Open your mind. LUT.
Lappeenranta University of Technology

LUT School of Business and Management
Global Management of Innovation and Technology

Simo Rintakari

VALUE ADDED KPI SERVICE DELIVERY WITH QUALITY FUNCTION DEPLOYMENT: MULTIPLE CASE STUDY IN ASSET & REAL ESTATE MANAGEMENT

Master´s thesis

Helsinki, July 28, 2015

Examiners: D. Sc. (Tech.) Ville Ojanen
D. Sc. (Tech.) Kalle Elfvengren

Supervisor: D. Sc. (Tech.) Tomi Ventovuori

ABSTRACT

Author: Simo Rintakari

Title: Value added KPI service delivery with quality function deployment: Multiple case study in asset & real estate management

Year: 2015 **Location:** Helsinki

Master Thesis. Lappeenranta University of Technology, Industrial Engineering. 79 pages, 24 figures, tables 9, ja 2 appendices.
Examiners: D. Sc. (Tech.) Ville Ojanen and D. Sc. (Tech.) Kalle Elfvengren

Keywords: Value added service, quality function deployment, asset and property management, service development, key performance indicator(s)

The aim of this study is to investigate value added service concept for an asset and real estate management case company. The initial purpose was to recognize the most value adding key performance indicators (KPIs) information delivered for its customers, real estate investors with value added service. The multiple case study strategy included two focus group interviews with five case interviews in total. Additionally, quality function deployment (QFD) was used in order to form up the service process.

The study starts with introduction and methodology explaining the demand for the-thesis study. The subsequent chapter presents the theoretical background on real estate management KPIs in four main points of views and quality function deployment from the service development point of view. The chapter also defines research gap for the case study.

According to the case study interviews, the most favored KPIs to deliver for the clients are income maturity of lease agreements and leasing activity. These KPIs and quality characteristics are translated into the QFD. In total, the service QFD explains the service planning, process control, and action plan phases.

TIIVISTELMÄ

Kirjoittaja: Simo Rintakari

Otsikko: Value added KPI service delivery with quality function deployment: Multiple case study in asset & real estate management

Vuosi: 2015 **Paikka:** Helsinki

Diplomityö. Lappeenrannan teknillinen yliopisto, Tuotantotalous.
79 sivua, 24 kuvaa, taulukkoa 9 ja 2 liitettä.
Tarkastajat: TkT. Ville Ojanen ja TkT. Kalle Elfvengren

Hakusanat: lisäarvopalvelut, quality function deployment, kiinteistöjohtaminen, avaintunnusluvut, palvelujohtaminen, kiinteistötekniikka, palvelukehitys

Tämän tutkimuksen tavoitteena on selvittää lisäarvoa tuottavan palvelun konsepti kiinteistöjohtamisen alan yritykselle. Alkuperäinen tarkoitus oli tunnistaa kaikkein eniten lisäarvoa tuottavat avaintunnusluvut kiinteistöjohtamisyrityksen asiakkailleen, kiinteistösijoittajille lisäarvopalvelun avulla. Tutkimus toteutettiin kahdessa eri kohderyhmässä viiden eri case-haastattelun voimin. Lisäksi, quality function deployment (QFD) –työkalua käytettiin rakentamaan koko palvelukonsepti tunnuslukuteorioiden tukena.

Tutkimus aloitetaan kirjallisuusselvityksellä, joka käsittelee avaintunnuslukuja sekä QFD:hen liittyviä akateemisia tutkimuksia sekä artikkeleita; kirjallisuusselvityksen tarkoituksena on kuvata kirjallisuudessa oleva tutkimustarve case-tutkimusta varten. Lisäksi kirjallisuusselvitys sisältää käsittelyn avaintunnuslukujen neljällä pääteemalla sekä palveluiden QFD-työkalun teoriaosuudella.

Haastattelujen perusteella eniten arvoa lisäävimmät tunnusluvut olivat vuokratuottojen maturiteetti sekä vuokrausaktiivisuus. Nämä kaksi avaintunnuslukua sekä näiden käyttöominaisuudet käännettiin QFD:n palvelurakentamisprosessiin. Kokonaisuudessaan case-tutkimus kokosi yhteen kiinteistöpalveluntuottamisen asiakastarpeesta teoreettisen toteuttamismalliin.

FOREWORD

The thesis was produced for an international asset and real estate management branch as a part of a development project that specialized in service management. The branch was familiar to me from the past ten years, but conducting the service development project in such context was rather a new experience for me. I found the project as a possibility to learn new qualities regarding the company´s clients and their perception of the service development. In addition, I believe I can deliver something value added from industrial engineering and management sphere to the real estate management branch.

Concerning the study project, I would like to address my humble regards to the company instructor Mr. Tomi Ventovuori who gave me valuable advice and support. Also, I would like to that other company member that helped me with the case. Without them I would have been completely lost with the thesis. In addition, I would like to thank mine LUT School of Business and Management´s first supervisor Mr. Ville Ojanen. Both Mr. Ventovuori and Mr. Ojanen pointed out the most important issues concerning the process from day one. Most of all, they both gave me motivation, value adding perspectives, and generated fruitful workshops during the writing process.

Finally, I would like to thank my parents and girlfriend Tanja for patience, support, and helping me out during the studies. Secondly, I had a privilege to meet fresh-minded and brave people from the coldest places of Lapland to the hottest places of Australia during my seven years of studies in different universities and countries. Those people have inspired, supported, and showed me things that I could never imagine. Thank you from the memories.

Sincerely,

Simo Rintakari
Helsinki, 28th of July 2015

TABLE OF CONTENT

FIGURE LISTING

TABLE LISTING

ABBRIVIATIONS

B2B	*Business to Business*
BSC	*Balanced Scorecard*
CREM	*Corporate Real Estate Management*
EDA	*Exploratory Data Analysis*
ERV	*Estimated Rental Value*
FM	*Facility Management*
HoQ	*House of Quality*
IT	*Information Technology*
KPI	*Key Performance Indicator*
LUT	*Lappeenranta University of Technology*
MIT	*Massachusetts Institute of Technology*
NPV	*Net Present Value*
PV	*Present Value*
QFD	*Quality Function Deployment*
ROCE	*Return on Capital Employed*
SWOT	*Strength, Weaknesses, Opportunities and Threats -analysis*
TQM	*Total Quality Management*
VoC	*Voice of Customer*

1 INTRODUCTION

1.1. Background

The real estate management business has become more dependent on measuring key performance indicators to interpret and evaluate a quality of the services. The modern day asset and real estate management service business models try to utilize up-to-date information technology (IT) and business intelligence such as success rate in tenant negotiations, level of utilization, energy costs per square, operating, and maintenance costs per square etc. Generally, real estate business and construction management servants are focusing on new service innovations regarding services for real estate owners, such as real estate services measuring energy consumption, and people flow, and on building user friendly applications. However, these innovations are initially developed by other technology sectors such as IT and Energy, and utilized by real estate business sector (RYM, 2015; ROTI, 2015). Moreover, the real estate management business companies have quite restricted capabilities to innovate new earning logics in Finland since asset and real estate management sector itself does not generate new product or service innovations; the technology is rather saturated, and atmosphere of "everything has been invented" remains; usually the innovations are rather incremental and do not have much value when invented. Additionally, lack of innovative executives is rare. (Ahonen, 2014; Palojärvi, 2012)

Since the real estate management service companies are competing in a restricted market with restricted value-adding functions, pressure to innovate new services is high. (Ahonen, 2014) Although, operators can copy each other's services, the companies need to innovate, or they die and lose market share in Finland. Despite the fact that asset and real estate management innovations are rare, the business intelligence method could open new doors in the real estate management service sector. The key performance indicators (KPIs) that give new value-added information are examined with the real estate owners.

Furthermore, the all comes down to the question of where an asset and real estate management company could have a new competitive advantage. Article by Jensen et al. (2012, pp. 212–213) suggest that asset and real estate management should seek answers to questions such as:

- *"What value dimensions are most important for different stakeholders"*
- *"What facility management encounters with clients/customers/end users are most responsible for perceptions of value of facility management?"*
- *"What are the key value drivers in each facility management encounter?"*
- *"In what ways can facility management providers signal high value to clients/customers to obtain desired effects?"*

The new opportunity in real estate business service is to utilize business intelligence indicators to generate latent customer needs in business-to-business (B2B) customers in Finland. For the above-mentioned reason, this thesis will concentrate on innovative KPIs in the real estate management business. The thesis will gather up the most convenient theoretical background to real estate management and KPI management to illustrate latent customer needs and desired KPIs which are identified with real estate and property management company and with its customers. Finally, the thesis will consider recognized real estate management key performance indicators (Lindholm, 2008), and how the measurements are regenerated with quality function deployment (QFD).

1.2. Scope and Objective

The aim of this study is to demonstrate elements of present and prospective value added services delivered from an asset and real estate management company to its accounts, real estate investors; institutional insurance funds. Additionally, the KPI service delivery is viewed as a quality function deployment tool to meet customer needs. In this thesis, the QFD development process is illustrated as in Prayani et al. (2010) from the service delivery development point of view which enhances organizations core capabilities. Moreover, the service development process is seen

as a long-term continuum in organizations. The service development is usually seen in in-house action, although it needs to be taken into consideration that outsourced product development projects do exist (Chesbrough, 2003). The selected view in the thesis is rather a common strategy concerning service and product development project. The thesis follows a formatted development project strategy by Prayani et al. (2010) and Bernal et al. (2009). However, most service and product development strategies are formally planned (deliberate) or emergent but it is vital to understand that the development process can be emergent, developing without any specified intentions. (Chesbrough, 2003)

In order to focus on the stakeholders investigated in the thesis, it is not worthwhile to investigate separate asset management and real estate management (seller), or real estate investor functions (buyer). In the asset and real estate management company, separate actions could be such as property management and valuation advisory spheres. Although, the buyer and seller sides both have versatile and complicated processes and functioning units, the main idea is to reach a holistic understanding on both sides. Additionally, forming the actual value-added service tool is rather challenging. Therefore the thesis´ scope and objective give something to the scientific world. As the theoretical background chapter will indicate, the asset and real estate management does have very little indication of service development studies, since the convenient literature needs to be attached from other industries. Service development theories are partly introduced in industrial engineering and scientific business forums; the articles are rather cross-academic but are however applicable research material for the thesis.

First, the purpose is to illustrate the current state of service between the asset and real estate management company and real estate investors. The overview of currently delivered KPIs are investigated with the asset and real estate management company. Secondly, the multiple case study will give deeper understanding on the asset and real estate management company´s accounts and how the desired KPIs could be achieved by the real estate investors. Furthermore, the purpose is to illustrate a new value-adding element for the asset and real estate

management company that could be to its advantage on the real estate management market in Finland. The thesis will give overviewed knowledge on the rather unused customer information. Finally, the thesis will end with a discussion of the quality function deployment application, which sums up the service development process concerning the value adding KPIs between the asset and real estate management company and real estate investors. To provide a wide perspective of the most value added elements of asset and property management service delivery, this study aims to answer to the following fundamental questions:

RQ1: Which asset and real estate management information resources are the most important in developing new service KPIs for the customers?

RQ2: Based on the case interviews, which KPIs are the most value added for asset and real estate management company´s customers?

- *RQ2.1: Which KPIs are the most necessary to know in the timely manner?*

- *RQ2.2: Which KPI contexts are important for real estate investors decision-making?*

Multiple points of view need to be taken into consideration when defining the research questions. The real estate management services business is rather versatile comprising multiple functions such as accounting, construction management, renting activities and life-cycle economics, etc. The desirability of the KPIs needs to be managed and measurable since the value adding element need to be explained on a timely basis. Finally, the delivered KPIs for decision-making can be separated from the overall amount of desired KPIs.

In order to meet Jensen´s (2012) question proportions stated in Chapter 1.1., the problem analysis of the case study focuses on five case interviews concerning the asset and real estate management company and its accounts. The first case

interview is the asset and real estate management company, and case interviews 2 to 5 include four real estate investors. The research questions are focused on the actual value given to the asset and real estate management company and its management board. Additionally, the problem analysis is defined since new information is given to the academic world that has never been examined before within the particular customer relationship.

1.3. Structure of study

The study started with the *introduction* to the dilemma of creating value-added services in the real estate management business. Moreover, the introduction revealed where the study of real estate management stands in the field of innovation and what are the actual benefits of this thesis to the company and academic community.

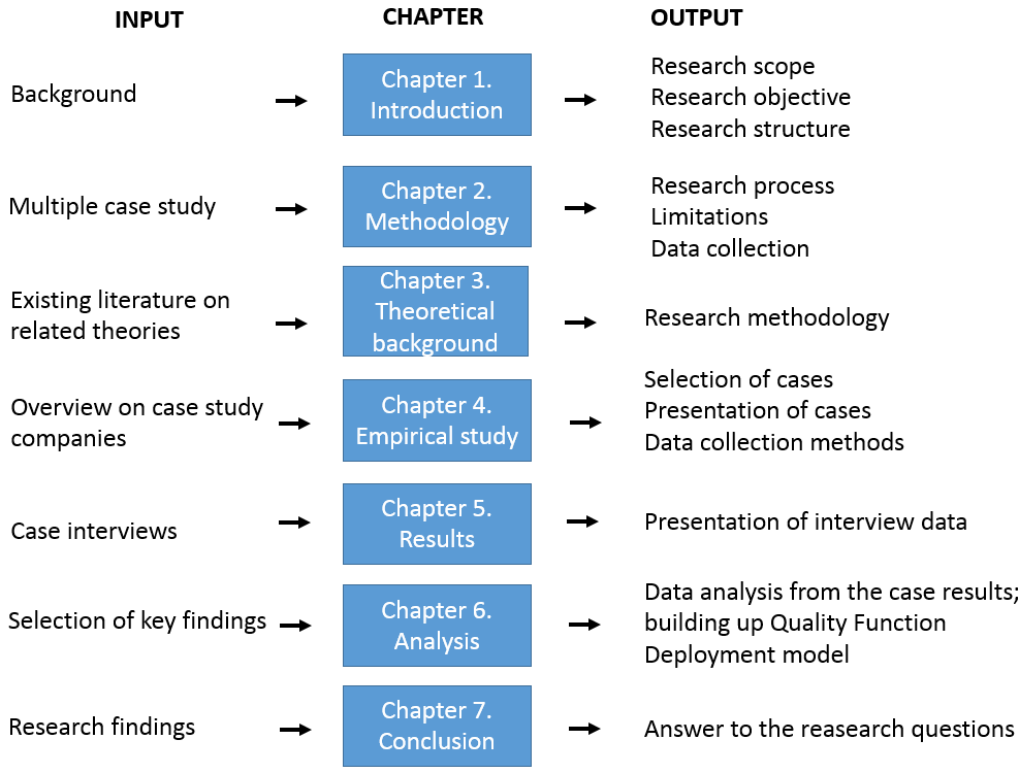


Figure 1. Thesis structure.

The *methodology* introduces a selection of case study research and the research process. In this chapter, focus groups are formatted and the multiple case study idea is represented. Additionally, data collection explains the tactic how practical data collection is done in the case interviews. Moreover, the case interviews are implemented in a strictly limited manner that narrows down the information input and output of the thesis. The *theoretical background* goes thru the most convenient and contemporary theoretical releases. In this part, research gap is justified. Additionally, the chapter starts with the interpretation of the literature review on key performance indicators in real estate and facility management, and follows literature on quality function deployment. The fourth chapter illustrates the rationale behind the selection of cases, data collection, and case presentation.

The *results* chapter starts with qualitative interviews arranged with five case organizations in two focus groups. Focus group 1 defines the prospect KPIs to be investigated among focus group 2; rated questionnaire is formed. Furthermore, in focus group 2, the quantitative answers are presented in figures. In addition, only relevant information is presented regarding the topic and the research questions and the desired output of the case. Finally, the chapter ends in a rough interpretation of the case study's key findings. The results roughly interpret the key findings of the case study.

The *analysis* chapter illustrates the most convenient discussion of the results based on focus group 2 findings. The discussion chapter discusses what could be the best impact of each key finding; what the results tell, and are they applicable for the value-added service proportion of focus group 1´s customers. The analysis includes quality function deployment build-up for the case.

Finally, the *conclusion* chapter sums up the best practice recommendations for the asset and real estate management company according to the key findings and analysis managed. The chapter illustrates the overall view of the study and its success; research questions are answered. Finally, further topics to examine are recommended based on the study.

2 METHODOLOGY

2.1 Selection of case study research

The thesis utilizes exploratory case study design since the research is inductive and seeks to answer the question what is the current situation in the case company regarding the problem definitions. Moreover, the case study includes researching an organism in its own environment; the research is an empirical study which investigates a phenomenon in its own real-life circumstances in a cross-sectional time horizon (Cresswell, 2013; Yin, 2009). The case illustrates the circumstance at a particular time (March-April in 2015). Moreover, Robson (2002, p. 178) has stated that:

"A research strategy which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence"

Saunders et al. (2009) suggested that case study is categorized into three levels. Literature search and theoretical framework, research on articles about the current state of affairs in the case study and testing the findings with the theory. The case study combines theories from KPI measurements and QFD fields and tests what is the current situation in the case companies. According to the Yin (2009), this case study is considered a holistic case study since the thesis treats only the asset and real estate management company and its account companies, each as a separate entity. The asset and real estate management and real investor companies are in a seller-buyer relationship. Also, the case study interprets the clarification and understanding of the research problem in the two different focus groups. Additionally, a focus group is utilized to express a certain group of respondents as a part of the methodology, not as an actual research strategy in this thesis. The research strategy relies on multiple case study.

2.2 Research process

The multiple case study strategy (Figure 2.) is divided in three main sections:

1. *Definition* and *Design,*
2. *Collection,* and
3. *Analysis* and *Conclusion.*

First, the theoretical framework, case selection and focus group interview 1 define the current state of KPIs utilized in the 1st case company and KPIs desired to illustrate to the accounts. Theoretical framework and focus group 1 study define the KPIs that might be of interest to the accounts. The second phase concerns the collection of the most desired KPI information from focus group 2; results are illustrated case by case. The third part collects the results and draws separate and overall analysis of focus group 2 results. In all cases, data collection is utilized with a single data collection technique with face-to-face interviews.

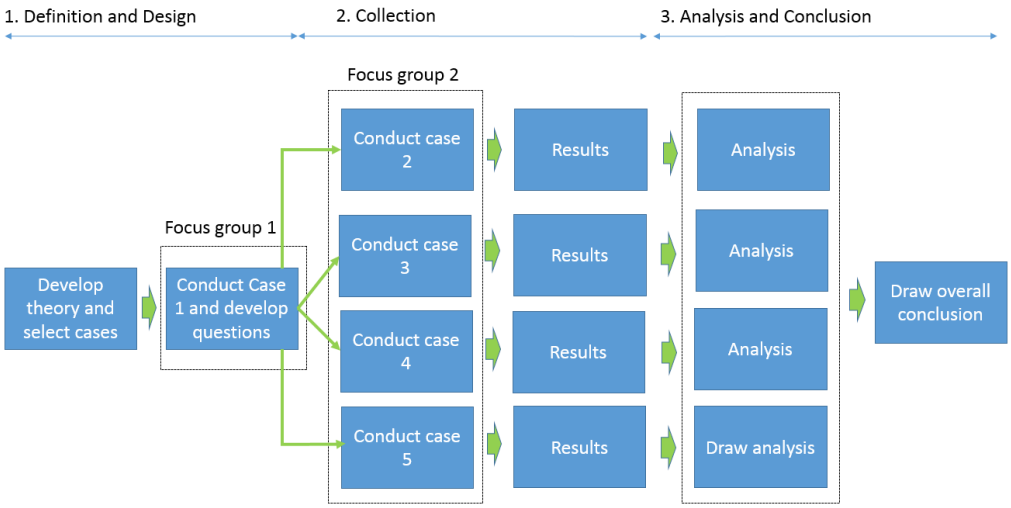


Figure 2. Multiple case study strategy.

2.3 Data collection

The available information for the case is managed by multi-method qualitative research with a qualitative and quantitative questionnaire addressed to the asset and real estate management (management board) company´s, and real estate investors´ representatives (asset manager and/or leasing manager simultaneously). The answers generate qualitative and quantitative information that are analyzed separately (Saunders et al., 2009; Creswell, 2007). The study has five different case companies, and each interview is documented. Focus group 2 answers are further analyzed; the focus group 2´s four cases are drawn together to manage an overall analysis of the cases. Additionally, the five case studies comprise research to identify the quantitative research data e.g. numerical data and non-numerical data. (Saunders et al., 2009)

Additionally, the response rate of the rating research questionnaire is designed to reduce refusals from respondents concerned about the threat of disclosing confidential information. Finally, the focus group 2 information is used for the analysis managed in association with the account. The case study is performed with multiple case interviews with the stakeholders since the proof of the validity of the first case answers needs to be confirmed. This comes especially to the question with focus group 2. According to (Saunders et al., 2009, p. 146):

"The rationale for using multiple cases focuses upon the need to establish whether the findings of the first case occur in other cases and, as a consequence."

Finally, the analysis and conclusions are demonstrated based on the information gathered from the focus group 2 interviews. The multiple method research with rated questions helps to funnel the information leverage to a more detailed size and form (Saunders, 2009). Additionally, rated questionnaire gives analytical actual numeric values to analyze QFD matrix processes' dependencies, criticalities and assessments. Finally, generalizability can be utilized only for the case companies since there is a reason to believe that each case interview gives

different answers. Additionally, the case research sampling is done by purposive sampling in order to answer the research questions, since only a small amount of case interviews available for the case. However, there is a reason to believe that information saturation occurs after five case interviews; a bigger amount of interviews does not give any significant scientific value to the results.

2.4 Data analysis

In this multiple case study, the numerical data is managed with exploratory data analysis (EDA) that enables numerical analysis with bar charts, contingency tables, and line graphs or with mixed table of them. This approach enables to explore and understand data more deeply. Since case study is multi-method research, the most beneficial idea is to interpret the quantitative information with EDA (Tukey, 1977). The method emphasizes on invention of new information like Saunders et al. (2009, p. 428) has stated:

"...the exploratory data analysis approach allows you flexibility to introduce previously unplanned analyses to respond to new findings".

The numerical data is illustrated in weight and regular average data on the charts since the small leverage information does not support analysis with regression or standard deviation analysis.

2.5 Limitations

The limitations are formatted in five main points. First, the multiple case study has to be done in cooperation with case study companies to get access to the information. Furthermore the information used in the client relationships and thesis are highly classified. Only information permissible to use is utilized. Secondly, the study´s case companies´ names are given anonymity because of the information classification and reduction of information spillovers to competitors.

As for the information formats, the information that is documented can be analyzed with Microsoft Excel.

Thirdly, the thesis will utilize primary studies such as scientific articles, journals and theses from the Lappeenranta University of Technology´s library and electronic databases; such as Emerald and Springer. Company´s unclassified documents are also available for the thesis. Fourth, the thesis is restricted to investigate the KPIs that give new information to the asset and real estate management company value-adding components to its customers. Secondary information sources such as LUT´s course books are used. The study avoids using any tertiary information sources such presentation slides, etc. to make the thesis as credible as possible.

Finally, time-horizon for the study sets a boundary for the research. The study started in February 2015 and deadline for interviews was set to mid-May 2015. Therefore the case interviews are limited to five. Accessibility to the data is difficult since usually asset managers in real estate investors companies are rather busy and not so willing to participate in the research; the property owners already participate in examinations arranged by multiple research and excellence centers in Finland.

The answers that can be identified with the case studies are used for the KPI and quality function deployment analyzes. Only case interview data is utilized. Moreover, the interviews are not recorded because of the information classification and reduction of information spillovers. Moreover, the focus group 2 interview data is collected with a rated questionnaire to avoid misunderstandings with the most crucial research answers.

3 THEORETICAL BACKGROUND

3.1 Key performance indicators in real estate management

Strategic management concerns the formulation and implementation of big company objectives and goals, and the executions made in order to reach them. They are also called vision and mission of the company and how they are reached. The strategic management regards internal and external resources that formulate an organization's core competencies and capabilities to exceed customer needs (Hamel & Prahalad, 1990; Porter, 1979). The fundamental quote of strategic management was identified in a research on American industry enterprises by MIT professor Chandler (1962):

"Strategy is the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals"

Also, strategic management involves concepts of strategic planning and thinking, in order to meet the long-term goals of the organization´s business. Moreover, the strategic planning is the process of analytical thinking and contributed by formalized procedures in everyday business processes. Strategic planning is also a control mechanism that is implemented for the decision-making; strategic thinking and decision-making goes hand in hand, once the company measures something, they need to make decisions based on strategic thinking.

The theoretical background analyzes the most contemporary theoretical releases published within the field of strategic management; the theories illustrate the publications dealing key performance indicators in real estate management and quality function deployment in service management. Additionally, the literature reviews´ goal is to explain the research gap for the case study. Additionally, theoretical background discusses and explains the strategic management options to be implemented as the theory for the case study, resulting in a suitable

framework to utilize and finally explaining the KPIs related to the real estate service management.

The key performance indicators are used in various products and services management; competition is strong since there is plenty of available knowledge on e-business, global networks, social media, changing client needs and restructuring of economic and political systems. Hence knowledge management and knowledge resource utilization have been taken under glance for their possibilities in the markets. In scientific research, it has been recognized that strategic management would benefit from collecting information to gain competitive advantage. (Porter, 2001)

In such changing context, companies need dynamical change and understand the needs for the competitive advantage building compared competitors in the markets. Such skills to develop and maintain customer satisfaction and offering capabilities are called core competencies (Prahalad and Hamel, 1990). Core competencies are both individual and organizational. Individual are personal knowledge and capabilities. Organizational competencies are company infrastructure, core technologies, organizational routines, and company branding. (Marr et al., 2004)

In the real estate management services, the most common KPI themes are internal client satisfaction, productivity, flexibility, and cost reduction (Jensen 2010; Lindholm et al., 2006). The KPIs are widely recognized mainly in the real estate management sector but they seem to benefit all stakeholders in facility management and construction industry. This is illustrated in a value map by Jensen (2010). Usually, KPIs are originated from the internal point of view. The most common view is corporate real estate management and facility services performance measurements and how these components influence on corporate´s core businesses (Jensen et al., 2008). Corporate real estate management (CREM) is recognized as a secondary activity to the primary core business. Lindholm (2008) has done research on the KPI in her doctoral dissertation; the study is the

one of the most sophisticated among real estate management studies. Additionally, Lubieniecki & Desrocher (2003) have introduced the CREM KPIs in the balanced scorecard (BSC) in order to manage cost reduction and cost analysis as internal activities.

Although real estate management KPIs are identified from within the organization, the academic releases do not analyze for example the tenants' financial capabilities to add value to property owners. However, the most related articles to the case study are related to gross rent payment capabilities from the tenant point of view. How risky is it to lease individual tenants and how these influence on property owners´ asset net present value (NPV).

The article by Fenyves et al. (2014) measures company´s liquidity management within a short period of time. In addition, the main focus of the study is to illustrate the working capital management in focus companies in 2013. In total, the liquidity indicators illustrate if the companies can meet their liabilities utilizing their current assets. Liquidity and working capital management analysis play huge roles, especially among small-sized companies. These companies usually demonstrate difficulties with working capital. The working capital is significantly related to rent payment risk towards the real estate owner.

Finally, the themes listed in Table 1. are relevant to the thesis since they represent current knowledge on quality function deployment and KPIs related to real estate management, property management or facility management. Additional scientific releases related to the theme articles are based on their in-text references. The chapter explains the essential KPIs to the real estate management. The first chapter illustrates KPIs from tenants´ financial statement analysis KPIs. Secondly, income maturity of lease agreements illustrates income maturity in owned assets.

Table 1. List of relevant KPI literature in real estate management.

Author	Approach	KPIs used
Jensen et al. (2012)	In search for the added value of FM: what we know and what we need to learn	Customer value, user value and value add
Lindholm (2008)	Identifying and Measuring the Success of Corporate Real Estate Management	Amount of leased properties versus owned properties
Lubieniecki & Desrocher (2004)	The case for simple comparison: A simple performance scorecard for effectiveness and efficiency	Employee satisfaction with CREM services
Fenyves et al. (2014)	Financial indicators in managerial decision-making	Quick ratio & revenue
Ekanem (2010)	Liquidity management in small firms: a learning perspective	Quick ratio & bad dept.

Thirdly, the leasing activity illustrates the quality aspects of real estate broker service management. Last, service satisfaction rate is explained by the service perceived from the service cost point of view.

3.1.1. Financial statement analysis

Tenant financial statement analysis consists measuring single company's financial performance and viability based on the financial statement figures and calculation based on them. Additionally, the measurements are used to evaluate a single company´s performance compared to other companies. According to Kallunki (2008), financial statement analysis consists of measurements from seven points of view including turnover, solvency, liquidity, invested capital, return on capital employed (ROCE), and economic value. Like the problem definition and literature review suggest, the main focus of the financial statement analysis is

solvency and liquidity. Finally, the financial statement analysis figures can be benchmarked according to an industry based grading that is deployed for every analysis from solvency to economic value.

The scale of a company can be measured with its turnover. Based on changes in turnover, perceptual changes can be illustrated to explain leverage of growth or loss within a certain period of time. Turnover is the most crucial measurement since it has direct or indirect influence on several financial statement analysis figures Turnover is one of the components in each figure (Salmi, 2012). The meaning of solvency is to enhance a company´s financial structure against bad times in the company´s personal economic situation. A bad time for companies might occur because of intensive domestic and international competition in the markets, financial crisis, changing level of tax and interest rates, and changes in the political situation. (Salmi, 2012)

The solvency consists of companies' capabilities to payment commitments in a long-term period. Moreover, the financial structure consists of equity and liabilities, and the solvency analysis concerns both. These parameters can be found from a balance sheet. If the liabilities are bigger than an amount of equity in the balance sheet, the greater is the risk of getting in trouble during bad economic eras. Additionally, when examining the financial risk, the risks based on the financial structure are concerned. This means that companies that are financially sound have a smaller financial risk than a company with weaker solvency. Additionally, if the company is very solvent the company has weaker liability leverage effect. Then, the company has a lower return of equity (ROE). The main idea is to identify the balance that liability´s leverage effect could be optimal with a lesser financial risk. (Kallunki et al., 2008; Salmi, 2012)

$$Equity\ Ratio = \frac{Total\ Shareholder´s\ Equity}{Total\ Assets} \quad (1)$$

Financial leverage effect is a utilization of borrowed capital in order to increase the ROCE. (Kallunki et al. 2008). In general, the measure of solvency is called

equity ratio. It measures balance between shareholder´s equity compared to total assets. *Equity ratio* tells how many percent of the balance sheets total sum is financed with equity. (Kallunki et al., 2008; Salmi, 2012)

Liquidity illustrates company´s capabilities to manage short-term debts; liquidity tests the strength of a company´s finance structure. Furthermore, the liquidity illustrates the level of company´s financial adequacy to survive from current expenditures with cash reserve and assets which can be quickly liquidated. If the company has its liquidity on a good level, the company does not need to resort to expensive short-term financing or to pay interest for late payments due to insolvency. On the other hand, the companies need to avoid over liquidity because then the cash laying on the accounts does not increase the return of assets; the capital productivity rate is low. For the reason, organizations are recommended to pursue efficiency of return of equity. (Kallunki et al., 2008; Arlander et al., 2009)

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities} \quad (2)$$

General KPIs for liquidity are *current ratio* and *quick ratio* which illustrates how capable the organizations are to handle short-term liability commitments if the company's functions stop suddenly. The challenge of measuring liquidity is that KPIs can only measure liquidity at a given point in time and they do not include the effect of seasonal changes industries such as skiing resorts and summer festivals seasonal sales. (Kallunki et al., 2008; Arlander et al., 2009)

$$Quick\ Ratio = \frac{Current\ Assets - Inventories}{Current\ Liabilities} \quad (3)$$

Quick ratio measures company´s capability to survive short-term liabilities only with financial assets. Additionally, quick ratio measures organizations liquidity capabilities taking into consideration only financial assets which include a company's inventories as well. For this reason, *quick ratio* is called acid test. (Arlander et al., 2009; Salmi, 2012)

3.1.2. Income maturity of lease agreements

The finance activities aim at maximizing shareholders wealth. Therefore, the wealth delivered is measured by positive net present value *(NPV)* when acquiring finance instruments. The *NPV* is always related to investors capital budgeting. The most favorable acquisition model for utilizing net present value analysis. The analysis tells how discounted future cash inflows (e.g. rent and selling property) are affordable in present time.

$$NPV\ (i, N) = \sum_{t=0}^{N} \frac{N}{(1+i)^2} \tag{4}$$

N = Total number of periods
R = Net cash flow i.e. cash inflow
i = Discount rate

Additionally, projects are evaluated by future cash outflows (e.g. maintenance and development costs). If the *NPV* is positive, the property acquisition project is affordable; if the *NPV* analysis is negative, a project is rejected, but if the *NPV* is zero or positive the property acquisition is accepted. In the markets, the potential cash inflows and outflows are based on the assumption and estimations on the markets. Thus, the value of each real estate is dependent upon the cash flows generated by asset in its current utilization. (Hwa, 2008)

$$NPV = PV\ (Benefits) - PV\ (Costs) \tag{5}$$

On a property market that behaves well. The present value of a real estate project is equal to the market value. Moreover, property development projects increase the value of the firm. Moreover, positive *NPV* projects increase the overall value of the company. If a company invests in an underpriced real estate, the investment company´s value increases by the amount of the *NPV* earned. (Hwa, 2008; Brown & Matysiak, 2000)

When the property selling process starts, the sale of the real estates is desired if the net sales increase the present value of the net future cash flows. On the other hand, the buyer only acquires if the purchase generates positive NPV. Additionally, the selling price is dependent on the real estate's potential for efficient use and what alternative deployment purposes exist for the real estate and competition on the market. (Hwa, 2008)

The gross rental income includes gross lease that tenants pay when renting a flat. The gross lease includes property´s income and operating costs. The operating costs are administration, water, heating, cleaning, electricity, repairs, security, taxes and insurances. Usually, with low-margin businesses such as warehousing, grocery wholesaler, computer resellers´ gross rent is utilized (Cullotta & Shapiro 2003). Additionally, gross income rent can be signed as fixed amount, or in the case of commercial buildings, a lessee and a tenant may sign turnover rent that is based on monthly sales of a tenant. Additionally, the turnover rent risk is usually hedged with minimum gross rent with the tenant and the property.

The gross rent strategy is utilized since gross margins are key indicators of profit leverage in the markets and indicators of companies' competitive advantage. *Gross margin* represents the relationship between revenues and cost of service or goods (Cullotta & Shapiro, 2003):

$$Gross\ margin\ (\%) = \frac{Revenue - Cost\ of\ Goods\ or\ Service\ sold}{Revenue} \quad (6)$$

In addition, the gross margin strategies as an earning logic. First incremental gross profit strategy suggest that high margin product or service is produced with the same margin to all customer segments. In these markets, the product or service is rather volume-based. Secondly, the price/bundling strategy suggest that multiple product and service deliveries to multiple customer segments with different gross margins. In the latter matter, the strategy considers more strategic performance compared to the incremental gross profit strategy; the strategy concerns the customer behavior. The behavior is utilized to form the gross margin management

to answer customer needs. Additionally, the company strengthens its competitive advantage in the markets. The strategy is considered as gross margin portfolio strategy. (Smith, 2006)

3.1.3. Leasing activity

This chapter illustrates the qualities of leasing activities regarding brokering in construction and real estate industry. The research conducted by Chen (1998) illustrates the possibilities of the internet for information acquisition for broker firms. Therefore, the internet enables improvement in:

- quality, quantity and speed of information in the real estate markets
- real estate broker firm business efficiency
- markets expanding to global

Internet and its applications are recognized as an asset in formulating real estate broker business models. For example, this phenomenon has occurred in Beijing China, where the internet phenomenon has been investigated as part of real estate broker company markets. (Li & Wang, 2006)

Additionally, when it comes to the real estate broker company management advantages and disadvantages, the real estate brokers and real estate branch managers can be very different since the market is based on the individual work delivery. Often, real estate agents´ and branch managers have contradictory internal information on the customers (Bates, 1982; Kleinder, 2005):

- management roles are misunderstood
- new real estate brokers are hired with wrong purposes
- training is unprofessional or irrelevant issues are concerned
- collecting information on real estate exhibitions are inadequate

However, the mistakes in the management can be various. The training of a real estate broker should take into consideration qualities such as (Chan & Kleiner, 2005):

- The management system of property shows, etc.
- Managing consistent training program
- Market analysis
- Property shows
- Customer meeting, inquiries, telephoning techniques
- Sales presentation
- Property geographic inspection; neighborhood scouting

In total, the good qualities in a real estate broker firm require total commitment to each value-adding delivery to the customers. It requires expertise and a sense of human nature to achieve the goal of the broking activity: selling the property. Additionally, Chan & Kleiner (2005) have identified that managing excellence in the real estate industry is very difficult since a single real estate agent´s wage is based on the commission paid for each brokered house or building. That´s why it is not beneficial for both the real estate broker and the broker firm; there is no need to continue an unproductive relationship. Furthermore, the qualitative research by Chan & Kleiner (2005) suggested that brokers with good networking skills and knowledge on customers are always individual. If the real estate agent changes the broker service provider, the customer and network follows to the new broker firm.

3.1.4. Service satisfaction rate

Customer satisfaction is based on the perceived quality and performance of a service. Customer service is rather dependent on how fast the delivery is and how expensive the services are. Moreover, the satisfaction rate corresponds to the customers' expectations, brand loyalty and brand trust (Sahin et al., 2011). In addition, customers' relationships to brands are called function of brand

knowledge, brand signals and experiences that are perceived from the services before ordering something new service even if they are different than the previous ones. Furthermore, customer relationship highly depends on how successful the establishment of service performance was among customers in the first contacts and service occasions (Sahin et al., 2011).

Although, researchers have seen the relationship between practical and academic world, little empirical evidence is available between the relationship between satisfaction and quality. However, according to the research by Careres & Paparoidamis, (2007) quality may be a pre-requirement for satisfaction. Additionally, perceived satisfaction and quality merges into total relationship satisfaction in long-term relationships (Leverin & Liljander, 2006). Finally, the relationship between intangible and tangible assets in service delivery has many points of view. Some studies suggest that a service process is more value adding than a single product with no service contribution and vice versa (Lymperopoulos, 2008). According to the problem defining, the literature puts focus on value added deliveries from the customer point of view. The theories and key findings by Jensen (2008) and (Price et al., 2009) illustrate the value added measurements for customers in facility management environment.

This chapter illustrates the value added aspects of facility management delivered to the customers and how the value added services can be managed; the focus is on the *user value* delivered to the customer. First, Jensen (2008) has explained the value added points of view of facility management to the stakeholders with customer value based equation. The model was developed in the Danish financial corporation called Nykredit.

$$User\ value = \frac{Quality\ and\ Process}{Price\ and\ Difficulties} \tag{7}$$

The measurement was introduced to illustrate the company´s internal management. The management needs to understand the correlation of delivered value and cost and exclusiveness to the customer. *User value* includes quality,

process, price and difficulties into the equation. The tool was introduced as a qualitative tool in order to assistant internal decision-making (Jensen 2008). Secondly, the facility management services regard value-add to the customers from the efficiency point of view. Lego service center has developed the KPI measurement for managing processes, employees and innovations with the BSC. The method was defined by key objectives for value equation. (Price et al., 2009)

$$Added\ value = \frac{Volume * Quality * Flexibility}{Cost} \quad (8)$$

The volume represents the number of services delivered to the tenant. Additionally, perceived quality is measured from randomly selected users. Furthermore, the flexibility concerns the number of non-regular services produced for the users. Finally, costs cover the total amount of delivered services (Price et al., 2009). In total, these FM measurements can be of value for the external performance of the internal management. The latter value added measurement is rather easier to measure than the first one since process and difficulties are difficult to assess in a single customers. The process and difficulties have to be measured since they may be mixed up with the quality parameter.

Finally, the basic level of service is determined by the service contract, but concerning the service delivery it is important to illustrate value adding points of view. Kano (1984) has introduced a model concerning product and service delivery; the model helps organizations to identify the state of their service from the requirement and satisfaction points of view. The following model explains the difference between *must-be*, p*erformance* and *delighters* qualities. First, the must-be quality includes the granted when basic service is fulfilled and *dissatisfaction* occurring the service is not fulfilled (Shahin & Zairi, 2009); the satisfaction is fulfilled if, for example, an apartment house has basic lights and sewerage in it.

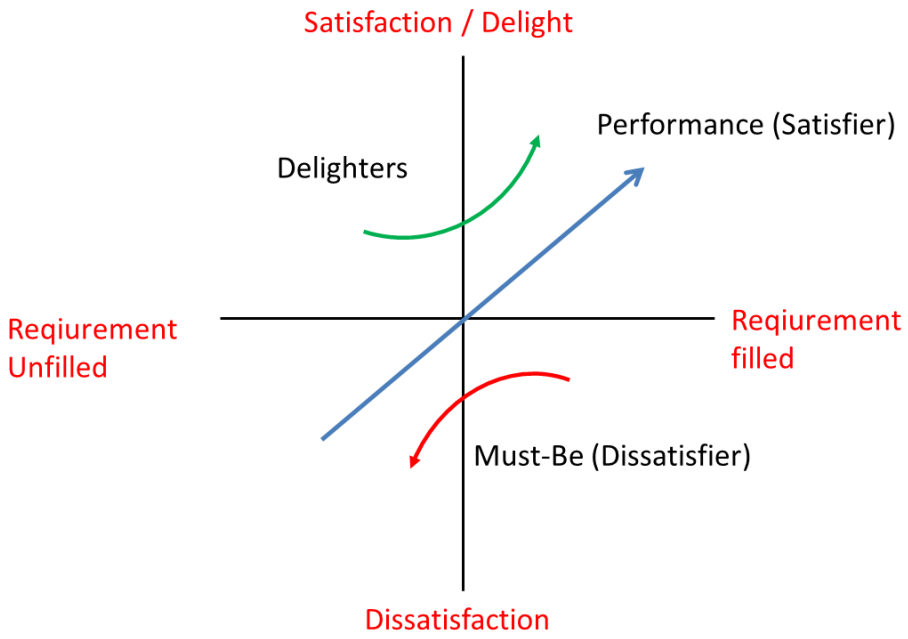


Figure 3. Service performance in Kano model (Modified from Huang et al., 2014)

Secondly, the attributes result in satisfaction in the service if the service is fulfilled and dissatisfaction if the service is not fulfilled. Generally these attributes are spoken out and are also known as nice-to-have attributes and with which companies compete (Shahin & Zairi, 2009). An example could be buying a lemonade bottle which has one and a half liter of ingredients but is sold with the same price as competitors' 1-liter lemonade bottle. Production performance and assessing offering price right may be seen as competitive advantages.

3.2 Quality function deployment

This chapter introduces the purpose and output of quality function deployment also known as house of quality. Furthermore, the chapter explains and justifies the use of QFD in this case. The quality function deployment model was formed by Yoji Akao and Shigeru Mizuno in the late 1960s. The model translates service and product features in managed form. Moreover, the model maintains and develops quality assurance in product and service management to maintain customer

satisfaction and meet customer expectations in the beginning and during the manufacturing process (Akao, 1990).

For the case study, the QFD product and service development tool is the best, compared to other methods such as balanced scorecard (Kaplan & Norton, 1996), technology roadmap (Garcia & Bray, 1997), five forces (Porter, 1985), and SWOT-analysis (Kotler & Keller, 2014). The following subchapters go through the most common strategic management frameworks in industrial engineering studies mentioned previously and their issues of unsuitability for the case study.

Balanced scorecard by (Kaplan & Norton, 1996) concerns tool for strategic measurement but does not identify the criticality of customer need and the delivery whereas the QFD illustrates both of them.

Table 2. Product and service development frameworks.

Framework	Source of information	Where used	Solves
QFD	External information	Internal use	customer´s problem
BSC	Internal information	Internal use	performance problem
Technology roadmap	Internal information	Internal use	technology problem
Five Forces	Both	Internal use	competitive advantage
SWOT	Both	Internal use	competitive advantage

Balanced scorecard measures primarily company´s internal performance indicators from four points of view: financial, customer, internal processes and learning. According to Kaplan and Norton (1992 & 1996), the BSC management tool is a system that enables units to classify their own strategy and vision, put them into effect. Additionally, the BSC provides feedback system for continuous improvement. Although, the BSC considers feedback and possibility for regeneration, the system does not translate specific action for external competitive environment. Moreover, the BSC´s all four dimension are measured separately from each other; the QFD illustrates these four dimensions in a single matrix and additionally considers a detailed competitor analysis as well (Kaplan & Norton, 1992 & 1996). Finally, according to Lindholm (2006) the BSC was the most used method of strategic management in the real estate management environment.

Secondly, *technology roadmap* by Garcia & Bray (1997) explains a swimline illustration of product and service delivery as well as the relationships among different organizations in the company, but again, does not measure the initial customer delivery to the customer. The BSC and technology roadmap focus more on internal capabilities rather than external influences like customer value; R&D plays huge role is the system. Technology roadmap explains the service and product delivery process step-by-step but does not evaluate the customer need characteristics with the delivery process like the QFD does (Garcia & Bray, 1997). Technology roadmap resembles Porter´s value chain -theory (1990) but it is more detailed on the practical level.

Thirdly, the framework of analyzing the level of competition within an industry is called *five forces* analysis by Porter (1985). Competitive advantages analysis is one the key issues regarding launching of the products onto the market. The five forces analysis by Porter (1985) illustrates the key views considered in industrial organizations' external threats contributing the competitive advantages. The five forces are divided into the following categories: threat of new entrants, threat of substitute products and services, bargaining power of customers, bargaining power of suppliers, and intensity of competitive rivalry (Porter, 1985). Moreover,

the *five forces* describe a company's ability to earn, reach desired rate of returns, and change. Additionally, the five forces model describes an industry's capability to profit from the forces effects on the prices, costs and required investments gained from the stakeholders. The pitfall of the model is the lack of technology regeneration point of view. The model does not consider any technological paradigm changes; Teece et al. (1997) argued about the missing fact called dynamic capabilities (Teece, 2013):

"The firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments."

Fourth, the *SWOT*-analysis by Kotler & Keller (2014) illustrates the four-part matrix measuring the internal and external sides of an organization: internal as strengths and weaknesses and external; opportunities and threats.

Table 3. Comparison of product and service development tools.

Framework	Missing	Does QFD have the feature?	What is the feature?
BSC	Link between all the point of views	yes	Total HoQ
Technology roadmap	Customer requirement assessment	yes	VoC Correlation matrix Competitive analysis
Five Forces	Technology life-cycle	yes	Competitive analysis
SWOT	link between all the point of views	yes	Total HoQ

The model considers the same issues of competitive advantage as the five forces by Porter (1985) but this model does not consider an actual delivery process of the service. The matrix´s four cells are illustrated as separate, not linked as in the QFD. In total, Table 3. lists the weaknesses of other frameworks compared to the QFD.

For the case study, it is important to illustrate the value added services delivered to the customers. The more the service goes strategic and intangible the more crucial it is to understand the latent customer needs. For the reason, the QFD illustrates and measures the essential voice of the customer for the internal service development. Moreover, the additional feature is competitive benchmarking tool concerning other identical or similar services. Since the markets for real estate management services are narrow in Finland, it is all the more essential to understand the possible competitive advantage gained from the service delivery.

Firstly, the quality function deployment is rather a fundamental tool of the product and service development. Cohen (1995) argues that the QFD method is a systematic procurement of the product development that enables total focus on the customer need identification by planning groups which is called inside-outside method. Secondly, the definition by Griffin & Hauser (1993) of the QFD method is a utilization of the customer needs into the technological requirements which is called outside-in method. The tool originated in Japan and the QFD has been successfully utilized in many Japanese companies to create competitive advantage (Mehrjerdi, 2010). According to a research by Cristiano et al. (2001) among 400 companies in Japan and USA, approximately 69 % American companies utilized QFD in their projects in 2001, whereas among the Japanese companies the utilization of the QFD was only 33 % in 2001. However, both Japanese and American companies indicated that the QFD decreased internal malfunction and the risk of quality problems. Additionally, Japanese companies indicated that the QFD translated customer satisfaction into their internal development by a 42.9 % success level. (Cristiano et al., 2001)

In total, the amount of industries covered with the QFD method is quite large. Most applications are managed in industries such as shipbuilding, car industry, electronics, and computer software, In addition, the first known application of the QFD was managed at the Kobe Shipyard by Mitsubishi Heavy Industries Limited. Afterwards, other industries have been reached by the QFD, such as education, banking, and healthcare services (Akao, 1972; Nishimura 1972; Mehrjerdi, 2010). At least by now, all industries have been covered with the QFD development tool (Mehrjerdi, 2010). Furthermore, QFD has been recognized as a part of managing total quality management during the products and services lifecycle management. Finally, the QFD was recognized by companies producing tangible products, but the ideas applied in the service industry as well. It took nearly 30 years to introduce an academic method into the service sector (Chan & Wu, 2002). Eventually, the number of service applications has introduced in scientific articles, but the studies have been limited. No more than 136 case studies on service business quality function deployment worldwide in the mid-90´s. (Mazur, 1997)

Modern academic publishers such as Hamilton & Seler (2004), Kumar & Kumanan (2011), Razali & Juanil (2011), and Smith et al. (2014) have examined the QFD service applications in the real estate management or related industries. All of these studies are the QFD illustration of service businesses. For the case study, it is rather relevant to discuss, argue and introduce theories within the service industry. By today, academic releases do not take a stand towards combined theoretical study case, including quality function deployment and real estate management KPIs. In the Table 4., there are the most relevant examinations to the case.

Table 4. List of relevant QFD literature in real estate management

Author	Approach	Matrices used	Source
John Hamilton & Seler (2004)	Enabling real estate service chain management through personalized Web interfacing using QFD	Only HoQ	International Journal of Operations & Production Management
Kumar & Kumanan (2011)	An Integrated Fuzzy QFD and AHP Approach for Facility Location Selection	Only HoQ	The IUP Journal of Supply Chain Management
Razali & Juanil (2011)	A study on knowledge management implementation in property management companies in Malaysia	Only VOC on listing introduced	Journal of Facilities
Smith et al. (2014)	Awareness and effectiveness of quality function deployment (QFD) in design and build projects in Nigeria	HoQ	Journal of Facilities Management

The table four illustrates the utilization of the QFD in the real estate management, and related activities. Additionally, these case studies illustrate only few features of the QFD; mainly the HoQ, that was illustrated in every research. The best application included the VoC and core functionalities matrix assessing property managers need in order to gain added value from the application. The service mainly addressed to homebuyers illustrates features such as local government services, supporting infrastructure including transportation, post service, education service, and location. Hence, the web interface designed to different customer segments indicated by many different VoC –matrices. In total, the

research by Hamilton & Seler (2004) examines a total application in which one service utilizes multiple information sources in one application.

The other two studies have both only few examinations of the QFD. For example, the study by Razali et al. (2011) has relevance to the real estate management by facility location with the quantitative research reasoning and the HoQ matrix illustrating the location evaluating criteria and facility related design requirements. Also, a total of three QFD processes is rather limited. Finally, the research by Smith et al. (2014) examines QFD utilization in designing an apartment construction project. The main idea in this study is to illustrate the housing features from the tenant point of view and how much the QFD requirement identification effects on living square compared to non-specified feature planning in the apartment. In total, the most important issues that QFD regards are:

- Customer needs and their criticality
- Enabling technology and correlation between them
- Competition benchmarking compared to competitors in the market
- Assessing market positioning
- Assessing the technology and human resource capabilities and prioritization

Therefore, any service quality improvement and risk reduction will have an effect on market positioning and competitive advantage in the real estate management. The number of scientific publications concerning the QFD applications in the real estate management services business is rather limited, or almost non-existent. As mentioned above, only a few available thesis publications concern the real estate or property management or related. The picture below illustrates the theoretic overview of the QFD.

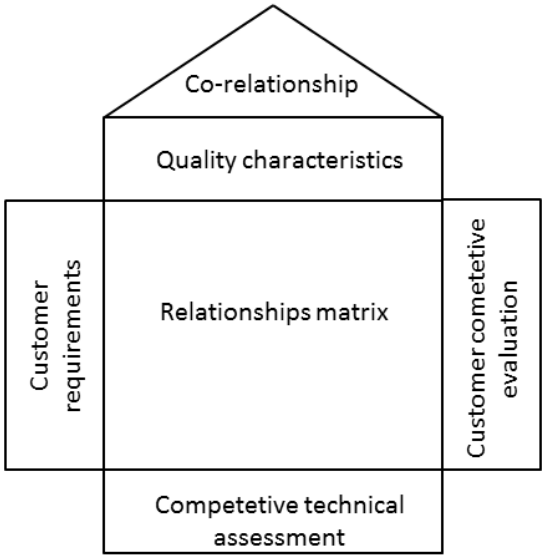


Figure 4. House of quality (Modified from Bernal et al., 2009)

The house of quality matrix name comes from the roof-like structure on the rectangle resembling rooms. The HoQ consist of six main features (Park et al. 2015):

1. Customer requirements
2. Quality characteristics
3. Co-relationship
4. Relationships matrix
5. Customer competitive evaluations
6. Competitive technical assessment

In total, the HoQ matrix is based on the translation of known customer needs in order to build the correlation of each QFD component. The translation of the voice of the customer to the actual engineering components is a challenge to tackle. Additionally, the VoC can be formatted according to the customer´s needs, wants and expectations. Prioritizing customer requirements helps to draw a picture of company's services' and products' competitive advantage delivery to the customer. (Park et al., 2015)

In total, the quality assurance is developed during the service development process; the model interprets the process of improving and fixing service attributes. The main features concerned when utilizing the QFD (Mayfield, 2007; Cohen, 1995):

- Customer is placed as number one
- Proactive product development is rather better than reactive development
- The QFD is team methodology; everyone is obligated to participate in the process
- The QFD is method a that helps organizations to determine the most useful features for product engineerings such as risk analysis and quality assessment

However, the HoQ is very well known and easily implemented in the field of product development; the service industry simply lacks applications of the QFD in the case study world. Services are different from tangible assets; they are intangible, heterogeneous, perishable and in isolation (Edvarsson et al., 2005). Since the service products value perception is difficult from the customer point of view, the value proportion to the customers is difficult to foresee. Moreover, in the modern age, service businesses are increasing, but at the same time competition is increasing due to new knowledge, connectivity and availability of work power globally (Arslaner, 2009). Paryani et al. (2010) has stated the same with the following quote:

"...a key challenge for management is achieving customer satisfaction in an increasingly competitive marketplace." (Paryani et al., 2010, p. 7)

The market pressure is generated by the external forces; companies need to assess their customer needs time after time to understand what is and what is not important from the customer point of view. Therefore, the benefits of the QFD are (Benner et al., 2003; Prayani et al., 2010):

- Identifying customer trade-offs and how service providers can benefit from it
- Which data is needed to form service or product
- Educate development team where additional information is needed in the process
- Decrease market entry time

The QFD is not a project that comes to an end after developing something that is of value to the markets. The QFD is a process that includes several phases to cope with latent customer needs. (Akao, 1990; Paryani et al., 2010)

3.2.1. Voice of customer

The voice of the customer regards features that customers desire from the product. The VoC is listed in the left column. Additionally, the VoC answers to the question what customers "want" from the service or product; intangible and tangible customer values are translated. Moreover, the customer priorities (weight / importance, P_i) criticality is assessed with the number from 1.00 to 5.00. (Pakdil et al., 2012)

Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Quality Characteristics (a.k.a. "Functional Requirements" or "Hows") / Demanded Quality (a.k.a. "Customer Requirements" or "Whats")
1	9	100,0	5,0	
2				
3				
4				
5				
6				
7				
8				
9				
10				

Figure 5. Voice of customer (QFD Online, 2015)

On the left side of the matrix, depending on the rating, relative weight calculates the importance of each VoC feature compared.

3.2.2 Quality characteristics

The design requirements are the functional requirements for the service delivery and they answer to the question “how” customer value and expectations are delivered to the customer. The requirements are based on the technological capabilities that are necessary for the creation of value. In total, the voice of customer integrated to the technical requirements to enhance the service or product quality delivered to the respondent. Moreover, the matrix includes direction of improvement for each technical feature. The direction of improvement has three possible objectives: to minimize, to maximize or to reach a certain target value (Pakdil et al., 2012; Walker, 2002)

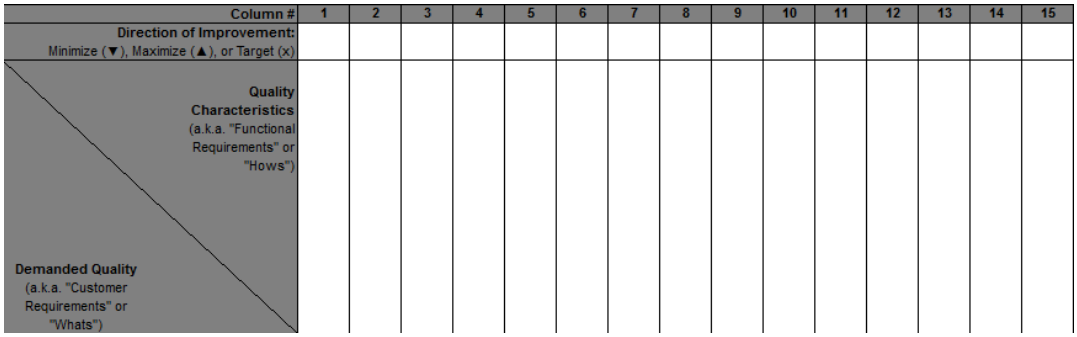


Figure 6. Quality characteristics (QFD Online, 2015)

3.2.3 Co-relationship

The correlation matrix illustrates the technological correlation concerning the output. The technological correlation is valued by *strong positive correlation*, *positive correlation, negative correlation* and *strong negative correlation.* The correlation represents the criticality of success in the output of service and which of the features are needed to deliver another technological feature. Additionally, positive impact on one quality characteristic affects the performance of another characteristic. Co-relationship does not have an effect on the calculation related to

the HoQ. (Walker, 2002). The picture below illustrates the correlations between the design requirements.

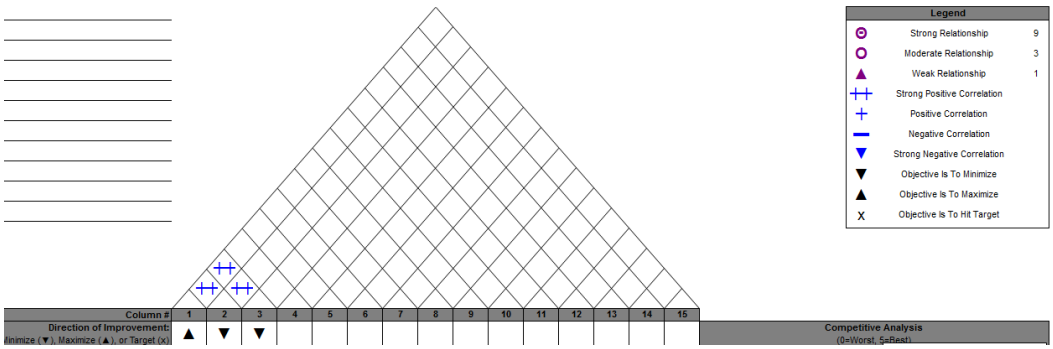


Figure 7. Co-relationship matrix (QFD Online, 2015)

3.2.4. Relation matrix

Relation matrix illustrates the relationship between each functional and customer requirement. The significance of relationships (W_{ij}) are valued with strong (=9), medium (=3) and low relationship (=1) signs. The relation matrix is the centerpiece of illustrating the frame of the HoQ. In the early days, development work was implemented as internal development by the engineering staff. Often engineering experience ruled the way of product development and arguments occurred with the rest of the staff. That's why it is important to understand the criticality, need and essence of each technological and functional requirement (Shahin, 2013; Schulte, 2008). The relationship values and symbols are presented in the figure 7.

				Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)															
Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Quality Characteristics (a.k.a. "Functional Requirements" or "Hows") / Demanded Quality (a.k.a. "Customer Requirements" or "Whats")	Over 70" screen size	HD resolution	Good contrast ratio												
1	9	9,5	2,0	VoC 1	⊙														
2	9	14,3	3,0	VoC 2		⊙													
3	3	9,5	2,0	VoC 3		○													
4	9	14,3	3,0	VoC 4			⊙												
5	3	19,0	4,0	VoC 5		○													
6	9	23,8	5,0	VoC 6		⊙													
7	9	9,5	2,0	VoC 7	⊙														
8																			
9																			
10																			
				Target or Limit Value															
				Difficulty (0=Easy to Accomplish, 10=Extremely Difficult)															
				Max Relationship Value in Column	9	9	9												
				Weight / Importance	171,4	428,6	128,6												
				Relative Weight	23,5	58,8	17,6												

Figure 8. Quality characteristics (QFD Online, 2015)

Relative weight calculates the relationship of *weight / importance* and number of VoCs in the customer requirement rows.

3.2.5. Customer competitive evaluations

The benchmarking consists of competitive assessment of *"wants"* and *"hows"* to competitors offering; benchmarking column is situated on the right-hand side of the HoQ. The benchmarking matrix describes a company's possible product and service delivery capabilities with a rating on a scale of 0=worst to 5=best. The case company is assessed separately with competitor companies with known qualities; graphic illustration is drawn on the right side of the benchmarking matrix, see example drawn in the next figure. (Shahin, 2013; Walker, 2002)

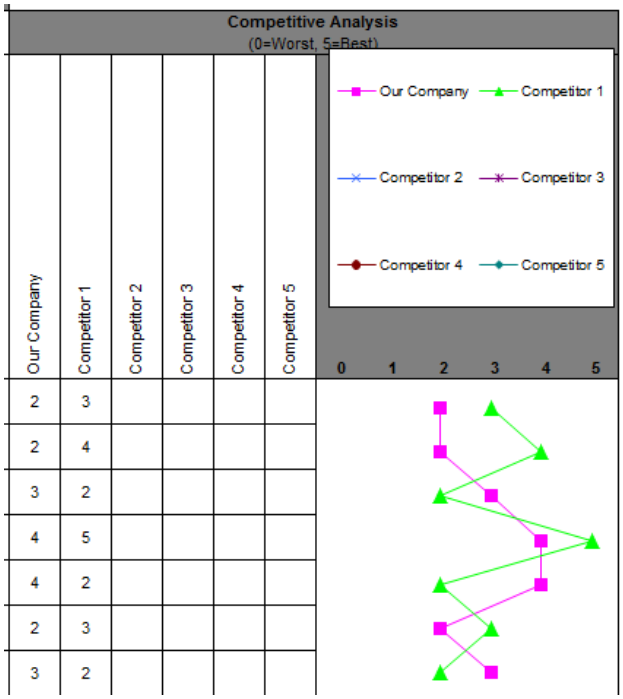


Figure 9. Competitive evaluation example (QFD Online, 2015)

3.2.6. Competitive technical assessment

The importance rating is situated at the bottom of relationship matrix. The importance matrix illustrates the target value and technology difficulty related to the implementation. The technology difficulty is rated from 0 *(=easy to accomplish)* to 10 *(=extremely difficult)*. The technology assessment answers to the question "how much is enough" with the technology deployed in the product development process. Competitive technical assessment increases the overall reflection of competitive assessment, competitive advantage, competitive analysis, and technology assessment. (Park et al., 2015; Walker, 2002)

$$Weightj = \sum_{i=1}^{m} Wij\, Pi \tag{9}$$

In total, the significance of every relationship is calculated with a relative weight ($RWeight_j$), P_i represents customer priorities (=1.00-5.00, weight / importance, P_i). Absolute weight, also known as Weight / Importance sums the relationship

weights for the design requirements, including all customer requirements in the following equation. The significance of relationships is W_{ij}.

$$AWeightj = \sum_{i=1}^{m} Wij \quad (10)$$

Finally, the last three rows in the in the HoQ interpret the max relationship value, weight importance, and relative weight. Additionally, target values or difficulty are not included in the calculations. Max relationship value in the column illustrates the highest score of significance of relationships gained.

Target or Limit Value	10	11	23												
Difficulty (0=Easy to Accomplish, 10=Extremely Difficult)	3	4	8												
Max Relationship Value in Column	9	9	9												
Weight / Importance	171,4	428,6	128,6												
Relative Weight	23,5	58,8	17,6												

Figure 10. Technology importance (QFD Online, 2015)

3.2.7. Service development process

The service delivery with the QFD is not restricted to only one HoQ illustrated above. Service development with the QFD has regenerated with three main phase: service planning HoQ, process control characteristics matrix, and action plan matrix. The main idea is to interpret the quality of management from customer feature identification and to create a practical action plan accordingly. Compared to the traditional product QFD development process, the service building includes three steps, not four. In the traditional product development, the steps are product planning, part planning, process planning and production planning (Shahin, 2013; Mayfield, 2007). The service planning process is rather shorter since the services are intangible and require less physical delivery and planning. (Edvarsson et al., 2005)

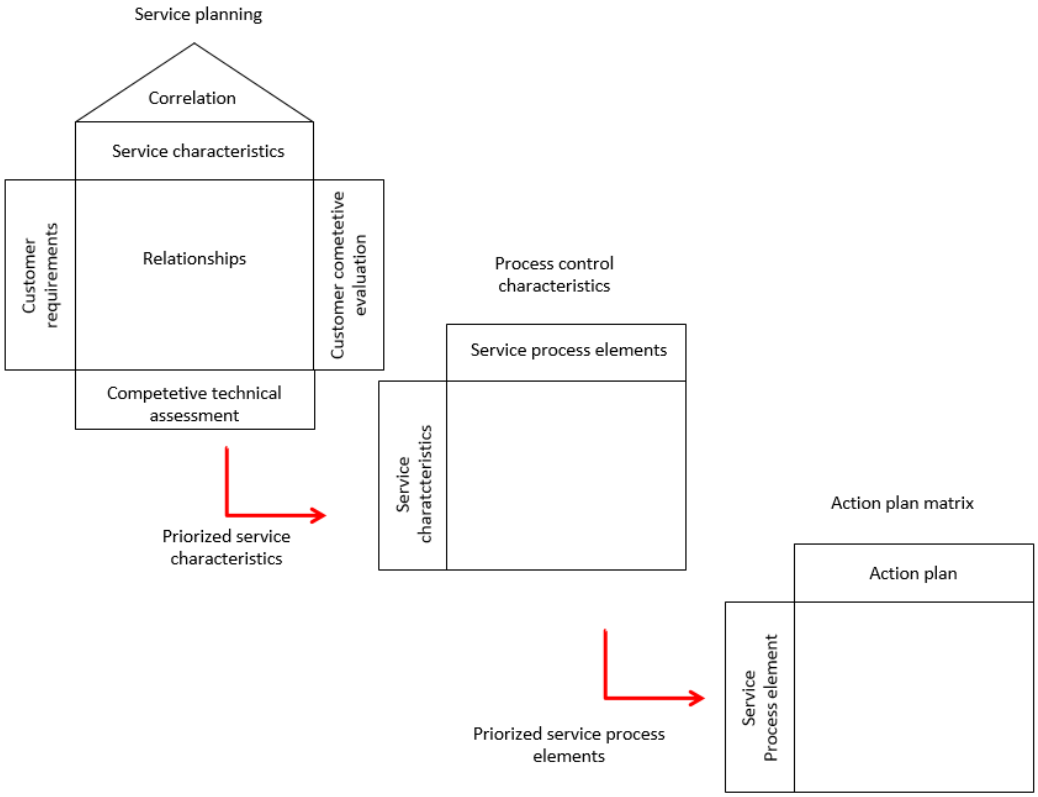


Figure 11. Service development process with QFD (modified from Prayani et al., 2010)

The same points of view are considered as in the thematic development process in the first chapter, but here the intangibility of service takes the place totally. The first phase, called *service planning* (HoQ), gathers up the initial HoQ whose components are (Prayani et al., 2010; Bernal et al., 2009):

- Understanding the target customer and market
- Illustrating and analyzing the customer requirements aka "whats"
- Illustrating and analyzing service characteristics aka "hows"
- Figuring out the relative importance of customer requirements in assistance of analytic hierarchy process -driven importance rating
- Assessing relation matrix between "whats" and "hows"
- Assessing customer and technological competitive analysis and evaluation
- Prioritizing service qualities and technological weightings
- Assessing correlation matrix with service characteristics

In *service planning* process in the (Figure 11.), the desired target values are illustrated to meet the desired customer satisfaction and expectations. At the end of the first phase of HoQ, the most prioritized service characteristics are moved to the next phase called *process control characteristics* matrix (Bernal et al., 2009). In the second phase, the measurable service characteristics are transformed into a service process matrix, including features such as (Prayani et al., 2010; Bernal et al., 2009):

- service process features and characteristics
- measure values and units
- measurable scales
- target values

On the whole, the biggest difference after the first phase is that the service characteristics correlation matrix is diminished. The key issue is to identify the key elements of the service process delivery. In the end, the prioritized service process elements are transferred to the next and last service process matrix called *action plan matrix* (Prayani et al. 2010; Yamamoto et al. 2005). Finally, the last phase links the service process elements identified in the second phase to the action plan and service quality control system. The last phase illustrates the monitored quality parameters that ensure initial customer satisfaction. The action plan is executed in order to deliver each critical service characteristics to the customer. In addition, all action plans are measurable to allow full control over critical service and to deliver value to the respondent. (Park et al., 2015; Yamamoto et al., 2005)

4 EMPIRICAL STUDY

4.1 Selection of cases

Selection of case studies is the most vital issue of a case research. The fundamental selection criteria should be that the case company ought to be representative of each theoretical question. In order to manage multiple case study research, at least three case organizations need to be studied (Yin, 1994). In this study, there are five case companies divided into two different focus groups.

4.2 Presentation of cases

The multiple case study was managed in two focus groups. The asset and estate management company (case 1.) formed focus group number one and four institutional mutual insurance funds (cases 2-5.) formed focus group number two.

Table 5. Case organization characteristics

Focus group	Case number	Case company	Type of Organization	Services	Type of building investments
1.	1.	Asset and estate management	Private	Real estate and property management	Non
2.	2.	Institutional Insurance Fund	Private	Leasing Asset Management	Offices Residential Commercial
	3.	Institutional Insurance Fund	Private	Asset Management Leasing	Offices Residential Commercial
	4.	Institutional Insurance Fund	Private	Leasing Asset Management	Offices Residential Commercial
	5.	Institutional Insurance	Private	Asset Management	Offices Residential

The numbering concerning the focus groups and is maintained throughout the thesis; the anonymity remains. Additionally, the case companies are major players in the real estate management sector in Finland. In addition, the case companies 2-5 are all long-term relationship accounts to the case company 1.

Case 1: Asset and Real Estate Management Company

The asset and real estate management company enterprise is offering business-to-business (B2B) property management services in Finland. The main customers are major investment banks and institutional investors. The core property services are divided into four main activities: property acquisition consultation services, leasing activities, asset and property management, and valuation services. The company employs approximately 200 persons and has app. 4.0 million square meters under management, and thus it is one of the biggest players in the asset and real estate management industry in Finland.

Case 2: Institutional Insurance Fund

The Case 2 organization is an institutional mutual pension insurance fund that is a real estate investor. The case company owns approximately 800 000 square meters of private equity based investments in Finland. Most of the investments are offices, commercial and residential buildings. Most of the estates are situated in Helsinki metropolitan area and middle- and northern parts of Finland.

Case 3: Institutional Insurance Fund

The Case 3 organization is an institutional mutual pension insurance fund. The case company owns approximately 15 buildings of private equity based investments in Finland. The case company three has the least investments in Finland. Most of the investments are offices, commercial and logistics buildings. The majority of the investments are offices, and most of the estates are situated in Helsinki metropolitan area, and middle part of Finland.

Case 4: Institutional Insurance Fund

The Case 4 organization is an institutional mutual pension insurance fund. The case company has approximately 100 million euros worth of private equity based investments in Finland. The case company four has the second least investments in Finland. Most of the investments are office, commercial and logistics buildings. Most of the estates are situated in the Helsinki metropolitan area.

Case 5: Institutional Insurance Fund

The Case 5 organization is also an institutional mutual pension insurance fund. The case company owns approximately worth 2.6 billion Euros of private equity based investments in Finland. The case company five has the second most investments in Finland. The investments are residential, offices, and commercial. Most of the estates are situated in the Helsinki metropolitan area.

4.3 Data collection

The case study includes two focus groups; one included in case 1, and one included in each of the cases 2-5 belonging to focus group 2. Focus group is an interview with a small group of people discussing a specific issue. Usually, a focus group interview consists of 6 to 10 persons sharing the same professional or academic background (Patton, 2002). In this case, the focus groups are formed based on the respondents' roles in the study, not on an actual research strategy. Initial research strategy was stated in chapter 2. According to Morgan (1997), focus group method can be a supplementary source of data in researches which also rely on another primary method such an interview. In this case, the primary information source is case interview 1 (focus group 1) which is fundamental in order to form a structured interview with Focus group 2 cases 2-5. Focus group is used since it provides fast data with fewer costs. By using this method, researchers are able to interact with respondents, and ask follow-up questions. The interviews are considered rich forums, because the flexibility of the sessions

provides deep understanding of the respondents' worlds. (Stewart & Shamdasani, 1990)

The focus groups 1 and 2 are divided based on the buyer-seller relationship. In this study, the relationships between focus group 2´s cases 2-5 were not investigated. Initially, focus group 1 interview illustrates the thoughts of Case 1 current state and beliefs of service delivery to focus group 2 representatives; the preliminary value-adding KPIs are tested with focus group 2. Secondly, the focus group 2 information modifies the QFD´s voice of the customer section. The focus group 1 interview was conducted with the company's key personnel. The data was gathered with a semi-structured interview; the interview has some keywords and/or predetermined questions used as a guide (Rogers & Bouey, 1996).

Table 6. Data collection methods

Focus group	Case number	Case company	Phase purpose	Number of interviewees	Data collection method
1.	1.	Asset and estate management company	Current KPIs served to the investors	5	Semi-structured interview
2.	2.	Institutional Insurance Fund	Desired KPIs and services	2	Structured interview
	3.	Institutional Insurance Fund	Desired KPIs and services	1	Structured interview
	4.	Institutional Insurance Fund	Desired KPIs and services	1	Structured interview
	5.	Institutional Insurance	Desired KPIs and services	1	Structured interview

Semi-structured interview enables freedom of exercising a researcher's initiative action in order to seek answer to a question. A semi-structured interview enables answering to questions which were not initially included in the session. This method may result in unexpected findings (Hair et al., 2003). Meeting minutes were written after the session by the researcher. All interview results are agreed to

be anonymous. The focus group 2 answer sheet is in the appendix 1. Further interview data collection material was formed after case interview one which consisted of a structured interview with questionnaire for all focus group 2 case companies. In the interviews, the researcher took the minutes and the rated questionnaire was filled during the sessions.

5 RESULTS

5.1 Case 1

The case 1 (focus group 1) included only one case interview. The idea was to figure out what is the current state of value added KPI delivery to all representatives of cases 2-5 (focus group 2). Additionally, the case 1 interview was conducted with five key persons with an informal one-hour interview. The company representatives were obligated to prepare for the interview.

The first interview was arranged on 2/13/2015 with an asset and real estate management company in Helsinki.

The aim of this case was to illustrate the present state of use of key performance indicators with case 1 accounts and that new KPIs could be beneficial to the case 1 clients. The case study started with focus group interviews in case 1. Based on the interviews the current KPIs which are measured and part of the customers are:

- Running and planned repairs costs per leasable square (€/sqrm)
- Gross rent per square (€/sqrm)
- Energy consumption per square (kWh/sqrm)
- Rate of non-rented area from total leasable area
- Lease agreement lengths
- Property user satisfaction rate
- Property's market value rating; micro and macro location, condition, functionality, and rentability
- Success rate in leasing

These KPIs are used on several accounts in case 1 and not all of them are used at once in a single customer. However, most of them are used by focus group 2 companies. In most cases, the KPIs are defined by the customer and agreed to be measured and managed in the company monthly, quarterly or yearly. Based on the

focus group 1 interview, the recognized KPIs hypothetical themes were listed for the Focus Group 2 from four different points of view

5.1.1. Tenant financial statement analysis

The initial idea is to examine what is a single tenant's capability to manage short-term liquidity liabilities and solvency with quick ratio, change in revenue, a number of staffs and outstanding accounts. In the internal workshop, this point of view was recognized as the most valuable for focus group 1´s current accounts.

5.1.2. Income maturity of lease agreements

The purpose with this theme is to identify the gross rent income level translated onto a timeline. This information can be adjusted from the rent rolls which are usually Excel -sheets illustrating gross rent values, and the start and end date in the lease plan. Additionally, the income maturity is rated with maximum theoretical income rate by maximum occupancy in each property or investment portfolio. One portfolio includes multiple properties, such as housing, retail, office and industrial buildings.

5.1.3. Leasing activity

The idea of the theme is to measure how attractive the account´s portfolio properties are for present and prospective future tenants. The buildings' values, such as number lease negotiations, number of tenant contacts and a number of property exhibits are measured.

5.1.4. Tenant satisfaction rate

Finally, the last theme regards tenant satisfaction rate compared to gross rent level. The idea is to illustrate how the level of paid rents meets with the initial

tenant satisfaction. Tenant satisfaction values, in this case, are satisfaction towards maintenance company and property management services.

Additionally, for each term the common denominators are comparability between properties or portfolios, and is some other asset management company offering the same service. Finally, the respondents are obligated to assess which of the KPIs are the most useful and least useful in value creation and decision-making.

5.1.5. Thematic interview questionnaire

Suggested value added elements and recognized KPIs were examined in four different real estate investors in Finland.

The case examines four different real estate investors in Finland. The main themes in the rated questionnaires from the four points of view are related to the problem analysis. Moreover, the questionnaire examined the usefulness of each KPI theme to be investigated among asset and real estate management company´s clients and its tenants. The standardized questions were assessed during a one-hour interview with the clients. Additionally, the usefulness rating questionnaire is rated on scale of 1 to 4. If the rating was from 1 to 5, number three would not indicate real opinion towards good or bad. See Appendix 1.

Tenant financial statement analysis

Tenant financial statement analysis regards turnover, operating income, the number of employees, current ratio, quick ratio, defaults and equity ratio. The answers of the questionnaire were determined if the KPI values were related to the industry, building, prospect tenant and current tenants. Additionally, the frequency of the service delivery was asked at rate of once a month, once a quarter, once in half a year, and once a year. Additionally, it was asked if another competitor provided the same service.

Income maturity of lease agreements

The income of the maturity was observed with two simple parameters; gross rent and margin during a building´s lifecycle. Secondly, the maximum gross rent profit rate was compared to the market maximum gross rent profit rate on a timeline. The questionnaire was based on ratings. In total, the answers of the questionnaire was determined if the KPI were related to the industry, building, and current tenants based. Furthermore, the frequency of the service delivery was asked ratio of one in a month, once a quarter, once in half year, and once a year. Additionally, the issue were asked if another competitor provides the same service. Additionally, the frequency of the service delivery was asked at a ratio of once a month, once a quarter, once in half year, and once a year.

Leasing activity

The questions concerning leasing activity were examined with a rating questionnaire. The questionnaire regarded questions such as property exhibitions, the number of contacts of prospective tenants, number of tenant negotiations, and the number of contracts made. Additionally, the frequency of the service delivery was asked at a ratio of once a month, once a quarter, once in half a year, and once a year. In total, the answers of the questionnaire were determined on the KPI values relevancy to the location and investment portfolio. Additionally, it was asked if another competitor provided the same service.

Tenant satisfaction rate

The question regarding tenant satisfaction rate investigated tenant satisfaction towards gross rent level and tenant satisfaction towards property. Additionally, the frequency of the service delivery was asked ratio of one in a month, once a quarter, once in half year, and once a year. In total, the answers of the questionnaire were determined by the KPI values' relevancy to the building and

investment portfolio. Additionally, it was asked if another competitor provided the same service.

In total, the rated questionnaire had a rating scale of one to four, where one indicated less interest, and four indicated the most interest. The traditional rating scale of one to five was modified to avoid the irrelevancy of number three which is too neutral to consider an answer.

Also, two open questions were asked; which one of the themes are the most favored and which one the least favored from the real estate investor point of view. Moreover, the questionnaire investigated which one of the themes could be purchased if it was available. Finally, the respondents could indicate a building type that could be investigated from the four theme points of view of even one of them.

5.2 Cases 2-5

This chapter illustrates the key findings that were investigated according to the case 1 interview results. There are four cases (2-5) which were conducted with the same questionnaire (Appendix I)

5.2.1. Case 2

The second interview was arranged with two company representatives (leasing manager and real estate manager) on 3/31/2015 with an institutional insurance fund in Helsinki.

Tenant financial statement analysis

According to the respondent, the financial statement analysis figures are not so relevant to the customer. The respondent stated that tenants´ accountability is inspected only with Asiakastieto –database. The database has a one to three-star

rating that is used to assess a company´s accountability. Asiakastieto has information on companies that have registered in Finland. Additionally the interest for the turnover, operating income, Current ratio and quick ratio were graded 2 (= little), only interest towards equity ratio was valued 4 (=very much) and the number of employees valued 1 (=very little). Moreover, the respondent was interested in having the numbers graded among the industry (3=much) and prospect tenants (3=much). Finally, building based and present tenant-based information was valued 2 (=little). The information frequency was estimated once a year and no other property management servant is producing such information to the respondent. The additional comment for the theme was that the information could be just nice-to-know, so it is not crucial to the respondent.

Income maturity of lease agreements

The gross rent margin in the lifeline and Gross rent rate margin (%) from the possible maximum were both considered nice-to-know and were graded 3. Moreover, the respondent was interested in having the numbers graded among investment portfolios (3=much) and current tenants (3= much). Building based information was valued 2 (=little). The KPI information frequency was estimated once a year and no other property management servant are producing such information to the respondent. Again, the additional comment for the theme was that the information could be just nice-to-know, so it is not crucial for the respondent.

Leasing activity

The leasing activity was seen as extremely useful by the respondent. The number of property exhibitions, the number of contacts, the number of tenant negotiations and the number of agreements signed were all valued 4 (=very much). Additionally, location based data were valued 4 (=very much), and portfolio was valued 3 (=much). The respondent would be happy if the service frequency could be once in two months instead of once in a quarter and if no other property

management servant was producing such information to the respondent. Additionally, the respondent indicated that Tiloja.fi –service produces some information on leasing activity once a month, but does not provide building or location based information. No third party information is gathered and no broker management was considered according to the respondent.

Tenant satisfaction rate

Information concerning tenant satisfaction to gross rent and property were both valued 4 (=very much). Additionally, building and portfolio based information were valued 3 (=much). The KPI information frequency was estimated once a year and no other property management servant is producing such information to the respondent.

In total, the themes were organized as leasing activity, tenant satisfaction rate, income maturity and financial statement analysis. Furthermore, the respondent could purchase services information related to leasing activity and tenant satisfaction rate, the service could be seen as project based, not as a continuous service. In the open question, the respondent stated that information by KTI Kiinteistötieto Inc. should be cracked and analyzed in smaller, manageable forms. Now there is too much information available that cannot be handled. KTI Kiinteistötieto Inc. gathers and releases property informatics from the Finnish market.

5.2.2. Case 3

The third interview was arranged with a leasing manager on 4/9/2015 with an institutional insurance fund in Helsinki.

Tenant financial statement analysis

The KPIs were valued 3 (=much) including operating income, number of employees, Current ratio, quick ratio, defaults and equity ratio. Exceptionally, turnover was seen as very useful 4 (=very much) in order to measure tenants´ liquidity capabilities. Furthermore, industry based figures and prospect tenant contexts were valued 3 (=much), Building based and current tenant-based information was seen as less relevant to know, valued 2 (=little). The respondent stated that information once a month would be useful and if no other property management servant is producing such information to the respondent at the moment.

Income maturity of lease agreements

The gross rent margin in the lifeline and gross rent rate margin (%) from maximum possible were both seen as interesting to know and were graded 4. Moreover, the respondent was interested in having the numbers graded among building based rating (4= very much) and current tenants (4= very much). Portfolio based information was valued 3 (=much). The KPI information frequency was estimated once in three months, and other property management servant is producing such information only related to gross rent. No further analysis is done by a competitor.

Leasing activity

The leasing activity was seen extremely useful to the respondent. The number of property exhibitions, the number of contacts, the number of tenant negotiations, the number of agreements signed were all valued 3 (=much). Additionally, location based data were valued 4 (=very much), and portfolio was valued 3 (=much). The respondent would be happy if the service frequency could be delivered once a month and no other property management servant was producing such information to the respondent. Additionally, broker management was not

considered completely according to the respondent at the moment, but would it be beneficial to know, for example, the number of property exhibitions managed by real estate brokers.

Tenant satisfaction rate

Information concerning tenant satisfaction in gross rent was valued 3 (= much) and tenant satisfaction to property was valued 4 (=very much). Additionally, building based information was valued 3 (=much), and portfolio based 4 (=very much). The KPI information frequency was estimated once a year and no other property management servants are producing such information to the respondent. Although basic tenant satisfaction data is gathered, no further analyzes are made.

In total, the themes´ importance was organized as tenant satisfaction rate, leasing activity income maturity, and financial statement analysis. Furthermore, the respondent could purchase services information related to leasing tenant satisfaction rate. The most beneficial building types to be investigated could be retail and office buildings. In the open question, the most interesting topics to investigate are:

- Modern building space efficiency from the property owner point of view
- The change process from regular office to combined office environment (open office, meeting spots and rooms etc.)
- Future trends in workspace management
- How tenants´ attitudes and prejudices change during the transition from a regular office to a combined office environment.

5.2.3. Case 4

The fourth interview was arranged with an asset manager on 4/15/2015 with an institutional insurance fund in Helsinki.

Tenant financial statement analysis

The most of the KPIs were valued 1 (=very little) including the number of employees, current ratio, and quick ratio. Operating income was seen as very useful 4 (=very much) and turnover (3=much) for measuring tenants´ liquidity capabilities. Also defaults and equity ratio were graded 3 (=much). Furthermore, industry based rating was valued 3 (=much), building based 1 (very little), current tenants, and prospect tenants 4 (= very much). The respondent stated that once in half a year information would be useful and no other property management servant is producing such information to the respondent at the moment. Additionally, tenant information is gathered from Asiakastieto -database.

Income maturity of lease agreements

The gross rent margin in the lifeline and gross rent rate margin (%) from maximum possible were both seen interested to know and were graded 3. Moreover, the responded was interested in having the numbers graded among building based rating 3 (=much), and current tenants 3(= much). Portfolio based information was valued 3 (=much). The KPI information frequency was estimated once in one to three months, and other property management servant is producing such information only related to gross rent in the lifetime to the respondent. No further analysis is done by competitors.

Leasing activity

Again, the leasing activity was seen as extremely useful for the respondent. Number of property exhibitions, the number of tenant negotiations, the number of agreements signed were all valued 3 (=much) and number of contracts 4 (=very much). Additionally, location and portfolio based data were valued 3 (=much). The respondent would be happy if the service frequency could be delivered once a month and other property management servants were producing such information to the respondent already.

Tenant satisfaction rate

Information concerning tenant satisfaction in gross rent and tenant satisfaction in property were valued 3 (=much). Additionally, building and portfolio based information were both valued 3 (=much). The KPI information frequency was estimated once a year and no other property management servant is producing such information to the respondent. Although basic tenant satisfaction data is gathered, no further analyzes are made. Also, KTI information surveys are arranged.

In total, the themes´ importance rating was organized as leasing activity, tenant satisfaction rate, financial statement analysis, and income maturity. Furthermore, the respondent could purchase services information related to all themes if they were not included in the regular property management service agreement. There was no particular interest towards a specific building type; all property types should be investigated from the KPI point of view. In the open question, the most interesting topic to investigate was property renovation cost in different building types.

5.2.4. Case 5

The fifth interview was arranged with an asset manager on 4/17/2015 with an institutional insurance fund in Helsinki.

Tenant financial statement analysis

The KPIs were valued 4 (= very much) including turnover, operating income, the number of employees, defaults and equity ratio. Exceptionally, current ratio and quick ratio were seen less useful 2 (=little) in measuring tenants´ liquidity capabilities. Furthermore, industry based figures and prospect tenant contexts were valued 4 (= very much). Building based and current tenant based information was seen as less relevant to know, the first was valued 1 (=little) and the second 2 (=little). The respondent stated that information once in three months

would be useful, and other property management servant is producing such information to the respondent at the moment; information comes from Asiakastieto –database.

Income maturity of lease agreements

The gross rent margin in the lifeline and gross rent rate margin (%) from maximum possible were both seen nice-to-know and were graded 4. Moreover, the respondent was interested in having the numbers graded among building based rating (4= very much) and current tenants (4= very much). Portfolio based information was valued 2 (=little). The KPI information frequency was estimated once a month, and no other property management servant is producing such information only related to gross rent in the lifetime to the respondent.

Leasing activity

The leasing activity was seen as extremely useful for the respondent. The number of property exhibitions, the number of contacts, the number of tenant negotiations, the number of agreements signed were all valued 4 (=much). Additionally, location based data were valued 4 (=very much), and portfolio was valued 3 (=much). The respondent would be happy if the service frequency could be delivered once a month and if no other property management servant was producing such information to the respondent.

Tenant satisfaction rate

Information concerning tenant satisfaction in gross rent and tenant satisfaction in property were valued 2 (=little). Additionally, building based information were valued 3 (=much) and portfolio based 1 (=very little). The KPI information frequency was estimated once a year and other property management servant is producing such information to the respondent. Although basic tenant satisfaction

data is gathered with the assistance of KTI Kiinteistötieto, no further analyzes are made.

In total, the themes´ importance was organized as leasing activity, tenant satisfaction rate, income maturity, and financial statement analysis. Furthermore, the respondent could purchase services information related to all services but only when separately ordered. The most beneficial building types to be investigated could be office business parks due to the variety of companies operating. In the open question, the most interesting topics to investigate are:

- Modern building space efficiency from the property owner point of view
- The transition from a regular office to a combined office environment (open office, meeting spots and rooms etc.)
- Property management staff's capability to react to service needs on time
- Tenant satisfaction ratings
- Value adding information added to KPI information

In total, all points of view aroused interest, and no single point of view was ignored based on the interview. Therefore relying on the hypothesis, all points of views were seen as relevant to investigate, and KPI points of view were important to be aware of.

6 ANALYSIS

This chapter explains the most convenient findings based on the interviews of the quality function deployment building from the service development point of view. To avoid data interpretation –based logic leaps and false assumptions, the rated questionnaire remains one to four although the theory on P_i scaled from one to five. The following table illustrates the scientific proof in order to translate the questionnaire answer ratings into the QFD´s VoC criticality. Each case study illustrates the analysis of each of the four KPI points of view and the necessity of each service delivery. Additionally, the answer related to numbers 8-11, 14-17, 22-23, and 26-27 on KPI context are analyzed separately from the case analyses. All analyzed figures indicate an average of the answers except Table 16. is indicates a weighted average.

Table 7. Scale of grading the answers

	Very little	Little	Much	Very much
P_i, Customer priority (1-4)	1	2	3	4
Rated questionnaire (1-4)	1	2	3	4
Necessity of the service	Once a year	One in half a year	Once in three months	Once in a month

6.1 Case 2

The second interview illustrates that leasing activity and tenant satisfaction are the most favored KPIs to measure. In the figure, the relationship between KPI importance and service necessity rated according to the time-frequency value from the respondent point of view. This figure includes answers number 1-26, excluding questions number 8-11, 14-17, 22-23, and 26-27. *The necessity of a service* illustrates the frequency of KPI delivery to the respondent.

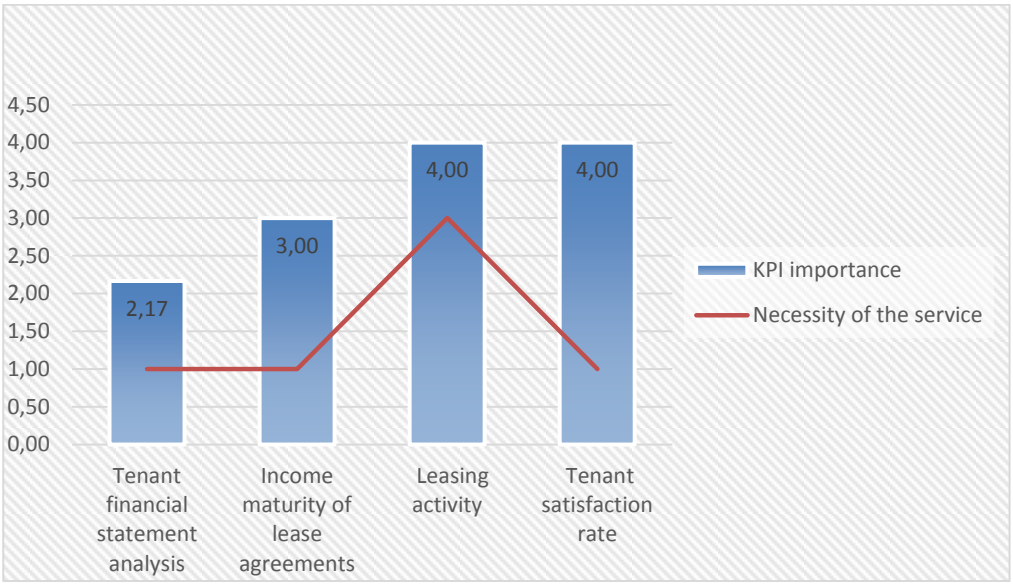


Figure 12. 2nd case interview results in a graph

The first theme is not valued very high. There is some interest on *income maturity of lease agreements*, valued 3 (= much). To build the QFD, two last themes were the most interesting, both valued 4.00 (=very much). Additionally, there was no competition on the market regarding the delivery of the service among other property management services. In addition, the necessity of the total service delivery is rather low, the frequency for the KPI service delivery being valued 1.50. However, the necessity for *leasing activity* service delivery was seen the most critical and valued 3.00; other services were valued as 1.00. Total interest to the KPI service needs is weighted average was 3.28 (=much). As presented in the results, the first two service points of views, *tenant financial statement analysis* and *income maturity of lease agreements* were valued just nice-to-know KPIs. The actual interests were on the last two points of view.

6.2 Case 3

The third interview illustrates that the respondent favors most of the KPIs. In the picture, the relationship between the KPI importance and service necessity is rated according to the time-frequency value from the respondent point of view. This figure includes answers 1-26, excluding questions number 8-11, 14-17, 22-23, and

26-27. The necessity of the service tells the frequency of KPI delivery to the respondent.

Figure 13. 3rd case interview results in a graph

All the points of view are valued above 3.00 indicating great interest in the KPI services in general. There is significant interest in *income maturity of lease agreements*, valued 4 (=much) and *tenant satisfaction* rate was valued 3.50. *Tenant financial statement analysis* and *leasing activity* are both important points of view as well. Additionally, there was no real competition on the market regarding the delivery of the services among other property management services. In addition, the necessity of the total services delivery is rather high; valued weighted average 3 (=much). Moreover, the *necessity of tenant financial statement analysis* and *leasing activity* were graded 4, but the interest in each KPI is lower than the necessity. Total interest in the KPI service needs is 3.26 (=much) on weighted average. The answer indicates that frequency could be fast although the information itself might not be too important to have. *Tenant satisfaction rate* was also important to the respondent, although necessity was graded 1 (=very little). This might indicate that tenant satisfaction information is difficult to gain and information production can be difficult from the property management service

side. For this respondent, tenant satisfaction rating in workspace management and office renovation projects could be beneficial to investigate.

6.3 Case 4

The fourth interview illustrates that most of the KPIs are useful to the respondent. In the picture, the relationship between KPI importance and service necessity are rated according to the time-frequency value from the respondent point of view. This figure includes answers 1-26, excluding questions number 8-11, 14-17, 22-23, and 26-27. The necessity of the service tells the frequency of KPI delivery to the respondent.

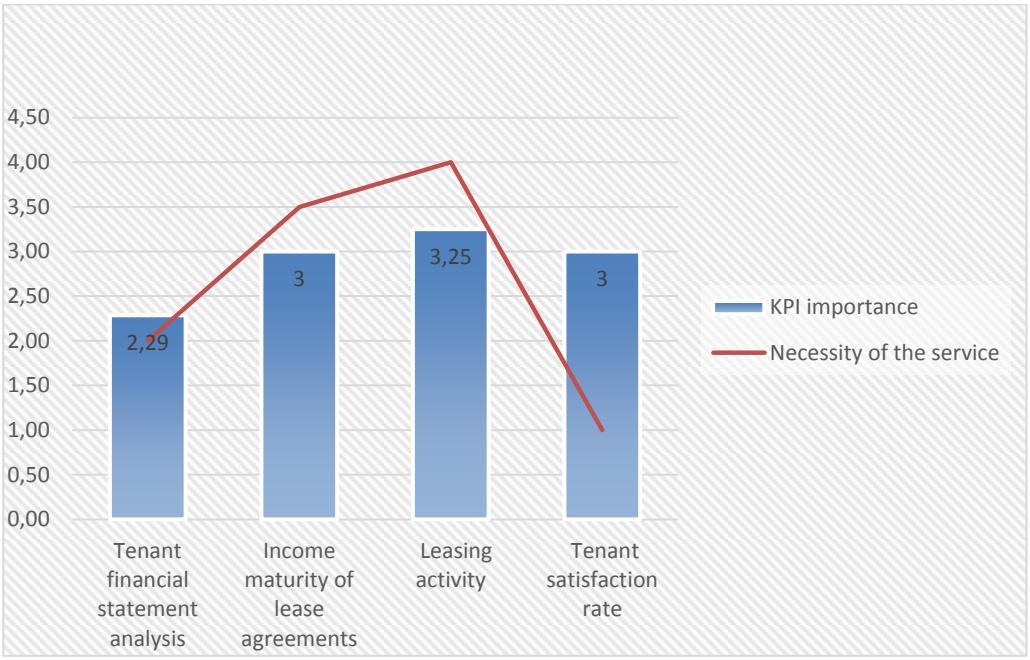


Figure 14. 4th case interview results in a graph

All the points of view are valued above 3.00 expect *tenant financial statement analysis*, indicating general interest in the KPI services. There is significant interest in *leasing activity*, valued 3.25 (=much) and *tenant satisfaction rate* was valued 3.00. *Income maturity of lease agreements* is an important point of view as well. Additionally, there was no real competition on the market regarding the delivery of the services among other property management services. Total interest

to the KPI service needs is weighted average 2.93 (=little). In addition, the necessity of the total services delivery is rather average; total weighted average 2.65 (=much). Moreover, the necessity of *leasing activity* was graded 4. Again, *tenant satisfaction rate* was important to the respondent, although necessity was graded 1 (=very little), meaning that the tenant satisfaction information is difficult to gain and information production can be difficult from the property management service side.

6.4 Case 5

The fifth interview illustrates that the KPIs are useful to the respondent. In the picture, the relationship between KPI importance and service necessity is rated according to the time-frequency value from the respondent point of view. This figure includes answers 1-26, excluding questions number 8-11, 14-17, 22-23, and 26-27. The necessity of the service tells the frequency of KPI delivery to the respondent.

Figure 15. 5th case interview results in a graph

All the points of view are valued above 3.00 except *tenant satisfaction rate*, indicating great interest in the KPI services in general. There is significant interest in in*come maturity of lease agreements* and *leasing activity* valued both 4

(=much) and *tenant satisfaction rate* was valued 3.14 (=much). This time, the *tenant satisfaction rate* was valued only 2 (=little). Additionally, there was real competition on the market regarding the delivery of the services among other property management services; almost all KPI components were offered in the market. In addition, the necessity of the total services delivery is rather high; valued weighted average 3 (=much). Moreover, the necessity of *income maturity of lease agreements* and *leasing activity* were graded 4. Total interest in the KPI service needs is weighted average 3.93 (=much) the highest of all respondents. For this respondent, tenant satisfaction rating in workspace management and office renovation projects, and further tenant satisfaction ratings could be beneficial to investigate.

6.5 Cases 2-5 summary

The analysis below illustrates the cases 2-5 (focus group 2) from the total average mean KPIs and the necessity of each service delivery points of view. Additionally, the analysis related to questions 8-11, 14-17, 22-23, and 26-27 on KPI context are analyzed separately from the focus group 2 case answers 1-7, 12-13, 18-21, and 24-25.

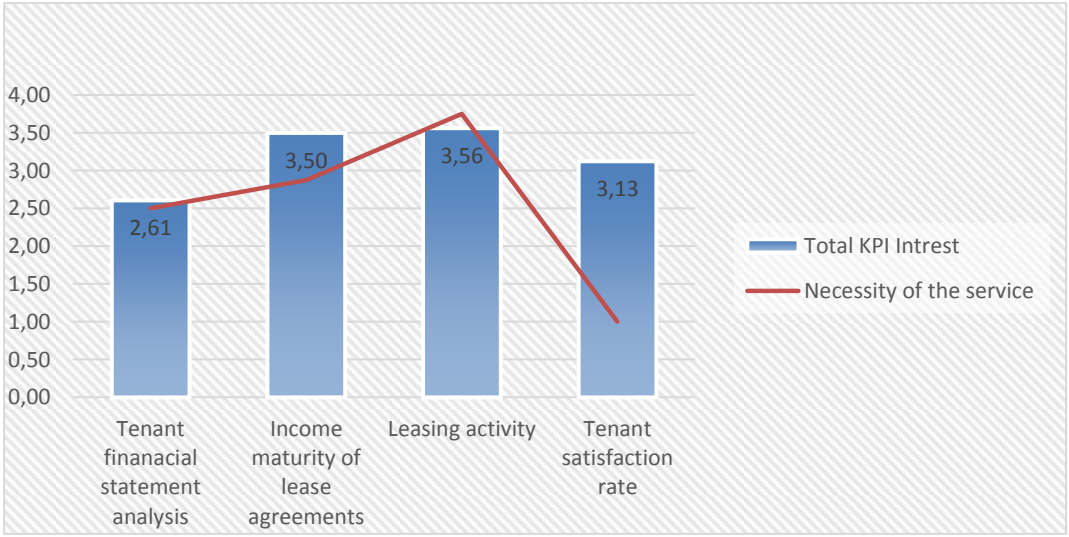


Figure 16. Total focus group 2 interview results in a graph (weighted average)

The total KPI analysis tells that *income maturity of lease agreements and leasing activity* are clearly the most important issues for the respondents. Additionally, *tenant satisfaction rate* is important, *whereas tenant financial statement analysis* was seen as less important issues. What it comes to the necessity of the services delivery, *income maturity of lease agreements* and *leasing activity* are again clearly the most important. The less important KPIs are *tenant financial statement analysis* and *tenant satisfaction rate*. Additionally, there is some competition on the markets. The market competition analysis (rating 1-5) illustrates that the first two cases do not have so many service providers of the KPI issues. Cases 4 & 5 have some service provided to the case companies.

Table 8. Market competition analysis.

	Tenant financial statement analysis	Income maturity of lease agreements	Leasing activity	Tenant satisfaction rate
Case 1	1	1	2	3
Case 2	1	1	1	3
Case 3	1	4	3	3
Case 4	3	3	4	3

As a general conclusion for the QFD´s VOC qualities from the market competition analysis, the most convenient KPIs to integrate with it are *income maturity of lease agreem*ents and *leasing activity*. Moreover, question number 17 had to be omitted from all of the interviews since it does not have any relevance to the topic.

6.6 Quality function deployment: Service planning

The quality function deployment analysis starts with choosing the VoCs in the matrix. According to the previous chapter, *income maturity of lease agreements* and *leasing activity* are the most desired KPI issues to pursue. In addition, the weight / importance levels come from the average number of importance, valued

from 3.5 to 3.8 in the scaling of P_i (1-4). See more the values of *income maturity of lease agreements* below.

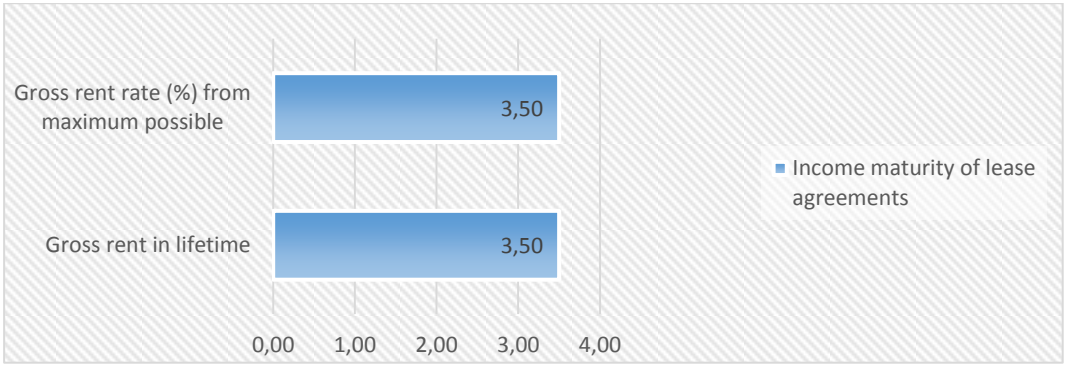


Figure 17. Income maturity of lease agreement values (average).

Both *income maturity of lease agreements* and *leasing activity* values are average values based on the popularity and number of respondents.

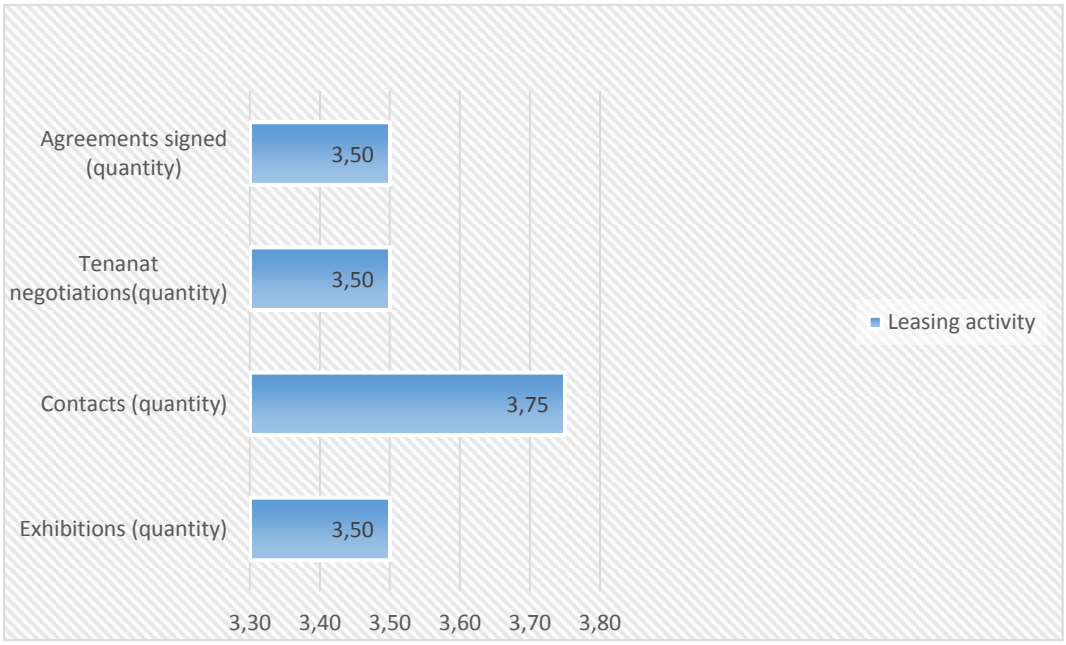


Figure 18. Leasing activity values (average).

Function requirements

The second phase concerns function requirements that are formatted based on the average value of the most important KPI contexts. Additionally, a convenient IT system needs to support the KPI delivery. Moreover, the most convenient KPI contexts for *income maturity of lease agreements* are *building and current tenant based ratings*. For leasing activity the KPI context is *location based rating*. See total KPI index rating related to the KPI points of view in the Figure 20.

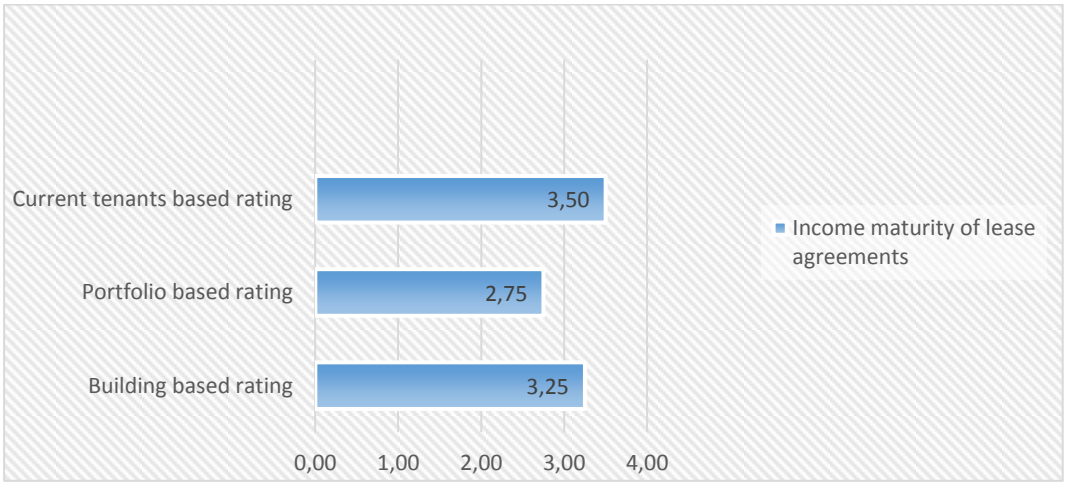


Figure 19. Total KPI context score for income maturity of lease agreements (average).

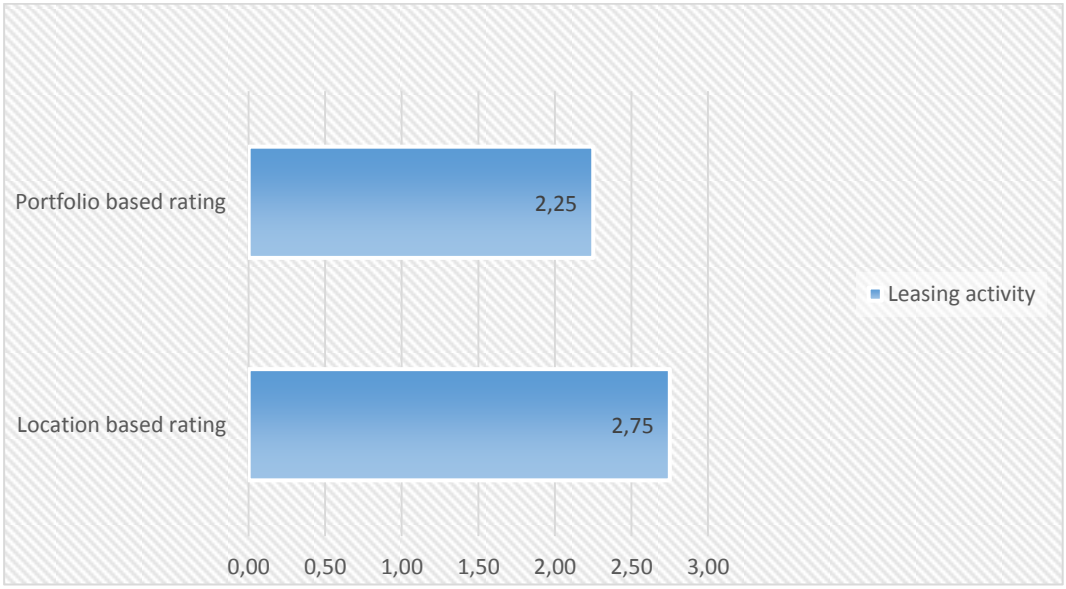


Figure 20. Total KPI context score for leasing activity (average).

Furthermore, the values given above do not have any effect on the grading of the QFD matrix. In the following matrix, customer requirements and quality characteristics are drawn on the first QFD matrix. The purpose is to illustrate the best function requirements for the competitive analysis.

		Column #	1	2	3	4	5	6
		Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)	▲	x	▲	▲	▲	▲
Relative Weight	**Weight / Importance**	**Quality Characteristics** (a.k.a. "Functional Requirements" or "Hows") / **Demanded Quality** (a.k.a. "Customer Requirements" or "Whats")	IT system to support actions	IT Database	Building based information	Portfolio based information	Current tenant based information	Location based information
16,5	3,5	Gross rent in lifetime	⊖	⊖	⊖	O	⊖	▲
16,5	3,5	Gross rent rate (%) from maximum possible	⊖	O	⊖	O	▲	▲
16,5	3,5	Exhibitions (quantity)	▲	▲	⊖	▲	▲	O
17,6	3,8	Contacts (quantity)	▲	▲	⊖	O	▲	O
16,5	3,5	Tenant negotiations (quantity)	▲	▲	⊖	▲	O	⊖
16,5	3,5	Agreements signed (quantity)	O	⊖	⊖	O	▲	O

Figure 21. Quality function analysis: service planning, part 1

Direction of improvement and relationships matrix

The direction of improvement indicates, where to go with the quality. In this case, it has been recognized that most of the improvements need to be done in order to meet customer requirements. The asset and real estate management company does not have any particular KPI context information tools or any databases related to the service delivery. The relation matrix represents the relationships between VoCs and Quality characteristics; the analysis tells that most of the relationships have strong or even moderate significance. However, some relationships are considered weak.

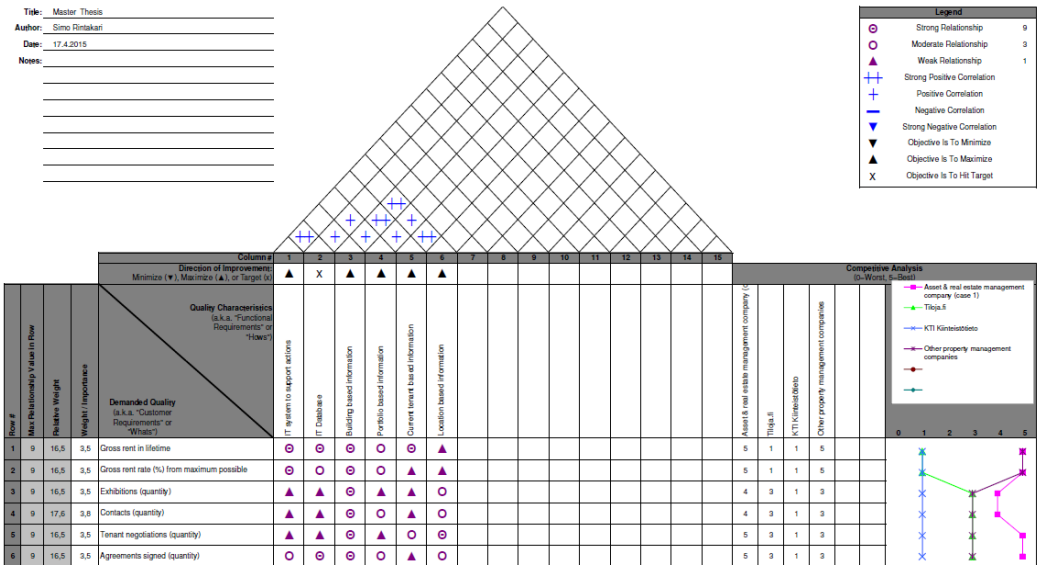


Figure 22. Quality function analysis: service planning, part 2

Co-relationship matrix and competitive analysis

The correlation matrix illustrates the correlations between each functional requirement. Most of the correlations are seen as positive, and only some of the correlations do not have so much in common. Most of the KPI contexts have more or less in common with each other. The competitive analysis explains the most common competitive assets on the market. It has been recognized that *Tiloja.fi* - website, *KTI Kiinteistötieto*, and *other property management professionals* do have some elements regarding the KPI services. According to the interviews, the competition is various in many spheres. The competition is valued from 0 to 5. However, the real competition is in gross rent in the lifetime and gross rent rate (%) from the maximum. The maximum level can be estimated by calculating rental value (ERV) per square.

Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Demanded Quality (a.k.a. "Customer Requirements" or "Whats")	IT system to support actions	IT Database	Building based information	Portfolio based information	Current tenant based information	Location based information
				Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)	▲	x	▲	▲	▲	▲
				Quality Characteristics (a.k.a. "Functional Requirements" or "Hows")						
1	9	16,5	3,5	Gross rent in lifetime	⊙	⊙	⊙	○	⊙	▲
2	9	16,5	3,5	Gross rent rate (%) from maximum possible	⊙	○	⊙	○	▲	▲
3	9	16,5	3,5	Exhibitions (quantity)	▲	▲	⊙	▲	▲	○
4	9	17,6	3,8	Contacts (quantity)	▲	▲	⊙	○	▲	○
5	9	16,5	3,5	Tenant negotiations (quantity)	▲	▲	⊙	▲	○	⊙
6	9	16,5	3,5	Agreements signed (quantity)	○	⊙	⊙	○	▲	○
7										
8										
9										
10										
				Target or Limit Value	Basic data input system	Integrated to M-Files and data input system	Data input in the application	Data input in the application	Data input in the application	Map based application for the respondents
				Difficulty (0=Easy to Accomplish, 10=Extremely Difficult)	6	4	5	7	6	8
				Max Relationship Value in Column	9	9	9	3	9	9
				Weight / Importance	396,5	396,5	900,0	234,1	264,7	332,9
				Relative Weight	15,7	15,7	35,6	9,3	10,5	13,2

Figure 23. Quality function analysis: service planning, part 3

Competitive technical assessment

The competitive technical assessment illustrates the key points of the technical requirements needed for the service development. The technical requirements include basic data input system; that is, a simple software for the asset and real estate management company. Additionally, the IT application needs are integrated to M-Files database that is used in the asset and real estate management company´s internal actions. Furthermore, each KPI context needs data input in the application. According to the rating, the difficulty is valued rather low, expect for the map application for measuring location that might cause some difficulties.

6.7 Quality function deployment: Process control characteristics

The process control characteristics illustrate the processes that need to be done in order to build the service channel for the respondent. The process control characteristics include mainly internal processes which need to be formatted in order to build an information system between focus group 1 and 2. The following quality characteristics form a modern database illustration of the service. Most of the KPI components are built from the customer based information and external information from YTJ yritystieto, Kauppalehti, and Finnish company registrations, etc. Additionally, the relationships matrix again explains the importance of each relationship in the service characteristics and process control characteristics. In total, most of the relationships are significant with few exceptions.

Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Demanded Quality (a.k.a. "Whats") \ Quality Characteristics (a.k.a. "Hows")	Data surveys about tenants and lease agreements	Data from map applications	Data from finance portfolios	Tenant information external sources	Application developement outsoursing
1	9	15,7	396,5	IT system to support actions	▲	⊙	⊙	⊙	⊙
2	9	15,7	396,5	IT Database	⊙	⊙	⊙	⊙	⊙
3	9	35,6	900,0	Building based information	⊙	○	○	○	▲
4	9	9,3	234,1	Portfolio based information	⊙	○	⊙	⊙	▲
5	9	10,5	264,7	Current tenant based information	⊙	⊙	⊙	⊙	▲
6	9	13,2	332,9	Location based information	⊙	⊙	○	○	▲
7									
8									
9									
10									
11									
12									
13									
14									
15									
				Target or Limit Value	Online Lease agreements	Map application integration	Data permit for customer´s portfolio information	Permit to see data from the public data bases such as YTJ	Developement with parter company
				Difficulty (0=Easy to Accomplish, 10=Extremely Difficult)	7	6	8	2	3
				Max Relationship Value in Column	9	9	9	9	9
				Weight / Importance	774,4	630,5	607,0	607,0	351,3
				Relative Weight	26,1	21,2	20,4	20,4	11,8

Figure 24. Quality function analysis: process control characteristics

The competitive technical assessment illustrates the target value. It is more or less subject to permission to access the customers' lease agreement databases and the asset and real estate management company's external databases and client information, which are all needed in the technical assessment. There are no major difficulties in accessing the databases, except for the customers' portfolio information since it may be classified.

6.8 Quality function deployment: Action plan matrix

Since the tasks are not that variable in the action plan matrix, it is not necessary for the case; it can be replaced with a simple task matrix. The matrix illustrates action plan issues, responsibility and what the responsible needs to do.

Table 9. Quality function deployment: Action plan matrix

Action plan	Who?	What?
Data surveys about tenants and lease agreements	Project worker	Seeks the information on the premises
Data from map applications	Project worker	Seeks the information on the premises
Data from finance portfolios	Project manager	Recognizes the customer needs and asks permission to seek information
Tenant information external sources	Project worker / external consultants	Makes surveys needed if the information is not available
Application development outsourcing	External consultants	Provides the IT application for PCs, tables, and smart phones

Most of the tasks aimed at project members and project manager; no other working types are needed from the asset and real estate management company.

Some consultation is needed from an external service provider such as IT developers who build the application. In total, the QFD the asset and real estate management company service needs to build on to meet customer needs, concerns KPI service delivery. This analysis illustrates just the main points of view on how to build a service in such service sphere.

6.9 Evaluation of case study

6.9.1. Reliability

The analysis section concerns only focus group 2 (cases 2-5) answers, since they are related to the QFD service development process. Each occasion hedges the subjects of reliability errors. In this thesis, each hedging action is followed by a bullet point state by Saunders et al. (2009) & Easterby-Smith et al., (2008):

- Subject or participant error: The questionnaires are conducted in two-weeks time, so different duration does not generate different results e.g. economic or political situation.
- Subject or participant bias: Upper management and KPI professionals give the answers, so they can be considered real and serious. No internal manipulation of the respondents are considered e.g. pressure of supervision, etc. additionally, the rating questionnaire is impossible to finish without taking part in each question
- Observer error: Only one researcher is conducting the interviews, no mixing up between interview sessions
- Observer bias: Only hard evidence shown by the interview reports are utilized

6.9.2. Validity

The subjects of reliability errors are hedged on each occasion (Saunders et al., 2009). The subjects of validity errors are hedged on each occasion:

- Events in recent history: There are no dramatic events concerning the customers that may affect the interview answers; clients businesses have been stabile
- Testing: It has been recognized that questions do not illustrate unfavorable information for the case company or its clients´ business processes
- Mortality is low since the time-horizon for the interviews is very short. No fear of interviewees dropping out
- Maturation cannot be concerned since the time horizon is so short in the research.

In total, reliability and validity errors can be hedged with face-to-face interviews in order to diminish bias and participant errors in the research. Additionally, hedges are possible because of utilizing a short time-horizon for the multiple case study.

7 CONCLUSIONS

The purpose of this study was to identify new value added KPIs in the asset and real estate management company's present customers. The aim was to illustrate competitive advantage services that may create value adding perspective to the asset and real estate management company´s clients. The study started with the first chapter introducing the case background with focus on the increasing competitiveness on the property management service market. The problem analysis stated the prospects of value adding elements in the real estate management context identified by other article writers. Additionally, the investigation was conducted with a multiple case study method; four unnamed asset and real estate management company´s clients participated in the interview sessions during spring 2015. Focus group 1 interview (case 1) stated the first steps of the KPIs question forum for the focus group 2 case interviews. The case interviews were documented in Word and Excel –documents in order to manage quantitative information of the QFD analysis and valued data for it. The sampling needed to be purposive because of the amount of available data gathered.

The limitations were identified according to the timeliness, confidentiality and accessibility of the data. However, the case interviews were managed so that valid data could be utilized in the discussion and analysis sections without any doubts. The case company presentation illustrated the working area of the asset and real estate management company in Finland with a short highlighted analysis of the Finnish property market.

The point of the theoretical background was to illustrate the research gap and the necessity of the topic, stated in chapter 3. Furthermore, the chapter was divided into two sections: explaining key performance indicators in real estate management and quality function deployment. The idea was to illustrate the justification of deployment of QFD in the case study from internal and external points of view. Additionally, there have not been any studies on QFD applications in property management service. Secondly, the literature review illustrated the

necessity of the KPIs used in different contexts but not in the real estate management KPI service delivery. Fourth chapter illustrated case company selections, case presentations, and data collection methods.

Chapter 5 illustrated all case interview results. These results were explained in four main KPI themes tenant financial statement analysis, income maturity of lease agreements, leasing activity, and tenant satisfaction rate. The answer sheet was also divided into four main KPI categories. In the Chapter 6, the focus group 2 case interviews were measured using quantitative data interpretation of results given in the answer sheet. The information was analytically explained for each case interview. The data analysis was used in the QFD building in three main steps; service planning, process control characteristics, and action plan matrix; the steps were illustrated in the theory part. According to the limitation of research and data collection, the QFD model is a rather thematic interpretation of service planning. As a conclusion, the following section answers the initial research questions:

RQ1: Which asset and real estate management information resources are the most important in developing new service KPIs for the customers?

According to the research data, the most important external data bases are domestic and international financial statement databases, such as Amadeus and Voitto+ which are general private database applications. Additional information database is KTI Kiinteistötieto information which is possible to gain in the customers. The most important internal databases are rent rolls, tenant agreements, and surveys on tenant satisfaction.

RQ2: Based on the case interviews, which KPIs are the most value added for asset and real estate management company´s customers?

According to the case studies, the most desired KPI points view are clearly income maturity of lease agreements and leasing activity. Income maturity of

lease agreements KPIs, Gross rent rate from the maximum and gross rent in lifeline were both seen as the most relevant. Additionally, lease activity KPIs were considered the most valuable. Quantity of agreements signed, tenant negotiations, contacts, and exhibitions were all graded above 3.5 on a scale of 1-4. The most desired KPIs were chosen into the QFD service process development since they had most potential in valued adding. According to the table no. 8, the market competition analysis, the convenient decision was to choose some of the four main KPI themes that may have competitive capabilities on the market. There is no reason to deliver just one KPI component e.g. turnover of tenant, since there are so many databases that provide the KPIs, however, the KPI is important to know customer-wise.

RQ2.1: Which KPIs are the most necessary to know in a timely manner?

The multiple case study stated that the most necessary KPIs are income maturity of lease agreements and leasing. In this case, leasing activity was the most necessary service to know. The desired interval for information reception was approximately once a moth or even once in three months. The second most desired KPI was income maturity of lease agreements, the desired interval for information reception was approximately stated once in three months.

RQ2.2: Which KPI contexts are important for real estate investors decision-making?

It has been stated that income maturity of lease agreements and leasing are the most value adding KPIs. According to the case study interview results, the most favored KPI contexts were portfolio, location, building, and current tenant based ratings. Finally, the KPI context rating is secondary information compared to the KPI theme rating since it does not solve the identification of initial value adding components.

In total, the case study does not give any general overview on all of the real estate owners in Finland. So the case studies only give an overview of these asset and real estate management companies' clients; institutional insurance funds. For further investigation, the most convenient case study could be setting up an IT development project and data base integration with external and internal sources for some of the clients. According to the research, case study number 2 could be the best option to pursue. Additionally, the interviews showed that another case could change tenants´ attitudes and prejudices during the transition from a regular office to a combined office environment. Thirdly, the information concerning change process from regular office to combined office environment from the cost point of view could be beneficial to investigate.

Future research on the topic could concentrate on value added KPIs among private equity investors since this study focused on institutional insurance fund as asset owners. The private investors could be bankers of private investors such as individuals and companies specialized in such business. Moreover, additional research topics could discuss how fast an asset and real estate management company can produce such KPIs for its customers. Additionally, based on this theoretical model defined, how value adding service delivery is evaluated in practice. Finally, also a software development project could assess the usability of the theoretical model. In this case, the QFD should managed leveraged to dual model combining

REFERENCES

Ahonen, Ari. (2014). Viisi vuotta shokkihoitoa – sitoutumisessa on parannettavaa. [Web article]. Rakennulehti. Available at: http://www.rakennuslehti.fi/blogit/viisi-vuotta-shokkihoitoa-sitoutumisessa-on-parannettavaa/. [Accessed 5.4.2015]

Akao, Y. (1990). History of quality function deployment in Japan, the best on quality. New York: Hanser.

Akao, Y. (1972). New product development and quality assurance deployment system. *Standardization and Quality Control*, Vol. 25 No. 4. pp. 243 – 246.

Arlande, H., Aro-Horelli, I., Hakola, M., Koivisto, P., Lindqvist, H., & Turunen, R. (2009). Yritystutkimuksen tilinpäätösanalyysi. Helsinki: Gaudeamus. Sivut 61, 66, 70 & 73.

Arslaner, B. (2009). Virtual Meetings Will Erase Face to Face page [Online] Available at: http://www.businessweek.com/debateroom/archives/2009/01/virtual_meetings_will_erase_face_to_face.html [Accessed 22.3.2015]

Bates, D.R. (1982). How to run a real estate office. Reston, Va: Reston Publishing Co.

Cohen, L. (1995). Quality function deployment: How to make QFD work for you. Reading, Mass.: Addison-Wesley.

Benner, M., Linnemann, A. R., Jongen, A. R., and Folstar, W. M. F. (2003). Quality function deployment (QFD): Can it be used to develop food products? *Food Quality and Preference 14*. pp. 327 – 339.

Bernal, L., Dornberger, U., Suvelza, A. & Byrnes, T (2009). Quality Function Deployment for Services: Hanbook. University of Leipzig. [Electronic document]. Available at: http://www.vgu.edu.vn/fileadmin/pictures/studies/MBA/Handbook_QFD_Services.pdf. [Accessed 22.3.2015]. pp. 7 – 20.

Careres, C. R. and Pararoidamis, N.G. (2005). Service quality, relationship satisfaction, trust, commitment and business-to-business loyalty. *European Journal of Marketing*. Vol. 41 Nos 7/8. p. 2007.

Chandler, A.D. Jr. (1962). Strategy and Structure: Chapters in the History of the American Industrial Enterprise. *Cambridge, MA: MIT Press*

Chan, L. K. & Wu, M. L. (2002). Quality function deployment: A literature review. *European Journal of Operational Research* 143. pp. 463 – 497.

Chan, W., Kleiner, B. H. (2005). Managing for excellence in the real estate industry. *Management Research News*. Vol. 28 Iss 11/12. pp. 171 – 178.

Chesbrough, H. W. (2003). Open Innovation: The New Imperative for Creating and Profiting from Technology. Harvard Business School Press.

Creswell, J. W. (2013). Qualitative inquiry and research design: Choosing among five approaches (3rd ed). Thousand Oaks, CA: Sage.

Creswell, J.W. (2007). Qualitative Inquiry and Research Design: Choosing Among Five Approaches. 2nd ed., Sage. Thousand Oaks, CA. pp. 4-5.

Cristiano, J.J., Liker, J.K. & White, C.C. III (2001). Key factors in the successful application of quality function deployment (QFD*). IEEE Transactions on Engineering Management*. Vol. 48 No. 1. pp. 81 – 95.

Cullotta, C. & Shapiro, S. (2003). Channel pricing trends - presentation handout for the North American Building Material Distribution Association 2003 Annual Convention & Tabletop Business Session, Las Vegas, NV. November 6 – 7.

David, Q. K. & Dalton, I. P. (2008). The determinants of business performance of estate agency in England and Wales. *Property Management.* Vol. 26 Iss 4. pp. 255 – 272.

Easterby-Smith, M., Thorpe, R. Jackson, P. and Lowe, A. (2008). Management Research (3rd edn). Sage: London

Edvardsson, B., Gustafsson, A., Roos, I. (2005). Service portraits in service research: a critical review. *International Journal of Service Industry Management*. Vol. 16 Iss 1. pp. 107 – 12.

Ekanem, I. (2010). Liquidity management in small firms: a learning perspective. *Journal of Small Business and Enterprise Development*. Vol. 17 Iss 1 pp. 123 – 138.

Fenyves, V., Tibor, T. & Petér V. (2014) Financial indicators in managerial decision-making. [Electronic document]. Available at: http://steconomiceuoradea.ro/anale/volume/2014/n1/098.pdf. [Accessed 22.3.2015]

Garcia, M.L. and Bray, O.H. (1997). Fundamentals of Technology Roadmapping. Strategic Business Development Department Sandia National. [Electronic document]. Available at: Laboratories.http://prod.sandia.gov/techlib/access-control.cgi/1997/970665.pdf. pp. 12 – 15. [Accessed 22.3.2015]

Gargione, L. A. (1999). Using Quality Function Deployment (QFD) in the Design Phase of an Apartment Construction Project. University of California, Berkeley, CA. [Electronic document]. Available at:

http://www.ce.berkeley.edu/~tommelein/IGLC-7/PDF/Gargione.pdf. pp. 357–368. [Accessed 22.3.2015].

Griffin, A. and Hauser, J.R. (1992). Patterns of communications among marketing, engineering and manufacturing – a comparison between two new product teams. Management Science. Vol. 38 No. 3. pp. 360 – 373.

Hair, J.F. Jr., Babin, B., Money, A.H., and Samouel, P. (2003). Essentials of business research methods. Hoboken: Wiley.

Hamilton, J. & Selen, W. (2004). Enabling real estate service chain management through personalised Web interfacing using QFD. *International Journal of Operations & Production Management*. Vol. 24 Iss: 3. pp. 270 – 288.

Hwa, T. K. (2008). Sources of net present value gains in the acquisitions of corporate real estate. *Journal of Corporate Real Estate*. Vol. 10 Iss 2. pp. 121 – 129.

Jensen, P.A. (2010). The Facilities Management Value Map: a conceptual framework. *Facilities*. Vol. 28 Nos ¾. pp. 175-88

Jensen, P.A., Nielsen, K. and Nielsen, S.B. (2008). Facilities Management Best Practice in the Nordic Countries – 36 Cases, Centre for Facilities Management – Realdania Research, Kongens Lyngby

Jensen, P. A, van der Voordt, T., von Felten, C. C. D, Lindholm, A.-L., Nielsen, S. B., Riratanaphong, C., Pfenninger, M. (2012). In search for the added value of FM: what we know and what we need to learn. *Facilities*. Vol. 30 Iss 5/6 pp. 199 – 217.

Juan,Y-K, Huang S-J H, & Chen, H-T. (2014). Applying a Kano quality model for intelligent green building design strategies in Taiwan. *International Journal of Strategic Property Management.* 18:2. pp.128.

Kaplan, R. & Norton, D.P. (1992). The Balanced Scorecard – Measures that Drive Performance Harvard Business School Press. [Electronic document]. Available at: http://www.csee.umbc.edu/~sweet/Ph.D/papers/BSC/BSC%20%20Measures%20that%20drive%20performance.pdf. pp. 71–72. [Accessed 22.3.2015]

Kaplan, R. & Norton, D.P. (1996). The Balanced Scorecard. Translating Strategy into Action. Harvard Business School Press.

Kallunki, J-P., Lantto, A-M. & Sahlström, P. 2008. Tilinpäätösanalyysi IFRS-maailmassa. Helsinki: Talentum. pp. 125, 130–132, 142, 147, 153 – 157 & 177 – 180.

Kotler, P. & Keller, K. L. (2014). Marketing Management. 14th Edition, Prentice-Hall, Inc. ISBN 13: 978-0-13-210292-6. pp. 48.

Kumar, K. & Kumanan, S. (2012). An Integrated Fuzzy QFD and AHP Approach for Facility Location Selection. *The IUP Journal of Supply Chain Management*. Vol. VIII, No. 4, December 2011. pp. 30 – 41.

Leverin, A. and Liljander, V. (2006). Does relationship marketing improve customer relationship satisfaction and loyalty*? International Journal of Bank Marketing*. Vol. 24 No. 4. pp. 232 – 51.

Li, L. H. & Wang, C. (2006). Real estate agency in China in the information age. *Property Management.* Vol. 24 Iss 1 pp. 47 – 61.

Lindholm, A-L. (2008) Identifying and Measuring the Success of Corporate Real Estate Management. Faculty of Engineering and Architecture. [Electronic document]. Available at: http://lib.tkk.fi/Diss/2008/isbn9789512293605/isbn9789512293605.pdf. [Accessed 22.3.2015]

Lindholm, A-L & Leväinen K. I. (2006). A framework for identifying and measuring value added by corporate real estate. *Journal of Corporate Real Estate.* Vol. 8, number 1, pp. 38 – 46.

Lubieniecki, E. C & Desrocher, N. J. (2003). The case for simple comparison: A simple performance scorecard for effectiveness and efficiency. *Journal of Corporate Real Estate*. Vol. 6 Iss: 1, pp.39 – 52.

Mazur, G. (1997). Service QFW: State of the art. In Proceedings of the Third Annual International QFD Symposium, Linköping University, Linköping, Sweden

Marr, B., Schiuma G. & Neely, A. (2004). Intellectual capital – defining key performance indicators for organizational knowledge assets. *Business Process Management Journal*. Vol. 10 Iss 5 pp. 551 – 569.

Mayfield, P. (2007). Introduction to Quality Function Deployment. SigmaZone.Com Digital Computations, Inc. [Electronic document]. Available at: http://www.sigmazone.com/Files/Introduction%20to%20Quality%20Function%20Deployment.pdf. pp. 2–12. [Accessed 22.3.2015]

Mehrjerdi, Y. Z. (2010) Applications and extensions of quality function deployment. *Assembly Automation.* Vol. 30 Iss 4. pp. 388 – 403.

Morgan, D. (1997). Focus groups as qualitative research, 2nd edition, Thousand Oaks: Sage.

Nishimura, H. (1972). Ship design and quality table. *Quality Control.* Vol. 23. pp. 16 – 20.

Pakdil, F., Is¸nc, F. B. and Hande Gens (2012). A quality function deployment application using qualitative and quantitative analysis in after sales services. *Total Quality Management.* Vol. 23, No. 12, December 2012. pp. 1397–1411.

Lymperopoulos, A. P. K. (2008). Customer satisfaction and loyalty in the eyes of new and repeat customers. *Managing Service Quality: An International Journal*. Vol. 18 Iss 6. pp. 623 – 643.

Palojärvi, L. (2012). Mistä rakentamiseen innovaatioita? [Web article]. Available at: www.rakennuslehti.fi/blogit/mista-rakentamiseen-innovaatioita/. [Accessed 2.4.2015]

Park, H. Geum, Y. & Park, Y. (2015) A dual quality function deployment approach for benchmarking service quality. *Total Quality Management & Business Excellence*. 26:5-6, 569-582.

Porter M. E. 1985. Competitive Advantage: Creating and Sustaining Superior Performance United States: The Free press. ISBN: 0-684-84146-0. pp. 4 – 6, 10, 28 & 51.

Prahalad, C.K. and Hamel, G. (1990). The core competence of the corporation. Harvard Business Review Vol. 68, no. 3. pp. 79 – 91.

Prayani, K., Masoudi, A & E. A Cudney (2010). QFD Application in the Hospitality Industry: A Hotel Case Study. www.iienet2.org. [Electronic document]. Available at: http://webcache.googleusercontent.com/search?q=cache:N6SigmUMSvMJ:www.iienet2.org/uploadedfiles/IIE/Education/Six_Sigma_Black_Belt_Transition/qfd-application-in-the-hospitality-industry-a-hotel-case-study.pdf+&cd=1&hl=fi&ct=clnk&gl=fi. pp. 7–9. [Accessed 22.3.2015]

Price, I., Macdonald, R. and Ellison, I. (2009). Practical postmodernism – FM and socially constructed realities - paper presented at Research Symposium of EFMC2009, Amsterdam, 16-18 June.

QFD Online (2015). Company webpage. [Electronic document]. Available at: http://www.qfdonline.com/. [Accessed 2.4.2015]

Razali, M. N. & Juanil, D. M. (2011). A study on knowledge management implementation in property management companies in Malaysia. *Facilities*. Vol. 29 Iss: 9/10. pp. 368 – 39.

Robson, C. (2002). Real World Research. A Resource for Social Scientists and Practitioner-Researchers (Second Edition). Malden, Mass.: Blackwell

Rogers, G. and Bouey, E. (1996). Collecting your data Qualitative research for social workers – Phases, steps, & tasks, Boston: Allyn and Bacon, pp. 50-87.

ROTI (2015). Rakennetun omaisuuden tila 2015. [Electronic document]. Available at: www.roti.fi/document.php?DOC_ID=422&SEC=1d2ddbdb53c1c6336dd2365ccee469e6&SID=1#roti_2015_net_sivut_final_250215.pdf. [Accessed 2.4.2015]

RYM (2015). Build Environment Innovations –webpage. [Electronic document]. Available at: http://rym.fi/showroom/. [Accessed 2.4.2015]

Salmi, I. 2012. Mitä tilinpäätös kertoo? Porvoo: Bookwell. pp. 177-180, 187 – 188, 199 – 202, 281 – 284 & 288 – 292.

Saunders, M., Lewis, P. & Thornhill, A. (2009). Research methods for business students. Fifth edition, Pearson Education [Electronic report]. Available at: http://doha.ac.mu/ebooks/Research%20Methods/ResearchMethodsForBusinessStudents_Saunders.pdf. pp. 145–147, 150-153, 428, 431, 435 & 439. [Accessed 27.11.2014]

Schulte, S. (2008). Customer centric PLM: integrating customers' feedback into product data

and lifecycle processes. Int. J. Product Lifecycle Management, Vol. 3.[Electronic document]. Available at: http://www.inderscience.com/info/inarticle.php?artid=27007. pp. 298–300; 302–305. [Accessed 8.4.2014]

Shahin, A. (2013). Quality Function Deployment: A Comprehensive Review. www.researchgate.net [Electronic document]. Available at: http://www.researchgate.net/profile/Arash_Shahin/publication/228360297_Quality_Function_Deployment_A_Comprehensive_Review/file/d912f50fff7ed89f0d.pdf. pp. 2–6. [Accessed 22.3.2015]

Shahin, A. & Zairi, M. (2009). Kano model: a dynamic approach for classifying and prioritizing needs of airline travellers with three case studies on international airlines. *Total Quality Management and Business Excellence*. Vol. 20 No. 9, pp. 1003 – 1028.

Smith, (2006). Leveraging profitability in low-margin markets. *Journal of Product & Brand Management*. Vol. 15 Iss 6 pp. 358 – 366.

Smith, R. J. A, Chotipanich, S., Pitt, M. (2014). Awareness and effectiveness of quality function deployment (QFD) in design and build projects in Nigeria. *Journal of Facilities Management.* Vol. 12 Iss 1. pp. 72 – 88.

Stewart, D.W. and Shamdasani, P.N. (1990). Focus groups: Theory and practice. Newbury Park: Sage.

Teece, D. (2013). Scholar entrepreneur - Personal website. [Electronic document]. Available at: http://davidjteece.com/dynamic-capabilities/. [Accessed 22.3.2015]

Teece, D., Pisano, G., Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal* 18 (7). pp. 509–533.

Tukey, J.,W. (1977). Exploratory Data Analysis.Reading, MA: Addison-Wesley

Walker, M. (2002). Customer-driven breakthroughs using QFD and policy deployment. *Management Decision.* Vol. 40 Iss 3. pp. 248 – 256.

Yadava, O. P. & Parveen S. G. (2007). Customer satisfaction driven quality improvement target planning for product development in automotive industry. *International Journal of Production Economics 113 (2008)*. pp. 997 – 1011.

Yamamoto, C., Kishi, K., Hara, F. & Satoh, K. (2005). Using quality function deployment to evaluate government services from the customer´s perspectives. *Journal of the Eastern Asia Society for Transportation Studies*. Vol. 6. pp. 4160 – 4175.

Yin, R. K. (2009). Case study research: Design and methods (4th ed). Thousand Oaks, CA: Sage.

APPENDIX I: RATED QUESTIONNAIRE

Questionnaire 2015

1. *Tenant financial statement analysis*

How useful do use see KPI listed below (1: very little – 4: very much)

Num.		1	2	3	4
1	Turnover				
2	Operating income				
3	Number of employees				
4	Current Ratio				
5	Quick Ratio				
6	Defaults				
7	Equity ratio				
	KPI Context				
8	Industry based rating				
9	Building based rating				
10	Current tenants				
11	Prospect tenants				

Necessity of the service

	Once in a month	Once in three months	One in half a year	Once in a year
How often do believe you could use these KPIs				

Does other property management service offer such service? Yes __ /No ___

2. Income maturity of lease agreements

How useful do use see KPI listed below (1: very little – 4: very much)

Num.		1	2	3	4
12	Gross rent in lifetime				
13	Gross rent rate (%) from maximum possible				
	KPI Context				
14	Building based rating				
15	Portfolio based				
16	Current tenants				
17	Prospect tenants				

Necessity of the service

	Once in a month	Once in three months	One in half a year	Once in a year
How often do believe you could use these KPIs				

Does other property management service offer such service? Yes __ /No __

3. Leasing activity

How useful do use see KPI listed below (1: very little – 4: very much)

Num.		1	2	3	4
18	Exhibitions (quantity)				
19	Contancts (quantity)				
20	Tenanat negotiations(quantity)				
21	Agreements signed (quantity)				
	KPI Context				
22	Location based rating				
23	Portfolio based rating				

Necessity of the service

	Once in a month	Once in three months	One in half a year	Once in a year
How often do believe you could use these KPIs				

Does other property management service offer such service? Yes __ / No___

4. Tenant satisfaction rate

How useful do use see KPI listed below (1: very little – 4: very much)

Num.		1	2	3	4
24	Tenant satisfaction to gross rent				

25	Tenant satisfaction to property				
	KPI Context				
26	Building based rating				
27	Portfolio based rating				

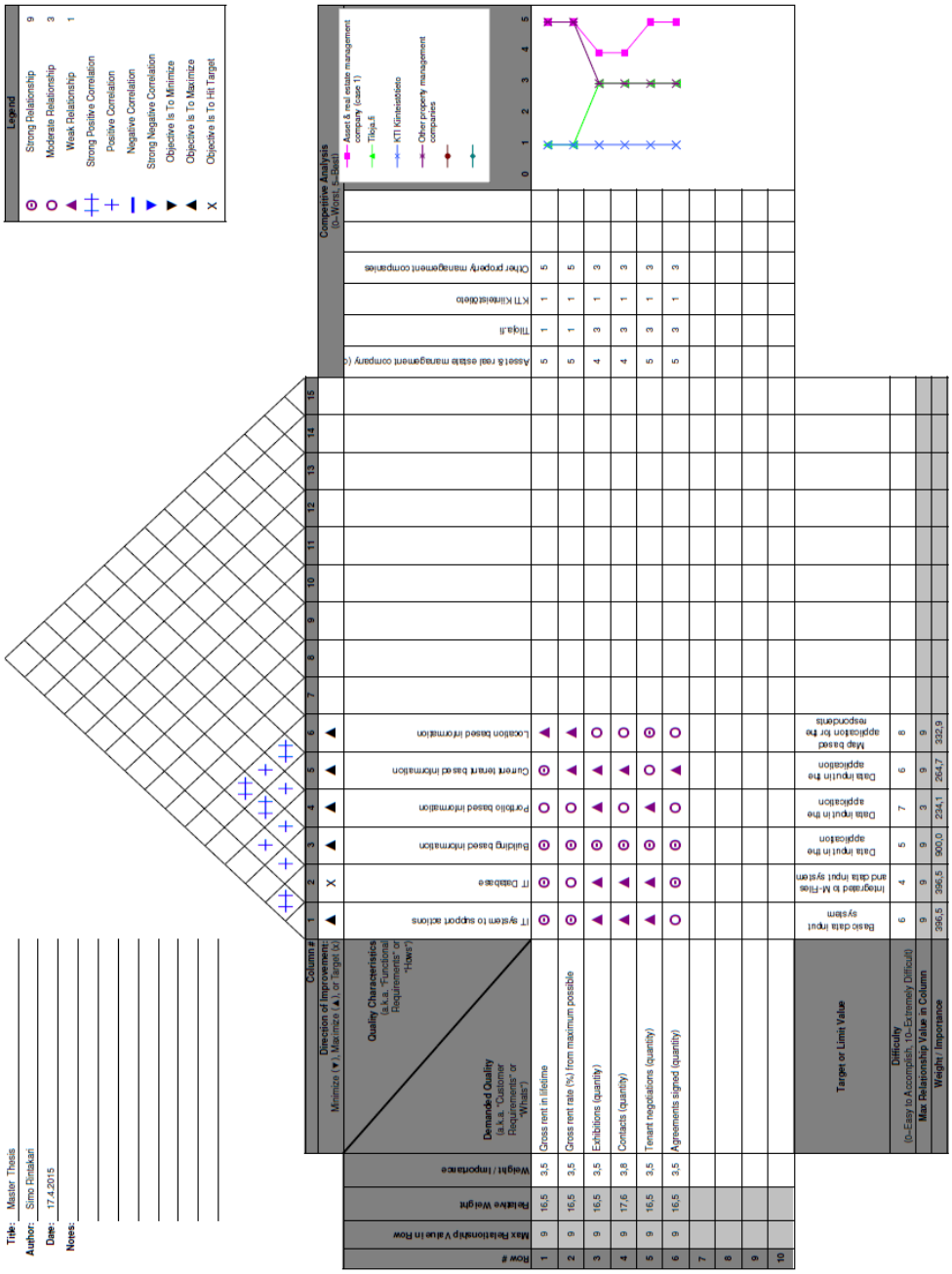
Necessity of the service

	Once in a month	Once in three months	One in half a year	Once in a year
How often do believe you could use these KPIs				

Does other property management service offer such service? Yes __/No___

5. Which one of the themes is more interested than other? The most important theme as first:
6. Which one of the themes are you willing to pay?
7. Which properties could be beneficial to investigate?
8. What issues could be considered as advantage to investigate in property management field?

APPENDIX II: QUALITY FUNCTION DEPLOYMENT: SERVICE PLANNING



APPENDIX III: QUALITY FUNCTION DEPLOYMENT: PROCESS CONTROL CHARACTERISTICS

Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Demanded Quality (a.k.a. "Whats") / Quality Characteristics (a.k.a. "Hows")	1	2	3	4	5
				Column #	1	2	3	4	5
				Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)					
					Data surveys about tenants and lease agreements	Data from map applications	Data from finance portfolios	Tenant information external sources	Application developement outsoursing
1	9	15,7	396,5	IT system to support actions	▲	⊝	⊝	⊝	⊝
2	9	15,7	396,5	IT Database	⊝	⊝	⊝	⊝	⊝
3	9	35,6	900,0	Building based information	⊝	○	○	○	▲
4	9	9,3	234,1	Portfolio based information	⊝	○	⊝	⊝	▲
5	9	10,5	264,7	Current tenant based information	⊝	⊝	⊝	⊝	▲
6	9	13,2	332,9	Location based information	⊝	⊝	○	○	▲
7									
8									
9									
10									
11									
12									
13									
14									
15									
				Target or Limit Value	Online lease agreements	Map application integration	Data permit for customer´s building portfolio information	Permit to see data from the public data bases such as YTJ	Development with parter company
				Difficulty (0=Easy to Accomplish, 10=Extremely Difficult)	7	6	8	2	3
				Max Relationship Value in Column	9	9	9	9	9
				Weight / Importance	774,4	630,5	607,0	607,0	351,3
				Relative Weight	26,1	21,2	20,4	20,4	11,8