision and strategy, which are the components of an effective Balanced Scorecard (Niven 2002, 71). Balanced Scorecard approach can only be successful if the mission, the vision, the goals of the company and the strategy, i.e. how the vision and goals can be achieved, are clearly defined (Bruggeman 2004, 44).

3.3.1 Mission and values

At the core of an organization is its purpose or mission. According to Kaplan and Norton (2004, 34), mission is a short, internally focused statement of the grounds for the organization's existence, the basic function toward which its activities are directed and the values that guide employees' activities. Furthermore, mission should tell how the organization supposes to compete and deliver value to customers. Mission reflects

motivations of employees for engaging in the organization's work (Niven 2008, 106). Mission helps employees to make decisions and know what course of action to take. Mission is not a strategy or a strategic plan, even the terms mission and vision are often used interchangeably with strategy. Although mission statements may include elements of a strategy, they are typically broader and more abstract than effective strategy statements. (Phills 2005, 21.)

Values represent the deeply held opinions and thoughts within the organization and are demonstrated through the daily behaviors of all employees. Organization values should be authentic, which means values that are consistent with organizational objectives. (Niven 2008, 114.) Values are focused on how the organization will perform to the mission. The entire process of objective setting, goal acquisition and strategy deployment are guided by values. (Nair 2004, 70.)

3.3.2 Vision and goals

The organization must first recognize and introduce the strategic vision, before it can use the Balanced Scorecard framework (Northrup 2004, 92). Vision is a picture of a preferred future state, a description of what it would like to be some years from now. Vision is a brief statement that identifies the mid- to long-term (3 to 5 year) goals of the organization. Vision should be external and market-oriented and should state how the organization wants to be perceived by the world. (Kaplan & Norton 2004, 34-35.) Vision provides the context for designing and managing the changes that will be necessary to reach organization's goals. Visions are rooted in reality, but focused on the future and they enable exploring possibilities. At the same time as a vision directs toward the future, it is experienced in the present. (Jaffe & Gerould & Tobe 1993, 81.) Vision launches the movement from the stability of the mission and core values to the dynamism of strategy, the next step in the continuum (Figure 6).

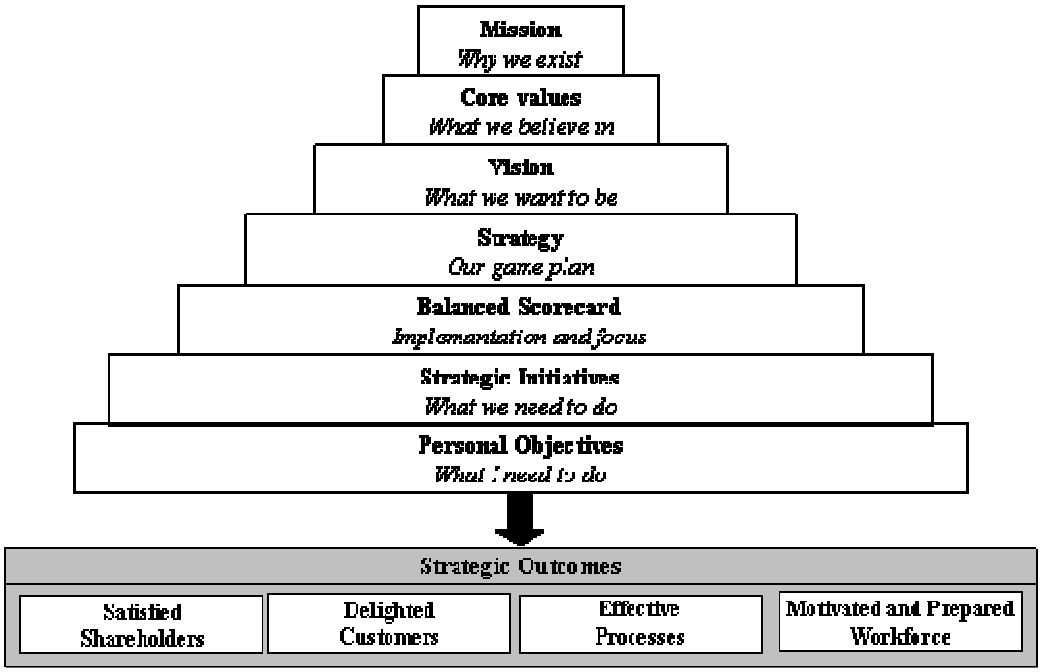

Figure 6. The BSC is a step in a continuum (Kaplan & Norton 2004, 33).

A vision statement should contain the organization's basic strategy on how organization wants to achieve its mission. It should include the organizations spoken and unspoken hopes and dreams. Everyone working at the organization should be inspired and touched by the vision. If the vision does not inspire people inside the organization, it will probably not inspire others. (Jaffe et al. 1993, 76.) Vision should be clear, concrete, and achievable and it should also be easy to communicate and fit with the highest values (Jaffe et al. 1993, 82). After the vision and values are aligned, management can start to establish strategic goals. Strategic goals are the higher-level components of the vision that must be accomplished to produce the desired results. (Gupta 2004, 95.)

3.3.3 Strategy

There are many definitions of the strategy used in the literature. According to Grant (2005, 14), strategy is the overall plan for deploying resources to create a favorable position. Daniell (2004, xiv) defines strategy as “the art and science of informed action to achieve a specific vision, an overarching objective or a higher purpose for a business enterprise". The strategy of an organization describes how it intends to create value for its shareholders, customers and citizens (Kaplan & Norton 2004, 4).

One of the managers prime responsibilities in universities is the formulation of a strategy (Morden 2007, 13) and every organization should pursue a unique strategy, based on its interpretation of the external and internal situation (Olve et al. 2003, 15). A strategy is developed and changed over time to meet the changing conditions caused by real world (Kaplan & Norton 2001, 73). The major goals of a strategy are:

1. To provide a way of understanding (diagnosing) organizational performance.
2. To provide a coherent and actionable plan through which an organization can achieve superior performance. (Phills 2005, 55.)

Phills (2005, 55) points out that a strategy must reflect a truthful understanding of the environment and the dynamics of competition for achieving superior performance. Equally, a strategy must reflect exact statements about the connection among organizational actions and performance, given the context. Finally, a strategy needs to be translated into concrete choices. A strategy must be clear, generally understood and commonly accepted within the organization. Only then can the strategy offer a guide for actions on a day-to-day basis that will lead to the achievement of competitive advantage. (Phills 2005, 55). An organization's strategy can be formulated by following the systematic strategy development process shown in Table 1.

According to Kaplan, Norton and Barrows Jr. (2008, 3), the organization starts the process by developing or reaffirming the mission, vision and values. After this, the existing goals and outcomes which would characterize the achievement of the organization will be determined. The third step is identification and analysis of key issues, like internal and external forces that affect the organization's strategy. The formulation of the new strategy is the last of these four strategy development steps. (Kaplan et al. 2008, 3.) Kaplan et al. (2008, 3) states that these four strategy development steps address the following questions:

1. What business are we in and why? (Mission, vision and values)
2. Where are we going? (Strategic goals)
3. What are the key issues that our strategy must address? (Strategic analysis)
4. How can we best compete? (Strategy formulation)

Table 1. The Strategy Development Process Model (Kaplan et. al 2008, 4)			
Strategy Development Process	Objective	Platform Issues	Representative Activities
Mission, Vision and Values	To reaffirm the highest-level guidelines about organizational purpose and conduct	Establish the vision in terms that are conductive to execution	Mission analysis Vision statement Core values Enhanced vision
Strategic Goals (where are we going)	To clearly define the highest level financial or mission goals that will drive the strategy	Establish the economic model that will be used throughout the strategy management process	Macro mission-measure Values gap decomposition Strategic themes 3 to10 year goals Financial Models
Strategic Analysis (what are our key issues)	To identify through structured analysis, the events, forces and experiences that impact and modify the strategy	Define the linkage between the influencing forces and the process of value creation	Environmental scan (PESTEL) Internal scan (SWOT) Strategy of record review Key issue identification
Strategy Formulation (How can we best compete?)	To define where and how the organization will compete	Ensure that changes in strategy are linked to changes in the planning and execution processes Establish the boundaries of permissible change	Where to compete Differentiators (value proposition) How to compete (strategy map) Financial model Strategic change agenda

Sandler (2003, 9) states that there are a number of words and phrases, which all can be linked in some way with the notion of strategy, these are: Purpose or mission, policies, defining what business the organization is in, defining what kind of organization it is, objectives or goals, strengths and weaknesses, opportunities and threats, key success factors, key decisions, capabilities or competences, planning and scheduling, implementation and sustainable competitive advantage.

3.4 What does the Balanced Scorecard measure?

The answer to the question of what the scorecard is measuring varies from organization to organization and depends on the business and strategic vision. According to Northrup

(2004, 93), Balanced Scorecard offers a retention of financial metrics by making available non-financial measurements, which permit focus on internal business processes efficiency, issues related to customers and employees. Balanced measurement involves measuring both financial and non-financial performance (Meyer 2003, 81). Northrup (2004, 93-94) points out that financial measures do not capture factors such as the recognition of customer needs and satisfaction or organizational and employee issues. When measuring non-financial measures together with financial measures, the problem is to find the right non-financial measures and then using these measures in combination with financial measures to evaluate and compensate performance (Meyer 2003, 81).

Scorecard measures are usually a combination of lag and lead indicators. A lag measure reflects the outcome or present-day bottom-line result. Lead measures are defined as those that drive future outcomes or bottom line success, in other words, non-financial measures that look ahead. In general, lead measures support certain types of behavior within the organization. (Orion Development Group 2011.) On their work, Neely, Richards, Mills, Platts and Bourne makes a summary of different authors' proposals what performance measures (PMs) should be, these are for example:

- PMs should be resulting from strategy (Kaplan & Norton 1992, cited in Neely et al. 1997, 1137).
- PMs should be easy to understand and focus on improvement (Lea & Parker 1989; Lynch & Cross 1991, cited in Neely et al. 1997, 1137).
- PMs should be derived from numbers that can be affected or controlled (Lynch & Cross 1991; Fortuin 1988, cited in Neely et al. 1997, 1137).
- PMs should imitate the business process (Lynch & Cross 1991; Fortuin 1988, cited in Neely et al. 1997, 1137).
- PMs should be related to certain goals and those should be relevant (Lynch & Cross 1991; Fortuin 1988, cited in Neely et al. 1997, 1137).
- PMs should be broadly defined and they should make available timely and accurate feedback (Globerson, 1985; Fortuin 1988, cited in Neely et al. 1997, 1137).
- Performance measures should have visual effect, produce information and those should be accurate and objective (Fortuin, 1988, cited in Neely et al. 1997, 1137).

According to Kaplan and Norton (1996, 25), the financial perspective measures point out whether an organization's strategy, implementation and execution are contributing to bottom-line progress. Financial measures are a vital component of the BSC and these metrics must be customized to the organization and its strategy (Northrup 2004, 103). The measures in this perspective tell managers if strategy execution is leading to improved bottom-line results (Niven 2005, 13). Typical generic measures in this perspective are related to profitability, like operating income, return on investment and economic value-added (Kaplan & Norton 1996, 25).

From the customer perspective, customers are paying attention to factors such as time, quality, performance, service and cost. In this perspective, managers should recognize the customer and market segments in which the organization will compete and the measures of the organizations' performance in these targeted segments. (Northrup 2004, 101.) Typical measures are related to market share, customer retention, acquisition, satisfaction and profitability. Furthermore, customer perspective should also contain detailed measures of the value propositions that the organization will deliver to customers in targeted market segments. (Kaplan and Norton 1996, 26; 44.) Niven (2005, 13) points out that organization must answer to two important questions, when choosing measures for the customer perspective:

1. Who are our target customers?
2. What is our value proposition in serving them?

If the organization is still aiming to add value to the customers, organizations must identify and do extremely well the key processes in the internal business process perspective (Niven 2005, 15). Measures in this perspective are focused on core competencies, processes, and managerial decisions, which have the highest impact on customer satisfaction and accomplishing an organization's financial objectives. (Northrup 2004, 101-102; Kaplan & Norton 1996, 27.)

Learning and growth perspective categorize the infrastructure, which the organization must construct to produce long-term growth and improvement. People, systems and organizational procedures are principal sources from where organizational learning and growth come. (Kaplan & Norton 1996, 28.) According to Northrup (2004, 102), the measurements of this perspective are related to employee retention, productivity and

satisfaction, which produce results in performing differentiated strategies and value building. Northrup (2004, 102) points out that the measurement framework should contain indication of how staff competencies, technology infrastructure and a climate for action enable and drive employee happiness and satisfaction, which can be seen as the drivers of employee retention and productivity. The organization should take care of employees and their needs, because this strategy has proven to be one of the best ways of creating pleased customers. (Northrup 2004, 102.)

3.5 Phases of performance measurement

According to Bourne, Mills, Wilcox, Neely and Platts (2000, 757-758), the development process of performance measurement can be divided into three main phases (Figure 7):

1. **The design** of the performance measures. Design phase can be subdivided identifying the key objectives to be measured and designing the measures themselves.

2. **The implementation** of the performance measures. In implementation phase systems and procedures are put in place for collecting and processing the data, which enables regular measurements.

3. **The use** of the performance measures. This phase is divided into two main subdivisions. First, as the measures are derived from strategy, the primary use to which measures should be put is that of measuring the success of the implementation of that strategy. Second, the information and feedback from the measures should be used to challenge the assumptions and test the validity of the strategy.

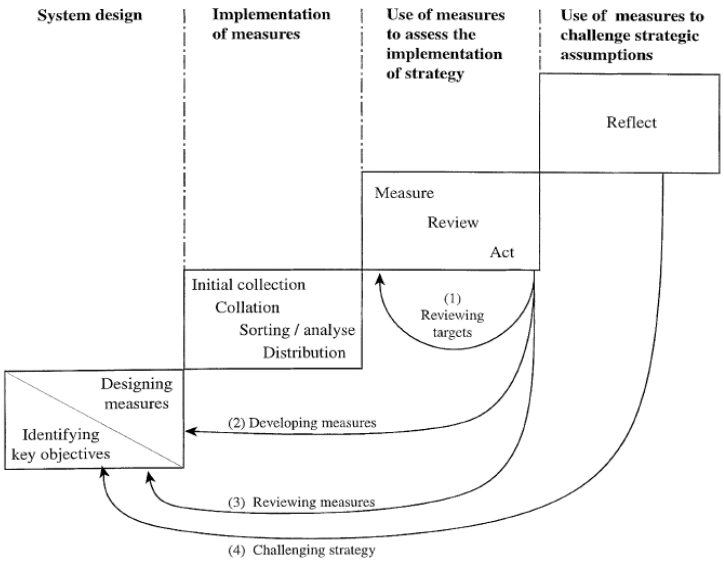

Figure 7. Phases in developing a performance measurement system (Bourne et al. 2000, 757).

As Bourne et al. (2000, 758) describe, phases of design, implementation and use are only theoretical. The developing process of a performance measurement system is not a simple linear progression from system design to the use of performance measures for challenging strategy. The performance measurement system requires developing and reviewing in different levels of an organization, when the situation changes. Bourne et al. (2000, 761) point out that creating a performance measurement system is more than implementation of the individual measures.

Bourne (2003, 18 - 19) points out one difference, which is related to the time and effort required of managers in various phases as shown in
Figure 8. The design phase is usually carried out using workshops, which asks efforts from managers and other employees. In the implementation phase, the workload of managers increases. The reason for this is that managers must carry out activities, which were planned in the design phase. (Bourne 2003, 19.) In the implementation phase, the managers' workload might even be the maximum amount of effort available. The workload decreases rapidly after the measures have been implemented. In the using phase, managers are using time only for reviewing results and maintaining the measurement system. (Bourne 2003, 19.)

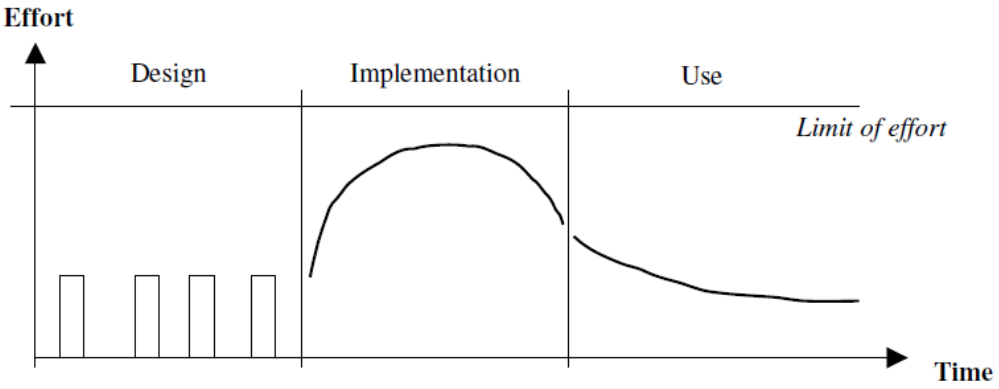

Figure 8. Managerial effort required in different phases of performance measurement (Bourne 2003, 19).

According to Bourne et al. (2000, 761-762), there are three main obstacles to the full implementation of the performance measures:

1. Resistance to measurement, occurring during design and use phases.
2. Computer systems issues, occurring during implementation of the measures.
3. Top management commitment being distracted, occurring between the design and implementation phases.

3.6 Implementation process of Balanced Scorecard

According to Lönnqvist (2001, 5), the comprehensive measurement framework, which includes also intellectual capital perspective, provides an excellent structure for knowledge-intensive organizations to create a measurement system. As Lönnqvist (2001, 5) points out, the uniqueness of the knowledge-intensive organizations have an effect on the implementation and use of performance measurement. Lönnqvist (2001) states, that these effects can be separated into two groups, which create the necessary framework for applying performance measurement to knowledge-intensive organizations:

1. The new ways of operating, for example fast changing business objectives and organizational structures, have need of detailed principles for design of performance measurement, implementation and use (Lönnqvist (2001, 6).
2. Measurement system should correspond to knowledge-intensive organizations detailed success factors, for example intellectual capital (Lönnqvist 2001, 6).

The first step in designing a balanced scorecard is the identification of strategic goals. Agreement on the strategic goals is needed before scorecard measures can be developed. The Balanced Scorecard is only as complete and competent as its designer. Otherwise, the scorecard measures might not reflect the organization's mission and strategies. As Kaplan and Norton (1996b, 77) describe, Balanced Scorecard can be used in the strategic management (Figure 9) and the scorecard allows managers to introduce four new processes:

1. Translating the vision.
2. Communicating and linking.
3. Business planning.
4. Feedback and learning.

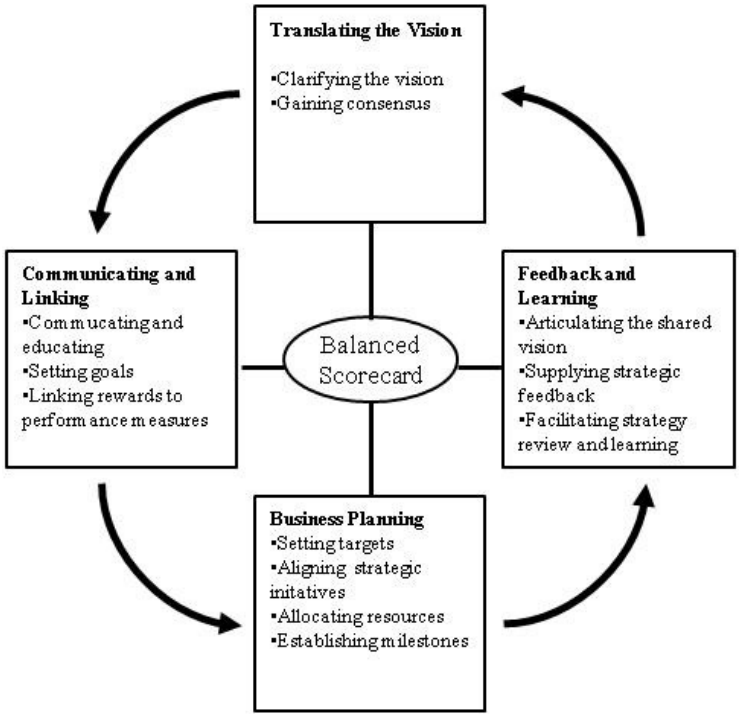

Figure 9. Managing Strategy (Kaplan and Norton 1996b, 77).

The first process, translating the vision, is a means of expressing the mission/vision statements with an integrated set of objectives and measures. This process helps managers build a consensus around the organization's vision and strategy and forces the management to build up operational measures, which entail them to discuss and eventually agree on a means of achieving the goals of the company. (Kaplan & Norton 1996b, 77).

The second process communicating and linking lets managers communicate their strategy up and down the organization and link it to organizational and individual objectives. Organizational and individual objectives must be aligned with the strategy through evaluation procedures and incentives. The Balanced Scorecard signals to everyone what the organization is trying to achieve for shareholders and customers alike. (Kaplan & Norton 1996b, 80).

In performance measurement and managing through measures, it is critical that employees are aligned to the strategy of the organization. To have goal correspondence between the individual employees and the company, Kaplan and Norton (1996b, 2001) propose three distinct processes in where organizations can use BSC to align employees to the strategy: 1) communicating and educating, 2) setting goals, developing personal and team objectives and 3) linking rewards to performance measures.

1. Communicating and educating

Implementing a strategy begins with educating those who have to execute it (Kaplan & Norton 1996b, 80.) Employees must learn about the strategy and understand it if they are to help implement it. The purpose of an effective communication process is creating employee knowledge and understanding. (Kaplan & Norton 2001, 213).

2. Setting goals, developing personal and team objectives

To change the employee's mind-set, setting goals alone is not sufficient (Kaplan & Norton 1996b, 80-81). Employees must be aware of how they can contribute the successful implementation of the strategy. Managers must assist employees set individual and team targets, which are dependable with strategic success. To achieving these goals, personal development plans can be adapted. (Kaplan & Norton 2001, 213).

3. Linking rewards to performance, incentive and reward systems

Linking rewards to performance is an important motivation to help an organization reach its purpose (Kaplan & Norton 1996b, 81-82). Employees need to know that when the organization has been successful, they share the rewards; on the contrary, when the organization has been unsuccessful, they should feel some of the pain. The linkage between organizational performance

and individual rewards is provided by incentive and reward systems. (Kaplan & Norton 2001, 213).

Business planning is the third process used by managers with the Balanced Scorecard. By using the Scorecard, businesses will combine their strategic planning and budgeting processes. This makes sure that the budgets support the strategies of the company. (Kaplan & Norton 1996b, 82.) The users of the scorecard select measures that characterize each of the four perspectives and then set targets for each. Then they will choose which specific actions will help them in reaching those targets. Using short-term milestones to evaluate the progress toward the strategic goal is what results from using the balanced scorecard. (Kaplan & Norton 1996b, 82-83.)

The fourth, and final, process is feedback and learning, which gives organizations the capacity for what is called strategic learning. Existing feedback and review processes concentrate on if the organization, its units or its employees have met their budgeted financial goals. With the Balanced Scorecard in place managers can monitor feedback and relate this to the strategy. (Kaplan & Norton 1996b, 84.) The first three processes are very important, but they demand a constant objective. Any deviation from the plan is considered a defect. By adding the feedback and learning process, the scorecard becomes balanced by providing real time information to enhance strategic learning. (Kaplan & Norton 1996b, 84.)

3.7 Benefits and pitfalls of Balanced Scorecard

Balanced Scorecard assists organizations to design an integrated performance measurement system. The process of translating the strategy into measures offers managers a clear understanding of what the strategy actually is. Balanced Scorecard assists strategy communication right through the organization. Moreover, BSC aligns organization and individual goals with the company strategy, connect strategic objectives to long-term targets and recognize cause-and-effect relationships between performance measures. (Bruggeman 2004, 42.)

According to Olve et al. (2003, 4-5), the Balanced Scorecard has proved useful for following purposes:

- Strategic intentions communication, allowing managers and employees to understand planned strategies.
- Conversing activities, which are motivated by strategic goals rather than present necessities, for example competencies development, customer relationships and how these will pay off in the future?
- Monitoring and rewarding such activities.

As Kaplan and Norton (1996, 19) state, the adoption of the Balanced Scorecard can assist organization in accomplishing the following strategic planning and control functions:

- Clarifying and gaining consensus about strategy.
- Communicating strategy right through the organization.
- Aligning organizational and individual goals to the strategy.
- Linking strategic objectives to long-term targets and yearly budgets.
- Identifying and aligning strategic proposals.
- Performing periodic and systematic strategic reviews.
- Obtaining feedback to learn about and improve strategy.

Ukko, Tenhunen and Rantanen (2008, 89) point out that if performance measurement can assist organization's management in leadership and communication, it can increase employees' commitment, motivation and possibilities to have an effect on the decision making. Performance management also helps employees to clarify job contents and descriptions, as well as employees' awareness of expected tasks (Ukko et al. 2008, 94). According to Ukko (2009, 49), the other positive impacts of performance measurement can be described as follows:

- The linkage of performance measurement to rewards.
- Understanding the linkage between the individual's and organization's targets.
- Interactive communication.

There are some real practical difficulties of measuring intangibles, such as service quality, social inclusion, quality of life that are typical high-level strategic goals for authorities. Even where these can be measured any real change in the numerical values of these measures may take many years, calling into question the usefulness of the

scorecard for performance management purposes. (Wisniewski & Olafsson 2004, 606.) According to Wisniewski and Stewart (2004, 223), local citizens, clients, consumers, users, customers of the service producers, the media, regulatory agencies, managers and employees are the potential stakeholders of a public sector. The variety of different stakeholders may create problems for the performance measurement, because stakeholders have dissimilar interest in different aspects or dimensions in performance measures. The problem is that such an approach produces a multitude of performance measures that satisfy no one. (Wisniewski and Stewart, 2004, 223-224.)

Rantanen, Kulmala, Lönnqvist and Kujansivu have studied performance measurement systems in the Finnish public sector. According to Rantanen et al. (2007, 428), there are four main causes for the problems of performance measurement in Finnish public organizations. First, when designing the performance measurement system, there are numerous stakeholders that should be taken into account. Second, the identification of the main long-term objective in public organizations is not easy and as a result the decision-making is guided by many different factors. The lack of ownership of the property is the third cause for the problems. The fourth cause for the problems is the lack of managerial skills. Lönnqvist (2002, 57) has identified six interrelated types of factors that may hamper the use of performance measurement:

1. General measurement-theoretical problems.
2. Current performance measures and measurement systems.
3. Definitions of the performance measures.
4. Nature of business and operating environment.
5. Information systems.
6. Organizational culture.

In a survey concerning how Finnish managers use performance measurement, the managers had the greatest problems with managing employees' competencies and knowledge capital, forecasting future situations and applying double-loop learning. In addition, managers had problems also with teaching personnel the relationships between success factors, transforming the strategy into actual objectives and controlling the implementation of the strategy. (Lönnqvist, 2002, 118.)

Balanced Scorecard may be difficult to adapt to academic non-profit organization, because it might not take into account the specific needs and conditions of this sector. However, Kaplan and Norton (2001, 134-135) point out that the Balanced Scorecard is suitable and can also be adjusted to fit non-profit or public organization. Balanced Scorecard perspectives can be adjusted to fit also to the non-profit organization. The mission is at the top in the non-profit version of the Balanced Scorecard (see Figure 10.) and the mission is achieved by reaching targets in the related perspectives.

Figure 10. The non-profit Scorecard (Kaplan & Norton 2001, 135)

4 CENTRE FOR WIRELESS COMMUNICATIONS, CWC

The Centre for Wireless Communications (CWC) is a professionally managed project-funded research group operating in conjunction with the Telecommunication Laboratory at the University of Oulu, Finland. The initiative to establish CWC as a research programme was jointly developed by partners of the Telecommunications laboratory and operation commenced in late 1995.

4.1 Characteristics of Centre for Wireless Communications

Research activities of CWC are strongly characterized by three facts: First, it operates as "a bridge" between university and industry supporting its research partners' R&D work. Second, CWC aims at producing results that are of the highest international level. Third, its operations must cover all the resulting expenses, and if possible, CWC operations should be profitable. (Centre for Wireless Communications 2011.) CWC does not rely in its funding on the state-funded part of the University budget. It finds funding for its operation from competitive sources. Competitive funding sources are for example industrial customers or government agencies from which funding is obtained after review of competing project proposals. In short, the operational principles of CWC are similar to corporate practices rather than those typical to universities.

CWC aims to combine the best features of academic research and industrial research and development to achieve a new model of applied research with a scientific emphasis. Some of the key ingredients are a strong commitment to project schedules, and an active role in proposing research topics to potential project partners. CWC is active in transferring technology by enhancing the flow of information between the academic community and the outside world.

All research, including customer-funded projects that CWC does, should have a scientific and academic aspect so that all projects could result in at least one scientific publication besides research results. Publications in recognized scientific journals and conferences are actively aimed at as the most significant measure of scientific excellence. All project-related publications are subject to explicit approval by the executive boards of the respective projects before submission. CWC as an organization

puts strong emphasis on researcher training and production of publications and inventions. (CWC Annual 2005.)

In addition to publishing their results, CWC staff members are encouraged to actively take part in organizing scientific conferences, acting as reviewers, and attending the major scientific meetings in the field. Staff members are also encouraged to seek scientific, no-cost type co-operation with other research establishments in the field, and to develop and maintain a good international contact network.

4.2 Mission, Vision and Strategy of the CWC

The overall mission of the Finnish universities has been defined in the Act of Universities:

> "The mission of the universities is to promote free research and academic and artistic education, to provide higher education based on research, and to educate students to serve their country and humanity. In carrying out their mission, the universities must promote lifelong learning, interact with the surrounding society and promote the impact of research findings and artistic activities on society." (Act of Universities 558/2009, 1:2.)

However, research units can also have their own mission statements. The mission of the CWC is to conduct world-class research, train world-class graduates, create new technology and support industry (Centre for Wireless Communications 2011).

According to Niven (2008, 121), a vision statement presents a clear view of what the organization is going to be in the future. CWC's vision statement is: "CWC aims at being one of the leading research institutes globally in the area of wireless communications" (Centre for Wireless Communications 2011).

CWC takes into account the goals from the University strategy for the years 2010-2012 in its strategic planning. According to the University's strategy (Oulun yliopisto 2010), the goal is to develop the University as an international, research-oriented science university in cooperation with sector research institutes and business life. Central development goals are to increase the research's' international level and to strengthen

the cooperation structures. As far as research is concerned, the University's internal development goals have been defined as follows: Implementation of a researcher career system, developing researcher training and recruiting, developing internationality, creating internationally competitive research units, developing and redirecting focus areas and diversification of funding sources (Oulun yliopisto, 2010).

In its own operations, CWC aims to strengthen the University of Oulu's attractiveness as a research and learning environment. CWC is committed to maintaining and further improving the high scientific level of research. CWC's own goal is to be at the field's international top level in the future. CWC is also strengthening the interface between teaching and research and the topicality of its teaching contents.

4.3 Organizational structure of CWC

According to CWC’s organization and operational principles, strategic outlines for research are prepared by research area leaders or managers, who are responsible for different key research areas and strategic planning of CWC. In addition, the research group leaders are in charge of the daily management of each research area, including human resources, project planning and financing. In addition, the leaders take care of relations with research partners. CWC's organisational structure (Figure 11) includes research groups, teams and application areas.

Research strategy is annually approved by the CWC Board which consists of representatives from the university and industry. The Director of CWC is responsible general operations of CWC and co-operation between the university and sponsors. Practical project work and working practices are co-ordinated by Project Management Group which consists of project managers and a financial manager. (CWC 2009; CWC Annual 2005.)

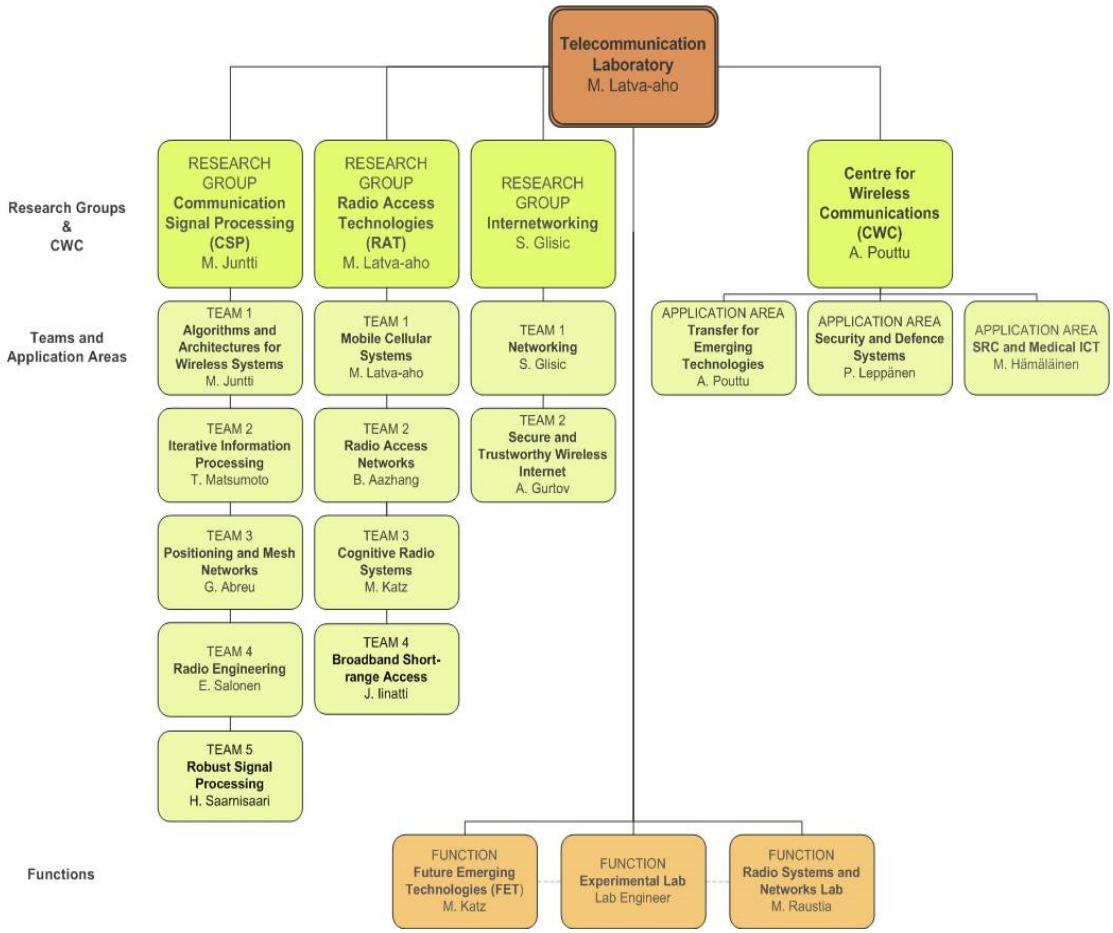

Figure 11. Organizational chart of CWC (CWC Wiki 2011).

Currently CWC employs around 100 experts in the area of wireless communication research. In addition, there are three members of administrative staff. The composition of CWC's staff is illustrated in Figure 12. More than half of the staff is doctoral students whereas almost one third of the research staff is professors and postdoctoral researchers.

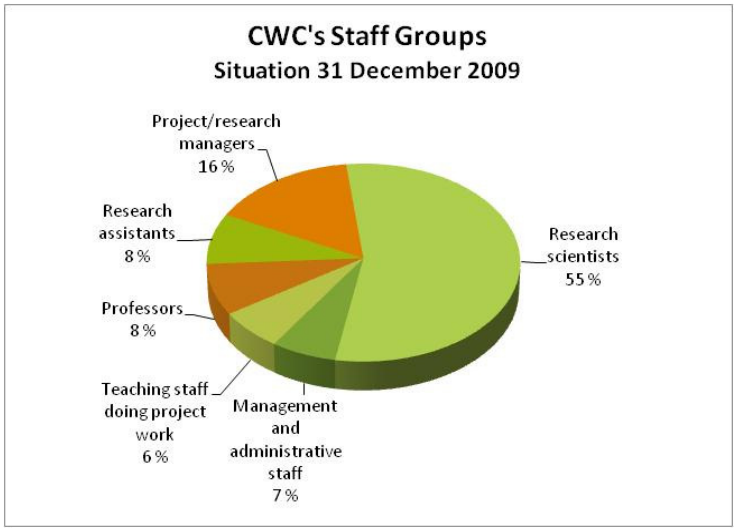

Figure 12. Composition of CWC's staff (CWC 2011).

The organization aims at continuous knowledge building and achievements in the form of academic outputs, i.e. degrees and publications. These objectives are harmonized with the demands of project work where the interests of all cooperation partners are combined to achieve ideal results.

4.4 SWOT-analysis of CWC

CWC's SWOT-analysis is based on my experience and observations from the case organization, but as Friend and Zehle (2004, 86) point out, the SWOT-analysis should be done in a workshop made by a multidisciplinary team, which is dedicated to producing such analysis.

Strengths

- CWC's name and reputation as a research organization that provides high quality research.
- High focus of qualified academic personnel with a high level of scientific knowledge and recognition at international level i.e. competent personnel.
- Research infrastructure and expertise.
- Doctoral Study Program - Post Graduate Studies.
- Increasing cooperation with foreign research institutions.

Weaknesses

- Lack of autonomy in certain decision areas (salary policy, hiring supporting personnel etc).
- Insufficient cooperation with other research units inside the department.

Opportunities

- Globalization and adaptation of new technologies.
- Increasing funding i.e. from European Commission.
- Increasing demand for continuing CWC's doctoral study program.
- Increasing interest for research activities from outside of Europe.

Threats

- Reduction of the national funding (TEKES, Academy of Finland, etc).
- Lack of support personnel i.e. lack of economical autonomy and decision making.
- Academic and Financial Competition.

4.5 Present situation of CWC's performance measurement

Present situation of CWC's measurement is typical for higher education or public sector organizations and it focuses on measuring inputs, outputs and outcomes, for example human capital, costs of personnel, amount of degrees (bachelor, master and doctoral), publications and different types of dissemination. However, these measures can be considered as external performance indicators, because these are targeted mainly to stakeholders, like Ministry of Education and public sponsors (Tekes, Academy of Finland, European Commission etc.). CWC's growth is measured by few common indicators. These are for example the increase of the annual turnover, the number of projects, the amount of (research) personnel and the increase of the total number of man months.

Internationalization and increasing academic competency are measured as follow: the increase of foreign researchers, lecturers, visitors and partnerships, number of researchers attending an international conferences or workshops, amount of published international papers, articles and journals, the number of basic and postgraduate degrees and educational level of research personnel

The above mentioned measures describe the success factors like internationalization, increasing academic competency, good productivity and positive publicity.

5 ANALYSIS OF THE FINDINGS

All empirical findings analyzed in this chapter are gathered through participant observation and some interpretations might be subjective. However, this is typical of qualitative research, because qualitative research approach includes interpretation which depends on the author's judgments.

BSC can be implemented in many kinds of organizations and every organization has its own special features during the process. Special features of knowledge-intensive organizations affect how the Balanced Scorecard should be implemented, so it is important to analyze the characteristics of the case organization. Considering what are the characteristics of knowledge-intensive organizations (see chapter 2.1), it can be agreed that CWC is a typical knowledge-intensive organization and the work done in the CWC is mainly knowledge work because:

1. Education level of the research staff is high (Figure 13) and members of the staff have a strong knowledge base and emphasis on competence development (see e.g. Alvesson 2004,17; Sveiby 1997, 19)

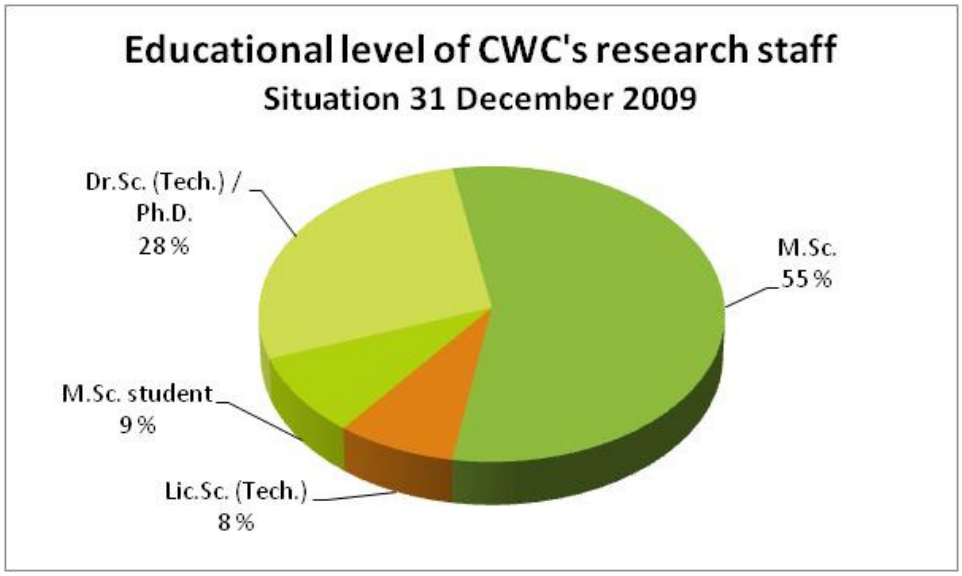

Figure 13. Educational level of CWC's research staff (Centre for Wireless Communications 2011).

2. Research work at CWC is mainly done in research projects. Projects are financed by sponsors such as Tekes, European Community and Academy of

Finland or customers. Every project has its own goals, deadlines and research strategies. Projects are managed by research director and a project manager is taking care of daily management, as supervising researchers. A single project can be considered as a small company.

3. Research work is typically very independent and the research work is done individually. CWC has a heavy reliance on individuals (researchers) and researchers have a high degree of independence (see Alvesson 2000, 1102). Researchers are continuously doing professional decisions trying to solve complex and unique problems. Even though professors usually have more knowledge and insights, they might have less understanding of what can and should be done in specific situations comparing to researchers.

4. Projects are planned in close collaboration with customers in order to ensure that the knowledge created completes the research partners' own expertise and learning needs, and supports the fine-tuning of raw ideas. By cooperating with CWC, research partners gain access to the latest developments in strategic research areas, as well as advantage on future technological trends.

5. CWC's research has two dimensions: Fundamental long-term research and applied research that allow the development of more robust theory for customers' needs which can be tested in "the real world". The scope of long-term research is ten to fifteen years whereas the results of applied research projects are typically utilized in industry in less than 5 years.

6. As Alvesson (2000, 1102) point out, the problem solving, which is the common process of knowledge work, is hard to describe. This is common situation in research work, because every project is different depending on scope of the project, sponsors or customers.

5.1 Benefits and ways of using the Balanced Scorecard

The major benefit of the Balanced Scorecard is that it helps organizations to translate strategy into action. As Rantanen et al. (2007, 417) state, the main task for performance

measurement is to assist the decision-making process by gathering information about how well the goals have been accomplished and how exact the estimates have been. At CWC, measurements have been used only for measuring (financial) performance, not for strategic management or guidance. The use of BSC assists CWC's management link the long-term strategy with the short-term actions, identify and align strategic initiatives and finally, communicate strategy throughout the organization (CWC) as Kaplan and Norton (1996) describe. I argue that the Balanced Scorecard assists CWC's management better in valuing intangible and intellectual assets, such as motivated and skilled researchers or internal processes. The reason for this is that BSC has positive effect on employees motivation and BSC clarifies employees' expected tasks, job contents and descriptions as Ukko et al. (2008, 89; 94) describe.

Balanced Scorecard also assists CWC’s management in evaluating capability and efficient use of resources, e.g. workforce and time, to complete allocated tasks acceptably in right time. With BSC, project and research managers can prioritize the responsibilities and allocate needed resources to execute detailed strategy. CWC has grown remarkable since 1995 and the common problem is, how to coordinate cross-functional and cross-level decisions and activities due to the new organizational structure of CWC. In these kinds of situations BSC can be used as a management or communication tool.

CWC, as every organization, is seeking better performance and this can be reached with the help of employees. As Ukko (2009, 49) points out, the use of BSC improves management, leadership and also quality of working life. Eventually, this will lead to a higher performance of the employees and finally higher performance of the CWC. As Kaplan and Norton (2001, 213) state, Balanced Scorecard should not to be used simply as a measurement system. It should be used as a strategic management system for communication and education, developing personal and team objectives and also for rewarding.

5.2 Factors that may hamper the use of performance measurement

The primary problems that may hamper the performance measurement at CWC are related to the lack of ownership, managerial skills and human resources together with

organizational culture and current measurement systems (see e.g. Rantanen et al. 2007, 428; Lönnqvist 2002, 57).

Lack of ownership

At the University of Oulu and also at CWC, lack of ownership of the property means that everything is collective and at the same times nobody's property, which results in an outcome of uncertainty in terms of responsibilities and control. The result is that the controller of the performance is missing, because there is no "actual" owner for the process.

Lack of managerial skills and management's genuine commitment

In the Academic environment, managers are usually chosen by substance skills instead of managerial capabilities, for example the oldest professor will often be chosen for the head of the unit. This can lead to a situation where the manager of the organization is the best expert – not the best manager. (Rantanen et al. 2007, 429.) A manager without managerial capabilities does not necessarily know what he or she is supposed to manage or measure. From my point of view, managers of the CWC have substance skills on their own expertise area (wireless communication), but not necessarily in the area of financial and strategic management.

One reason for the lack of genuine commitment can be seen from the present University's salary system i.e. State Salary System (SSS). The salary system is divided in two components: task-specific and personal performance salary components. This kind of salary system should be consoling and rewarding also for organizational performance not only on personal performance. If managers are supposed to engage with Balanced Scorecard, they should also be rewarded, because performance measurement should be rewarding and motivating. Without proper rewarding system, managers won't be genuinely committed to performance measurement.

The use of short fixed-term work contracts especially among research personnel (including also managers) is the other reason for the lack of the genuine commitment. Fixed-term contacts may cause insecurity and this can influence managers' commitment and contribution in the long term development process, like creating and implementing Balanced Scorecard.

Lack of human resources

Balanced Scorecard's main challenge is that implementing process of the BSC can be difficult and time-consuming. As Bourne (2003, 18-19) described, especially the design and implementation phase of performance measurement system asks a lot of effort from managers and other people. Based on my experience and observation from the CWC, all administrative personnel, research staff and managers are involved in daily work activities and have no extra time for extra activities, such as designing and implementing Balanced Scorecard. Many of the CWC's research managers are also professors and they have heavy workload consisting of research managers and teaching duties. Conflicting and competing task priorities can easily lead to a situation, where all strategic issues are secondary, like planning and executing the strategy.

Organizational culture

Lönnqvist (2002, 57) stated that the organizational culture is one of six factors that may hamper the use of performance measurement. Based on participant observation, my opinion is that the current organizational culture might not support Balanced Scorecard implementation process. In academic environment performance measurement can be understood as a threat, which hampers academic freedom. Managers at the academic research organization are usually skeptic of their nature and they need empirical and scientific evidences from Balanced Scorecard's usefulness as a performance management and strategic management system.

Linking strategy to everyday work

One key challenge is how CWC's employees can be linked to organization's strategy. Typically employees are not aware of the organization's strategy as a result they fail to focus on the correct things and don't recognize how well they are doing or how they should improve strategic results. Therefore, assuming performance is sufficient, they don't try to improve. (Abernathy, 2000, cited in Von Bergen & Benco, 2004.) As Kaplan and Norton (2001, 48) state, everyone should be aware of the organization's strategy and be motivated to assist the organization to accomplish its strategic objectives. At the end, it is CWC's employees, who are putting strategy into practice, not managers. From my point of view, the problematic area in the case organization is that employees won't necessary understanding the link between their research (job tasks) and CWC's strategic goals.

Current measurement systems and data collection

The important component of performance measurement is collecting the relevant and accurate data for performance indicators. In the case organization, the possible data sources are for example KOTA (the database on university sector), employee records, records of business and publishing activities etc. However, even if there is a lot of data available, the problem is how to collect the needed data for performance measurement. Besides these, the different needs and expectations of the stakeholders are problematic, when selecting proper and correct performance measures. One of the potential threats for performance measurement implementation in the case organization is the lack of integrated system.

5.3 Perspectives

The Balance Scorecard should focus on the most important measures for the strategy implementation and measures should be derived from the strategy. In this case, this is not possible due to the lack of written, generally published strategy of the CWC. Moreover, measures selection should be done in teamwork and also employees' opinions need to be taken into account. Success factors and measures presented below are only examples.

1. Financial. The strategy for growth, profitably and risk viewed from the perspective of shareholder.
2. Customer. The strategy for creating value and differentiation from the customer perspective.
3. Internal business processes. The strategic priorities for various business processes, which create customer and shareholder satisfaction.
4. Learning and growth. The priorities to create a climate that supports organizational change, innovation and growth. (Kaplan & Norton 2001, 23).

Financial perspective - How does CWC look like for key "stakeholders" and resource providers?

As Wisniewski and Stewart (2004, 223) state, public sector organization has different

variety of stakeholders. The main task in this perspective is to identify the key stakeholders of the CWC and the needs of different stakeholders need to be taken into account, when selecting performance measures. Identifying the key stakeholders can be done for example with brainstorming approach.

Financial perspective indicates to the traditional need for financial data and it should show the actual results of strategic choices made in other perspectives. Typical generic measurements in this perspective include for example turnover, profitability, cash flow and economic value added. Based on my long experience from case organization's financial management, these growth measures should be in balance in the long-term. If the amount of projects increased, the annual turnover, the amount of the researchers and amount of man-months should increase as well. The goal is that CWC's operations must cover all the expenses, and if possible, CWC operations should be profitable and provide reserves for the future. This can be done for example by decreasing costs or increasing funding i.e. annual turnover.

Customer perspective -How CWC is seen by customers?

From the customer viewpoint, this perspective means focusing on results, research (service) quality and costs. The first step in designing customer-focused measures is to identify the key customers of the CWC and understand customer's requirements. Frequently gathered and measured information, like customer satisfaction, needs or customer retention will assist the customer orientation. Typical measurements in this perspective include for example customer satisfaction, customer retention and positive publicity. The goal is to maintain ability to attract new customers and retain present customers, i.e. improve customers' satisfaction.

Internal perspective - What CWC must excel at?

The internal business process perspective is generally an analysis of the organizations internal processes. The benefit of this analysis is that it focuses on those resources and capabilities, which organization needs to improve. Internal processes should lead to financial success and provide the value expected by the customers both productively

and efficiently. Typical measurements in this perspective are related for example innovation (customer needs in the future), quality of customer and project management, operations etc. The goal is to increase the quality of research and productivity.

Learning and growth perspective - Can CWC continue to improve and create value?

According to Olve, Roy and Wetter. (1999, 256), one of the main purposes of the Balanced Scorecard is to develop a learning organization, which is constantly developing and changing in a way, that will keep the organization competitive in the future. This perspective with correct measures can assist CWC as an organization to reach one its goals: CWC is aiming at continuous knowledge building and achievements in the form of academic outputs, i.e. degrees and publications. This aim can be successful only if there are sufficiently skilled and motivated researchers, outfitted with timely and accurate information to drive them. In the area of wireless communication research, technology changes fast, it is compulsory for knowledge workers to be in a constant learning mode, i.e. maintain employees' competence is the main goal. Learning and growth represent the critical basis for success of any knowledge-intensive organization.

Typical measurements in this perspective include for example competence and employee wellbeing, employee retention, personnel education and satisfaction. Lönnqvist (2004, 168) states that the key asset for the organization are its employees and their wellbeing is in the concern of the organization. Dissatisfied employees are considered more likely to leave the organization than satisfied employees (Lönnqvist 2004).

5.4 Recommendations for clarifying mission, values, vision and strategy

CWC must have a well defined mission, a shared vision and organization values, even without any performance measurement system. When analyzing CWC's mission and vision, it can be argued that those are not clearly defined. Besides, there are not any organizational values except university's general values. The most critical finding is that

there is not any written, generally published strategy available. Implementing a strategic management system, like Balanced Scorecard, is very complicated without a strategy.

Clarifying mission

As Kaplan and Norton (2004) point out, the mission statement should be brief and state the reason why the organization exists. CWC's mission reflects clearly what organization actually does and what it is all about. Mission is quite relevant for example to CWC's customers and it is compelling reason for existence. However, CWC's mission statement could be more accurately reflecting customer base. CWC must have a clear and concise view of its purpose or mission and the core values that will guide its actions. The most primary action an organization will take is defining customer oriented mission. It must be at the same time wide enough and narrow enough to offer path for organizational decision-making while providing a platform for definition of the organization's vision. (Kauppinen & Ogg 1999, 60; 63).

Establishing values

As Niven (2008, 114) states, the organization is guided by values. The link between the value and the mission is that values should support the achievement of CWC's mission. One of the empirical findings is that CWC don't have its own value statements. Even University of Oulu has its general values, those are not enough for guiding CWC's employees to correct path i.e. achieving the CWC's mission. The recommendation is that CWC's management generates CWC's own value statement, because organization values have an important function when building a high-performance culture. After value statement has been generated, values must be clearly articulated and disseminated to all employees.

Clarifying vision

In order to be able to communicate the vision to the whole organization, the vision should be quite simple. If employees don't understand the vision, they are even less likely to understand the strategy intended to realize that vision (Kaplan & Norton 2001,

217). CWC's vision clearly states what organization wants to be in future: "one of the leading research institutes globally in the area of wireless communications ". However, there is not any mention how this desired state or goal will be reached, neither those success factors, which make vision unique.

CWC's vision should be, as Kauppinen and Ogg (1999, 68) state, a source of inspiration for employees and at the same time, a basis for decision making and a coordinating point for action. If the CWC's vision is not correctly understood, it might lose its power. Recommendation is that CWC's management re-formulates vision and it must also be effectively communicated throughout the CWC. Vision could also been translated into few detailed organizational areas, which are considered compulsory for reaching of the vision:

1. Academic excellence: What is the CWC's contribution to the creation of knowledge in the area of wireless communications?
2. Outreach and engagement: How effectively does CWC transfer knowledge to local, national and international research society?

Formulating and publishing the strategy

When implementing BSC, at the same time organization can actually implement the strategy. The biggest problem is that CWC does not have any written, generally published strategy. Formulating and publishing CWC's strategy is one of the many reasons why CWC should implement BSC, because BSC presents considerable opportunities to develop, communicate and implement the strategy of the organization. CWC has a vision statement, but without any commonly approved strategy, the vision will only be an unreachable dream, because at the end, it is the strategy, which describes the logic of how vision will be achieved.

The most critical recommendation is that CWC's management must describe clear and understandable strategy, which specifies general directions and priorities of CWC. All employees of the CWC must be engaged and to be aligned to the strategy. Strategy could be built around three to five different strategic themes. According to Kaplan and Norton (2001, 78), strategic themes reflect what the management team, in this case

CWC's research group leaders, believes must be done internally to achieve strategic outcomes and order to succeed. CWC's strategy can be developed by following the strategy development process described in chapter 3.3.3.

6 CONCLUSIONS

The main research question of this study is "What is Balanced Scorecard and is it a suitable tool for performance measurement and strategic management in the case organization?" The key conclusion is that the Balanced Scorecard is a suitable tool for measuring CWC's performance and it is also adequate for strategic management. The conclusion can be supported by the following statement: Balanced Scorecard focuses on CWC's goals and performance measures, which drive the purpose of a business against the accomplishment of its future vision. Besides this, BSC presents considerable opportunity for CWC to develop, communicate and implement the strategy. Improving the performance of CWC, so that it can better serve its customers, employees and stakeholders, is the definitive aim of implementing Balanced Scorecard.

I have not found any conclusive support against Balanced Scorecard's suitability in case organization. CWC is a typical knowledge-intensive organization and it has certain characteristics, which might results on how performance should be measured and also how performance measurement should be designed and used. Balanced Scorecard approach for performance measurement and strategic management has some practical difficulties, which are primarily related to the development and implementation processes of BSC. If CWC's management make decision about Balanced Scorecard's implementation it can be done as described in chapter 3.6. However, successful implementation of BSC entails continuous management commitment and Balanced Scorecard's implementation should always be a separate development project. From my point of view, the biggest obstacles for implementation of BSC in the case organization are the management's will, ability and genuine commitment to the BSC-process.

Based on the theory and also empirical findings, my conclusion is that CWC should consider adopting BSC as a performance measurement and strategic management system. The conclusion can be supported by the following statement: The traditional accounting-based measures have considerable limitations in comparison with BSC. Balanced Scorecard does not focus on any one specific aspect of the CWC, such as its finances, because BSC supports both qualitative and quantitative information. BSC can also assist CWC's staff to understand better CWC's key strategies and how activities relate to it. BSC has also a series of benefits for the research area leaders and managers. They will have a better understanding and integration into the strategic indicators. BSC

also allows the improvement of the internal communication of the CWC in order to achieve the objectives according to the strategic plan.

It is important to understand why measuring and managing CWC's performance is both compulsory and critical in every situation. The fact is that financial measures alone are insufficient for guiding and assessing CWC's paths through competitive environments. As Northrup (2004) state, accounting-based financial measures do not capture important factors such as customer or employee satisfaction, organizational innovation or other intangible assets, which can bring competitive advantage to organization. CWC is an employee-driven organization. The most significant value-driving assets of CWC are its employees with their knowledge and competences. The fact is that the outstanding performance of the employees is the foundation of success of the whole CWC. Therefore it is vital to measure employees' competency and accomplishments and evaluate if these are in line with CWC's short and long term goals (vision and mission). Besides measuring organizational and individual performance, BSC presents a practical framework for defining strategic goals and executing strategy throughout whole CWC.

This study has certain limitations. Reliability is the most central criterion for research methods. According to Yin (2003, 37), the reliability means that the same results or conclusions could be accomplished again by another researcher if the researcher trails the identical procedures precisely as the original researcher did. I argue that same results can be accomplished again by another researcher in the same environment. However, the problematic area in this study is the data collection, because evidences or data have been collected through participant observation, documents and archival records. Even all procedures used in this study would be well enough documented; the problematic area would still be the participant observation. As Yin (2003, 96) points out, how can it be assured, that another researcher will be at the right place at the right time or participate in or to observe important event as the original researcher did? Besides these, the analysis and the results of observed data is based on my own interpretation.

According to Olkkonen (1994, 39), validity means the ability of the results to measure what they are supposed to measure. This means whether or not the collected material, the research methods and the results of the study justify the presented claims. King (1994, 31) states that a study is valid if it truly examines the topic, which it claims to examine. The validity in this study can be evaluated to be good, both the theoretical and

empirical parts of the study focused on the topics that were intended to be researched and I was capable to get answers to all the research questions, which were set in advance.

The results of this study rely on my interpretation on verbal and visual research material from the case organization. Due to the nature of participant observation, the concern is related to required objectivity and this can be seen as limitation of this study. Required objectivity is linked directly to generalization. Despite the limitations of this study, my opinion is that the achieved results are applicable to knowledge-intensive organizations in the academic environment.

The aim of this thesis was to evaluate if Balanced Scorecard is suitable instrument for performance measurement and strategic management in knowledge-intensive organizations in academic environment. However, the results presented in this study are only theoretic. Therefore interesting topic for the future research would be testing the theory in practice.

REFERENCES

Printed

Alvesson, Mats 1995. Management of knowledge-intensive companies. Walter de Gruyter & Co. Berlin

Alvesson, Mats 2004. Knowledge Work and Knowledge-Intensive Firms. Oxford University Press.

Andersen, Bjørn & Fagerhaug, Tom 2002. Performance Measurement Explained: Designing and Implementing Your State-of-the-Art System. Quality Press. Milwaukee, Wisconsin.

Blaxter, Loraine & Hughes, Christina & Tight, Malcom 2006. How to Research, 3rd Edition. Open University Press. Buckingham, GBR.

Bourne, Mike 2003. The design, implementation and use of performance measurement systems. Proceedings of the 3rd International Workshop on Performance Measurement, Bergamo, 19.-20. June. 13-22.

Bruggeman, Werner 2004. Performance Management from a Control Perspective. Introducing the Balanced Scorecard. Integrated Performance Management. A Guide to Strategy Implementation. In Verweire, Kurt & Van Den Berghe, Lutgart. (ed). Sage Publications, Incorporated. London, GBR. Pages covered by this article by Bruggeman. 37-50.

Colwell, Richard 2006. MENC Handbook of Research Methodologies. Oxford University Press, Incorporated. Cary, NC, USA.

Daniell, Mark 2004. Strategy. A Step-by-Step Approach to the Development and Presentation of World Class Business Strategy. Palgrave Macmillan. Hampshire, UK.

Drucker, Peter F. 1999. Management Challenges for the 21st Century. Butterworth-Heinemann. Oxford, UK

Edvinsson, Leif & Malone, Michael S. 1997. Intellectual Capital: Realizing your Company's True Value by Finding Its Hidden Brainpower. Harper Business. New York.

Friend, Graham & Zehle, Stefan 2004. Guide to Business Planning. Profile Books Limited. London, GBR.

Grant, Robert M. 2005. Contemporary Strategy Analysis. 5th edition. Blackwell Publishing. Malden, MA, USA

Gupta, Praveen 2004. Six Sigma Busines Scorecard. McGraw-Hill Professional

Publishing. Blacklick, OH, USA.

Harbour, Jerry L. 1997. The basics of performance measurement. A Division of The Kraus Organization Limited. New York.

Jaffe, Dennis T. & Gerould, Philip & Tobe, Glenn 1993. Organizational Vision, Values and Mission. Course Technology Crisp. Menlo Park, CA, USA.

Kaplan, Robert S. & Norton, David P. 1996a. The Balanced Scorecard: Translating strategy into action. Harvard Business School Press. Boston, Massachusetts.

Kaplan, Robert S. & Norton, David P. 2001, The Strategy-focused Organization. Harvard Business School Press. Boston, MA

Kaplan, Robert S. & Norton, David P. 2004 Strategy maps: converting intangible assets into tangible outcomes. Harvard Business School Publishing Corporation. Boston, Massachusetts.

Kauppinen, Tero J. & Ogg, Alexander J. 1999. Vision into action. The leader's guide to Driving change in turbulent times, 2nd edition. Leadership Studies International, Inc. Gummerus Printing. Saarijärvi.

King, Nigel 1994. The Qualitative Research Interview. Qualitative methods in organizational research, a practical quide. In Cassell, Catherine & Symon, Gillian. (ed). Sage Publishers. London. Pages covered by this article by King. 14-37

Kirjavainen, Paula 2001. Strategic Learning in a Knowledge-intensive Organization. Rethinking Strategy. In Volberda, Henk W. & Elfring Tom (ed). Sage Publications Incorporated. London, GBR. Pages covered by this article by Kirjavainen. 172-190.

Koteen, Jack 1997. Strategic Management in Public and Nonprofit Organizations: Managing Public Concerns in an Era of Limits. Greenwood Publishing Group Incorporated. Westport, CT, USA.

Lankhorst, Marc 2009. Enterprise Architecture at Work: Modelling, Communication and Analysis. Springer-Verlag. Berlin.

Lönnqvist, Antti 2004. Measurement of Intangible Success Factors: Case Studies on the Design, Implementation and Use of Measures. Publication 485. Tampere University of Technology.

Mard, Michael J. & Dunne, Robert R. & Osborne, Edi 2004. Driving Your Company's Value: Strategic Benchmarking for Value. John Wiley & Sons, Incorporated. Hoboken, NJ, USA.

Meyer, Marshall W. 2003. Rethinking Performance Measurement: Beyond the Balanced Scorecard. Cambridge University Press. West Nyack, NY, USA.

Morden, Tony 2007. Principles of Strategic Management. Ashgate Publishing Group. Abingdon, Oxon, GBR.

Myers, Michael D. 2009. Qualitative research in business & management. Sage Publications, Inc. Thousand Oaks, CA.

Nair, Mohan 2004. Essentials of balanced scorecard. John Wiley & Sons, Inc. Hoboken, New Jersey, USA.

Neely, Andy & Adams, Chris. & Kennerley, Mike 2002. The Performance Prism. The Scorecard for Measuring and Managing Business Success. Prentice Hall.

Neely, Andy & Mills, John & Gregory, Mike & Richards, Huw & Platts, Ken & Bourne, Mike 1996. Getting the Measure of Your Business. Findlay. London. UK.

Niven, Paul R. 2002. Balanced scorecard step-by-step: Maximizing Performance and Maintaining Results. John Wiley and Sons Inc. New York.

Niven, Paul R. 2005. Balanced Scorecard Diagnostics: Maintaining Maximum Performance. John Wiley & Sons, Incorporated. Hoboken, NJ, USA.

Niven, Paul R. 2008. Balanced scorecard step-by-step for government and nonprofit agencies, 2nd edition. John Wiley and Sons. New York.

Northrup, C. Lynn 2004. Dynamics of Profit-Focused Accounting: Attaining Sustained Value and Bottom-Line Improvement. J. Ross Publishing, Incorporated. Boca Raton, FL, USA.

Olve, Nils-Göran & Petri, Carl-Johan & Roy, Jan & Roy, Sofie 2003. Making scorecards actionable: balancing strategy and control. John Wiley & Sons Ltd. Chichester, West Sussex, England.

Olve, Nils-Göran. & Roy, Jan & Wetter, Magnus 1999. Performance Drivers: A Practical Guide To Using The Balanced Scorecard. John Wiley & Sons. New York.

Patton, Michael Q. 2002. Qualitative Research and Evaluation Methods. Sage Publications.

Phills, James A. 2005. Integrating Mission and Strategy for Nonprofit Organizations. Oxford University Press, Incorporated. Cary, NC, USA.

Rampersad, Hubert K. 2006. Balanced Scorecard. The Way to Individual Happiness, Personal Integrity, and Organizational. Effectiveness. Information Age Publishing Inc. USA.

Sadler, Philip 2003. Strategic Management. Kogan Page Ltd. Milford, CT, USA.

Simons, Robert 2000. Performance measurement & control system for implementing strategy: text and cases. Prentice Hall. Upper Saddle River, N.J.

Stainback, Susan B. & Stainback, William C. 1988. Understanding and Conducting Qualitative Research. Kendall/Hunt. Dubuque, IA.

Sveiby, Karl Erik 1997. The new organizational wealth: managing & measuring knowledge-based assets. Berrett-Koehler Publishers, Inc. San Francusco, CA.

Swart, Juani & Kinnie, Nicholas & Purcell, John 2003. People and performance in knowledge-intensive firms: A Comparison of Six Research and Technology Organisations. Chartered Institute of Personnel and Development. London.

Sydänmaanlakka, Pentti 2000. Älykäs organisaatio. Tiedon, osaamisen ja suorituksen johtaminen. Kauppakaari, Helsinki.

Yin, Robert K. 2003. Case Study Research: Design and Methods. Third Edition. Sage Publications, Inc. Thousand Oaks, CA.

Not printed

Alvesson, Mats 2000. Social identity and the problem of loyalty in knowledge-intensive companies. Journal of Management Studies, vol. 37, issue 8. 1101–23. Downloaded in April 2011.
< http://onlinelibrary.wiley.com/doi/10.1111/1467-6486.00218/pdf>

Brown, Terry & Bush, Patricia & Nordberg, Lennart 2001. Building Executive Alignment, Buy-In, and Focus with the Balanced Scorecard SWOT. Downloaded in March 2011.
<http://www.tetriscg.com/downloads/ExecutiveAllignment AndBuyIn_CR.pdf>

Bourne, Mike & Mills, John & Wilcox, Mark. & Neely, Andy & Platts, Ken 2000. Designing, implementing and updating performance measurement systems. International Journal of Operations & Production Management. Vol. 20, No. 7. 754-771. Downloaded in March 2011.
<http://www.emeraldinsight.com/journals.htm?issn=0144-3577&volume=20&issue=7&articleid=849266&show=pdf>

Centre for Wireless Communications. 2011. Downloaded in January 2011. <http://www.cwc.oulu.fi>

Chan, Yee-Ching L. 2004. Performance measurement and adoption of balanced scorecards. A survey of municipal governments in the USA and Canada. International Journal of Public Sector Management Volume: 17 Issue:3. 204-221. Downloaded in April 2011.
<http://www.emeraldinsight.com/journals.htm?issn=09513558&volume=17&issue=3&articleid=868024&show=pdf>

CWC Annual Review 2005. Internal document.

CWC 2009. Strategic Research Agenda for Wireless Connectivity, Networks & Communication 7.2.2009 (v. 0.5). Internal document.

CWC Wiki 2011. Downloaded in January 2011. <https://www.ee.oulu.fi/research/cwc/wikis/ cwc/FrontPage>

FINLEX-Valtion säädöstietopankki 2011. Act of Universities. 558/2009, 1:2. Downloaded in December 2010. <http://www.finlex.fi/fi/laki/kaannokset/ 2009/en20090558.pdf>

Jungman, Hannu & Okkonen, Jussi & Rasila, Tommi & Seppä, Marko 2004. Use of performance measurement in V2C activity. Benchmarking: An International Journal 11(2). Downloaded in January 2011. <http://www.emeraldinsight.com/journals.htm?issn=14635771&volume=11&issue=2&articleid=843107&show=pdf>

Kaplan, Robert & Norton, David 1992. The Balanced Scorecard – Measures that drive performance. Harvard Business Review. 123-45. Downloaded in December 2010. <http://www.marketmatch.com/content/download/1075/6422/file/BalancedScorecard.pdf>

Kaplan, Robert S. & Norton, David P. 1996b. Using the Balanced Scorecard as a Strategic Management System. Harvard Business Review, January–February. 75–85. Downloaded in December 2010. <http://portal.sfusd.edu/data/strategicplan/Harvard%20Business%20Review%20article%20BSC.pdf>

Kaplan, Robert.S. & Norton David P. & Barrows Jr. Edward A. 2008. Developing the Strategy: Vision, Value Gaps and Analysis. Balanced Scorecard Report, Jan 01. Downloaded in March 2011. <http://www.exed.hbs.edu/assets/Documents/developing-strategy.pdf>

Lee, S.F. & Ko, Andrew Sai On 2000. Building balanced scorecard with SWOT analysis, and implementing “Sun Tzu’s The Art of Business Management Strategies” on QFD methodology", Managerial Auditing Journal 15(1/2). 68 – 76. Downloaded in March 2011. <http://www.emeraldinsight.com/journals.htm?issn=02686902&volume=15&issue=1/2&articleid=868452&show=pdf&PHPSESSID=qkjc2772b521e6s3cvbr9jqkg7>

Leitner, Karl-Heinz & Warden, Campbell 2004. Managing and reporting knowledge-

based resources and processes in research organisations: specifics, lessons learned and perspectives. Management Accounting Research 15. 33–51. Downloaded in March 2011.
<http://www.angelfire.com/ak5/ceulfinanzas/8_making.pdf>

Lönnqvist, Antti 2001. Business Performance Measurement for Knowledge-Intensive Organizations. World Productivity Congress, Hong Kong - Beijing, China. 5-6. <http://www.tut.fi/units/tuta/teta/mittaritiimi/julkaisut/HK.pdf>

Neely, Andy & Richards, Huw & Mills, John & Platts, Ken & Bourne, Mike 1997. Designing performance measures: a structured approach. International Journal of Operations & Production Management 17(11). 1131-1152. Downloaded in March 2011.
<http://pessoas.feb.unesp.br/vagner/files/2009/04/aula-7_neely-et-al-1997.pdf>

Okkonen, Jussi & Pirttimäki, Virpi & Hannula, Mika & Lönnqvist, Antti 2002. Triangle of Business Intelligence, Performance Measurement and Knowledge Management. 2nd Annual Conference on Innovative Research in Management, May 9 - 11, Stockholm, Sweden. Downloaded in March 2011.
<http://www.tut.fi/ units/tuta/ teta/mittaritiimi/julkaisut/tukholma.pdf>

Orion Development Group 2011. Building the Balanced Scorecard in Public Sector Organizations. Downloaded in January 2011.
<http://www.odgroup.com/articles/public-sector-balanced-scorecard/>

Oulun yliopisto. Oulun yliopiston strategia vuosille 2010-2012. Downloaded in December 2010.
<http://www.hallinto.oulu.fi/suunnit/raportit/oy_strategia_2010-2012_final.pdf>

Rantanen, Hannu & Kulmala, Harri I. & Lönnqvist, Antti & Kujansivu, Paula 2007. Performance measurement systems in the Finnish public sector. International Journal of Public Sector Management 20(5). 415-433. Downloaded in December 2010.
<http://www.emeraldinsight.com/journals.htm?issn=09513558&volume=20&issue=5>

Social Research Methods 2011. Research Methods Knowledge Base. Qualitative Methods. Downloaded in March 2011.
<http://www.socialresearchmethods.net/kb/qualmeth.php>

Starbuck, William H. 1992. Learning by Knowledge-Intensive Firms. Journal of Management Studies 29(6). 713–740.
<http://onlinelibrary.wiley.com/doi/ 10.1111/j.1467-6486.1992.tb00686.x/pdf>

Sveiby, Karl Erik. 2003. Knowledge workers and professional development. Don't think traditional education and corporate training. Think better management skills! Draft Paper. Downloaded in March 2011. <http://www.sveiby.com/articles/ Kworkerdvlpment.htm#_Toc57520801>

The Balanced Scorecard Institute. Balanced Scorecard Basics. Downloaded in January 2011. <http://www.balancedscorecard.org/BSCResources/AbouttheBalancedScorecard/tabid/55/Default.aspx>

Ukko, Juhani & Tenhunen, Jarkko & Rantanen Hannu 2008. The impacts of performance measurement on the quality of working life. International Journal of Business Performance Management, vol. 10, nr 1. Downloaded in December 2010. <http://inderscience.metapress.com/media/np330jyurqdwrc0ujn9m/contributions/2/4/q/6/24q611gu207gqm57.pdf>

Ukko, Juhani 2009. Managing through measurement: A framework for successful operative level performance measurement. Acta Universitatis Lappeenrantaensis 348. Lappeenranta University of Technology. Downloaded in February 2011. <http://www.doria.fi/bitstream/handle/10024/46886/isbn%209789522147950.pdf?sequence=2>

Westbrook, Roy 1995. Action Research: A New Paradigm for Research in Production and Operations Management. International Journal of Operations & Production Management. Vol. 15, Iss. 12. 6-20. Downloaded in April 2011. <http://www.emeraldinsight.com/journals.htm?issn=0144-3577&volume=15&issue=12&articleid=848923&show=pdf>

Von Bergen, C. W. & Benco, Daniel C. 2004. A balanced scorecard for small business. Proceedings of the United States Association for Small Business and Entrepreneurship Conference. Dallas, Texas, 2004, January 15-18. Downloaded in March 2011. <http://usasbe.org/knowledge/proceedings/proceedingsDocs/USASBE2004proceedings-Vonbergen.pdf>

Wisniewski, Mik & Stewart, Derek 2004. Performance measurement for stakeholders. The case of Scottish local authorities. International Journal of Public Sector Management 17(3). 222-233. Downloaded in March 2011. <http://www.emeraldinsight. com/ journals.htm?articleid=868025&show=html>