CREATING PERFORMANCE MEASURES FOR WAREHOUSING AND PRODUCTION

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Abstract

This thesis is qualitative case study about performance measurement and how to create a performance measurement system into warehousing and production environment. Thesis client is HUB logistics Oy and during thesis work the performance measurement system is created to their unit in Lahti. HUB logistics is a Finnish specialized in logistics outsourcing and logistics services. Unit in Lahti handles logistics operations for several customers and also provides value added services with production-alike methods.

Performance measurement system created in this thesis work is based on Balanced Scorecard (BSC) theory. The idea of BSC is to implement company´s strategy with financial and non-financial performance measures. In the case of HUB it was satisfied just to measure performance with the Scorecard, but the performance measures are linked to financial results. In future Balanced Scorecard is most likely taken into corporation wide use with central focus in strategy.

In this thesis theories of performance measurement, Balanced Scorecard, KPI´s and Performance pyramid are studied. A lot attention is given for project models for building a performance measurement system that are presented in literature. These project models are summarised in thesis and also compared in a small extent. Thesis presents also the project steps in HUB and the results of the project.

Keywords Performance measurement, Balanced Scorecard, KPI, Performance measurement system

Miscellaneous

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Tiivistelmä

Tämä opinnäytetyö on kvalitatiivinen tapaustutkimus tehokkuuden mittaamisesta ja mittariston luomisesta varastoinnin ja tuotannon ympäristöön. Työn toimeksiantajana on HUB logistics oy, jonka Lahden toimipisteeseen uusi mittaristo on työn aikana luotu. HUB logistics on logistiikan ulkoistukseen ja logistiikkapalvelujen tuottamiseen erikoistunut suomalainen yritys. Lahdessa HUBin logistiikkakeskuksessa hoidetaan usean HUBin asiakkaan logistisia toimintoja, sekä tarjotaan lisäarvopalveluita tuotannonomaisin työtavoin.

Työssä valmistettu mittaristo pohjautuu tasapainotetun tuloskortin, eli Balanced Scorecard (BSC) teoriaan. Tasapainotetun tuloskortin tarkoituksena on jalkauttaa yrityksen strategia taloudellisten ja ei-taloudellisten mittareiden kautta. HUBin tapauksessa tasapainotettua tuloskorttia tyydyttiin opinnäytetyön osalta toteuttamaan pääasiassa suorituskykymittaristona, joka kuitenkin on linkitetty taloudelliseen tulokseen. Tasapainotettu tuloskortti tultaneen ottamaan käyttöön laajalti HUBin organisaatiossa, ja myöhemmin strategia tulee olemaan tarkemmin tuloskortin keskiössä.

Opinnäytetyössä on tutkittu mittaamisen teoriaa, tasapainotetun tuloskortin teoriaa sekä avainmittarien ja suorituskykypyramidin teoriaa. Paljon on myös keskitytty kirjallisuuden esittämiin mittariston luomiseen liittyviin projektimalleihin, joista työssä esitetään tiivistelmiä ja pienimuotoista vertailua. Työssä käydään myös läpi projektin vaiheet HUBin tapauksessa sekä työn tuottamat tulokset.

Avainsanat (asiasanat) Suorituskyvyn mittaaminen, tasapainotettu tuloskortti, avainmittarit

Muut tiedot

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1 Introduction

This research is a qualitative case study about establishing a performance measurement system for warehouse and production environment. The client of this research is Hub logistics Oy, and the focus is unit in Lahti. Hub logistics is a logistics service provider who´s main field is outsourcing of inbound and outbound logistics and warehousing, as well as logistics consulting. Hub logistics has its headquarters in Kerava. Premises in Lahti handle the logistics and warehousing for several customers, from which biggest is a leading Finnish mobile network operator. Operations in Lahti include warehousing, inbound and outbound logistics, order picking, packaging, product modifications, quality control and more. (HUB logistics 2012, 2013)

The reason for the research comes from management´s concern about the real performance of the unit. At the moment of initiating the research almost all the measuring that existed was collecting the needed data for billing and paying salary. Results from these indicators were collected, but not really analysed and no real picture of performance, and especially the progress in performance, existed. Good performance measurement system was needed to gather the important and needed information and that information should be used in management decision making. Research was limited to premises in Lahti.

Research of performance measurement is important in field of logistics as the supply chain performance and supply chain management is growing its importance, especially in Europe. In these days of growing globalisation and reduced barriers for international trade customers expect shorter lead times, and improvements in information availability allow them to expect better communication and surveillance of supply chains performance. (Gunasekaran, Patel and McGaughey, 2004 334) Without knowledge of suitable performance measurement systems and methods this demand is hard to fulfil.

Having a view about what should be measured, why should be measured, how to benefit from measuring are very essential things for an engineer to know. Every field of business and public sector can benefit from good measurement system. All companies adopt some scale of performance measurement. Only in a world of unlimited resources it would not be necessary. (Bond 1999 1318)

1.1 Thesis client HUB logistics

HUB logistics Finland Oy is a part of HUB logistics -corporation, which is a logistics service provider founded in 1992. Company is owned by Finnish private persons.

Company is specialized to logistics services offered to trade and industry sector. The main functions are supplier network management, procurement logistics, logistics outsourcing, warehousing solutions, packaging and packaging services, industrial packages and logistics specialist services.

With outsourcing solutions HUB offers its customers the complete realization of the agreed logistic process, personnel management and process development according to customer strategy. Services offered are flexible, tailored and profitable for the customer. If needed, HUB logistics acquires the required personnel and equipment for the task.

Company values are strong grip of operations in practice, carrying responsibility in all situations, satisfied customer and win-win-win situation in all operations (winners are customer, service provider and end customer). Hub logistics is growing rapidly, total number of personnel is 350 and turnover 23,5 M in 2012. (HUB logistics 2012, 2013)

1.2 Purpose and goal of the Thesis

Performance measurement has been somewhat neglected in the focal unit of HUB logistics in Lahti. Warehouse manager is always busy as he is managing three units in different locations and the time needed to study deeply the performance in any of the units is huge. When it comes to management of these three small units, it can be done by a single manager without too much burden. These daily routines, though, take all the working time. As it is ideal to any business to grow and increase profits by better performance, some simple and easily obtained performance measures are needed to solve this problem.

The goal of this thesis is to build up a performance measurement system, which is time saving and for a measurement system most simple in kind. Ideal would be that the data for measurement already exists, but now it would be pointed out clearly and investments for the measurement system would not be needed. Another goal is to obtain knowledge of performance measurement theories and especially Balanced scorecard to the organisation of HUB logistics. (Rantanen 2012)

1.3 Research problem

Research problem is how to measure performance and how to establish performance measurement system (PMS). At the time of starting the research project there was no actual PMS in use, and the data gathered from production was collected for piecework payment and billing. Data which was gathered was not analysed or there was no actual performance figures conducted.

A challenge for the project is that in the unit there is no common enterprise resource planning (ERP) software in use, so in practice all the data should be collected manually to excel sheets from which they would be transferred manually to another excel sheet (scorecard). As this is where we stand, it is obvious that regardless of the number of measures, nature of measures and cycle of updating, this scorecard will require extra usage of time even though the time needed should be minimized by carefully considering the suitable measures. (Rantanen 2012)

1.4 Research methods

Research methods can be divided into qualitative and quantitative. Difference of these two main divisions are not always clear (Hirsjärvi, S. Remes, P. & Sajavaara, P. 2007, 131-133). Quantitative research is focused in conclusions from earlier researches and theories and qualitative is more about real, natural situations. Typical for qualitative research is that the research plan changes as the research goes on. (Hirsjärvi et al 2007 136, 160)

Qualitative and quantitative researches are not clearly different methods, but more like different approaches towards research. They are considered to be complementary to each other and it can be that quantitative phase precedes the qualitative phase. Sort of a distinguishing feature could be that quantitative research focuses more on numbers and qualitative more on meanings. (Hirsjäriv et al 2007 132-133)

Quantitative research is often used in social sciences. Typical for this method are conclusions from earlier studies and theories as well as presenting hypothesis and definitions. Qualitative research aims collecting comprehensive information, most favourable from natural and real situations by using real persons as a source of information.

Ann Manning Fiegen states in her research *Systematic review of research methods: the case of business instruction* that most of the business instruction studies (51% of the sampling) are done by qualitative case study method. This method was found the most suitable for this research as well, because this thesis shall be used in some extent as an instruction of Balanced scorecard for HUB logistics. (Fiegen 2010 393)

1.5 Research limits

This research is limited to certain performance measurement theories (Balanced scorecard, Performance pyramid, Key performance indicators) and their differences, similarities and characteristic. Main focus is on the creation process of measurement system. The result of this research is a Balanced Scorecard which is limited to logistics centre in Lahti. Balanced scorecard is at its best as a strategic tool for whole organisation, but very common for organisations is to take it in use first in one organisational unit. (Malmi, Peltola, Toivanen 2006 76; Kaplan & Norton 1996 36)

2 Performance measurement theories

Performance measurement is considered costly in Small and Medium size Enterprises (SMB), which HUB logistics can also be categorized. It has even been stated that performance measurement is a luxury. Of course there is a certain cost of building up a measurement system and managing the measures needs time which is money. The cost-benefit relation is very seldom analysed, but the benefits from increased quality, faster cycles and better sales are almost always achieved as a result of improved performance measurement (Neely, Gregory and Plats 1995 83-84).

The most ultimate purpose of doing business and all the processes included in business is to obtain profit for owners, and in a way that is the ultimate purpose of measurement as well. In performance measurement the increased profit comes from increased process quality, shorter time cycles and increased sales. As it is said, you get what you measure.

Performance measurement is important in successful management. In ISO 9001:2008 quality standard, process approach and continual improvement of the quality management system plays central role. Continuous improvement becomes difficult when there are no exact performance figures available, and often the case is that management does not suffer lack of information, but instead the relevant data is hard to catch from the flood of information (Bond 1999 1318)
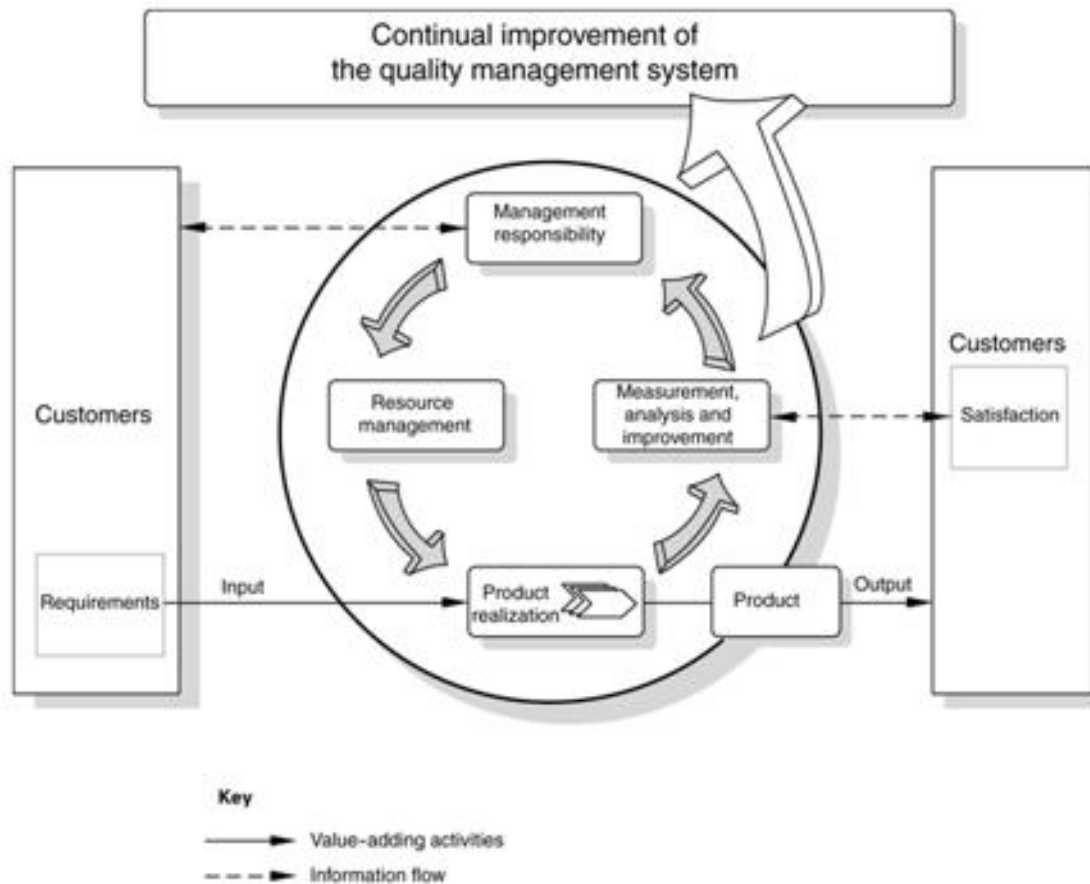
Figure 1. Model of process-based quality management system. Source: Jorgensen, Remmen, Mellado 2006

2.1 Process-based quality management

Figure 1 shows the model of process-based quality management system. This figure illustrates how management should communicate with customer about product requirements (information flow), and product requirements then work as input for product realization (value-adding activities). Value-adding activities output is the product itself, which is sold to customer. Now when quality improvement is on our mind, we should find out the customer satisfaction. This, of course, needs measures which can be analysed, and according to results actions should be done. As it is said, this is a continual improvement, so it continues as a cycle with communication between management and customer. Although it is expressed as a cycle, all these processes in the cycle are ongoing: communication, resource management, production and measurement should not be put on a pause.

ISO 9001:2008 recommends also using of Deming´s PDCA approach for any process. PDCA comes from Plan, Do, Check, Act. In plan-phase are established the objectives and processes needed to deliver wanted results. Do-phase is for implementing previously produced plan, check-phase is for monitoring and measuring the processes and products and then reporting results, and the final act-phase is for doing needed actions according to results in order to improve process performance. (SFS-EN ISO 9001. 2008, Bond 1999 1320)

ISO 9001:2008 demands following:

> *"The organization shall plan and implement the monitoring, measurement, analysis and improvement processes needed*
>
> *a) to demonstrate conformity of the product,*
>
> *b) to ensure conformity of the quality management system, and*
>
> *c) to continually improve the effectiveness of quality management system."*

It is also required to measure customer satisfaction, process quality and product quality. Knowing this it is therefore clear that every certified company must have adequate measurement system in order to fulfil certificate demands.

2.2 Balanced scorecard

Balanced Scorecard (BSC) was originally introduced by Kaplan and Norton in an article "The Balanced Scorecard – measures that drive performance" published in Harvard business review January-February 1992. In the first place it was a measurement system but from it quickly evolved into a strategic management tool. When building up a measurement system, BSC is a good approach if it is intended to have measures which are linked together and to have them as a scorecard to make it easy to follow whole organizations performance with one look. In addition to that, BSC can be transformed in to a management system when it´s true power can be used. (Kaplan & Norton 1996 preface viii, 19, Niven 2006 12)

Traditionally in twentieth century financial information has been the one that interests companies, and all the measurement has been related to that perspective. Anyway, all the financial measures which you can collect are showing facts from history. Steering a company according to only this information is like driving from rear mirror. This type of measures are called "lagging" indicators, sort of an outcome measures. In BSC these lag-indicators are reinforced with lead-indicators, which work as performance drivers. The word "balanced" in the name of this theory stands for the fact that well constructed BSC should have a balance of financial and non-financial measures as well as balance between lag and lead indicators. (Kaplan & Norton 1996 7-8, Niven 2006 2-3)

BSC sets measures originally on four perspectives:

- Financial
- Customer
- Internal process
- Employee learning and growth

It is not uncommon to change, add or reduce these perspectives: it all depends the on the purpose which BSC is build. Perspectives most likely vary, and it should be kept in mind that originally these perspectives were developed during a project including twelve companies, so it is not self-evident fact that these perspectives are best for all. (Malmi et al 2006)
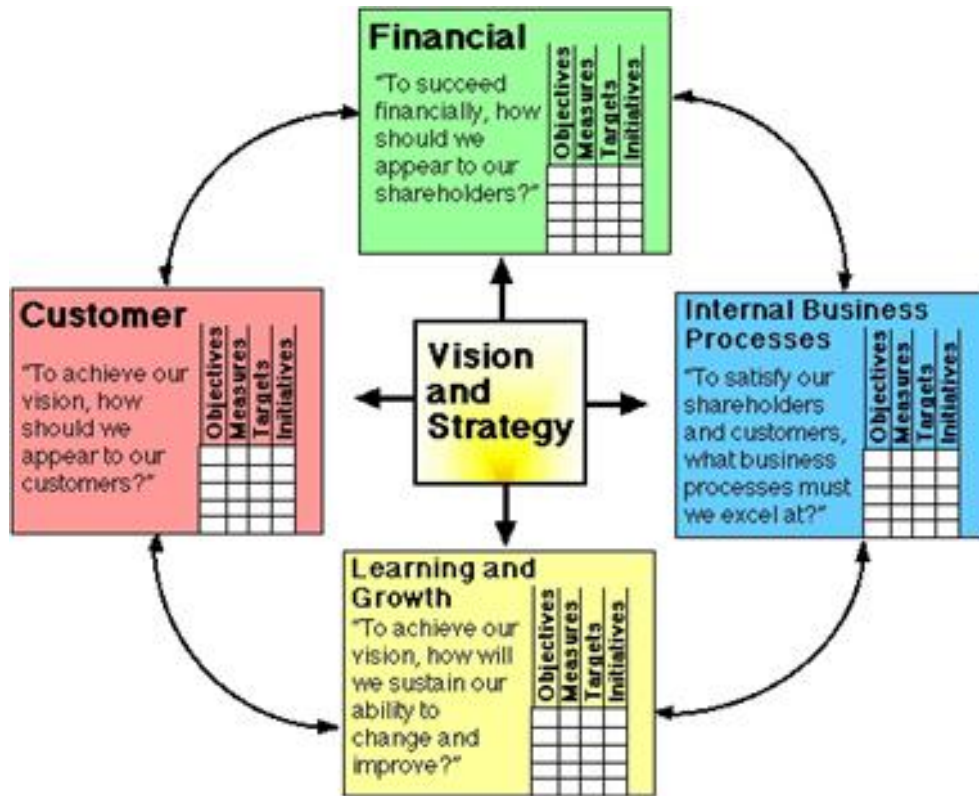
Figure 2. Four perspectives of Balanced Scorecard. Source: http://www.balancedscorecard.org/bscresources/aboutthebalancedscorecard/tabid/55/default. aspx

Figure 2 illustrates these four basic perspectives of BSC. This figure is from balancedscorecard.org webpage, but it is made in accordance to Kaplan and Norton´s model from *Harvard Business Review (January-February 1996): 76.* Figure shows how vision and strategy should be linked to each of these perspectives, as well as each of the perspectives link to others. Kaplan and Norton also address a question within each of perspectives to clarify what is the perspective about, for example, with customer perspective: "*To achieve our vision, how should we appear to our customers?"*. As one starts with thinking of objectives and measures for this perspective, it is helpful to think those in reflection to this question.

This idea of different perspectives is the key issue with balanced scorecard. By using different perspectives by which the objectives and measures are selected the strategy can be viewed more clearly. Financial measures are important, although Kaplan and Norton give critic for financial measurement for it being history information, but money is the king in business after all. Customers are important to any business, because that is where the money comes from. Internal process´s enable customer to be served, and for excelling with internal process´s is talented people needed and that is why employee learning and growth is also important. (Kaplan & Norton 1996 25-29, Niven 2006 13-16)

Strategy maps are an excellent innovation if you want to make sure that your measures are linked to strategy and to each other. Strategy maps answer to question "What we have to do well in order to succeed". In strategy map you link the objectives and measures by cause and effect- linkages, like "proper training" is linked to "fewer defects" or by measures "training hours" and "number of defects". Ready strategy map is graphical representation of the objectives and their linkages and with one look employees can understand the strategy better. (Niven 2006 97-99)
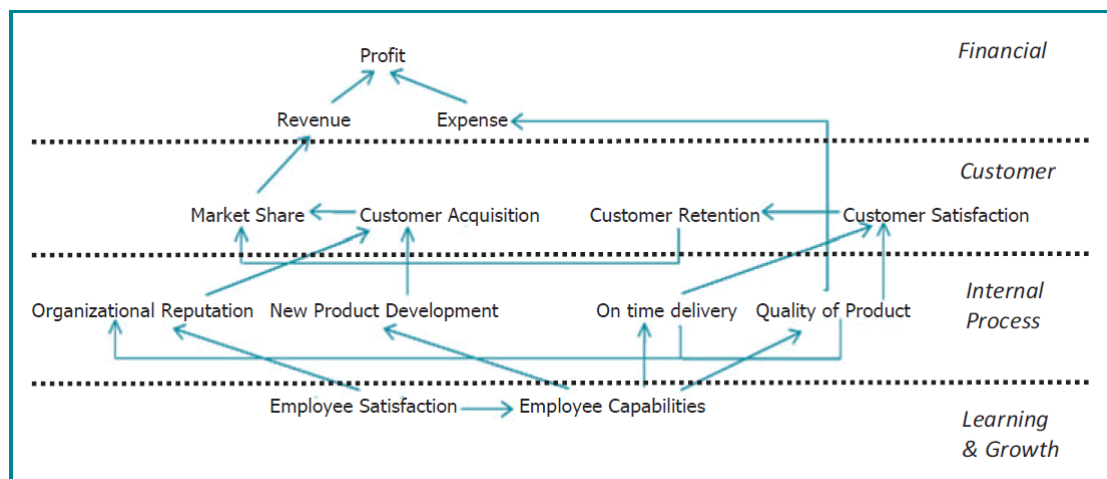
Figure 3. Strategy map. Source: Rompho, 2012

Figure 3 shows an example of a strategy map in which the four classic perspectives are on the right forming four levels on the map, and measures for each perspective are shown on the corresponding level. Measures are connected with arrows to show their cause-and-effect linkages. This strategy map was used in Nopadol Rompho´s research concerning usefulness of strategy maps. Dr. Rompho concluded, that strategy-map itself does not provide remarkable extra value for decision making, but is a very powerful tool if enough additional information about the measures correlation is given, and also how to interpret the map. (Rompho 2012 63)

Objectives and indicators

Best way to ensure that you are measuring strategy execution with your measures is to first think of objectives for each perspective. What it comes to perspectives, it is not a necessity that perspectives are those four suggested by Kaplan and Norton (financial, customer, internal processes, employee learning and growth). Depending on the strategy and nature of the business, some other perspectives can be more useful. Some examples could be "innovation", "environment" or "leadership" or something else. Simply choose those perspectives which suits best for your strategy. (Niven 2006 111)

For the financial perspective the ultimate objectives are increased productivity and revenue, which means that it would be advisable to set objectives for cutting costs, increasing sales and so on. Financial objectives have the risk of short term financial objectives winning long term goals, but despite that financial goals are important to be set. (Niven 2006 112)

For customer perspective it is important to first think about the customer discipline: is it operational excellence, product leadership or customer intimacy? Operational excellence aims to be the most efficient with operations which then leads to possibility to have cheapest prices in the market. If the chosen discipline is this, objectives most likely relate to price, defects and convenience. With product leadership it is aimed to have to best products on the market, and important objectives could be, for example, strong brand image and functionality of products. Customer intimacy attempts to have long, partnership-alike customer relationships and in this case objectives most likely relate to customer knowledge and relationships duration. When considering the outsourcing business, in which HUB is in with, customer intimacy is clearly the strategy. (Niven 2006 114-118)

Internal processes can be categorized to four different process clusters: operations management processes, customer management processes, innovation processes and regulatory and social processes. Operations management include the routine activities in a company, and objectives as well as measures in this section are often related to output rates, throughput times, and contacts in a day or something similar, depending on business type. Customer management objectives could be linked to customer retention, products sold etc. (Niven 2006 119-121)

Regulatory and social processes are things related to good reputation, occupational health and safety, waste management or other environmental issues, and objectives could be set from that point of view as well. Employee learning and growth is the cornerstone of the BSC. In a way, this perspective is the foundation of success for a company. Objectives for this perspective could be, for example, employee motivation. (Niven 2006 122-124)

The actual measures for BSC are planned on the basis of objectives for these perspectives. By doing this way it can be made sure that you are measuring something which is relevant for your strategy execution, as you have first chosen objectives according to your strategy.

2.2.1 Strategy

In business world strategy should set guidelines for company and its goals and with strategies companies try control their operations and their environment (Kamensky 2004 19-21.) Tony Morden (2007 184) summarises strategy as follows:

> *"Strategies determine how enterprise intends to carry out its activities during the time horizons to which it is working, in order to achieve its objectives"*

Michael E. Porter introduced a strategy theory called competitive strategy in 1980´s (Kamensky 2004 19-21). Competitive strategy, as Porter puts it, is about being different. (Porter 1996 62-65) The most important thing with competitive strategy is to find competitive advantages compared to your rivals. How to achieve it, then maintain it and even strengthen it? It is all about concentrating to relevant and ignoring irrelevant and relevant is everything that customer values. (Kamensky 2004 223)

Henry Mintzberg (1987) explained strategy with model of 5Ps:

- perspective
- plan
- pattern
- position
- ploy

Plan and pattern represent the process of strategy. Planned strategy can also be called as deliberate and emergent strategy is a pattern of actions by which the planned strategy was eventually implemented.

Some managers see strategy as a position and some as a perspective. Strategy is considered as a position when entering a typical product to untypical (new) market is considered as a strategic decision, meanwhile someone who sees strategy as a perspective considers the same decision as non-strategic because the product was typical for the company. Neither one of the ways is incorrect; it is only about how you see it. (Mintzberg 2007 1-8) Strategies are also often used as ploys to retain, strengthen or take over market position. (Morden 2007 185)

What is a good strategy?

In his article "What is strategy?" published Harvard business review November-December 1996 Porter criticised that companies occasionally put operational excellence above strategy in their priorities. It seems like companies compete with operational excellence instead of different strategies. Porter mentions few companies like Ikea and Southwest Airlines Company who have done successful strategic positioning and differentiate their selves from rivals with their strategic positioning. For Ikea, for example, one of the brilliant strategic decisions which provided their success was their self-service model for order picking and furniture assembly. This gave possibility to have nice designs, good materials but still keep cheap prices. (Porter 1996 62-65)

2.2.2 BSC for different purposes

Most of all Balanced scorecard is today considered as a strategy tool more than just a measurement system. BSC translates strategy into a set of comprehensive performance measures. (Kaplan & Norton 1996 24) In ideal situation BSC can play three different roles in an organisation: communication system, measurement system and a strategic management system. (Niven 2006 13)

As a communication system Scorecard shows to leaders, stakeholders and employees the performance of organisation and by strategy maps scorecard tells you is the current performance enough for achieving strategic goals. These strategy maps are the most brilliant thing in BSC as the creation of these maps forces you to think how your measures links to each other and which type of overall picture they bring. When all the objectives and measures are linked together in a map form, it gives a good and comprehensive idea for employees about what should be done in order to execute the strategy. (Niven 2006 16-18)

The role as a measurement system is somewhat obvious, as the whole scorecard is set of measures. For the measuring, though, Scorecard is a better approach than just a bunch of non-linked, separate from each other, and sometimes even irrelevant and conflicting, measures. When considering cause-and-effect linkages while building a strategy map, one is able to confirm, that everything important is included in measurement system and any of the measures is not irrelevant. When the measures are considered from the business´s four key perspectives, the measurement system will efficiently capture the organisational performance as a whole. (Niven 2006 18-19)

As a strategy management system BSC gives its best. As previously stated, BSC captures strategy to set of objectives and measures measuring the accomplishment of that objective. The challenge with strategy often is that it is not clear for employees, but when dressed as clear objectives strategy reaches the understanding of the most people. (Niven 2006 20)

In strategy execution one faces four barriers: vision, people, resource and management barrier. Vision barrier means the difficulty to catch the point from strategy. If company's strategy mentions, for example, "excellent process quality", many could wonder that how it is in practice. Then when management sets measures as "defect rate" and target value 0,5% it is more obvious what is considered as excellent level of processes, and this way BSC overcomes the challenge of vision barrier. (Kaplan & Norton 1996, Niven 2006 10, 20)

People barrier could be defined so that despite the new measures and objectives, people may not find how their daily activities really have an effect on strategy execution. With BSC all the levels of organisation and all the actions are linked to strategy and by cascading the BSC through the shop floor to the management level everyone are able to figure what their job can offer for strategy execution. (Niven 2006 11, 21)

People barrier might occur for BSC project itself. "Not invented here" – syndrome, aka NIH syndrome might occur when trying to start with BSC project. In NIH syndrome management feels threatened, does not trust or does not understand unfamiliar theories and wishes not them to be taken in use in their organisation. (Webb, Thoen and Sander 2010 83) Senior management NIH syndrome is a relevant risk, for example, in new product development projects and for some extent it can be avoided by active and visible senior management commitment in projects. (Owens 2007 247)

Resource barrier comes from the fact that companies must plan investments according to funds and the benefits from the investments. In ideal situation management receives initiatives as a steady flow, but some of the initiatives are worth of investing, some are not and this distinction is not always self evident, plus all the managers tend to have their pet projects which they want to be funded. With well structured scorecard the strategy has been delivered more clearly for everyone and initiatives can be evaluated in contrast to objectives in strategy and to see which initiative is most likely to lead us to wanted result. (Kaplan & Norton 1996, Niven 2006 11 22)

Jeroen De Jong and Deanne Den Hartog have found in their research that providing resources (time and money) is essential for promising ideas to develop into a useful product. Even if the management is enthusiastic about an idea but does not provide any resources, it might cause employees to lose their faith to the idea which kills the whole project. Innovative results go hand in hand with resources, and on the opposite, financial rewards promised for useful initiatives often do not bring wanted results. Therefore correct allocation of resources is important in development work, and BSC helps to evaluate most important development objects. (De Jong & Den Hartog 2007 55)

Management barrier is the heaviness of decision making. Often a lot of time is spent by management with discussing about different variances and problems, but with balanced scorecard the strategy related performance is right there on your scorecard. (Kaplan & Norton 1996, Niven 2006 11 22)

BSC offers good approach for not only enterprise-wide, strategic performance measurement, but as well for smaller purposes. Shi-Ming Huang, Chia-Ling Lee and Ai-Chin Kao have found in their research that BSC fits very well as a measurement tool for information security projects (Huang, Lee and Kao 2006 252). From HUB logistics it has been requested to investigate suitability of BSC to work as a performance measurement and communication system in contractor – customer relationship. (Salminen 2013)

2.2.3 Critic for BSC

It is very common that new theories receive critic, sometimes for reason, sometimes not. BSC is sometimes criticised for linking strategy to scorecard, because that is considered impossible. Secondly, it is stated that measuring strategy execution cannot be done by few measures. Thirdly, if strategy is not good, BSC helps to implement wrong strategy. In a way that is not fault of BSC, but still. (Malmi et al 2004 232, 233)

In his book *Rethinking performance measurement: beyond balanced scorecard* Marshall Meyer captures the problem of BSC as follows: it is said that "What you measure is what you get", but if you cannot measure you do not get what you want. By this Meyer means that best possible performance measures do not exist, and you cannot get one even with BSC. Therefore you end up linking bad measures to each other and consider that as your strategic story. (Meyer 2003 4)

Meyer states that linking measures to each other does not provide any extra value and measures that are linked together are not really linked but uncorrelated. For example, if customer satisfaction is linked to bottom-line results, why to measure customer satisfaction if, by using that logic, you can find the level of customer satisfaction by measuring bottom-line result. (Meyer 2003 3)

Performance measurement is an important issue for any company, and it is rather difficult to get done properly. Often the case is that you do not measure enough, only financial information which is only showing your past performance, nothing about present state or future prospects. On the other edge you might be measuring too much and collecting even the useless information, and the burden from heavy measurement system and pressure caused by different indicators has been sometimes stated as the key source of burnout. (Meyer 2003 1) Also in HUB the scorecard team was worried about that too scientific and complex measures might cause a loss of interest for the whole measuring project as if it is felt too difficult, time consuming and hard to understand.

2.3 Performance pyramid

As another strategic measurement tool in addition to BSC could be mentioned Performance pyramid. Performance pyramid divides a company in 4 levels instead of perspectives, and those levels form a hierarchy. In this idea, the objectives are to be set from up to downwards and measuring happens from down to upwards in the hierarchy. On the top of the pyramid is the Vision, and below vision are Business units and Marketing and Financial measures. On the third level of hierarchy is operational processes and the bottom of the pyramid is the departments and teams where the objectives are transformed into exact goals for exact measures as trough put time or quality. (Neilimo & Uusi-Rauva 2005 308-309)

Financial measures receive the highest level in measure hierarchy. These are then broken down to the next level into three issues: Customer satisfaction, Flexibility and Productivity. These then are reduced to more exact measures in operational level, including issues as Quality, Delivery, Cycle time and Waste. This model is considered to capture the most relevant in a company. (Bond 1999 1319-1320)
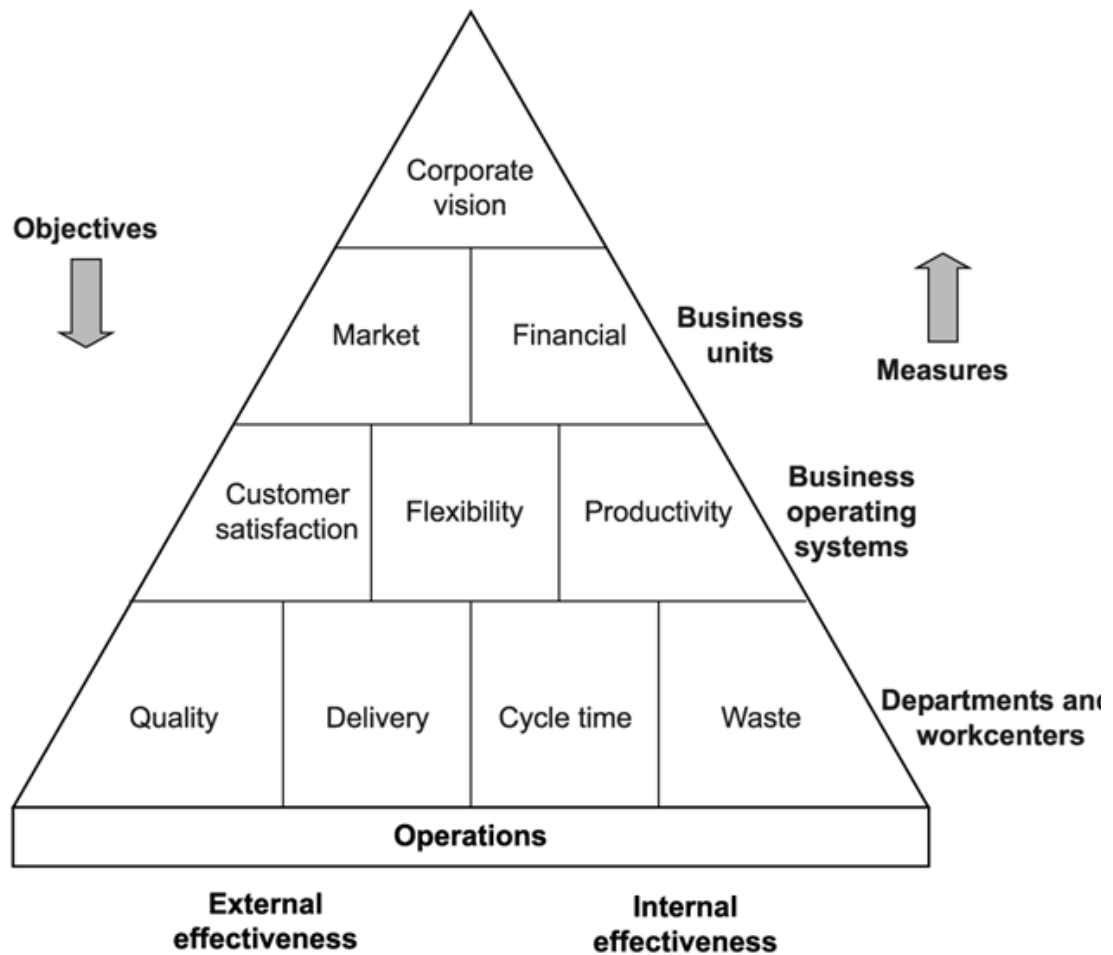
Figure 4. Perfromance pyramid by Lynch and Cross. Source: Tangen 2004

Figure 4 shows the formation of performance pyramid. As a picture it comes more clear how measures in lower levels measure the objectives in upper levels.

2.4 Key performance indicators (KPIs)

One option for performance measurement system is to establish a set of relevant KPIs. This idea is more straight forward performance measurement without as strong strategy linkages as with BSC and performance pyramid. KPIs are relevant for BSC and performance pyramid system as well, because both systems include some KPIs. According to Malmi, Peltola and Toivanen (2006, 50) Jukka Puiro (2001) has even found that 28% of organisations that use BSC find it most of all KPI system.

Key Performance Indicators (KPI) are indicators which are thought to be the most relevant for some operation or process. KPI´s are used widely in various industries as they stress attention to the most important issues and help to develop operations to the right direction. In performance measuring one of the problems is to realize what should be measured, because anything can be measured but everything is not worth of measuring. Idea of KPI´s lays here, that you should figure out which are the key factors for that particular operation in question and then start to measure those and analyze the results. To succeed with this, critical success factors should be found out. (Parmenter 2010 7)

KPIs are not that self-evident in practice, because each company, process, operation, strategy and problem is different. After all the idea of performance measuring is to manage processes and find problems straight as they occur, and this should be done with genuine, numeric data gathered from the process and for each sort of process the important data to be gathered is of course different. In manufacturing you consider, for example, through-put times, materials used and machine hours and in sales you consider customer contacts, relation of contacts and deals and things like that. (Krauth, Moonen, Popova and Schut 2005 241)

Parmenter (2010 6) identifies seven characteristics for a KPI:

1. Non-financial measure

2. Frequent measurements

3. A measure that is noticed by the management

4. Everyone in the organisation has an understanding for the KPI

5. Responsibility connections to individuals and teams

6. Significant effect

7. Positive effect

If the measure in question does not comply with these characteristics, then it might be that it is not really your KPI although it might seem to be important measure.

On the web page of KPI standard are expressed sub-categories of KPIs. Here is a straight quota from the webpage:

"Key performance indicators define a set of values used to measure against. These raw sets of values, which are fed to systems in charge of summarizing the information, are called indicators. Indicators identifiable as possible candidates for KPIs can be summarized into the following sub-categories:

- *Quantitative indicators which can be presented as a number.*
- *Practical indicators that interface with existing company processes.*
- *Directional indicators specifying whether an organization is getting better or not.*
- *Actionable indicators are sufficiently in an organization's control to effect change.*
- *Financial indicators used in performance measurement and when looking at an operating index."*

Source: http://kpistandard.com/ *referred 5.4.2013*

In companies and organizations it often happens that there occurs some misunderstanding of what actually are the KPIs and what actually should be measured for which purpose. Parmenter divides performance measuring to four different kinds of measures: KRI (Key result indicators), RI (Result indicators), PI (Perormance indicators) and KPI (Key Performance Indicators). According to Parmenter, these measures can be defined in a following way:

KRI	Tells you how you have done in a perspective of critical success factor.
RI	Tells you what you have done.
PI	Tells you what to do.
KPI	Tells you what to do to increase performance dramatically.

Table 1 Indicators explained. Source: Author

In many companies measures from each of these categories are all just KPIs even they all do not show what should be done as it is the purpose of KPI´s. This is not dramatically wrong, but when clearly understanding the different characteristic of each of this measures those can be used more efficiently. Parmenter illustrate the linkage of these measures in an onion analogy.
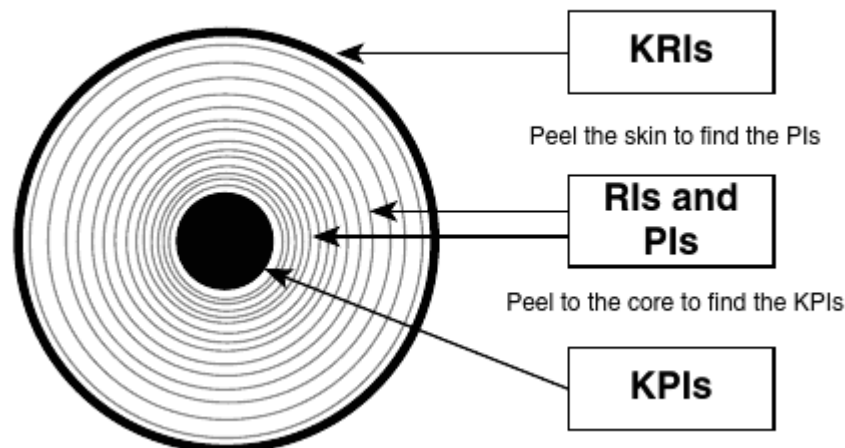
Figure 5. Onion analogy of different measures. Source: Parmenter, 2010.

If we here consider measuring as an onion, we can see KRIs as the outer layer and we can clearly see our key results. To obtain more information, we should peel the skin and RIs and PIs which are behind the KRIs which we just saw. By studying these RIs and PIs, we can recognize the KPIs which are the core of the onion. (Parmenter 2010, 2)

Paul R. Niven presents one good way to evaluate KPIs. In this method KPIs get points if following statements are true:

- Linked to strategy: This is a key idea of BSC, and as Niven studies KPIs in the context of BSC it is obvious to be mentioned at first.
- Countable: Specific, numeric values are better in measurement, because they are easier to compare and more exact than some verbal evaluation as a measurement method.
- Available: If the information is already available in ERP or it is gathered for customer anyway, it is easy to implement in scorecard. When you need to find new ways to collect some data, or even invest something, reconsider.
- Understandable: KPI should be clear, and if there occurs discussion is big or small value for some KPI good or bad, you should think is the whole KPI useful.

- Balanced: In scorecard there should be so-called lag and lead measures, and each KPI should be either lag or lead measure for some other KPI and the scorecard should be therefore balanced with lag and lead measures. If some KPI is neither one, reconsider.
- Meaningful: After a closer look, many measures may appear to be irrelevant for the performance. Avoid these measures in scorecard.
- Commonly agreed: It is a lot safer to measure something which is measured commonly among the same industry than to figure out your own special measures. (Niven 2002, 146-150)

3 Building a measurement system

First thing for building a new measurement system is to recognize the need for it. Paul R. Niven (2006, 40) refers to Michael R. Vitale and Sarah C. Mavrinac and their book Management accounting where they have listed seven things which might tell you whether you need a new measurement system:

"Signs that you may need a new performance measurement system:

- Performance is acceptable in all dimensions except profit
- Customers don´t buy even when prices are competitive
- No one notices when performance measurement reports aren´t produced
- Managers spend significant time debating the meaning of the measures
- Share price is lethargic despite solid financial performance
- You haven´t changed your measures in a long time
- You´ve recently changed your corporate strategy"

If the need for improving performance measurement of a company is discover, the next question certainly is "how to build it"? How to establish a performance measurement system is also the other research question in this study.

Literature offers several different, but still very similar ready-made guidelines for the creation project. Paul R. Niven, for example, has dedicated a whole book for establishment of a BSC: *Balanced scorecard step-by-step: maximizing performance and maintaining results.* The book has been published in two different editions, 2002 and 2006. Niven has also published a guide directed for government and non-profit agencies about the same issue. Similar project guides can also be found from Kaplan & Norton´s book *Balanced scorecard: Translating strategy into action* and also David Parmenters 12 step model of creating KPI measurement system in his book *Key Performance Indicators: developing, implementing and using winning KPIs* is surprisingly close to the project guides related to BSC.

3.1 Models for building BSC

As mentioned, the most original model for BSC project is presented by Kaplan and Norton in 1996. Kaplan and Norton underline systematic approach, fully engaged team and active participation and sponsorship of senior executives. Without these it is very unlikely that the project succeeds (Kaplan & Norton 2006, 294). First thing to do in BSC project is to set objectives for the program; why scorecard is built (Kaplan & Norton, 295). BSC should be helping with strategy implementation, and for it to happen strategy should be clear for the persons starting with BSC project. Otherwise it might become difficult to reflect the strategy with the scorecard, if the ones making the scorecard do not know the strategy. As a short summary, all the presented models for creating PMS emphasize the importance of executive commitment and building up an effective team.

Model by Kaplan and Norton

The actual building process which Kaplan and Norton suggest includes four "steps" which all include couple of activities. The process is described as a timeline in their book *"The Balanced Scorecard: Translating strategy into action"* and this timeline is shown in the Figure 6, made by the author in accordance to the original.

Figure 6. BSC project time-line by Kaplan and Norton

In Kaplan and Nortons model the project process starts with defining measurement architecture. This phase includes selection of organisational unit where the pilot of BSC will be carried out. Best option for suitable organisational unit is one with own products, customers, marketing channels and production facilities. Other task in this phase is to identify linkages between corporation and the strategic business unit (SBU) in question. This is for ensuring that the objectives of the SBU do not collide with interests of other units. (Kaplan & Norton 1996, 301-302)

Second step includes gathering background material by studying relevant company documents and by interviewing managers. In the synthesis session which is had with design team of scorecard the aim is to obtain a list of objectives, which are then approved by executives in the first workshop.

In the third step it is time for more hands-on planning of scorecard as the team plans for the proper measures included in the scorecard. Process for doing this suggested by Kaplan and Norton goes so that certain subgroups should define objectives in a clear verbal form and decide how to measure are we reaching our objective. At this point the objectives and measures are also linked together with cause-and-effect linkages among the perspectives and also from one perspective to another forming a strategy-map. Output from this is then presented to the executives in the workshop number two.

Last step is to develop an implementation plan. This work includes the practical issues about collecting the data from information systems. Executives will have third workshop in order to reach final consensus vision, objectives and newly created measures and agree the implementation plan for the scorecard implementation. Kaplan and Norton suggest that this project altogether should take 16 weeks of time.

Model by Niven

Niven offers a project model where project is divided into two main parts: planning phase and development phase, and both phases have several steps. This model was chosen to be the structure for the project in HUB as it describes the project in more detail and the whole book *Balanced Scorecard step-by-step: maximizing performance and maintaining results* is practically a project guide.

As a very first thing in planning phase Niven encourages to think why BSC is selected and forming a good rationale for the BSC in order to win opinions for favour for the project (Niven 2006 37). As well as Kaplan and Norton, Niven also emphasize the importance of executive sponsorship. For this kind of project which is going to change the way of doing and thinking in an organisation must have the trust and support of senior executives. If senior executives neglect ongoing BSC project, most likely BSC won´t be successful tool in an organisation.

Forming the BSC team is one of the critical steps in planning phase, as the team it the one which makes the magic happen with the project. If the team does not reach all the organisational levels and departments, the outcome might not reflect the strategy and tell the performance of the whole organisation but parts of it. Isolating parts of organisation completely out of the BSC project might also lead to situation where BSC is not considered equally important among the organisation. (Niven 2006 47-54)

Planning phase also includes formulating implementation plan and developing a communication strategy.

		Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Planning phase																						
Step 1:	Develop a guiding rationale for your Balanced scorecard		■																			
Step 2:	Determine the appropriate organisational unit			■																		
Step 3:	Secure exececutive sponsorship			■																		
Step 4:	Form and train your Balanced Scorecard team				■																	
Step 5:	Formulate your implementation plan					■																
Step 6:	Develop a communication strategy and plan					■																
Development phase																						
Step 1:	Gather and distribute background material							■														
Step 2:	Provide Balanced Scorecard education							■														
Step 3:	Develop or confirm mission, values, vision and strategy							■														
Step 4:	Conduct exececutive interviews								■													
Step 5:	Develop strategy map									■												
Step 5a:	Executive workshop									■												
Step 5b:	Gather employee feedback										■											
Step 6:	Develop performance measures										■	□										
Step 6a:	Executive workshop											■										
Step 6b:	Gather employee feedback												■									
Step 7:	Establish targets and prioritize initiatives													■								
Step 8:	Gather data for your first Balanced Scorecard report														■							
Step 9:	Hold your first balanced scorecard meeting																■					
Step 10:	Develop an ongoing implementation plan																	■	■	■	■	■

Figure 7. Schedule by Niven 2006

In development it is wise to start with collecting background material (interviews, company documents, studying measures which are used), sharing BSC knowledge for your team and studying mission, values, vision and strategy. As mentioned before, executive sponsorship is crucial for BSC project to be successful, therefore executive interviews are good opportunity to propose executives to support and really invest in the project. From interview you also obtain knowledge about what is executives view about vision, strategy, mission and values and what should be accomplished with BSC project.

Strategy maps are one of the most brilliant ideas of BSC and Niven suggests building up strategy maps from performance objectives decided by the BSC project team. Performance objectives should be linked together forming a strategy map. This strategy map should be presented to executives for them to approve in an executive workshop, and it would also be recommended to gather employee feedback about the project and objectives so far. This feedback collection could be used for sharing BSC knowledge among the organisation and winning minds in favour of BSC.

As objectives are in this phase agreed, each objective needs measures. Measures should also be approved by executive workshop, and also another round of employee feedback is possible but necessarily needed. If decided to collect the feedback, it would be advisable to use the opportunity and explain all the measures.

When objectives and their measures are ready follows an important but challenging step: setting targets. Good targets are very essential for successful implementation of measurement system. Targets should be set so that they are possible but not easy to reach, and this might be difficult to determine when just starting a new performance measurement system which might include even some new measures which have not been measured before. Still targets must be set; otherwise it does not make sense to measure if after measuring you do not unambiguously know are you doing fine or not.

After deciding targets it starts to be time for taking new scorecard in use and collect first data for it. This step might force to make some changes for measures if it occurs that same data is impossible or too difficult to gather in relation to benefit of measuring that.

3.2 Parmenter´s 12 step model KPI system

Parmenter (2010) suggest a 12 step model to really succeed with your KPI´s. Very often organizations just set up KPI´s and notice that it did not do much of a difference. If the project is taken seriously and done carefully and includes ongoing KPI development plan it has a lot more changes to improve your performance.

Parmenters steps are:

1. Senior management team commitment
   - Without the commitment of SMT project won´t be taken seriously
2. Establishing a "winning KPI" team
   - Well selected team members with right skill is essential, as well as teams direct connection to SMT
3. Establishing "just do it" culture and process
   - Team must believe to their selves and not to debate forever about measures to ensure project to be ready in time.
4. Setting up a holistic KPI development strategy
   - Time schedule, resources and implementation plan should be done

5. Marketing KPI system to all employees
   - Employees must be ready to change some of their ways of working.
6. Identifying organization-wide critical success factors
   - If CSF are known, correct winning KPIs can be set
7. Recording of performance measures in database
   - Performance measures need to be up to date, complete, and available to all employees
8. Selecting team performance measures
   - This way teams objectives can be clarified and improves job satisfaction when there is a goal for you and your team
9. Selecting organizational winning KPIs
   - Winning KPIs should link the daily activities to strategic objectives
10. Developing the reporting frameworks at all levels
    - Adequate reporting frequency is important in order to keep up to date and as well to avoid excess reporting.
11. Facilitating the use of winning KPIs
    - If SMT is not reacting changes in KPIs, employees lose their interest for achieving goals
12. Refining KPIs to maintain their relevance
    - As it is said, only change is permanent, so KPIs should be relevant on any current time. If products, processes, customers and organizations change, KPIs should as well

By following this process can be ensured that KPI project has the attention it needs and that the process is done carefully enough to ensure that the KPIs are the ones you really need.

4 BSC project at Hub logistics

Researches notes that many of the BSCs in use does not actually relate to the model presented in theory, and that is the case with the project in HUB logistics as well. In HUB the perspectives used were the same as with the theory, but BSC was studied more as a performance measurement tool than strategy implementation tool. Doing it like that is acceptable, as BSC originally was performance measurement tool, and applying theory for individual needs often provides the best result (Malmi et al 2006 24.) Even if starting with BSC by only focusing on performance measurement, it often leads to connecting strategy to the BSC in the future. Therefore, from the beginning it was clear that this balanced scorecard which we were making does not honour BSC theory in all its majesty: this is supposed to be a pilot of BSC, which is a new concept for the organisation, and it is only done for one location in the corporation. It does not follow strategy as it should; it is only a measurement tool. After all, research client order was better measuring system. With BSC this can be full filled, and as it always is, theory is theory, and after learning theory you should apply it.

Most often the BSC project starts like it did with HUB: a need for better measurement system, then the strategy advantage of BSC is realized. At the point of deciding which kind of measurement system will be made BSC was selected because of its popularity, a lot of information was available and the strategy connection as an extra feature which traditional KPI measurement system does not necessarily provide. Organisation needed a new measurement system, which BSC offers, but BSC offers also a lot of advantages related to strategy management as well. At the beginning BSC is used only as a measurement tool in one production unit, but perhaps later on it will be taken into use in the whole corporation and then the strategy side will be taken into focus. By starting from one production unit with only a faint linkage to strategy the project is rather easy to carry out, and during the project organisation receives knowledge and experience of BSC. On the basis of the experience from this pilot project it is easier to evaluate is it beneficial to expand BSC into whole organisation and then we also know what we are doing. As the proverb says, "learn to walk before you can run".

BSC was selected as the background for new way of measuring also because BSC is widely used in industries, and knowledge of this might be considered as a good reference among customers and also a product to be sold in consulting business. This idea shortly became as the second goal for the thesis; to obtain BSC knowledge to the organisation. As mentioned, BSC is a strategy tool which´s fundamental idea is to implement strategy in every day actions, and that is considered as an advantage of this theory. Later on as the results and experiences of this BSC project are known it is very likely that this concept is taken in corporation wide use and then mission, values, vision and strategy are reformed and BSC is linked to them.

Hub logistics has set strategy, vision and mission in corporation level, but those are not set or clearly discussed in unit level. Kaplan and Norton confirm that defining strategy for an individual strategic business unit, let alone a single production unit, is often very difficult and in that kind of scenario it would be very difficult to build a scorecard which implements strategy in a very fine way (Kaplan & Norton 1996, 301). And as it is said, HUB needed measuring tool more than a strategy tool (or perhaps it was needed as well but it is not the point now) and BSC offered a good way to build up a set of indicators. It was a conscious decision to leave strategy, mission and vision to still float in the air.

Kaplan and Norton discuss about two instances, in which BSC did not become a change driver or an integral part of the management process. In these instances the reason was most likely low involvement of senior executives in building process (Kaplan & Norton 1996 295). Project in Hub logistics suffered the same problem in theory, but practically the case was different. Senior executives were aware of project but were not involved, as the project officially was to create new set of performance indicators for premises in Lahti. Top management in Lahti was actively part of the project, but top management in Lahti unit are not senior executives of the corporation. In other words, the senior executive sponsorship was secured, but the senior executive is wrong word to be used in this matter.

As Kaplan and Norton as well as Niven suggest in their process models, in the beginning should be selected the suitable organisational unit. At HUB process went from a bit different path as the production unit was selected first and after that BSC as a corner stone of the new measurement system.

A lot of guidance was taken from Paul R. Niven´s book *Balanced scorecard step-by-step: Maximizing performance and maintaining results*. This book offers good tools for evaluating indicators, building strategy maps and it gives a ready framework in which to advance with the project.

During the project we followed the steps expressed by Niven, but applying them to our schedule and organisational needs. At the moment of initiating the project, we had the first edition from 2002 in which the steps are more straight forward than with the second edition 2006, and the more simple procedure fitted best to our small 30 person unit, and even from that process model we simplified our project model.

4.1 Project phases

In the very beginning there were discussions with management about suitability of BSC for this particular measurement issue. Reasoning behind BSC was approved and project was started. Project schedule was planned after Paul R. Niven (2002) steps, but some irrelevant steps were just ignored. Figure 8 shows the schedule which Niven suggestes.

	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	2
Balanced Scorecard projekt timeline																					
Planning phase																					
Step 1:	Develop objectives for your Balanced Scorecard	■																			
Step 2:	Determine the appropriate organisational unit		■																		
Step 3:	Gain executive sponsorship			■																	
Step 4:	Build your Balanced Scorecard team				■																
Step 5:	Formulating the project plan					■															
Step 6:	Develop a communication plan					■															
Development phase																					
Step 1:	Gather and distribute background material						■														
Step 2:	Confirm mission, values, vision and strategy						■														
Step 3:	Conduct executive interviews							■													
Step 4:	Develop objectives and measures								■	■											
Step 4(a):	Executive workshop																				
Step 4(b):	Gather employee feedback											■									
Step 5:	Develop cause and effect linkages												■								
Step 5a:	Excecutive workshop																				
Step 6:	Establish targets for your measures														■	■					
Step 6a:	Excecutive workshop																■				
Step 7:	Develop the ongoin Balanced Scorecard implementation plan																	■	■	■	■

Figure 8. Project timeline suggested by Niven (Niven 2002 64)

This earlier model by Niven (2002) gives it 16-20 weeks for the project, but of course it depends. It can vary between 4 to 12 months (Niven 2002 63). When compared to the latest Niven´s model in 2006, the differences are only small. In 2006 Niven gives more detailed steps, and HUB logistics was mainly looking for a rough plan that how to put up a scorecard. Therefore HUB used 2002- model and still some shortcuts was made.

		Week	26	27	28	29	30	31	32	33	34	35	36	37
Balanced Scorecard projekt schedule														
Planning phase														
Step 1:	Establishing goals for BSC		■											
Step 2:	Selecting target unit (Lahti)		■											
Step 3:	Securing executive sponsorship		■											
Step 4:	Building up BSC team			■										
Step 5:	Formulating the project plan			■										
Step 6:	Creating communication plan			■										
Development phase														
Step 1:	Collecting background information				■									
Step 2:	Confirming mission, values, vision and strategy				■									
Step 3:	Executive interviews					■								
Step 4:	Developing goals and indicators						■	■						
Step 5:	Executive workshop								■					
Step 6:	Employee feedback								■					
Step 7:	Creating strategy map									■				
Step 8:	Excecutive workshop										■			
Step 9:	Establishing target values										■			
Step 10:	Excecutive workshop												■	
Step 11:	Creating BSC continuos implementation plan													■

Figure 9. Project schedule in HUB.

In a figure 9 can be seen project schedule documented as the official plan for project at HUB. Weeks represent the actual calendar weeks in which the steps were executed. Biggest shortcuts were made in planning phase, which was actually done in two steps. Target unit was set already, executive sponsorship was not an issue and communication plan was considered irrelevant. Example models by Niven are guidelines for bigger, corporation wide BSC creation, so when making it in one production unit in which all the team members see each other every day and all the employees are closely connected in daily activities it was considered unnecessary to spend one week for planning communication. Sort of a communication plan was anyway made in which was decided how, when and which information should be shared for the whole staff at the unit. It was decided to establish a BSC-folder in common database of the Lahti unit, and we saved the BSC files and the minutes of each BSC meeting to that folder. Employees were encouraged to study materials, although it was up to individuals if they study or not.

Building up scorecard team

In a successful scorecard project the team is the key. When building up the scorecard team, you should be able to capture the right skills and positions in the organisation. Niven gives four roles for team members: executives sponsor, scorecard champion, team members and organisational change expert. Roles and responsibilities of each role could be sorted as follows:

- Executive sponsor: future "owner" of the scorecard. Executive sponsor should be able to influence other executives in favour of the project and commit time and resources for project to succeed. Executive sponsor should be able to make decisions and have the power to drive organisational change. For this role in the project was chosen Jarkko Rantanen, site manager of the unit in Lahti.
- Scorecard champion: champion should have the deep knowledge about BSC and he/she is the one who coordinates the project by arranging meetings and documentation etc. This role was assigned to Jukka Lanu, author.
- Team members: BSC team should capture the wide range of operations done in the unit, and team members should bring expert knowledge from the field to the team. For this role was selected suitable persons from different operations and different organisational levels; supervisors, foremen and floor-level workers who was. Operational experts chosen to the team were Kari Lindroos, Heidi Haverinen and Jarkko Vuontelo.
- Organisational change expert: In a team one should have a person who can investigate the moods in the organisation during the project and implementation phase. BSC should change the way of doing at least in some level, and every change causes some sort of reaction. In scorecard team there should be someone who is able to anticipate reaction for planned actions and guide the project into direction which pleases the whole organisation. For this role was selected health and safety representative Iiro Sievänen.

With the team building and during the project active management involvement was kept in mind in order to avoid NIH syndrome (Owens, 2007 247). Any of the meetings was not held without management representatives (foremen, supervisors) being present. The team members should be aware what they are in for with BSC project, so they received material and training about BSC theory and key concepts of the subject. With the team was also planned the schedule (Figure 9) and discussed about the goals of the project.

Collecting background information and planning the Scorecard

No one in the project group had practically no previous experience of BSC, so this project was an interesting trial in that sense. By this fact it was essential to collect some background information about the theory and key things about the theory was presented in a meeting with scorecard team. Also a short briefing was held to whole unit. For the scorecard team some printed material was also given.

For background information was also needed some data about what is measured at the moment, which systems are in use and how the usage of existing systems can be improved. It was a little bit disappointing, but not surprising, that only possible IT (information technology) system for measurement and data collection was Microsoft Excel. Disappointing because it means manual data input, not surprising because there is no common ERP system in use. Therefore it was planned to make a huge "excel monster" in which measurement is updated monthly under each measure, and then with formulas the data was brought to scorecard of each month to be able to study total performance with one view.

Strategy discussions and executive interviews

Company strategy was studied and discussed with unit management. The strategic objectives were mostly in corporation level. Of course growth, quality and profitability are things which can be affected by even the smallest things. BSC is stated to be at its best as a strategic tool, but at this point HUB decided to take advantage of the BSC as a measurement tool and leave the strategy part for later as mentioned.

As the project proceeds, strategy will be derived simpler and perhaps re-planned. Possibly a good moment to expand BSC would be next strategy publication and BSC implementation could be started directly for a brand new strategy.

Developing goals and indicators

The four perspectives were chosen to be classical ones: Financial, Customer, Internal Processes and Personnel, competence and development. Personnel, competence and development is not literally same as Kaplan and company presents in their theory, but HUB formulated it in the form which represents best what is wanted.

During numerous meetings objectives and their measures were suggested, evaluated, discussed, rejected, approved, changed, modified and finally the first set of measures was ready. During the process of choosing right measures and objectives, strategy-map with cause and effect linkages was also structured. While starting the strategy map and wondering "how do these objectives and measures really link together" the team found several irrelevant measures, as well as there was clearly something missing from the map. In Table 2 can be seen the first version of the scorecard with which was went off for the pilot phase. Several measures were considered difficult to measure (how the information can actually be obtained) and it was known and even intended to drop out some measures during the pilot phase. Some of the measures also seemed to be measuring almost the same thing but from a bit different aspect, and the pilot phase was supposed to sort out which measures were actually meaningful and which not.

Original number of measures was 22, which is well in range for suitable number of measures presented in theory. Parmenter (2010 3) mentions that BSC type PMSs often have about 20 measures, and Niven (2002 151) judges 15-30 as the common range of number of measures.

The scorecard in table 2 shows some measures and objectives with red colour instead of black as the majority of measures are expressed. Red ones were deleted after the pilot phase as a result of following reasoning:

- **Customer survey**: HUB was looking for dynamic performance measurement tool which would show as accurate as possible what is the current status of some issue. Customer survey is sent out annually which would mean that the measure would stick as a same figure for the whole year. Customer satisfaction is extremely important for HUB, no doubt about that, but keeping the same score for whole year does not sound very dynamic. Possibility for several surveys during the year was considered, but as there is about 5 business customers, would these 5 customers be willing to fill out our satisfactory surveys every now and then?

- **Investments share from turnover**: As a figure this perhaps interests the management and executives, but the problem was how to steer this measure? If the target is set to some percentage level, does it then mean that the decided share of turnover must always be invested to something, or should it not be invested more than the target is? These and several other questions were left open and these measure was removed.

- **Profitability reaching hours:** Idea of this measure was left a bit unclear, as there was the other measure under the same objective "Profitable hours / total hours". To open up these measures a bit, "Profitability reaching hours" was set to measure how many of our working hours have made profit. It is a very difficult approach, and pretty much same question is answered with measure "Profit / working hour" in Financial perspective.

- **Time wasted:** A daydream for lean manufacturing enthusiasts. Idea was to set a standard time to each operation in house and study how close we can get to those standard times in average. Shortly it became clear that most of daily routines in house was impossible or useless to set standard times because of the unique nature of operations. This idea, though, is not buried because it gives valuable information in those operations which it suits but for this BSC it did not fit.

- **Occupational satisfaction survey:** Important thing for any company, but was dropped out of BSC because of same reasoning than with "Customer survey". Problem here was that by erasing this measure it would erase the objective of "Employee satisfaction" if some other measure is not came up with. This is what happened, and when the day for BSC update comes this issue will somehow included to next scorecar.

- **Level of education and experience:** Operations in house do not need high level of education and needed experience can be achieved in months of time, so this measure does not give much of value in this work environment. Of course HUB still values education and experience, but measuring it in BSC was considered to be rather irrelevant.

Balanced scorecard		
Hub logistics Finland, Lahti		
Perspective	Goal	Measure
Financial	Profitability	Profit margin percentage
		Profit / working hour
	Growing turnover	TO growth percentage
Customer	Good quality	Complaints/shipments
		Customer survey
	Good supply certainty	Customer complaints of delivery times
	Profitable projects	Profit of individual projects
	Good profile	Tidyness follow-up
		Investments share from TO
Processes	Efficient space usage	Warehousing capacity utilization rate
	Profitable work	Profitable hours / total
		Profitability reaching hours
	Good quality of	Internal complaints
		Time wasted
		Average time of shipment
Personnel, competence and development	Committed personnel	Sick leave hours / working hours
		Staff turnover
	Employee satisfaction	Occupational satisfaction survey
	Systematic development	Development project throughput rate
		Initiatives
	Competent personnel	Level of education and experience
		Project based know-how

Table 2 Scorecard before entering the pilot phase.

Strategy map

Building the strategy map proved to be the most brilliant step of the project. When one links the indicators and goals to each other and sees which kind of tree they form one starts to realize how well the indicators and goals actually work together: do they show the strategy that was intended? With HUBs strategy map it was noticed that some things were missing an indicator and some indicators and goals were irrelevant as they were floating around alone without connection to other goals or indicators. This means that in same perspectives we are not measuring enough and in some others we are measuring something useless.
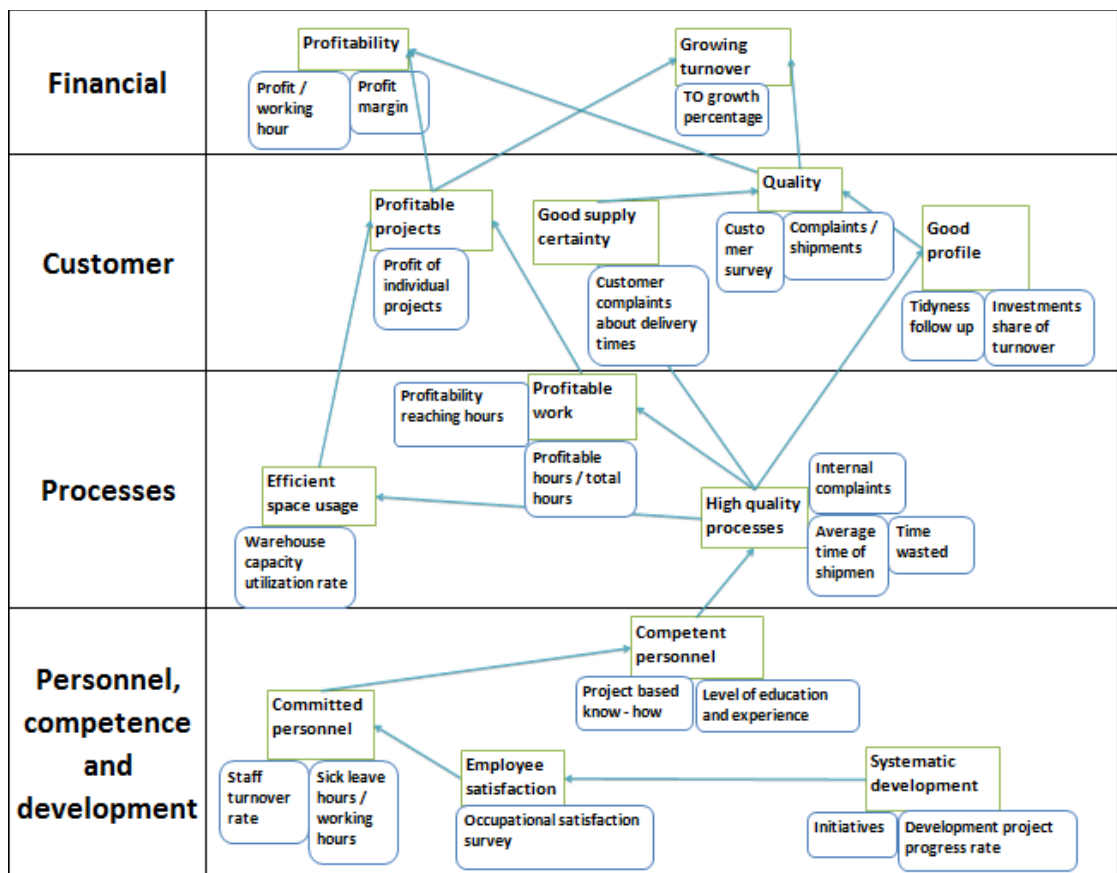

Figure 10. Strategy map before entering the pilot phase.

Figure 10. shows the strategy map as it was before the pilot phase with 22 measures. As mentioned, during the pilot phase some measures were dropped out and the scorecard which HUB Lahti is using for year 2013 can be seen in Appendix 1. Strategy map related to final scorecard for year 2013 can be seen in Appendix 2.

Target values

Indicators definitely need target values; otherwise there is no purpose for measuring. Setting targets is one very important phase of measurement system implementation. As the ultimate purpose of measurement is to obtain better profits by increasing output relatively lower input you need some targets for indicators. If you do not set target values, you satisfy to just observe your performance. How can your performance increase if you do not aim to anything? And if the performance drops, how can you be worried if you did not aim for increase in performance?

In order to get reasonable target values the pilot phase was important. During the 4 month pilot phase data for each measure was collected and studied the monthly variation as well as the reasons behind the variation it was easier to set targets for 2013. BSC is ought to be tied with bonus system, so it would be fair for every party to have reasonable but challenging targets.

Executive workshops, employee feedback

In the planning phase already goals and indicators were presented to CEO of HUB logistics Finland, Aki Jumppanen, who gave his comments and recommendations. Mr. Jumppanen gave good guiding and brought fruitful ideas. BSC was also presented to whole staff in small group meetings where everybody gained knowledge about the BSC we were making and got a change to comment. Before entering the pilot phase the strategy map was also presented to Mr. Jumppanen for him to comment and approve, as well as the suitable target values were discussed with him.

Pilot phase

In September 2012 the BSC was ready for use as planned. During the four month pilot period from September to the end of year 2012 BSC was filled monthly by the personnel assigned as responsible for each measure. For some measures the data was thought to be too difficult to catch and it was obvious to drop them out of the scorecard. In the beginning of 2013 BSC was to be reviewed and concluded that how it works, is it beneficial, are some indicators too difficult or irrelevant or should something else still be measured. In the beginning of 2013 the organisation in HUB Lahti changed remarkably and because of that and planned bonus system responsibilities for each measure were reconsidered and more carefully planned.

4.2 Results

After the pilot phase some indicators were considered as too difficult or too time consuming compared to their importance, and therefore some indicators were dropped out as stated before. Pilot phase gave good experience of BSC and indicated problems with ways to measure, attitudes for measurement and balance of resources:

- **Ways of measuring:** Some measures including data mining and calculations appeared to include high risk of mistakes. Measures involving money and time usage seemed to need more careful planning for which factors the measure actually includes, how to calculate it correctly, and how to express the end result.
- **Attitudes:** During the pilot phase BSC was not a management tool, actually hardly even a measurement tool. Data was collected late, and after receiving data and inputting it to scorecard it was forgotten and ignored. Presenting the BSC results to employees was superficial and BSC gain no interest and new recruit did really even know that the measurement system existed. For implementation plan the BSC was set to more central part of management, monthly results must be analysed and publicity of current performance should be emphasised.
- **Balance of resources:** Some measures include certain portion of extra work, and even the amount of extra work being very minor it some cases caused people to leave measures without the needed attention. This issue includes also a problem beyond balanced scorecard: does all the work fall for the same and few people? Even if this is the case or not, in final implementation BSC should win more minds than it does now, and people should be able to see that they benefit from it somehow. This also emphasises the importance of publicity of BSC results.

Final version of scorecard (Appendix 1) with 16 measures has been in use since January 2013. As an ongoing implementation plan measures were given under responsibility of certain members of personnel and ways of informing all employees regularly about results was agreed. Persons who are responsible of a measure must collect the information and also critically evaluate, is the information still relevant. Situations always change, and something which we are measuring now is not necessarily important to measure after, say, five years. Before entering a new fiscal year the scorecard is re-planned with management and executives to ensure its relevance for current situation and changes are possible to make even during the year if some matter requires HUB to make changes. What it comes to informing employees, the results from last month are shown on the screen located in social room at the unit.

5 Conclusions

Goals for the thesis were to set new performance measures, build a new performance measurement system, and as a "sub-goal" to obtain knowledge of BSC into organisation. New set of performance measures was successfully obtained through new PMS, which proves both main goals to be achieved. Most of the data which is collected for the scorecard exists already, even though for some measures data must be gathered from different databases and then combined. This of course consumes time and reduces the reliability of measurement as it increases risk for human errors when collecting data. This problem occurs only with couple measures, from which one (Profit from individual projects) is really problematic, and HUB is currently solving the problems. Generally BSC clearly fulfilled the expectations.

Knowledge for organisation was fulfilled, and it starts to prove to be good thinking as customers are already showing interest towards BSC measurement (Salminen 2013).

BSC should be a mixture of financial and non-financial measures and that it is in HUB. Final scorecard efficiently captures key processes in HUB and links that performance to financial results and that is what was wanted from the scorecard.

Chosen perspectives, *Financial, Customer, Internal Processes and Personnel, competence and development* seem to work well in HUB´s organisation. Perspectives are pretty much according to original BSC theory, only the last perspective was edited to a bit different form. Anyway, *Personnel, competence and development* means nearly the same as *Employee learning and growth*.

Certain issues proved to need and receive most focus and attention during the planning and implementation of the project. Every theory for PMS building project seemed to emphasize the importance of executive sponsorship, and that is also one notice from this project. Without executive sponsorship the project team at HUB could have lost interest for the project in the middle of all hurries at summer vacation time, but as the top management was clearly committed to project it had to be pulled through in time and with Good project could also be ruined with mistakes in team selection. If BSC project manager misses to catch the best creativity from organisation or misses some critical operational branches, BSC might not be measuring all that is needed. If organisational change expert appears to be in opposition for the project or lacks the skills of convincing majority in organisation in favour of BSC, it might put the successful implementation of BSC in jeopardy.

Here we get to the other fact relating to people. Attitudes towards BSC in the organisation are crucial in order to receive full benefits from the scorecard. Somehow employees should be motivated to pursue the targets set for each measure. In HUB the motivation was the interest for increased information sharing: employees like the fact that they know how they are doing.

Analysing the results is important part of measuring. After the scorecard is finished, the first results should be analysed with critical mind. If the results do not follow the cause-and-effect linkages which was thought to you should find out why. Also, the measuring is done to support decisions in first place, and to achieve that results should always be analysed and corrective actions must be made if some measures are clearly showing decrease in your performance or financial result.

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Appendices

Appendix 1. Final version of scorecard

Balanced scorecard		
Hub logistics Finland, Lahti		
Perspective	**Goal**	**Measure**
Financial	**Profitability**	**Profit margin percentage**
		Profit / working hour
	Growing turnover	**TO growth percentage**
Customer	**Good quality**	**Complaints/shipments**
	Good supply certainty	**Customer complaints of delivery times**
	Profitable projects	**Profit of individual projects**
	Good profile	**Tidyness follow-up**
Processes	**Efficient space usage**	**Warehousing capacity utilization rate**
	Profitable work	**Profitable hours / total hours**
	Good quality of processesses	**Internal complaints**
		Average time of shipment
Personnel, competence and development	**Committed personnel**	**Sick leave hours / working hours**
		Staff turnover
	Systematic development	**Development project throughput rate**
		Initiatives
	Competent personnel	**Project based know-how**

Appendix 2 Final version of strategy map

Financial		
	Profitability — Profit / working hour, Profit margin	Growing turnover — TO growth percentage

Customer: Profitable projects (Profit of individual projects); Good supply certainty (Customer complaints about delivery times); Quality (Complaints / shipments); Good profile (Tidyness follow up)

Processes: Profitable work (Profitable hours / total hours); Efficient space usage (Warehouse capacity utilization rate); High quality processes (Internal complaints, Average time of shipmen)

Personnel, competence and development: Competent personnel (Project based know-how); Committed personnel (Staff turnover rate, Sick leave hours / working hours); Systematic development (Initiatives, Development project progress rate)