Strategy Performance Management of IT Systems

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The realization of the strategy cannot be agreed if it is not measured. Building a measurement requires two things: understanding of the strategy and understanding of the measured information system. The strategy performance of the organization is often measured using the balanced scorecard. This research shows that balanced scorecard can also be used for measuring the strategy performance of an information system.

The research consisted of six phases:

- Theoretical research
- Selecting the framework for the research
- Collecting information about the strategy
- Analysing the interviews and forming the KPIs
- Creating the automatic measurement dashboard
- Analysing the initial results

The theoretical research discusses about strategy and measurement. It defines what the strategy is, what the measuring is, how strategic performance is measured and how IT is measured.

The information system balanced scorecard by Martinson, Davison and Tse was selected as the framework. However, it did not meet all the requirements. It was changed with two major alterations before it was used.

When this thesis work was started, there was very little useful material about the strategy of Santander Consumer Finance Oy. Therefore, it had to be collected by interviewing the top management. The interviews were transcribed. The transcriptions were coded, and a code-book was created. The most important quotations were copied to an excel sheet. The connections between the quotations were recognized. The direct KPI suggestions from the interviewees and the KPIs lead from the discussion were collected and analysed.

Finally, the selected KPIs were implemented using Microsoft PowerBI. The results show that Aplat is currently performing strategically very well. However, the KPIs showed, that there will be major problems with the future readiness. The created dashboard was working as expected.

This thesis work suggests future research for fitting the balanced scorecard framework working better with information systems. The alterations done in this thesis needs more reasoning. Also, the generalization of the automated measurement system serving many systems at the same time is a potential future research subject.

**Keywords**

strategy performance measurement, balanced scorecard, automated dashboard, framework, KPI, IT systems
# Table of contents

1 Introduction – Strategy - Labour and Capital .......................................................... 1
   1.1 Target system .................................................................................................... 2
   1.2 Objectives ........................................................................................................ 3
   1.3 Research questions .......................................................................................... 3
   1.4 Scope ................................................................................................................ 4

2 Methodology ............................................................................................................. 5
   2.1 Sampling the data ............................................................................................. 6
   2.2 Finding themes ................................................................................................. 7
   2.3 Building codebooks ......................................................................................... 8
   2.4 Building a conceptual model .......................................................................... 8

3 Strategy, measurement, measuring strategical performance and measuring IT performance .......................................................................................................................... 11
   3.1 Strategy ........................................................................................................... 11
      3.1.1 What is strategy? ....................................................................................... 11
      3.1.2 The history of strategy: Art of War ......................................................... 12
      3.1.3 The history of strategy: Art of Business .................................................. 12
      3.1.4 Strategy in the business today ................................................................. 13
   3.2 Measurement .................................................................................................... 14
      3.2.1 What is measuring? .................................................................................. 14
      3.2.2 The history of industrial measuring ....................................................... 14
      3.2.3 Measuring strategical performance ......................................................... 15
   3.3 Aplat performance measurement framework comparison ............................ 17
      3.3.1 IT-project performance measurement ..................................................... 17
      3.3.2 IT service performance measurement .................................................... 20
      3.3.3 Software quality measurement ............................................................... 21
      3.3.4 Balanced scorecard for information systems .......................................... 26
   3.4 Theory conclusions and framework selection ............................................... 30

4 Implementation of the research - measuring the strategical performance of Aplat ........................................... 33
   4.1 Summary of the interviews ............................................................................ 33
   4.2 Results of the interview analysis .................................................................... 40
      4.2.1 Business Value KPIs .............................................................................. 41
      4.2.2 Internal Process KPIs .............................................................................. 47
      4.2.3 Future readiness KPIs .............................................................................. 50
      4.2.4 User orientation KPIs .............................................................................. 56
   4.3 Starting point measurement results ................................................................... 60

5 Conclusions .............................................................................................................. 63
   5.1 Objectives ......................................................................................................... 63
   5.2 Research questions ........................................................................................... 64
6 Discussion................................................................................................................................. 66
  6.1 Outcome of the research for Santander Consumer Finance Oy.......................... 66
  6.2 Generalization of the research results................................................................. 67
  6.3 Need for further research..................................................................................... 67
  6.4 Acknowledgements............................................................................................... 68
References........................................................................................................................................ 69
Appendices.................................................................................................................................. 74
  Appendix 1. Predefined interview questions .......................................................... 74
  Appendix 2. KPI area suggestions.............................................................................. 75
  Appendix 3. Codebook................................................................................................. 76
  Appendix 4. Matrix of the most important quotations (CONFIDENTIAL)............ 77
  Appendix 5. Initial measurement dashboard 1/2 (CONFIDENTIAL)..................... 78
  Appendix 6. Initial measurement dashboard 2/2 (CONFIDENTIAL)....................... 79
1 Introduction – Strategy - Labour and Capital

Strategy deployment for the employees is a largely discussed subject. A google scholar search with “deployment strategy employees” returns over 240,000 results. There is a great number of different methods to deploy the strategy to employees and to measure the results. Karl Marx defined the ability to product goods forming from commodities. The main commodities are labour and capital. Consequently, labour-power is a commodity which its possessor, the wage-worker, sells to the capitalist (Marx, 1849, 19). However, deploying the strategy to IT systems, which can be considered as a commodity of the capital – modern time machinery – is not as common subject with strategy performance measurement. During this research it appeared, that there was only one usable framework for information system strategy performance measurement which was based on balanced scorecard. Even it was not good enough but needed major alterations before it could be used.

Santander Consumer Finance Oy has taken a good care of deploying the strategy to the employees. The intranet has many strategy documents. Every year employees participate at least one day in a strategy workshop. The chairman of Banco Santander, Ana Botini, came out with the new strategy in 2014. The main pattern for the employees is Simple, Personal and Fair (Chapman, 2014). The strategy deployment is steered and measured carefully with for example inquiries, interviews, feedbacks, reward systems and several tangible measures.

When a new IT system is developed to support the business, the measures are set for the project. In the end of the project, the KPIs are evaluated and the success level of the project is agreed. The next time the developed system is measured, could very well be during the next bigger development cycle where new KPIs are set for the new project. Of course, in this situation the KPIs cover the area of the new project, not necessarily the whole system. Continuous strategy performance measuring of IT systems could be missing. Another thing is that the KPIs for the projects do not necessarily have to align with the strategy. They can be led from the daily management needs without straight connection to the strategy. This can be good in some cases, but it proves the second difference between deploying and measuring the strategy to IT systems. The IT system project measuring often emphasis tangled KPIs, such as ROI. For example, the ITIL KPIs do not say anything about the business coherency of IT systems. It rather discusses about service level, service availability, service continuity, project management, release and deployment, etc (Kempter, 2017). The current emphasis on financial leads to the ‘unbalanced’ situation with regard to other perspectives (Sharma, 2009, 10). This means that forming the KPIs
only based on the economical facts seems often insufficient and even unfair way to set the measurement. Especially, when at the same time the labour is measured with a number of other intangible KPIs.

To make sure the coherence with the company strategy, the IT systems needs a set of continuous measurements in the same way as the employees. This would also help evaluating the effects of the smaller software changes made during the maintenance. There is not much research about this subject available. This thesis work is trying to find a way to build a continuous measuring system and a dashboard to show the metrics.

1.1 Target system

Santander Consumer Finance is the biggest car finance company in Finland. According to Autoalan tiedotuskeskus it held over 40% market share in the auto loans in the end of 2018. The other consumer products are Closed End Loan and Sales Finance. The similarity between all these products is the need to fill in a loan application. Filling in the loan application can be carried out by the dealer or the end customer. Since the beginning of year 2017, Santander Consumer Finance Oy has developed a new platform for the loan applications. It is called Aplat. Aplat is going to be a unified platform for all the loan applications. Its main function is to collect information needed for the loan applications from various sources, to combine the information and to feed it to the banking system for scoring and getting the loan decision. It can be considered as an information funnel, see picture 1. The need for Aplat was represented by the former Commercial Director Hannu Heliö. Heliö claimed Aplat being strategically the most important development project in Santander at least within the next five years. Thus, Aplat is a good target for planning and testing the continuous strategy coherence measurement.
1.2 Objectives

The objectives of this thesis work were bound to the need to find a stable way to measure if the software is carrying out the strategical goals. The strategical goals were bound more on the company strategy rather than any other part of it, for example IT strategy.

The objectives for the thesis work are as follows:

- To find a framework that enables an information system strategical performance measurement
- To find the KPIs for the measurement
- To build an automated strategic performance measuring system for Aplat using the selected framework
- To measure the starting point with the created measuring system
- To comment the strategical performance of Aplat based on the KPI values

1.3 Research questions

The research questions of the thesis work are as follows:

- RQ1: What is a suitable framework for building the measuring system?
- RQ2: What is the strategy of Santander Consumer Finance Oy?
• RQ3: Which strategic goals are supposed to be achieved with Aplat?
• RQ4: What are the preferred measured subjects, what are the KPIs?
• RQ5: How does Aplat perform in the initial measurement?
• RQ6: What should be changed in order to make the results better?

1.4 Scope

The thesis work consists of the following major phases:
• Finding a suitable framework for the strategy performance measurement
• Gathering and analysing information about the strategy
• Creating a measuring system
• Measuring Aplat and analysing the results

The general idea of the thesis work is to enable strategy performance measurement of an IT system so that the measures are mapped directly to the company strategy rather than to for example IT strategy. This research does not take a stand on the strategy itself.

Gathering information about the strategy aims to get the measured subjects. The selected framework must support continuous measurement for the IT systems. The framework must be able to support the vast majority of the found measurement objects. The selected measurements must be able to be automated. The challenge is to use intelligent technologies to model the manual intervention present in current systems and automate both the flow of information from operational to tactical to strategic layer, representing data to the information stage of RTBI, and the actions necessary to translate strategic objectives back to operational drivers to effect strategic decisions in real time (Azvine, Cui, Nauck, 2005, 216).
2 Methodology

To gain understanding in the strategy and measurement areas and to find a framework that enables measuring of the IT system strategy performance, this thesis work was started with a rather large theoretical study. The main sources are earlier research reports and articles, literature and publications.

The applied research of this thesis work was a case study, where the strategical performance of Aplat was measured. The framework selected in chapter 3.3 was used when forming the measurement tool.

The Aplat strategical performance measurement was carried out in five main phases:

1. Finding a framework for the research
2. Getting a strategy data collection of the Santander Consumer Finance Oy
3. Analysing the data collection and selecting the KPIs
4. Doing an initial measurement
5. Analysing the results

Conducting qualitative research interviews however requires from the interviewer careful planning and preparation and use of various skills, such as intensive listening and note taking. When interview is used as a research technique, the researcher needs to develop as much as possible expertise in the topic so that good quality, informed questions can be asked (Sandy, Dumay, 2011, 239). The researcher has worked for Santander Consumer Finance Oy for almost five years. Also, the research of the literature and earlier research has given expertise to be able to interview.

Semi-structured interview technique sets in between two extreme interview types: structured, where the questions are strictly predefined to collect large amount of data and analysing the answers might take less time and unstructured interview in which the questions and direction can change and evolve during the interview. Semi-structured interview is a popular technique due to its flexibility and it allows the interviewer to change the order of questions or wording based on the situation (Sandy, Dumay, 2011, 244-246). The data collection was gathered by interviewing seven members of the local management team using a semi-structured interview method. All local management team members, except for the HR representative were interviewed. The HR function is the only function that does not have direct touchpoint to Aplat. Forming and deploying the strategy is on the responsibility of the local management team. The interviews were semi-structured using a set of pre-defined, open-ended questions. The predefined interview questions are shown in ap-
The interviewees had possibility to express their weightings and bring topics from outside the set of predefined questions. The interviews were held in between May 5th and May 30th 2018. An interview took on average about 60 minutes. The difference between the shortest and the longest interview was about twenty minutes. In the beginning there was a short introduction, where the big picture of the thesis work was discussed and the objectives for the discussion were told to the interviewee. After the general discussion, the interviewees were introduced to the framework and suggested KPIs and KPI areas. The preliminary KPI area suggestion is shown in appendix 2. KPI area means a subject for the KPI but not a ready to use KPI with quantified metrics. The interviews were all in English even though all the interviewees are native Finnish speakers. All discussions were recorded. The initial transcription was done using IBM Watson artificial intelligence speech-to-text API. The quality of the automated transcription was a disappointment. After all the transcription was done also manually. The transcripts are altogether ninety pages.

The analysis of the transcriptions was based on the Handbook of Qualitative Research, second edition, by Norman K. Denzin and Yvonna S. Lincoln. The transcriptions were read two to three times before the coding was started. Coding is the heart and soul of whole-text analysis. Coding forces the researcher to make judgements about the meanings of contiguous blocks of text. The fundamental tasks associated with coding are sampling, identifying themes, building codebooks, marking texts, constructing models (relationships among codes), and testing these models against empirical data (Denzin, Lincoln, 2000, 780). The judgement was done by the researcher based on the understanding gathered in the last five years at Santander Consumer Finance Oy.

2.1 Sampling the data

Investigators must first identify a corpus of texts, and then select the units of analysis within the texts. Selection can be either random or purposive, but the choice is not a matter of cleaving to one epistemological tradition or another (Denzin, Lincoln, 2000 780). Sampling was done mainly by selecting the interviewees. The interviewee selection is handled in chapter 3. As the transcription was long, also some discussed themes were not taken in account when selecting quotations for the further analysis. For example, the Nordic 20 by 2020 strategy and discussions about the goal of car financing market share exceeding 40% was voided. 20 by 2020 was used in the warmup phase of the interviews and many of the interviewees did not have much interest on it. Market share discussion was used as a teaser to challenge the interviewees.
Before starting the formal analysis, a word cloud was created from the transcription. First a Word macro was created. It lists all the words from the document distinctively and counts the number of occurrences for them. It appeared, that the transcription formed of 2543 distinct words. The list was cleaned up by removing all the words having less than 21 occurrences because otherwise the word looked messy. Also removed was words that were person names, some pronouns, some prepositives, articles, than, of course, am, so and too. After the data clean-up there was 201 words left. The word cloud is presented in the picture 2. It does not tell anything about the results as such, but it does reflect the spirit of the interviews. Therefore, it was a helpful tool during the analysis phase guiding what should be emphasized in the general level.

![Word cloud](image)

**Picture 2, Word cloud made of the interview transcribes**

### 2.2 Finding themes

Themes are abstract (and often fuzzy) constructs that investigators identify before, during, and after data collection. Literature reviews are rich sources for themes, as are investigators own experiences with subject matter. More often than not, however, researchers induce themes from the text itself (Denzin, Lincoln, 2000, 780). The themes were found with two methods. The questions of the interview define loosely the subject of discussion. The final theme finding was done by reading the transcripts over and over again, until it was
possible to remember all the interviews well enough to understand the similarities between them. The important parts in every interview was highlighted.

2.3 Building codebooks

Codebooks are simply organized lists of codes (often in hierarchies). MacQueen, McLellan, Kay, and Milstein (1998) suggests that a good codebook should include a detailed description of each code, inclusion and exclusion criteria, and exemplars of real text for each theme (Denzin, Lincoln, 2000, 781). The codebook of this thesis work can be found in appendix 3. It has two levels of codes, which are loosely hierarchical. The first level is bound to the balanced scorecard framework. There are altogether five categories: Strategy, Business Value, Internal Processes, Future Readiness and User Orientation. The first category, Strategy, is not an original category of the framework, but it was needed to give light to the general level of the strategy that cannot be bound directly to any of the other categories. Codes, which are the sub categories for the five highest level categories, was recognized altogether fifteen. Seven of them are bound to only one main category. Eight of them are bound to two or more main categories. All the codes have inclusion criteria.

2.4 Building a conceptual model

Once the researcher identifies a set of things (themes, concepts, beliefs, behaviors), the next step is to identify how these things are linked to each other in a theoretical model (Miles & Huberman, 1994, pp. 134-137). Models are sets of abstract constructs and the relationship among them (Bulmer, 1979). Grounded theory, schema analysis, ethnographic decision modeling, and analytic induction all include modelbuilding phases (Denzin, Lincoln, 2000, 782). A widely used method for describing themes is the presentation of direct quotes from respondents-quotes that lead the reader to understand quickly what it may have taken the researcher months or years to figure out (Denzin, Lincoln, 2000, 784). Tables can be used to organize and display raw text or can be used to summarize qualitative data along multiple dimensions (rows and columns) (Denzin, Lincoln, 2000, 785).

The building of the conceptual model consisted of:

- Making a table of important quotations using Excel spreadsheet. The selected coding was marked for each quotation
- Printing out the table and making a wallboard
- Finding the links between the quotations and marking the findings on the table
- Proofing the table
After the important quotations was copied into the tables there was altogether five tables that were named by the categories. In the proofing phase the tables were combined in one table so that it was possible to make search with selected criteria (for example the link to another quotation, category, code or the name of the interviewee or with any combination). In the picture 3 there is a portion of all the quotations hanging on the wall. This made it much easier to make connections between quotations. The connections were marked using two methods: Adding information about the direct link between two or more quotations and adding supporting KPIs for the quotations. The columns in the table are as follows:

- Category (five of which four are from the used framework and one is about the general strategy)
- Index (the order number of the quotation in its category)
- PP from (quotation starting page number on the transcription)
- PP to (quotation ending page number on the transcription)
- Sub code (code)
- Quote (important quotation from the interviewee)
- Interviewee (the name of the interviewee)
- Note (researcher’s thoughts of the quotation)
- KPI suggestion (KPI suggestion directly from the interviewee)
- Link (link to another quotation line)
- Supporting KPI (a KPI invented by the researcher to support the important thing mentioned in the quotation)
The KPIs from the KPI suggestion and supporting KPI columns were collected and inserted into the four squares of balanced scorecard. They were represented to Juho Niiranen, who is responsible of the project measurements of Aplat and Heikki Oksanen, who is an expert of using Microsoft PowerBI. The researcher defined ways to collect the needed data in co-operation with Heikki Oksanen. Heikki Oksanen carried out the selected measurements with PowerBI. The definition phase brought some alteration needs and some KPIs were voided because of complexity or impossibility of implementation.
3 Strategy, measurement, measuring strategical performance and measuring IT performance

This chapter is theory about strategy, measurement and measuring the strategical performance. In the end of this chapter the framework is selected for the case study research.

3.1 Strategy

This chapter handles strategy the history of the strategy, and how strategy is used nowadays.

3.1.1 What is strategy?

What is strategy? We can now complete the answer to this question. Strategy is creating fit among a company’s activities. The success of a strategy depends on doing many things well – not just a few – and integrating among them. If there is no fit among activities, there is no distinctive strategy and little sustainability. Management reverts to the simpler task of overseeing independent functions, and operational effectiveness determines an organization’s relative performance (Porter, 2000, 25).

A strategy is a framework for making decisions about how you will play the game of business. These decisions, which occur daily throughout the organization, include everything from capital investments to operational priorities to marketing to hiring to sales approaches to branding efforts to how each individual shuffles his To Do list every single morning. Without a strategic framework to guide these decisions, the organization will run in too many different directions, accomplish little, squander profits, and suffer enormous confusion and discord (Latham, 2017).

The strategy work is never done. A number of disruptions may affect to the business environment and force to do changes. In the business world, change is all around us, almost every minute of the day. It can come in the form of:

- Stakeholder expectations
- Human resources
- The environment (Internal or external)
- Management
- Organizational structure
- Policies and processes
• Regulatory/legislated changes
• Cash flow
• Competition
• Products or services

…and myriad other forms. Merely acknowledging these changes is not sufficient to provide for successful business outcomes (Alexander, 2015).

3.1.2 The history of strategy: Art of War

There is no agreed-upon definition of strategy that describes the field and limits its boundaries. One common contemporary definition describes it as being about maintaining a balance between ends, ways, and means; about identifying objectives; and about the resources and methods available for meeting such objectives (Freedman, 2013, xi).

Strategy has a solid military background. The etymology of word strategy originates to war and battle planning. The Art of War written by Sun Tzu is claimed to be the first strategy book in the history. The Sun-Tzu or “Master Sun,” is the longest existing and most widely studied military classic in human history (Ames, Sun-Tzu, 1993, 3).

3.1.3 The history of strategy: Art of Business

The railroad in the United States was the beginning for the need to develop strategies for companies. The scope for strategy as a way to control market forces and shape the competitive environment started to become clearer in the second half of the nineteenth century. In the United States, the building of the railroads after 1850 led to the development of mass markets for the first time. Along with improved access to capital and credit, mass markets encouraged large-scale investment to exploit economies of scale in production and economies of scope in distribution. In some industries, Adam Smith’s “invisible hand” was gradually tamed by what the historian Alfred D. Chandler Jr. has termed the “visible hand” of professional managers. By the late nineteenth century, a new type of firm began to emerge, first in the United States and then in Europe: the vertically integrated, multidivisional (or “M-form”) corporation that made large investments in manufacturing and marketing and in management hierarchies to coordinate those functions. Over time, the largest M-form companies managed to alter the competitive environment within their industries and even across industry lines (Ghemawat, Botticelli, 2000, 38).

The need for a formal approach to corporate strategy was first articulated by top executives of M-form corporations. Alfred Sloan (chief executive of General Motors from 1923 to
1946) devised a strategy that was explicitly based on the perceived strengths and weaknesses of its competitor, Ford. In the 1930s, Chester Barnard, a top executive with AT&T, argued that managers should pay especially close attention to “strategic factors,” which depend on “personal or organizational action.” (Ghemawat, 2000, 38).

3.1.4 Strategy in the business today

It would be impossible to exhaustively describe the strategy in modern business in this chapter. Only the number of strategical tools is great nowadays. However, it is widely agreed, that a proper company strategy needs the components – statements – that are shown on the picture 4.

Picture 4, A Hierarchy of Company Statement (Collins, Rukstad, 2008, 85)

The first step is to create a great strategy, which requires careful evaluation of the industry landscape. This includes developing a detailed understanding of customer needs, segmenting customers, and then identifying unique ways of creating value for the ones the firm chooses to serve. It also calls for an analysis of competitors’ current strategies and a prediction of how they might change in the future. The process must involve a rigorous, objective assessment of the firm’s capabilities and resources and those of competitors, as
described in “Competing on Resources: Strategy in the 1990s,” by David J. Collis and Cynthia A. Montgomery (HBR July–August 1995) – not just a feel-good exercise of identifying core competencies. The creative part of developing strategy is finding the sweet spot that aligns the firm’s capabilities with customer needs in a way that competitors cannot match given the changing external context – factors such as technology, industry demographics, and regulation (Collins, Rukstad, 2008, 89). Finding the sweet spot has been a hot topic in strategy for few last years. One of the most well-known publications about this is a book Blue Ocean Strategy. Instead of dividing up existing – and often shrinking – demand and benchmarking competitors, blue ocean strategy is about growing demand and breaking away from the competition (Kim, Mauborgne, 2015, XXII). However, already the additional part in the name of the book hints that it is not a complete strategy guide: How to Create Uncontested Market Space and Make the Competition Irrelevant. Instead it concentrates on the marketing. On the production side Lean has become a big word and part of the strategy of many companies. Lean manufacturing is a widely recognized and practiced business philosophy as a significant percentage of manufacturers have implemented some variation of practice (Abolhassani, Layfield, Gopalakrishnan, 2016, 875-897).

3.2 Measurement

This chapter handles the history of the measuring, the need for the measurement, the history of the industrial measurement and the strategy performance measurement.

3.2.1 What is measuring?

Measurement is the assignment of numbers to aspects of objects or events according to one or another rule or convention (Stevens, 1968, 850). Note that the numbers are assigned to aspect of objects, not to the objects themselves. Thus, for example, one can measure the length, width, weight, volume, color and so on of a box, but not the box itself (Pedhazur, Pedhazur Schmelkin, 1991, 16).

3.2.2 The history of industrial measuring

As societies developed, the frequency and volume of trade increased among the societies. Within a society or an empire, it was important to trade in more or less consistent units of measurement to prevent disagreements. The rulers usually assumed the function of standardizing the measurement system so that trade was facilitated within the society of empire (Treese, 2018, 10). Another driver for standardization has been scientific and technological development. As recently as the 1800s, interpreting a scientific paper might
be an exercise in frustration. Papers used the units of measurement prevalent at the time the paper was produced in the location it was produced. In the late 1700s and early 1800s, efforts were made to standardize measurement units worldwide for scientific work (Treese, 2018, 11).

3.2.3 Measuring strategical performance

Already in 1985 there was good understanding not only about the former nature of the business performance measurement but also about how the business performance measuring is going to change in the near future. Most conceptualizations of business performance have generally tended to focus on financial performance indicators such as sales level, sales growth, profitability and stock price. This is in line with a prevalent view that business strategies are aimed at enhancing the economic value of the firm (or, business). However, there are increasing concerns that operational performance indicators such as market share position, new product introduction, product quality, operating efficiency, societal welfare, etc. should also be considered to broaden the concept of business performance (Venkatraman, Ramanujam, 1985, 5).

Only seven years later the change in the business performance measurement was proven to be true. What you measure is what you get. Senior executives understand that their organization’s measurement system strongly affects the behavior of managers and employees. Executives also understand that traditional financial accounting measures like return-on-investment and earnings-per-share can give misleading signals for continuous improvement and innovation—activities today’s competitive environment demands. The traditional financial performance measures worked well for the industrial era, but they are out of step with the skills and competencies companies are trying to master today (Kaplan, Norton, 1992, 71).

Kaplan’s and Norton’s idea was to measure not only the current situation with mainly economic measures. They also wanted to forecast the future with the measures. Think of the balanced scorecard as the dials and indicators in an airplane cockpit. For the complex task of navigating and flying an airplane, pilots need detailed information about many aspects of the flight. They need information on fuel, air speed, altitude, bearing, destination, and other indicators that summarize the current and predicted environment. Reliance on one instrument can be fatal. Similarly, the complexity of managing an organization today requires that managers be able to view performance in several areas simultaneously.
The balanced scorecard allows managers to look at the business from four important perspectives. (See the exhibit “The Balanced Scorecard Links Performance Measures.”) It provides answers to four basic questions:

- How do customers see us? (customer perspective)
- What must we excel at? (internal perspective)
- Can we continue to improve and create value? (innovation and learning perspective)
- How do we look to shareholders? (financial perspective)

(Kaplan, Norton, 1992, 72).

Picture 5, Balanced scorecard model (Kaplan, Norton, 1992, 72)
While giving senior managers information from four different perspectives, the balanced scorecard minimizes information overload by limiting the number of measures used. Companies rarely suffer from having too few measures. More commonly, they keep adding new measures whenever an employee or a consultant makes a worthwhile suggestion. One manager described the proliferation of new measures at his company as its “kill another tree program.” The balanced scorecard forces managers to focus on the handful of measures that are most critical (Kaplan, Norton, 1992, 73). While expanding the measurement field, Kaplan and Norton are warning about having too many KPIs. Obviously when they say “What you measure is what you get” it does not mean, that if everything is measured, everything is get.

3.3 Aplat performance measurement framework comparison

The plan for the applied part of this paper is to isolate one information system – Aplat – from the offering of the IT services and to measure its strategical performance. In this chapter the research framework is selected. The framework must enable the measurement of the strategic performance. It also must support an ability to automatically derive the values from the information system. The selection is done between software quality models and balanced scorecard framework. This requires getting familiar with IT performance measurement in general.

IT is not only a business enabler or booster, but it also is a big cost element for companies. Large companies need to give focus on their cost components related to their information technology. Business growths is supported by their IT and hundreds or thousands of applications worldwide. Top level management needs to focus more on their information strategy and the applications they need to manage (Lívia, Kovácsné, 2017, 143).

Because there is no widely agreed standard on project measurement, it is being analyzed using the common opinions in the Project measurement chapter. IT processes rely largely on ITIL in large companies. Therefore, ITIL measurements are used in the Process measurement chapter.

3.3.1 IT-project performance measurement

Organizations receive many capital outlay proposals. The CFO or CIO recommends which investments to pursue. To help this decision process, organizations use financial management techniques such as net present value (NPV), internal rate of return (IRR), activity-based costing (ABC), and other schemes involving opportunity cost and payback analysis (Morgan, 2005, 52-57). After the investment decision has been done, the develop-
ment or implementation project will be started. Pinto and Slevin suggests the following success factors for R&D projects:

- **Project Mission.** *Initial clarity of goals and general directions.*
- **Top Management Support.** *Willingness of top management to provide the necessary resources and authority/power for project success.*
- **Project Schedule/Plans.** *A detailed specification of the individual action steps required for project implementation.*
- **Client Consultation.** *Communication, consultation, and active listening to all impacted parties.*
- **Personnel.** *Recruitment, selection, and training of the necessary personnel for the project team.*
- **Technical Tasks.** *Availability of the required technology and expertise to accomplish the specific technical action steps.*
- **Client Acceptance.** *The act of "selling" the final project to its ultimate intended users.*
- **Monitoring and Feedback.** *Timely provision of comprehensive control information at each stage in the implementation process.*
- **Communication.** *The provision of an appropriate network and necessary data to all key actors in the project implementation.*
- **Trouble-Shooting.** *Ability to handle unexpected crises and deviations from plan.* (Pinto, Slevin, 1989, 31). Key success factors are commonly translated into key performance indicators (KPIs).

The agile development requires a little bit different targets. Dan Radigan from Atlassian – the company that develops Jira (the well-known agile project management software) – suggest five metrics for agile development:

- **Sprint burndown**
- **Epic and release burndown**
- **Velocity**
- **Control chart**
- **Cumulative flow diagram**
  (Radigan, 2018).

There is no need for deeper definition for each of them. They are all development work related metrics.
At the same time the IT executives identify project failure issues that are shown on the picture 6. It seems that the suggested metrics will not necessarily fully cover all failure reasons.

<table>
<thead>
<tr>
<th>IT executives identify 4 groups of issues that cause most project failures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rough distribution by cause of the 45% of IT projects that experience cost overruns (for those with budgets &gt;$15 million in 2010 dollars), %</td>
</tr>
<tr>
<td><strong>Missing focus</strong></td>
</tr>
<tr>
<td>- Unclear objectives</td>
</tr>
<tr>
<td>- Lack of business focus</td>
</tr>
<tr>
<td><strong>IT projects with budgets &gt;$15 million</strong></td>
</tr>
</tbody>
</table>

Picture 6, Issues that cause most project failures (Bloch, Blumberg, Laartz, 2010)

The metrics for IT projects are different depending on the perspective. It can be either strategical or tactical depending on the audience. What percentage of IT projects fail? At our recent SOA Executive Forum in New York, an attendee asked a group of panelists to estimate their success rate on projects; specifically, he wanted to know how many of their IT initiatives had “failed on any level.” Ed Vazquez, manager of SOA implementations at Sprint Nextel, and a real live wire, planted his tongue partway in his cheek and came up with a startling figure — 100 percent. His point: Every project fails somewhere, either organizationally, in reporting, in creating the right architecture, or elsewhere. In other words, IT success depends on how you define it and on the metrics you establish, as Contributing Editor Dan Tynan spells out in “Proving Your Project’s Worth” (page 24). “Everyone has a different idea of success,” Tynan says, “and no one really talks about it.” (Fox, 2005, 6).
Project Management Institute is very conservative with the guidance for setting the metrics. The quality management plan may be formal or informal, detailed, or broadly framed. The style and detail of the quality management plan are determined by the requirements of the project. The quality management plan should be reviewed early in the project to ensure that decisions are based on accurate information. The benefits of this review can include a sharper focus on the project’s value proposition and reduction in costs and in the frequency of schedule overruns that were caused by rework (Project Management Institute, 2013, 241).

3.3.2 IT service performance measurement

ITIL is a framework of best practices for delivering IT services (White, Greiner, 2015). ITIL is used by organizations in all industries and sectors, including: large, medium, and small companies; U.S. federal, state, and local governments; and universities. ITIL can benefit any organization that provides an IT service management (ITSM) product or service (BMC, 2015). ITIL is an IT service management framework but has some flavours for software development too. However, the weight of development is small. Application Development is barely mentioned in the ITIL books, as ITIL focuses on different topics like service design and rollout (Kempter, 2018). Focusing on ITIL will provide enough understanding on IT process measurement.

ITIL lists five KPI categories with the following KPI areas:

**ITIL KPIs Service Strategy**
- KPIs Service Portfolio Management and Strategy Management for IT Services
- KPIs Financial Management
- KPIs Business Relationship Management

**ITIL KPIs Service Design**
- KPIs Service Level Management
- KPIs Availability Management
- KPIs Capacity Management
- KPIs IT Service Continuity Management
- KPIs Information Security Management
- KPIs Supplier Management

**ITIL KPIs Service Transition**
- KPIs Change Management
- KPIs Project Management (Transition Planning and Support)
- KPIs Release and Deployment Management
• KPIs Service Validation and Testing
• KPIs Service Asset and Configuration Management

**ITIL KPIs Service Operation**
• KPIs Incident Management
• KPIs Problem Management

**ITIL KPIs Continual Service Improvement**
• KPIs Service Review
• KPIs Process Evaluation
• KPIs Definition of Improvement Initiatives

(Kempter, 2017)

Each KPI area consists of number of KPIs. Altogether there are ninety-seven of them. Applying all these KPIs could be harmful. *Companies rarely suffer from having too few measures* (Kaplan, Norton, 1992, 72-73). ITIL approach is much different to the strategic measurement. *The balanced scorecard can only translate a company’s strategy into specific measurable objectives* (Kaplan, Norton, 1992, 77-78). ITIL gives a collection of KPIs whereas Kaplan and Norton suggest deriving them from the strategy. *Traditionally, managers think of IT as a support function and only focus on the internal components of IT strategy that are essential to the business of the organization. But, if IT is considered as an important enabler of business transformation it becomes important for organizations to consider the external components of IT strategy* (Kashanchi, Toland, 2006, 343).

### 3.3.3 Software quality measurement

It is largely agreed that the software quality measurement was initiated in the late 1960’es. *It is common to associate this period with the first recognition of the software crisis. Some people insist that the original crisis still exists today, others have identified a series of crises, one following the other. The initial software crisis which turned away from coding tools to the study of the development process, was recognized first in industry. Later on, the subject was also discussed heavily in academic circles and appropriate curricula, conferences and journals were established. The key lesson learned during this period was that the quality of a product cannot be assured by only looking at the final product, i. e. the outcome of the development cycle* (Endres, 1996, 22). Solutions for the software crisis was soon represented by the scientists. *Nowadays, several software quality models were proposed in order to evaluate general and specific software quality products, they were developed based on well-known models, such as McCall, Boehm, FURPS, Dromey, and ISO* (AL-Badareen, Selamat, Jabar, Din, Turaev, 2011, 47). ISO 9126 was further devel-
operated to ISO/IEC 25010 in 2011. It is widely used in large organization. Thus, it is representing the software quality models in this comparison.

Software products and software-intensive computer systems have many stakeholders including those who develop, acquire, use, or who are customers of businesses using software-intensive computer systems. Comprehensive specification and evaluation of the quality of software and software-intensive computer systems is a key factor in ensuring value to stakeholders. This can be achieved by defining the necessary and desired quality characteristics associated with the stakeholders' goals and objectives for the system. This includes quality characteristics related to the software system and data as well as the impact the system has on its stakeholders. It is important that the quality characteristics are specified, measured, and evaluated whenever possible using validated or widely accepted measures and measurement methods. The quality models in this International Standard can be used to identify relevant quality characteristics that can be further used to establish requirements, their criteria for satisfaction and the corresponding measures (ISO/IEC 25010, 2011, V).

The scope of the standard is defined as follows: The scope of application of the quality models includes supporting specification and evaluation of software and software-intensive computer systems from different perspectives by those associated with their acquisition, requirements, development, use, evaluation, support, maintenance, quality assurance and control, and audit. The models can, for example, be used by developers, acquirers, quality assurance and control staff and independent evaluators, particularly those responsible for specifying and evaluating software product quality. Activities during product development that can benefit from the use of the quality models include:

- identifying software and system requirements;
- validating the comprehensiveness of a requirements definition;
- identifying software and system design objectives;
- identifying software and system testing objectives;
- identifying quality control criteria as part of quality assurance;
- identifying acceptance criteria for a software product and/or software-intensive computer system;
- establishing measures of quality characteristics in support of these activities.

(ISO/IEC 25010, 2011, 1)
Picture 7, Product quality model (ISO/IEC 25010, 2011, 4)

Picture 7 represents eight quality characteristics defined by ISO/IEC 25010. Each characteristic consists of KPI areas that are defined more comprehensively below.

**Functional Suitability**

Degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

**Functional completeness.** Degree to which the set of functions covers all the specified tasks and user objectives.

**Functional correctness.** Degree to which a product or system provides the correct results with the needed degree of precision.

**Functional appropriateness.** Degree to which the functions facilitate the accomplishment of specified tasks and objectives.

(ISO/IEC 25010, 2011, 10 -11)

**Performance efficiency**

Performance relative to the amount of resources used under stated conditions.

**Time behaviour.** Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

**Resource utilization.** Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements.

**Capacity.** Degree to which the maximum limits of a product or system parameter meet requirements.

(ISO/IEC 25010, 2011, 11)

**Compatibility**
Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.

Co-existence. Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.

Interoperability. Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged.

(ISO/IEC 25010, 2011, 11-12)

**Usability**

Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

**Appropriateness recognizability.** Degree to which users can recognize whether a product or system is appropriate for their needs.

**Learnability.** Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.

**Operability.** Degree to which a product or system has attributes that make it easy to operate and control.

**User error protection.** Degree to which a system protects users against making errors.

**User interface aesthetics.** Degree to which a user interface enables pleasing and satisfying interaction for the user.

**Accessibility.** Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.

(ISO/IEC 25010, 2011, 12-13)

**Reliability**

Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

**Maturity.** Degree to which a system, product or component meets needs for reliability under normal operation.

**Availability.** Degree to which a system, product or component is operational and accessible when required for use.
Fault tolerance. Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.

Recoverability. Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system.

(ISO/IEC 25010, 2011, 13)

Security
Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

Confidentiality. Degree to which a product or system ensures that data are accessible only to those authorized to have access.

Integrity. Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data.

Non-repudiation. Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later.

Accountability. Degree to which the actions of an entity can be traced uniquely to the entity.

Authenticity. Degree to which the identity of a subject or resource can be proved to be the one claimed.

(ISO/IEC 25010, 2011, 13-14)

Maintainability
Degree of effectiveness and efficiency with which a product or system can be modified by the intended maintainers.

Modularity. Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components.

Reusability. Degree to which an asset can be used in more than one system, or in building other assets.

Analyzability. Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified.

Modifiability. Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality.
**Testability.** Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met.

(ISO/IEC 25010, 2011, 14-15)

**Portability**

Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

**Adaptability.** Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.

**Installability.** Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment.

**Replaceability.** Degree to which a product can replace another specified software product for the same purpose in the same environment.

(ISO/IEC 25010, 2011, 15-16)

### 3.3.4 Balanced scorecard for information systems

Balanced Scorecard is widely used for measuring organizations strategy performance. It is also used in Santander Consumer Finance Oy. Therefore, the scope of finding the framework can be limited to Balanced Scorecard models. There are only few studies that are focusing directly to using the Balanced Scorecard when measuring the IT performance. The researcher could find only one which is focusing on building a foundation for the strategic management of information systems. This framework is done by Martinsons, Davison and Tse in 1999.

After exhaustive searches, only one credible balanced scorecard framework for measuring information system strategy performance could be found. It was developed by Martinson, Davison and Tse already in 1999.

The balanced scorecard BSC has emerged as a decision support tool at the strategic management level. Many business leaders now evaluate corporate performance by supplementing financial accounting data with goal-related measures from the following perspectives: customer, internal business process, and learning and growth. It is argued that the BSC concept can be adapted to assist those managing business functions, organiza-
This article develops a balanced scorecard for information systems IS that measures and evaluates IS activities from the following perspectives: business value, user orientation, internal process, and future readiness (Martinsons, Davison, Tse, 1999, 71).

This state of affairs may merely reflect the fact that recently-implemented, computer-based IS enhance value in ways that are not captured by conventional input–output accounting methods. For example, since effectiveness ‘doing the right things’ and innovation ‘doing new things’ cannot be readily quantified in terms of traditional outputs, these improvements are not reflected in economic efficiency statistics (Martinsons, Davison, Tse, 1999, 72).

Traditional methods focus on well-known financial measures, such as the return on investment ROI, net present value NPV, the internal rate of return IRR, and the payback period. These methods are best-suited to measure the value of simple IT applications, such as transaction processing and office automation systems. The aforementioned types of IS were often the first to be introduced in a given organization (Martinsons, Davison, Tse, 1999, 72).

Unfortunately, evaluation methods that rely on financial measures are not as well-suited for newer generations of IT applications. These computer-based IS typically seek to provide a wide range of benefits, including many that are intangible in nature (Martinsons, Davison, Tse, 1999, 72).

Business success in the past was largely based on the efficient allocation of financial and physical capital in order to achieve economies of scale and scope [10]. However, the ability to mobilize and exploit softer and less tangible intellectual assets is becoming more important (Martinsons, Davison, Tse, 1999, 73).

As a result, information age companies must focus on specific market segments or use technology improved processes in order to efficiently produce and deliver their products and services. For example, Martinsons and Revenaugh ([31], p. 81) point out that ‘rather than driving down employee numbers... (and cutting costs), it is ultimately necessary for organizations to deliver superior value (Martinsons, Davison, Tse, 1999, 73).
Picture 8, Relationships between the four perspectives in the balanced scorecard (Martinsons, Davison, Tse, 1999, 74)

The Kaplan, Norton Balanced Scorecard model is represented in picture 5. Martinsons, Davison and Tse have changed the original model so that instead of Financial Perspective their model has Business Value Perspective, Customer Perspective has changed to User Orientation Perspective, Innovation and Learning Perspective is Future Readiness Perspective and Internal Business Perspective has changed to Internal Process Perspective as picture 8 shows.

**Business Value Perspective**

*Value is a much broader concept than benefits, and IS projects can generate business value in many ways. For example, the implementation of a menu driven customer database may reduce the amount of IS specialist support needed to execute an ad hoc query, and generate a modest amount of direct benefits. However, the real value of such a database will be reflected in marketing and sales performance. Salespeople would be expected to integrate the database into their activities, thereby improving the productivity of the sales process, and consequently raising revenue levels and / or profit margins (Martinsons, Davison, Tse, 1999, 77-78).*
User Orientation Perspective

The end-user of an IS may be an internal customer or in another company that is utilizing an inter-organizational system. However, in contrast to the large potential market for the products and services of most companies, an IS department or function usually has limited opportunities to attract new customers, although we acknowledge that this may change in the expanding electronic marketplace. Given these circumstances, the satisfaction of existing customers will be much more important than building up market share or acquiring new customers. Indeed, it will be critical to monitor existing customer satisfaction on a frequent basis, especially if they can select among alternative suppliers of IS services. As a result, we suggest that the metrics for the user perspective focus on three areas: 1 being the preferred supplier for applications and operations; 2 establishing and maintaining relationships with the user community; and 3 satisfying end-user needs (Martinsons, Davison, Tse, 1999, 79).

Internal Process Perspective

Internal operations may be assessed by measuring and evaluating three of the basic processes performed by the IS department: 1 the planning and prioritization of IS projects; 2 the development of new IT applications; and 3 the operation and maintenance of current IT applications. Other processes may also be considered, such as hardware and software supply and support, problem management, user education, the management of IS personnel, and their usage of efficient communication channels (Martinsons, Davison, Tse, 1999, 80).

Future Readiness Perspective

In addition to managing current performance, there is also a need to measure and evaluate the readiness of the IS department or function for the future. The future readiness perspective is concerned with: (1) continually improving the skillset of IS specialists in order to prepare them for potential changes and challenges in the future; (2) regularly updating the applications portfolio; and (3) putting effort into researching emerging technologies and their potential value to the organization. Taken together, such preparations can establish an organizational vision for the assimilation and application of a new technology, such as knowledge-based systems (see Ref. [32]), or the re-engineering of a particular business process set [48] (Martinsons, Davison, Tse, 1999, 81).
3.4 Theory conclusions and framework selection

Strategy and measurement are tightly bound together. It would often be arguable if the organization would reach the strategical objectives without a way to measure it. This measurement has recently been based on tangible financial metrics. It changed in the nineties, when Kaplan and Norton presented their new framework Balanced Scorecard. It combines tangible (usually economical) metrics and intangible metrics.

IT is often measured from two perspectives: projects and processes. Project metrics are often set in the beginning of the project in the project plan. It seems that the project metrics and the reasons why the projects fail are not aligned. ITIL suggest a large set of KPIs to measure IT processes. The suggested KPIs are usually easy to measure and very tangible. Like financial measures with the business strategy, the tangible KPIs with IT may tell more about the history and not anticipate the future performance.

Software quality models and balanced scorecard have many similar characters. The best solution to compare them would be doing the measurement with both frameworks. That would, however, not serve the company needs and would require double work. The objective is to build a measurement system rather than compare frameworks. Therefore, one framework is selected for carrying out the applied part of this thesis.

ISO/IEC 25010 gives a strict guidance by splitting the quality definition into eight different categories and further to several KPI areas. The balanced scorecard splits the qualities only into four categories and does not suggest readily any KPI areas. However, ISO/IEC 25010 does not include the financial measures. The balanced scorecard: a foundation for the strategic management of information systems by Marinsons, Davison and Tse, states very well the problems of measuring the information systems with financial measures and the changed role of information systems.

ISO/IEC 25010 is very wide yet insufficient for strategic performance measurement. The KPI areas are often related to the KPIs suggested by ITIL. In some case it would be very hard to map the KPIs with the strategical goals. For example, Resource utilization is hard to line up with the strategy. There are, of course many good KPI areas that can be used regardless of the framework.

The balanced scorecard framework has its own problems too. The internal process perspective and the future readiness perspective are not measuring an information system, but the organization behind the system. The organizations developing and maintaining an
information system are hard to measure, when there can be a number of subcontractors and even chains of subcontractors. Quantifying and automating the organizational metrics would be impossible. Possibility to automate the KPI measurement was one of the requirements set for this study.

The balanced scorecard framework can be used for measuring an individual information system but with two alterations. As told in the chapter 3.3.4 the internal process perspective is originally meant for measuring and evaluating the planning and prioritization of IS projects, the development of new IT applications and the operations and maintenance of current IT applications. This metrics does not measure an individual information system. It would also be impossible to automate the metrics for planning and prioritizing of IS projects. The scope is too broad in the original framework for measuring one information system. Kaplan and Norton summarized the internal business perspective with a question: *What must we excel at?* (Kaplan, Norton, 1992, 72). The same can be asked here: What must Aplat excel at internally?

The future readiness perspective suggests for example measuring skillset of IS specialists. It too, does not measure an individual information system, but rather the organization behind it. With modern sub-contractor chains this kind of metrics would be hard to build. Especially, if the requirement of automating the KPIs would be appreciated. The future readiness perspective is derived from Kaplan’s and Norton’s balanced scorecard model, where it was innovation and learning perspective. This was summarized with a question: *Can we continue to improve and create value?* (Kaplan, Norton, 1992, 72). The same can be asked here: Can Aplat continue to improve and create value in the future?

Understanding these two fundamental differences with the requirements, the scopes of the framework will be changed as follows:

1. The internal process perspective needs to measure how well the measured information system serves the processes it is designed for.
2. The future readiness perspective needs to be changed to measure the scalability, flexibility and malleability of the information system.

The internal process perspective change can deal with the data quality that Aplat sends to other internal systems and how well it serves them. The future readiness deals with a question of how well the examined information system is prepared for the changes that emerges in the financing business. For example, how prepared it is for changes of regulations or changes with the technical environment. Using the framework with these two
changes makes it possible to quantify qualities that describe the information system itself and how it corresponds to the company strategy.

The lack of coverage in both frameworks and the need of redefining them would require more research. Despite of this insufficiency the balanced scorecard framework with the earlier described alterations will be used to carry out research.
4 Implementation of the research - measuring the strategical performance of Aplat

This applied research begins with an abbreviation of each interview. After that the found KPIs are represented and if necessary, to have enhanced evidence, supported with literary. Finally, the PowerBI measurement with the selected KPIs is disclosed.

4.1 Summary of the interviews

The summary of the interviews collects the most important things from the discussions. The structure of the text is:

- Results in numbers: Number of transcription pages, number of important quotations transferred to data table, number of interviewee’s direct KPI suggestions during the interview and the suggestions in text format, number of the KPIs the researcher could derive from the text.
- General: Researchers general image of the interview
- Future, disruption: Bigger changes the interviewee anticipates in the business in the upcoming years.
- Extreme: Something that the interviewee had repeated often or used a strong voice when expressing.
- Surprising: Something odd, some unexpected opinion or even lack of expected opinion.
- Aplat emphasis: What are the strongest expressions or requirements or needs the interviewee had about Aplat.

The atmosphere in interviews could be described as honest, appreciating, constructive and open. This probably leads to much better data collection results than was anticipated. Most or all the interviewees share some opinions in common. They were talking a lot about value adding. All of them emphasized the user experience. Everyone liked the idea of having a net promoter question in the end of the loan application. The internal process got a lot of attention too. The emphasis was on the ability to automate the loan application handling. The common believe was that the regulations will get tighter and there will be more regulations in the future. Although many interviewees shared also an opinion that this could be over emphasized at the very moment because of many ongoing regulations related projects such as GDPR projects. All the interviewees agreed that the ability to automate the data collection for the KPIs is a must to have.
The names of the interviewees are masked using alphabets from A to G. The alphabets are used accordingly in the analysis phase when referring to the interviewee’s opinion or quotation.

1. **Interviewee A, COO**

**Results in numbers**
13 pages of transcription. 21 quotations in the data table. 1 direct KPI suggestion: time-to-money. 9 KPIs derived from the text by the researcher.

**General**
Interviewee A was talking a lot of the value we create. A emphasized putting the customer in the core so that it would guide us to build simple, personal and fair processes.

**Future, disruption**
A was convinced, that in the future the car loan business will fragment to different products.

**Extreme**
A had the most extreme view to the internal processes. His opinion was that the processes are bad.

**Surprising**
A did not name any concrete suggestions when asked for three key elements to change to make customers life easier. The researcher thought that A does not want to guide the work of the subordinates too tightly by naming the things that needs development.

**Aplat emphasis**
The weight was on the requirement for Aplat to be malleable and scalable. A said, that as the number of products will grow, Aplat must support rapid development and prototyping. A also repeated this opinion during the interview. Secondly A weighted the processing speed and ability to automate the loan handling process. Third thing to mention is A’s strict opinions about the KPIs: A insisted, that the KPIs must be easy to measure. A also wanted the KPIs to be easy to understand.
2. **B, Commercial Director (sales finance, closed end loan)**

**Results in numbers**
13 pages of transcription. 42 quotations in the data table. 2 direct KPI suggestion: time-to-money, FTE per number of applications. 9 KPIs derived from the text by the researcher.

**General**
The need to blur the product lines was one thing B brought up in the beginning of the interview. B was also quite sceptic about current quality the internal processes. B has worked earlier as a COO and therefore probably share A’s thoughts. B’s thoughts of seeing the organization from inside and from outside are not just interesting as is but linking these theoretical thoughts to F’s thoughts of getting the ideas from the external stakeholders: “I think a lot of organizations are struggling with the fact that they are looking at things and they’re looking at the outside world as if the information that is inside would be there as well.”

**Future, disruption**
B was hired to redesign two of the customer products of Santander Consumer Finance Oy: Closed End Loan and Sales Finance. Therefore, B saw the biggest need for the change in those business areas. Downturn in the markets was the biggest disruption B was anticipating.

**Extreme**
B was the only interviewee forecasting a downturn in the market and with very strong voice. The same was repeated by the Bank of Finland already on 29th of May in the article: *The overall picture of debt accumulation gets blurred as provision of consumer credit becomes diversified* (Koskinen, Tuomikoski, 2018).

**Surprising**
B’s pessimism was the most surprising thing of all the interviews.

**Aplat emphasis**
Discussions about Aplat had two topics over others: development process and the product itself. About the development process B was also giving a lot of thoughts for the problem of measuring the development work. The need for malleability and scalability was emphasized in B’s opinions. B also saw the ability to automate the loan process important.
3. **C, Financial Director**

**Results in numbers**
14 pages of transcription. 22 quotations in the data table. 2 direct KPI suggestion: are the old portals decommissioned, pricing portfolio changes. 4 KPIs derived from the text by the researcher.

**General**
C was emphasizing the savings Aplat will bring. C wanted the old portals to be decommissioned as soon as possible. C suggested to make a KPI about this subject. C also told that the dealer pricing is followed on a weekly basis.

**Future, disruption**
The biggest disruption will come from the rivalry in the next few years. C was referring to another financing company that has recently aggressively entered the market.

**Extreme**
C was not particularly extreme with any subject. One opinion that makes big difference, although is not extreme, was that C’s opinion of the state of the internal processes was different than A’s or B’s. This could be due to the fact, that C’s organization is a customer for A’s and B’s organizations. The pain is taken already in the earlier steps of the value chain.

**Surprising**
The surprising moment was about two weeks after the interview. C, in a discussion, was joking that using only the financial measures can be misleading. C said: “*Some stupid financial director could by mistake take the numbers seriously*”.

**Aplat emphasis**
C’s expectations for Aplat are mainly financial. C wants the old dealer portal to be decommissioned. C shared the same thoughts with B about the problem of measuring the amount of change with an amount of work.
4. D, Risk Director

Results in numbers
9 pages of transcription. 28 quotations in the data table. 1 direct KPI suggestion: number of reported operational risks regarding to Aplat. 9 KPIs derived from the text by the researcher.

General
D had put lots of thoughts for the strategy in the general level. D had found a good match with own values and the mission statement of Santander Consumer Finance Oy: “Helping people and businesses prosper”.

Future, disruption
D is emphasizing the meaning of public regulations. D's opinion about the GDPR is that it is not the end of the story. It will be followed with PSD2, new anti-money-laundering rules and many other new requirements.

Extreme
D had a strong agenda about the data quality. D's statements about this subject are important as D is the risk director.

Surprising
It is hard to define any D's comments with expression surprising. Perhaps D's mature thoughts about the balance with strategy and D's own values, after all, characterizes this interview distinguishingly.

Aplat emphasis
D emphasizes two things over others with Aplat. They are data quality and malleability. The ability to automate the loan handling process is also important for D. D told that the loan application cases will be too complex for manual evaluation in the future. This reasoning has not been brought up by other interviewees.

5. E, Commercial Director (auto business)

Results in numbers
13 pages of transcription. 31 quotations in the data table. 1 direct KPI suggestion: number of vendors. 7 KPIs derived from the text by the researcher.
General
E started the interview pointing out the main thought that there needs to be a structured answer to customer's needs – a structured way with a sense of control. This was characteristic for the entire interview. The image E gave in the interview was that it had been thought thoroughly where Santander Consumer Finance Oy is with its car and leisure business, where the competitors are, what is going to happen, where the business is wanted to be steered and how.

Future, disruption
The fragmentation of the current car financing markets is one of the biggest changes in the future. Serving end customers directly will become more important. E forecasted, that the car importers role will reduce in the future. It could be possible, that the car importers disappear totally from the value chain.

Extreme
E emphasizes the user experience in every possible situation. E uses term dealer experience instead of user experience. He thinks that if the dealer user does not like the loan application process, it is good for nothing, no matter how good it would be from the point of view of other stakeholders.

Surprising
E had a very strict opinion to limit the number of the KPIs to two or three.

Aplat emphasis
Like said, the biggest emphasis was on the user experience. The same theme was repeated many times during the interview. E talked about the importance of giving guidance to the dealer user during the loan application process. E challenged the Aplat development team by giving a hint of the consultative sales. Consultative sales in this context means raising the awareness of the importance of financing in auto business – building an understanding that it will have a positive impact to the revenue of the car dealers.

6. F, CEO

Results in numbers
12 pages of transcription. 18 quotations in the data table. 2 direct KPI suggestion: TCO, number of development ideas generated by the dealer users. 8 KPIs derived from the text by the researcher.
General
F discussed a lot about Santander Consumer Finance Oy and Santander Nordic having exceeded a certain business size. It affects for example by growing the reporting needs. F was also repeating A’s and B’s opinion about problems with internal processes. F told that legacy in processes and IT systems is acceptable to a certain extend if the reason is customer centricity. However, F said that in some point the legacy may affect to growth. F gave an example about the sudden loan application volume changes. The normal changes in the application volumes should not have any effect in the operations. This statement has a strong message. It expresses the need to change the processes.

Future, disruption
F did not handle any major disruption in the future during the interview.

Extreme
F was the only interviewee who presented an idea about getting development ideas from the dealer users.

Surprising
Other local management team members told that the auto business will stay at the current level in the future. E, who is responsible of this, even anticipated that it could grow a little smaller in the next few years. F had an opposite opinion.

Aplat emphasis
F had three major emphasis about Aplat. The first one is about the possibility to automate internal processes for better scalability for the business. Second emphasis is about the malleability and scalability. F often used the word platform to describe the needed qualities. The third emphasis was about the user experience. It was divided into two major thoughts. The first was gathering the immediate feedback and the second was to gather future ideas.

7. G, Compliance Director

Results in numbers
15 pages of transcription. 8 quotations in the data table. 1 direct KPI suggestion: Number of user changes per number of users per month. 7 KPIs derived from the text by the researcher.
General
G seemed to be significantly less familiar with Aplat than the other interviewees. However, G did contribute to the research very well as can be seen from the results in numbers part.

Future, disruption
The discussion often handled the growing regulations. G’s conclusion was that financing is quite heavily regulated and there will be more regulations.

Extreme
G had the strictest opinion about data privacy. G was also the only interviewee who was worried about the lack of information sharing for the end customer when dealers are selling the loan products.

Surprising
The surprise in this interview was how little G knew about Aplat.

Aplat emphasis
G emphasized the need to increase development speed. G repeated this opinion several times during the interview. G suggested a practical measurement for the security: Number of user changes and user right changes per month.

4.2 Results of the interview analysis
When reading the transcriptions and coding them, altogether sixteen codes were identified. The codes can be divided into two classes. The first class contains of codes that are more general by nature. They describe the larger image of the strategy. The second class contains of codes that have direct value for setting the KPIs for Aplat.

All the interviews started with discussion about the values of Santander Consumer Finance Oy. It is understandable, that the SPF code (meaning Simple, Personal and Fair), was the most common in the analysis. The values are mentioned often, even in a normal everyday discussion. SPF did not affect directly to any KPI, but indirectly to most of them. Already the requirement of the KPIs being able to automate reflects to SPF. Therefore, SPF belongs to the first code class. Other remarkable second code class codes were disruption and need. Like SPF, disruption and need are most often not affecting many KPIs. Disruption has only one KPI suggestion. Need with nineteen occurrences has two direct KPI suggestions and four KPIs derived in the analysis phase. It does not mean that the code is unimportant, if it belongs to the first class. It would not have been selected as an
important quotation if it was not important. Quotations in this class are necessary to build a picture of the strategy.

In the second class the most common code was the malleability with twenty-four recognitions. In the codebook it was defined as follows: Ability to quickly answer to the market needs by changing the system and to make prototypes of the possible solutions and possibility to scale up. Malleability is mainly related to the future readiness. Only one quotation with malleability code belongs to user orientation category. The expectations for Aplat malleability are described for example with words modularity, flexibility, platform, and scalability.

Other second-class codes, that occurred often, were UX, processing speed and connectivity. UX is related to the user experience. The UX was seen as the key element of Aplat. E has launched a term Dealer Experience, which narrows the user experience only to dealer users. To E’s opinion only dealer experience is important for the financing business. See for example appendix 4, rows 59 and 101. Processing speed is related to business value and internal processes. Even though processing speed was mentioned often, there was just one direct KPI suggestion. However, the discussions about the processing speed helped the researcher to develop several different KPIs. Connectivity is described in the codebook as follows: Ability to connect to a 3rd party systems and internal services. It means ability to exchange data with other systems such as dealer management systems. Connectivity always relates directly with future readiness but affects also to internal processes with an ability to get better quality data and to user orientation with possibility to automate the application filling process at least to some extent.

The details of the result KPIs are in the following chapter. If the KPI is not easy to understand, for example because of its technical nature, there can be external information about it in the explanation of the KPI.

4.2.1 Business Value KPIs

BV1: Loan balance growth compared to non-Aplat dealers
EXPLANATION: How much the loan balance grows in a given time for the dealers using Aplat compared to those dealer not using Aplat.

ORIGIN: Project business case, benefit realization plan. In the business case this was formed: Revenue of deals coming via Aplat. The idea was to measure the average financed amount.
REASONING: Aplat should provide the dealer users with tools that make it easy to balance the financing and make the calculations based on the monthly payment rather than other financing variables. Therefore, the financed amount should be greater with the loan cases from Aplat than from other sources.

DIFFICULTIES: The number of non-Aplat dealers is fast decreasing. The life cycle of this KPI could be short. This KPI is also very much depending on the possible environmental changes in the financing business. If the whole business area will face a downturn, this KPI does not necessarily give valid metrics. This KPI does not necessarily describe the quality of Aplat.

OUTCOME: This KPI was implemented as is. It got a lot of support from the interviewees.

BV2: Change in the number of applications compared to non-Aplat dealers
EXPLANATION: How much does the number of the applications change in a given time compared to the historical time period for the dealers using Aplat compared to those dealers not using Aplat.

ORIGIN: Project business case, benefit realization plan. In the business case this was formed: Number of applications via Aplat. The idea was to measure the total number of applications sent from Aplat compared to the total number of other applications and to use a fixed multiplier based on self-assessment of saved work per application. After the analysis the KPI was formed: Growth in the number of applications compared to non-Aplat dealers. However, in the implementation phase, this was found being possibly misleading and the first word of the KPI name was changed.

REASONING: Aplat should be easy to use. Therefore, the dealers that have changed to Aplat are expected to send more applications than before they used Aplat. It got a lot of support from the interviewees. See for example appendix 4, row 50.

DIFFICULTIES: The number of non-Aplat dealers is fast decreasing. The life cycle of this KPI could be short. This KPI is also very much depending on the possible environmental changes in the financing business. If the whole business area will face a downturn, this KPI does not necessarily give valid metrics. This KPI does not necessarily describe the quality of Aplat.

OUTCOME: This KPI was implemented as is.
BV3: Number of cases where the financed amount has increased after the first scoring in last month
EXPLANATION: Dealer users have an ability to alter the data on the application and update the earlier version sent to the banking system. This KPI is supposed to count the number of cases where the financed amount and the down payment have increased within a given timeframe.

ORIGIN: G’s interview. See for example appendix 4, row 90.

REASONING: This metrics shows roughly the number of cases, where the dealer user is tampering with the calculation to get the loan case approved. The tampering is based on adding the value of the object vehicle and at the same time adding the down payment with the similar amount. This way the share of the down payment looks better, the loan case structure looks better and is often automatically approved.

DIFFICULTIES: This is not measuring the quality of Aplat. It is rather a control than a KPI.

OUTCOME: This KPI is not implemented in the first phase as it is not a KPI.

BV4: Number of collection cases compared to number of non-Aplat dealers collection cases in last month
EXPLANATION: The name of the KPI is self-evident.

ORIGIN: This KPI originates to D’s and G’s interviews. It was not directly mentioned during the interviews but invented by the researcher during the analysis phase.

REASONING: See for example appendix 4, row 116. The amount of applications from different sources is great. Therefore, this KPI does not measure what kind of cases are sent through Aplat, but the data quality.

DIFFICULTIES: There has not been any similar comparisons before. Therefore, it is hard to say before how well this KPI serves Aplat quality measurement.

OUTCOME: This KPI will be implemented in a later phase due to the need to get more information about the data needed. Instead of this KPI the implementation group invented a similar KPI: Approval rate compared to non-Aplat applications. It does measure the data quality even better. Because the number of compared cases is much greater, containing
almost 100% of all the applications, the standard deviation is much lower than with the collection cases.

**BV5: Number of cross sales compared to number of cross sales from non-Aplat dealers in last month**
EXPLANATION: Cross sales is for example insurance or service sales on top of the base financing product.


REASONING: Cross sales add value for the end customers and dealers.

DIFFICULTIES: Measuring this is uneasy as the cross sales object may occur in many ways in the final data.

OUTCOME: This KPI is not implemented.

**BV6: Number of operational risks from Aplat in last month**
EXPLANATION: All the operational risks needs to be reported using a dedicated system.

ORIGIN: This KPI was invented by D. D’s opinion as a Risk Director has a lot of weight in this subject.

REASONING: This KPI measures directly how the stakeholders feel about the security and functionality of Aplat.

DIFFICULTIES: The KPI does not value the severity of the found risk. For example, twenty reported low category risks look worse than nineteen high category risks. Usually the number of reported risks is very low.

OUTCOME: This KPI will be implemented as soon as the needed database access will be granted.

**BV7: Pricing portfolio index (and index change)**
EXPLANATION: Salesmen suggest new dealer pricings for the Sales Director. The pricing changes are followed on a regular basis.

ORIGIN: C’s interview. See for example appendix 4, row 28.
REASONING: C is following the pricing changes on a weekly basis at the moment.

DIFFICULTIES: This is not a KPI but a control.

OUTCOME: This is not a KPI measuring the quality of Aplat. It is a control. However, it might be needed in the future. It is not implemented in the first phase but can be implemented later if needed.

BV8: Estimated profitability of cases compared to estimated profitability of non-Aplat cases
EXPLANATION: Profitability of a loan case is the total amount of interest and fees minus the commission paid for the dealer. Sometimes the profitability may be extended with subvention paid by the dealer.

ORIGIN: A's interview. See for example appendix 4, row 2.

REASONING: See for example appendix 4, row 2. The business needs to be profitable.

DIFFICULTIES: As a database query this is very difficult to carry out. The database naming convention is not very descriptive. There is no database diagram available.

OUTCOME: This KPI can be implemented as soon as it is found out how to make a query for it. It will not be implemented in the first phase.

BV9: Time-to-money compared to non-Aplat cases
EXPLANATION: The handling of the loan application takes some time. Depending on the sufficiency and the quality of the data on the application it can change. When the loan application is handled, the money is paid out for the dealer.

ORIGIN: The KPI was directly suggested in A's and B's interviews. See for example appendix 4, rows 3, 27 and 96.

REASONING: This is one of the major KPIs. It indicates partially how the internal processes work. It also translates directly into money. It shows the comparison of the efficiency of loan application handling between Aplat and non-Aplat applications. This KPI was suggested by B as a substitute for using FTE/number of applications. See appendix 4, row 27. It was widely agreed, that quantifying the amount of change achieved with a
certain amount of work is uneasy if not impossible. See for example appendix 4, rows 32, 132, 133, 135. Therefore, the Time-to-money measures the efficiency better, especially if it is mixed later with the total cost of ownership.

DIFFICULTIES: It is easy to carry out and it reflects directly to the quality of Aplat. It is also easy to derive from the database. There are no difficulties.

OUTCOME: This KPI will be carried out in the first phase.

BV10: Number of user changes and user right changes per month
EXPLANATION: Dealer users can make changes to the user rights of other users in their organization depending on their own user rights.

ORIGIN: G’s interview. See for example appendix 4, row 167.

REASONING: This is compliance related KPI. See for example appendix 4, row 113, where C sums up the matter, that it is our license to play. Therefore, it is a business value KPI and a meaningful KPI. It is essential, that the dealer users change their user rights on a regular basis. This KPI indicates that the user rights are maintained as expected. It also gives proof for the external auditors with this matter.

DIFFICULTIES: No difficulties recognized.

OUTCOME: This KPI will be implemented in the first phase.

BV11: Total Cost of Ownership
EXPLANATION: Companies use the total cost of ownership over the long term as a framework for analyzing business deals. This analysis includes the initial purchase price as well as all direct and indirect expenses (Investopedia, 2018).

ORIGIN: F’s interview. See for example appendix 4, row 192.

REASONING: TCO sums up very well how much the development and implementation has cumulated direct costs.

DIFFICULTIES: The data to combine the TCO is uneasy to get.

OUTCOME: This KPI will be implemented as soon as the data feed can be automated.
4.2.2 Internal Process KPIs

IP1: Share of Aplat cases where calculation matches with the same case in Coreview

EXPLANATION: Coreview is the part of the banking system where the loan accounting is taken care of. When the loan application is approved and all the necessary information about the case is gathered, the case is moved to Coreview. If the calculations including interest rate, monthly fee, administration fee, monthly payment and residual value match, it proves that no changes have been done during the process.

ORIGIN: In the suggested KPI areas, there was mentioned Ability to automate the financing process. This KPI is one factor of that KPI area. Ability to automate the financing process could not be quantified as a whole. This is the first of three required components to fulfil the KPI area. The idea of having this component for the automation ability measurement was invented when analysing the appendix 4, row 36. C was telling about what would be good to be done less in C’s department. The errors are often about calculations.

REASONING: The KPI area Ability to automate the financing process from end-to-end got a lot of attention during the interviews. See for example appendix 4, rows 107, 159, 160, 185 and 186. E wanted to see only two KPIs on the balanced scorecard. E picked the Ability to automate the financing process as the second of the two choices.

DIFFICULTIES: This requires access to two databases at the same time. This problem can be handled by adding the data from both databases into the data warehouse.

OUTCOME: The change request to have the data in the data warehouse is made. This KPI will be implemented as soon as the change request is completed.

IP2: Share of Aplat cases where C/S rules are sent from Aplat and remain unchanged to Coreview

EXPLANATION: C/S rules are commission subsidy rules. Aplat adds this information into the application before it is sent to the banking system. If the C/S rules are unchanged it proves that no changes have been done during the process. This KPI is one of the three requirements to automate the loan handling process that Aplat can support.

ORIGIN: See the origin of the IP1. When the first component was recognized, the two other components become clear for the researcher.

REASONING: See the reasoning of IP1.
DIFFICULTIES: See the difficulties of IP1.

OUTCOME: See the outcome of IP1.

IP3: Share of esigned cases compared to all Aplat cases / all cases
EXPLANATION: Esigned application is electronically signed by all parties of the contract. Esigning is usually done by Tupas provided by bank or by Mobile ID provided by a cell phone operator. This KPI measures the share of esigned cases. It is one of the three requirements to automate the loan handling process that Aplat can support.

ORIGIN: See the origin of IP2.

REASONING: See the reasoning of IP1.

DIFFICULTIES: See the difficulties of IP1.

OUTCOME: This KPI requires a database access that has not been granted yet. It will be implemented as soon as the access is granted.

IP1 + IP2 + IP3: Share of Aplat cases where calculations and C/S rules are sent from Aplat and remain unchanged to Coreview and the case is esigned
EXPLANATION: In the suggested KPI areas, there was mentioned Ability to automate the financing process from end-to-end. During the analysis phase it become clear that this cannot be handled as one KPI. Instead the factors that affect to the automation was identified as three separate KPIs of which all must be true for a specific loan application to end up in the conclusion that Aplat has performed all the possible parts it can affect as expected. This KPI binds the three previous KPIs together and fulfils the requirement of quantifying the Ability to automate the financing process from end-to-end. It is likely that in the future this set will be extended with the fourth KPI. Possibility to automatically register the vehicles is not included into Aplat capabilities yet. If it becomes its capability, it has to be added in this combination.

IP4: Number of Aplat applications sent to banking system compared to the total number of applications
EXPLANATION: Where BV2 is a relative KPI concerning dealers, this KPI measures the share of the total loan application volume from Aplat.
ORIGIN: Project business case, benefit realization plan. In the business case this was formed: Number of applications via Aplat. This KPI was in the suggested preliminary KPIs areas shown in the appendix 2. C’s interview clarified the need for this KPI.

REASONING: The KPI is related to BV2 and is closer to the original KPI in the business case. It was found out during C’s interview that this KPI can be used to some extend to measure automatically if the other application sources have been decommissioned.

DIFFICULTIES: The usefulness of this KPI will decrease during the time. It will most probably never reach 100% but will get very close to it. In that point it does not describe the quality of Aplat very well.

OUTCOME: This KPI will be implemented in the first phase.

IP5: Decreased need to change the loan application in loans and decisions department
EXPLANATION: Aplat is letting the dealer users to update the cases that have been sent to the banking system. Old systems do not support this. When a dealer user does the update, a person at Santander Consumer Finance Oy does not have to do that.

ORIGIN: This KPI was in the in the suggested preliminary KPI areas shown in appendix 2, which was largely accepted by the interviewees. See for example appendix 4, row 50.

REASONING: There are two advantages this KPI is measuring: the data quality and the speed of the internal process.

DIFFICULTIES: There are no difficulties with this KPI.

OUTCOME: The KPI will be implemented in the first phase.

IP6: Number of returned Aplat contracts (to dealer) compared to returned non-Aplat contracts (due to errors or missing information on the contract)
EXPLANATION: The idea is to measure the data quality with this KPI. Occasionally the loan application cannot be financed due to problems on the financing contract. The contract is formed by Aplat automatically based on the loan application information.

ORIGIN: This KPI was created by Heikki Oksanen in the implementation phase when the other data quality KPIs were discussed. He is experienced with the loan activation process in the operations.
REASONING: There are three areas this KPI is capable to measure: Internal process, business value and user experience. Delayed financing can affect to the whole chain. The end customer will not get the vehicle, the dealer will not get their money and Santander Consumer Finance Oy is burdened by extra work. It is very powerful KPI. The weight, however, is in the internal process, therefore it is placed in that category.

DIFFICULTIES: The accuracy of the KPI is most probably very good, but not perfect. For example, if there are two end customers taking the car financing, but only one of them is added into the loan application the contract is returned. In that case, the KPI does not measure exactly the data quality, but the work quality of the dealer user.

OUTCOME: This KPI will be implemented in the first phase.

4.2.3 Future readiness KPIs

FR1: Number of ESB services compared to the number of User Stories
NOTE: As this KPI is not very close to the daily tasks of the employees of Santander Consumer Finance Oy and is very technical by nature. It needs more background information than other KPIs.

EXPLANATION: The ESB concept is a new approach to integration that can provide the underpinnings for a loosely coupled, highly distributed integration network that can scale beyond the limits of a hub-and-spoke EAI broker. An ESB is a standards-based integration platform that combines messaging, web services, data transformation, and intelligent routing to reliably connect and coordinate the interaction of significant numbers of diverse applications across extended enterprises with transactional integrity. (Chappell, 2004, 1). Web services provide a standard means of interoperating between different software applications, running on a variety of platforms and/or frameworks (W3C Working Group, 2004). A user story is the smallest unit of work in an agile framework. It’s an end goal, not a feature, expressed from the software user’s perspective. The purpose of a user story is articulate how a piece of work will deliver a particular value back to the customer. (Rehkopf, 2018). Aplat uses ESB and web service architecture. Its development has followed agile model to some extent.

The natural trend for new high-tech companies such as Amazon or Netflix is building their new software using microservices, which is the ideal scenario: they get a huge advantage of microservices-oriented software in order to scale up their new products without a big effort. The problem is that not all companies can plan their software upfront. Instead of
planning, these companies build software based on the organic growth experienced: few software components group business flows by affinity. It is not rare to see companies with two big software components: the user-facing website and the internal administration tools. This is usually known as a monolithic software architecture (Sharma, RV, Gonzalez 2016, 638).

Some of these companies face big problems when trying to scale the engineering teams. It is hard to coordinate teams that build, deploy, and maintain a single software component. Clashes on releases and reintroduction of bugs are a common problem that drains a large chunk of energy from the teams. One of the solution to this problem (it comes with benefits) is to split the monolithic software into microservices so that the teams are able to specialize in a few smaller modules and autonomous and isolated software components that can be versioned, updated, and deployed without interfering with the rest of the systems of the company (Sharma, RV, Gonzalez 2016, 638).

Splitting the monolith into microservices enables the engineering team to create isolated and autonomous units of work that are highly specialized in a given task such as sending e-mails, processing card payments, and so on (Sharma, RV, Gonzalez 2016, 638).

ORIGIN: This KPI was created by the researcher to quantify the malleability of the information system. As said, the interviewees used descriptions: modularity, flexibility, platform, and scalability. The Aplat - Solution description describes the architecture of Aplat as follows: The technical base idea for APLAT is modularity. APLAT is divided into independent modules that can perform one or more similar functions. Each component can call other components as needed. The modularity also enables light development processes and reduces time-to-market with new features. We also aim keeping the deployment processes in minimum with flexible configuration possibilities.

REASONING: Before Aplat, the developed systems in Santander Consumer Finance Oy have been monolithic. It means that the vast majority of all the program logic is in one monolith file. According to Aplat – Solution description its architecture is modular. According to the Aplat – Solution architecture document, the initial plan was to have 27 different modules. APM-Add-ons module was planned to form of many micro services. This means, that Aplat is not a pure micro service architecture, but closer to that rather than monolith architecture. Modular architecture brings scalability, when the services can be run on different servers. It brings security, when for example pricing can be run only on servers that are on the intranet zone. It brings shorter time-to-market and easier testing. API based information exchange makes it possible even to change the programming language or use
different operating systems and web servers for carrying out services that shows as one web site for the end users. Therefore, this KPI measures very well the malleability.

DIFFICULTIES: It is hard to say, what would be a good ratio with the number of web services and the number of user stories. As a lot of thoughts was put in design work, we can assume, that the defined 27 is the minimum amount to provide enough malleability.

OUTCOME: During this project a script to count the number of services was developed. However, it cannot be deployed to production environment during the first phase of the implementation because it was not agreed by the CAB before that.

FR2: Number of Aplat database changes in six months
EXPLANATION: The database is the heart of the information system. Every database change is a heart surgery. The smaller the amount of the changes is, the better the database is planned can implemented.

ORIGIN: This KPI was created by the researcher to quantify the future readiness of the information system.

REASONING: The format of the loan application data sent to the banking system is the same with all the applications. Some applications may have more information than others, but the format remains the same. The database structure should be able to serve this need without changes even if there are new products that Aplat needs to serve.

DIFFICULTIES: MS SQL Server, which Aplat uses as a database, does not save timestamps for alter table, create table or drop table queries. This was found out with Internet searches and discussions with Petri Kuosmanen from Netwheels Oy, who is a skilled SQL expert.

OUTCOME: This KPI cannot be implemented without further planning. It would require changes with the deployment process.

FR3: Number of front server services (connectivity)
EXPLANATION: FR3 is related to FR1. However, the meaning is to measure the number of external connections to 3rd party systems. If the other party can call the web service of Aplat, the web service must be installed on the front server. The front server means the server that is topologically on the DMZ which can interact on the Internet.
ORIGIN: This KPI was created by the researcher to quantify the connectivity of the information system.

REASONING: Five out of seven interviewees highlighted the importance of the connectivity to other systems. See for example appendix 4, rows 57, 93, 102, 143, 166.

DIFFICULTIES: One web service, depending on its meaning, can serve one or thousands of external systems. When the integration for the dealer management systems will be implemented, it could be a good idea to have another KPI for measuring the number of DMS connections.

OUTCOME: See FR1 outcome.

FR4: Amount of data sent to external systems
EXPLANATION: This KPI needs attention after the dealer management system connections are implemented. It can be implemented only then. The meaning is to count the amount of application data sent from Aplat to dealer management systems and compare it to the total amount of application data. The comparable amount of data can only consist of data that can be shared with the dealer. This means that for example the end customers income information is counted out from the amount.

ORIGIN: This KPI was created by the researcher to quantify the usage of the external connections. This KPI measures how big share of the loan application data is sent to 3rd party systems.

REASONING: Monitoring the data usage by the 3rd party systems can help with the further development of the information system.

DIFFICULTIES: The dealer management system 3rd party integration was not implemented yet, when this analysis was done.

OUTCOME: This KPI cannot be implemented before the dealer management system integration is implemented.

FR5: Number of reported production bugs in last month
EXPLANATION: This KPI is self-explanatory.
ORIGIN: There was just one direct suggestion and two mentions that lead to this KPI in all the interviews. This could be due to lack of coverage to this subject in the interviews. Another possible reason is that there have not been many changes with the previous systems recently before the interviews and the number of bugs in them has thus been small. B suggested this KPI directly. B has been formerly the CIO in Santander Consumer Finance Oy and has seen the amount of problems with similar information systems.

REASONING: Defects and bugs in the code, stories, mock-ups, and code result in rework (Sedano, Ralph, Péraire, 2017, 135). Bugs can also result in reliability or vulnerability. Although many bugs will be minor and will not affect users, problems can occur when the software is mission-critical and bugs could potentially bring the application down (Saltzman, 2004).

DIFFICULTIES: There are two major problems with this KPI. First, the developers may report bug fixing as developing new features. Secondly, for the simplicity, this KPI does not take in account the severity or the type of the bug. One severe bug that allow an attacker to misuse an application is worse than any amount of spelling errors on the user interfaces.

OUTCOME: Implementing this KPI requires more information from the developers. It will be implemented as soon as there is information enough.

FR6: Time used for fixing production bugs in last month
EXPLANATION: This KPI is related to FR5. Where FR5 measured the number of the bugs, this concentrates to the time used for fixing the bugs.

ORIGIN: This KPI was suggested by B.

REASONING: The time used for fixing the bugs may very well become as great as the time used for the development. Time spent for bug fixing is waste and is away from other development resources.

DIFFICULTIES: The developers may report bug fixing as developing new features.

OUTCOME: Implementing this KPI requires more information from the developers. It will be implemented as soon as there is information enough.
FR7: Time used for integration

EXPLANATION: This KPI is related to FR1. In this context, the integration means code integration after every development cycle. Here the word integration means enabling the coupling between independently developed pieces of source code. It means the fitting of different pieces of source code so that they will function together. Integration term is used, because it is common term used by the programmers developing Aplat.

ORIGIN: This KPI was suggested by B and indirectly by D and A. D said, that Aplat must not become a bottleneck in the development and A was emphasizing the changeability.

REASONING: High coupling signifies a strong interrelationship between modules in a program. In the event of a change to one module, high coupling implies that several other modules are likely to be affected. Loosely coupled modules, on the other hand, are more independent and thus easier to understand and adapt for reuse. Increasing the degree of reusability of a software component therefore implies high cohesion and loose coupling since the component can be reused without worrying too much about which other modules accompany it (Grubb, Takang, 2003, 167).

DIFFICULTIES: The developers are not currently reporting the time used for the integration.

OUTCOME: Implementing this KPI requires help from the developers to get the metrics from the VSTS and that the integration time is reported.

FR8: Share of the application data automatically got from external services

EXPLANATION: In the perfect world the dealer user, who is filling in the application, should not fill in manually any data in the loan application. Instead, all the data should be gathered from external sources and inserted automatically on the application form and into the database.

ORIGIN: This KPI was created by the researcher. It was influenced by the interviews with E, D and G. Especially D emphasized the data quality.

REASONING: The assumption is, that the data gathered from external databases is better quality than the data inserted into the loan application form by the dealer user. For example, the vehicle data from Trafi, even though it is not fully uniform, is much better quality than if the same information is inserted into text fields. Also, the loan applicant’s personal
information matches better with the personal information that is used in the scoring phase if it is get from Population Register Centre.

DIFFICULTIES: Implementing this KPI requires further development for Aplat. The data source must be able to track.

OUTCOME: This KPI can be implemented as soon as the needed changes are done.

4.2.4 User orientation KPIs

UO1: Net promoter question in the end of the application (raffle for 1/10 to 1/100)

*Net Promoter Score (NPS)* is perhaps the best known customer loyalty tool around today, based on the entirely sound principle that the more customer promoters you have (i.e., customers who say on surveys that they’re highly likely to refer you to a colleague or friend), the more likely you’ll be to grow your business and outpace the competition. That makes powerful sense, and the continued growth and success of Net Promoter is a testament to the idea’s relevance and value (Lee, 2012).

ORIGIN: UX is the second-class code with most occurrences in the analysis table. Six out of seven interviewees are quoted in the analysis material with the code UX. The idea of adding the net promoter score question was created by the interviewer. It was influenced by the emphasis of the interviewees and a visiting lecturer at Haaga-Helia from Taloustutkimus Oy.

REASONING: *The path to sustainable, profitable growth begins with creating more promoters and fewer detractors and making your net-promoter number transparent throughout your organization. This number is the one number you need to grow. It’s that simple and that profound* (Reichheld, 2003). F, the CEO of Santander Consumer Finance Oy, emphasized the need of the net promoter question.

DIFFICULTIES: The project group has many other things to develop. Developing the system for implementing the KPIs is not the top priority.

OUTCOME: This KPI will be carried out when there is room for the needed development.
UO2: Number of dealer customer support cases per Aplat user per month

EXPLANATION: The users, occasionally, may need support with Aplat. The number of reasons for the support need is large. This KPI measures only the number of support cases and is related to ITIL KPI Number of Incidents.

ORIGIN: This KPI was created by the researcher and presented to the interviewees during the interviews. It got support from the interviewees, especially from G. See for example appendix 4, row 196.

REASONING: This KPI measures how much problems the Aplat users are facing when using Aplat. It reflects the easiness of using the information system, the level of intuitiveness of the user interface and the sufficiency of the services Aplat provides for the users.

DIFFICULTIES: The call center system used by Santander Consumer Finance Oy does not have the needed classification for the Aplat customer support. The users cannot send their incidents or questions from Aplat.

OUTCOME: This KPI cannot be implemented before the needed classification is carried out.

UO3: Time from starting the application to sending it during the last month

EXPLANATION: The loan application form is long and requires a lot of information to be filled before the application can be sent to the banking system. Sometimes this may take a long period of time. The assumption is that the shorter the filling time is the easier the user feels the process.

ORIGIN: This KPI was created by the researcher and presented to the interviewees during the interviews. It got support from the interviewees, especially from D and G. See for example appendix 4, rows 164, 179.

REASONING: Users may become frustrated when filling in all the required information as the number of fields on the application form is big. This KPI measures the functionality of Aplat from many angles. The more there are connections to 3rd party information sources, the more the application form can be filled in automatically. The user needs only to check that the automatically filled information is correct. On the other hand, this KPI measures the easiness of using the loan application form.
DIFFICULTIES: There are two major difficulties with this KPI. The filling-in start time is not saved. This would be rather easy to change by adding a column in the database for it and inserting a timestamp. The other difficulty is that the dealer users sometimes start filling in the application form when the end customer goes for the test drive. Then the application form remains untouched for an extended period. It would require development to count only the time used actively filling in the application form.

OUTCOME: This KPI can be implemented only when there is way to measure the active filling time and add the time into the database.

UO4: Total number of errors returned from banking system when trying to send an application
EXPLANATION: The loan application form should be able to validate all the inserted data when the dealer user is trying to send it to the banking system. The loan application information is not directly sent to the banking system. Instead it goes through a middleware which takes care of the message queueing. There can occur an error in any of these technical parts.

ORIGIN: This KPI was created by the researcher and presented to the interviewees during the interviews. It got support from the interviewees, especially from G. See for example appendix 4, row 176.

REASONING: Sending an application to the banking system and waiting for the scoring and loan approval is the moment of truth in the loan application process. The moment of truth can be ruined with a technical problem. This moment must not suffer from technical problems. The ideal number of errors when sending the application is zero.

DIFFICULTIES: There are no difficulties with this KPI. The information can be retrieved from Aplat main database.

OUTCOME: This KPI will be implemented in the first phase.

UO5: Number of application updates by dealers
EXPLANATION: With the previous systems the dealer users has been able to fill in the application and to send it. Any alterations to the sent information has been done by calling the loans and decisions department. With Aplat the dealer users can change the information sent to the banking system for as many times as needed.
ORIGIN: This KPI was created by the researcher and presented to the interviewees during the interviews. It got support from the interviewees, especially from D. See for example appendix 4, rows 180, 181.

REASONING: Ability to update the application, at the same time, takes workload from the loans and decisions department and moves it to the dealer users. It enables self-service for the dealer users. For example, if the application is not approved, the dealer user can alter the data and make the banking system score the case again. This relieves the work in Santander Consumer Finance Oy and increases the number of automatically scored cases.

DIFFICULTIES: There are no difficulties to implement this KPI.

OUTCOME: This KPI will be implemented in the first phase.

UO6: Number (share per product) of dealerless customers
EXPLANATION: End customers can get a preapproved loan decision before they open negations with the car dealers. The idea of this KPI is to measure the number of preapproved loan applications to the total number of loan applications.

ORIGIN: This KPI was invented by the researcher during the analysis phase. It was influenced by the interviews with E, B and A, see for example appendix 4, rows 62, 136, 168.

REASONING: The purchasers who pay for the product or service may differ from the actual users, and in some cases there are important influencers as well (Kim, Mauborgne, 2015, 63). In car financing business the biggest influencers are the dealer users. Kim and Mauborgne suggest shifting the influencers role if it benefits the business. The idea behind this KPI is to make the end customer to get a preapproved loan decision before negotiating with the car dealer. This way the influencer role will shift more to the end customer.

DIFFICULTIES: The preapproved car loan application did not exist in Aplat when this study was done.

OUTCOME: This KPI will be carried out as soon as the process exists in Aplat.

UO7: Number of development ideas generated by the dealer users
EXPLANATION: This KPI is self-explanatory.
ORIGIN: This was a direct KPI suggestion from F. See for example appendix 4, rows 162, 190, 194.

REASONING: F thought, that involving the dealer users into the development idea generation helps the development team and makes a strong connection to the dealer users. He emphasized the idea of going outside the office, to meet the biggest stakeholder and user group and to get their feedback and ideas. B was thinking the same in a more general level.

DIFFICULTIES: There is no formal way to send the development ideas in Aplat. The development ideas are gathered in customer meetings and on telephone. Getting a mutual database for these channels requires development.

OUTCOME: This KPI will be implemented as soon as it is possible.

4.3 Starting point measurement results

This chapter represents the initial results of the measurements that were implemented by the time of writing this paper. The measurement for the selected KPIs were performed using Microsoft PowerBI. The proof of concept for the most complicated measures was first tested with writing SQL queries to get the data. Many KPIs were not implemented when this phase of the research was carried out. There were many reasons for this. The project group did not have access to all the needed databases. Also, the data warehouse team was still in a process to import many pieces of data into the data warehouse. However, the KPIs that were implemented can already measure the strategical performance up to a certain extend. Here is an evaluation of the readily implemented KPIs.

BV1: Loan balance growth compared to non-Aplat dealers

This is shown in the appendix 5 on the top left corner. The amount of loan applications that originates to Aplat is growing slowly being 14% at the moment of measuring. The target with this KPI is near 100%. When it is reached, this KPI becomes irrelevant. In that situation the other systems are decommissioned.

Aplat has slightly higher financing rate for the applications than other systems have. For example, on the measurement moment the share of all applications was 20% but the share of financed applications was 21% as can be seen on the appendix 6. This could be improved in the future. A good level could be 5% higher than from other sources.
BV2: Change in the number of applications compared to non-Aplat dealers
This is shown in the appendix 5 on the second box on the upper row. The number of applications that originates to Aplat is growing being 18.8% at the moment of measuring. The target with this KPI is near 100%. When it is reached, this KPI becomes irrelevant. In that situation the other systems are decommissioned. The growth from month to month can be seen on the appendix 6. At the moment of measuring it is satisfying.

BV9: Time-to-money compared to non-Aplat cases
This is shown in the appendix 5 on the top right corner. The time-to-money is based on the median of the differences between the times when the application is sent to the banking system and the money is paid out to the car dealer. Aplat has 33.8% faster time-to-money than other systems. It can be described as impressive improvement. This can get even better in the future when other processes are altered to take full advantage of the high data quality of Aplat applications.

BV10: Number of user changes and user right changes per month
This is shown in the appendix 5 on the lower right corner in the bottom. The number of user changes was 29.6% per month at the moment of measuring. This is mostly because of the new users in Aplat. At the moment, this KPI is useless and requires to be avoided when the performance of Aplat is estimated.

IP3: Share of esigned cases compared to all Aplat cases / all cases
The share of esigned Aplat cases is shown in the appendix 6 on the upper right corner. The initial result is 72.5%. The share of esigned loan cases from all the financed applications has risen to 13%. It has never been over 4% in the history. The result of this KPI can be considered being very impressive.

IP6: Number of returned Aplat contracts (to dealer) compared to returned non-Aplat contracts (due to errors or missing information on the contract)
The share of the returned Aplat contracts is shown in the appendix 5 on the lower left corner. It is significantly lower than with the other systems. The middle line shows the trend of all returned contracts. It is obvious that the data quality Aplat provides affects already. The result of this KPI can be considered impressive.

FR1: Number of ESB services compared to the number of User Stories
This KPI is not automated yet, but the result of the initial manual measurement is alarming. Thus, it is important to discuss about this KPI. The reasoning of this KPI suggest the number of the services being at least 27. Currently there are three services. This tells that
instead of malleable and scalable, the software is monolith. The integration times were already high in the beginning of the Aplat development project and this time will most probably grow when the system grows. It also exposes the system for bugs, vulnerabilities, longer development times and extended need of workforce. The system loses the purpose of being a platform. The result of the KPI is alarming. This requires immediate attention.

**UO4: Total number of errors returned from banking system when trying to send an application**

The share of the erroneous sendings is shown in the appendix 5 on the lower right corner on the top. The result of this KPI is 4.9% at moment of measuring. It is alarming high. This requires immediate attention.
5 Conclusions

In this part the conclusions are reported using the structure from the objectives and research questions from chapters 1.2 and 1.3.

5.1 Objectives

To find a framework that enables an information system strategical performance measurement
This thesis work shows that it is was possible to find a framework that enables IT system strategical performance measurement (3.4). However, the framework did not exactly support measurement of an information system. It suggested measuring the organization in some parts. The framework was further developed to fully support information system strategy coherence measurement (3.4).

To find the KPIs for the measurement
The KPIs were suggested by the interviewees or created by the researcher based on the interview transcripts (4.2).

To build an automated strategic performance measuring system for Aplat using the selected framework
An automated strategic coherency measuring system was built for Aplat with the selected framework (4.3). This was done using the KPIs that were found during the research (4.2). However, not all the chosen KPIs were implemented. This was due to several reasons. The project group did not have access rights to all the needed databases. The data warehouse team had to compile tasks to derive data from several databases into the data warehouse. This work was not completed during this research. Also, the project group did not get the permission to deploy the needed script on two servers during this research. Still many of the indicators are automatically measured when this research ends.

To measure the starting point with the created measuring system
The starting point was measured using the created measuring system. The results for the implemented KPIs were derived from the information system or databases it is closely connected to (4.3).

To comment the strategical performance of Aplat based on the KPI values
The dashboard indicated, that Aplat was performing strategically very well when the initial measurement was done. However, there will be troubles in the future due to the software architecture (4.3).
5.2 Research questions

RQ1: What is a suitable framework for building the measuring system?
It was found out that there are not many researches about how to measure the strategical coherence of an information system. This is an area, where future research is needed. There was two candidates for the measurement framework. The balanced scorecard: a foundation for the strategic management of information systems by Marinsons, Davison and Tse was found to be the most suitable framework (3.4). Before it could be used it needed two major alterations (3.4).

RQ2: What is the strategy of Santander Consumer Finance Oy?
The strategy of Santander Consumer Finance Oy was covered enough to carry out this thesis work. This was mainly done by interviewing the members of the local management team (4.1) and analysing the interviews (4.2). Some internal strategy materials were also used during the research work. The strategy can be simplified using the values of Santander Consumer Finance Oy: Simple, Personal and Fair. Simple means roughly, that the products and services should be easy to understand. Personal means roughly, that the customers are treated as individuals and with a personalized manner. Fair means roughly, that the customers are treated in a just and fair way.

RQ3: Which strategic goals are supposed to be achieved with Aplat?
The strategical role of Aplat was found to be big. It was seen as the future enabler and a shield for the business (4.1). It will be the primary link between the dealer users and Santander Consumer Finance Oy. It is also a primary link to the 3rd party information suppliers. The main expectations for Aplat were dealing with the customer experience, ability change with the changing requirements and reduced costs (4.1, 4.2).

RQ4: What are the preferred measured subjects, what are the KPIs?
During the research many KPIs were recognized (4.2.1, 4.2.2, 4.2.3, 4.2.4). The researcher would have limited the number of the KPIs, but most of the stakeholders from Santander Consumer Finance Oy wanted to see as many of them as possible. However, it was agreed, that some KPIs are more important than the others. For example, the time-to-money was mutually thought to be the most important individual KPI. The combination of IP1 + IP2 + IP3 (Share of Aplat cases where calculations and C/S rules are sent from Aplat and remain unchanged to Coreview and the case is esigned) is a metrics for the possibility to enable automation in the loan handling and another very important KPI. The researcher would emphasize the meaning of FR1 (Number of ESB services compared to the number of User Stories). It was an invention which made it possible to alter the used
framework so that it measures only the information system, not the organization. In the user orientation part, the most valued KPI appeared to be the UO1 (Net promoter question in the end of the application).

**RQ5: How does Aplat perform in the initial measurement?**

On average Aplat is performing very well in the initial measurement (4.3). For example, the number of returned contracts is much smaller than the average number of returned contracts is. The time-to-money is much better than with any other system. The share of esigned contracts is well over 70%, whereas with other systems it is less than 3%. The main idea of Aplat development was the better user experience. There are too few metrics for this to conclude how the end users are experiencing Aplat. The number of errors when sending the application seems to be 4,9% which is alarming. On the other hand, the number of application updates by dealer is good. As said, the FR1 (Number of ESB services compared to the number of User Stories) would be the most important KPI to measure the malleability of Aplat. The number of services cannot be automatically received. It makes sense to do the measurement manually. There are three services on the ESB server of which one is taking care of most of the business logic. The acceptable number would have been at least 27. This is by far the biggest disappointment.

**RQ6: What should be changed in order to make the results better?**

According to the measurements the base processes seem to work fine (4.3). The biggest problems are related to the technical part of the implementation. The number of errors when sending the application is too high. This requires immediate attention. In the long run the monolith architecture will be a problem. It was clearly stated in the beginning of the project, that Aplat will have a modular architecture (4.2.3). The programmers have decided otherwise. This is very uneasy and expensive to fix. It would require isolating the different functionalities from the main program and building APIs in between the isolated components. It would be risky and require very much work. It means that a lot of money would be spend without any new features and it would stop the future development for a long period of time.
6 Discussion

The strategy is frequently discussed subject in Santander Consumer Finance Oy. Everybody in the organization understands its importance. The results of this research support reaching better alignment with information systems and strategy. This research was more successful than the researcher would have been anticipated in the beginning. It was rather large with many aspects. Even finding the framework for the measurement required weeks of work. There were several stakeholders with their own agendas. That is a reason for so many KPIs. The researcher would have started with much smaller number of KPIs. It also added a lot of working hours for this thesis work. Even though the strategy is a hot topic in Santander Consumer Finance Oy, the documentation was insufficient for performing the research. Therefore, it needed to be documented first. It took many interviews and ninety pages of transcription.

This thesis work includes public domain information. The framework used in the case study: The balanced scorecard: a foundation for the strategic management of information systems by Martinsons, Davison and Tse was altered heavily before it was used for the measurement. The biggest innovation enabling this was to understand that the future readiness of a modern information system can be measured using for example with the number of web services compared to the user stories. This shows, that the researcher can not only apply the framework, but to alter it if needed. It became obvious during the discussions with Gustav Heiberg, that the developed measuring model can be used measuring the strategy performance of almost any information system.

6.1 Outcome of the research for Santander Consumer Finance Oy

The implemented KPIs tell, that Aplat is performing very well at the moment. The rate of the time-to-money is amazing good, the rate of esigned contracts is amazing high. The data quality seems to be very good as the rate of returned contracts is very small. On the other hand, during this research two urgent problems were found. The architecture of Aplat is monolith. It is not a malleable platform, which it was meant to be. The maintenance will be laborious, it will contain a lot of bugs and possible vulnerabilities. It can very well be too late to try to correct these problems. Getting the results that tell about the current situation and forecasts the future was the expected result of this thesis. It seems to do this very well.

It would be very important to get the KPI IP1 + IP2 + IP3 (Share of Aplat cases where calculations and C/S rules are sent from Aplat and remain unchanged to Coreview and the
case is esigned) implemented as soon as possible. It reveals, how well Aplat can feed and support further processes. If the vehicle registration process will be implemented in Aplat, it would be good to add into this combined KPI. The combined result of these four KPIs would tell how well Aplat enables the automation of the loan application handling. Also, getting the UO1 (Net promoter question in the end of the application) implemented would support the reason why Aplat was decided to develop. It is a great thing, that the third very important KPI BV9 saw the daylight during this project. It would be good to have the FR1 (Number of ESB services compared to the number of User Stories) implemented soon, but it can exceptionally be carried out manually as the situation will not change rapidly.

6.2 Generalization of the research results

There is an automated strategy performance measurement for one information system. Now what? During this project there was discussions with Gustav Heiberg from the Nordic headquarters of Banco Santander. Gustav wants to see the results of this project generalized so that there would be one main monitor summarizing the strategic performance measurements from many other information systems too. During the discussions it become clear, that this can be build. This would require a normalization of the measures from each information system to a level where the can be shown in one dashboard as a summary of all systems. The approach was tested with different strategy change scenarios. How would it affect, if Santander Consumer Finance Oy would start selling cars instead of partnering with the car dealers and if Santander Consumer Finance Oy would start to product sports equipment? It appeared, that the smaller strategy change could be handled by finetuning the KPIs. However, the paradigm change in the whole business would be hard to handle. In a bigger business strategy change, of course, the current information systems would not work either. Thus, the conclusion was that this measuring model is flexible enough to be spread to a large-scale use.

6.3 Need for further research

The balanced scorecard that was used as a framework for the applied research had to be altered before it could be used. Especially, if the results of this research will be generalized for monitoring many systems at the same time, a new framework must be developed. This would be an interesting project and would benefit the measurement of information systems. It would change the weight of measuring from the tangible to intangible metrics. The generalization itself would require a lot of further research. It would bring a new requirement for the framework too. Thus, the generalization would affect to the framework and the framework would affect to the generalization.
6.4 Acknowledgements

Many people have contributed to this research. It would not have seen the daylight without your unselfish help. Thank you Jouni Soitinaho from Haaga-Helia for challenging and supervising. Thank you, Ville Rinkinen from Santander Consumer Finance Oy for your support. Thank you, all the interviewees from Santander Consumer Finance Oy for your openness in the interviews. Thank you, Juho Niiranen from Santander Consumer Finance Oy for you support with creating the KPIs. Thank you Heikki Oksanen with your help with PowerBI and challenging with the created KPIs. Thank you for your support Gustav Heiberg from Santander Consumer Bank AS for your help with KPI analysis and discussions about future generalization of the measurement. Petri Kuosmanen, thank you for your support with SQL-Server information. Thank you, Mikko Vesa from Hanken School of Economics, for your support with research methods. Thank you Toivo family for being patient when the one family member is often absent and drowned in his thoughts even though he would be present.
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Appendices

Appendix 1. Predefined interview questions

Questions:

• Please describe our strategy shortly (please limit this as much as possible to auto and durables related parts from your point of view)...
• What parts of our strategy Aplat should fulfill?
• Describe these identified parts in more detail.
• How do you see Aplat should fulfill them?
• In your opinion, what are the three most possible major strategical changes which may affect to Aplat? (What could be the game changers?)
• I have sketched an initial set of KPIs for Aplat. Could you please comment on them? Please, feel free to criticize or propose additions.
Appendix 2. KPI area suggestions

BUSINESS VALUE
- Loan balance growth
- Growth in the number of applications
- Reduced need of labour
- Enhanced process transparency

USER ORIENTATION
- Net promoter question in the end of a fraction of the application
- Number of customer support cases per user
- Time from starting the application filing to sending it
- Number of errors when trying to send an application
- Number of application updates by dealers

INTERNAL PROCESS
- Ability to automate the financing process from end-to-end
- Number of applications sent to banking system compared to the total number of applications
- Number of signed car loan cases compared to paper contracts
- Decreased need to change the loan application in loans and decisions department

FUTURE READINESS
- Development cycle & amount of labor
- Ability to start new products
- Ability to make small adjustments to the application process (such as changing labels, adding or removing fields from the form etc)
- Ability to connect to new information sources
### Appendix 3. Codebook

$S$ = strategy, $BV$ = business value, $IP$ = internal process, $FR$ = future readiness, $UO$ = user orientation, $SPF$ = simple, personal, fair, $UX$ = user experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Inclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPF</td>
<td>Deals about the values Simple, Personal and Fair</td>
</tr>
<tr>
<td>X</td>
<td>Non-functional requirement (usually has word need in it)</td>
</tr>
<tr>
<td>X</td>
<td>Has opinion about the user experience</td>
</tr>
<tr>
<td>X</td>
<td>Handles the shift in the influencer role in a loan case. Usually the dealer is the influencer and the end customer makes the final decision.</td>
</tr>
<tr>
<td>X</td>
<td>A strategical game changer having an effect to Aplat in the future. Brings for example a set of new change requirements.</td>
</tr>
<tr>
<td>X</td>
<td>Ability to serve more, faster and with better quality, better data quality</td>
</tr>
<tr>
<td>X</td>
<td>Describes current problems</td>
</tr>
<tr>
<td>X</td>
<td>Describes the relative nature of measurement. For example: Is it OK to measure the business growth if the whole market is going down.</td>
</tr>
<tr>
<td>Shareholder</td>
<td>Requirements or measurements that could have been given directly from the shareholder. The base idea is to maximize the return on investment and minimize risks.</td>
</tr>
<tr>
<td>X</td>
<td>Need to change or redesign product or part of it.</td>
</tr>
<tr>
<td>X</td>
<td>Ability to quickly answer to the market needs by changing the system and to make prototypes of the possible solutions and possibility to scale up.</td>
</tr>
<tr>
<td>X</td>
<td>Ability to connect to a 3rd party systems and internal services.</td>
</tr>
<tr>
<td>Future</td>
<td>Future aspirations</td>
</tr>
<tr>
<td>X</td>
<td>Bug and software availability related comments</td>
</tr>
<tr>
<td>X</td>
<td>How profitable the pricing is and how well the pricing works</td>
</tr>
<tr>
<td>X</td>
<td>General comment about the preliminary KPI areas</td>
</tr>
</tbody>
</table>
Appendix 4. Matrix of the most important quotations (CONFIDENTIAL)
Appendix 5. Initial measurement dashboard 1/2 (CONFIDENTIAL)
Appendix 6. Initial measurement dashboard 2/2 (CONFICIENTIAL)