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SUSTAINALBE COMPETITIVE ADVANTAGE THROUGH RESOURCE ALLOCATIONS IN OPERATIONAL STRATEGIES IN HOUSING BUSINESS

Case company

Master's Thesis in
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ABBREVIATIONS

A - Analyzer
AHP – Analytic Hierarchy Process
Avg – Average
BCFI – Balanced Critical Factor Index
BSC – Balanced Score Card
CFI – Critical Factor Index
C – Cost
D – Defender
F – Flexibility
ICR – Inconsistency ratio
IMPL – Implementation
MAD – Maximum Deviation
MAPE – Absolute Percentage Error
MSI – Manufacturing Strategy Index
OP – Operational Performance
P – Prospector
RBV – Resource-Based View
RMSE – Root Means Squared Error
S&R – Sense and Respond
SCA – Sustainable Competitive Advantage
SCFI – Scaled Critical Factor Index
SD – Standard Deviation
T – Time
T/K – Technology and Knoweledge
Q – Quality

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ABSTRACT:
Nowadays being competitive in the market place depends not only on the quality and price of product/service, but also on such criterion as company's inner performance within resource allocation and leading operational strategy. Therefore this research is focused on the performance and resource-allocation analysis as well as defining of efficient operational strategy along with risk levels of the case company A, which operates in housing market. Moreover, this research tries to evaluate the performance of each department separately, based on which general picture of the case company can be concluded. The research is based on investigation of five departments of the Finnish case company. The main research method of collecting information is carried out with the help of Sense and Respond type of questionnaires, which were filled and returned by the participants of this research via email.

Major results of the thesis are that most of all departments of the case company follow one common operational strategy, even though different deviations and problems based on resource-allocation exist in every department. In addition to that, departments' performance along with risk levels should be improved in future period of time.

KEYWORDS: Sustainable Competitive Advantage (SCA), Sense and Respond (S&R) methodology, Operations strategy, Knowledge and Technology (K/T) rankings, Housing business.

1. INTRODUCTION

1.1. Background and objectives

Nowadays companies face the most common problem and concern – what is the best way to survive, perform and develop in the marketplace now and in future. Therefore a lot of operation managers of the companies confront with difficulties and new challenges concerned with strategy issues: define and develop effective strategy for the company, then properly and successful implementation it through the whole organization in order to be enough competitive in the market. The aim of operations strategy is providing a broad framework for defining how it prioritizes and utilizes its own resources to have a sustainable competitive advantage in the marketplace. Consequently it can be noticed that operation management is significant in order to manage effectively most of the company's resources.

Competitiveness is the ability and performance of an organization to offer products and/or services that can meet market needs and requirements, and also the ability to react faster compared to your competitors to the market changes and needs (Krugman 1994). Unpredictable environment situations can be the cause of unsustainable improved operational competitiveness. These unpredictable environment situations can be global competitive environment, continuous increasing customer needs, rapid and unpredictable changes in government policy etc. Thus companies exist and perform in a dynamic and uncertain competitive environment which creates more and more challenges to survive in the marketplace.

In spite of different company goals from various perspectives (for instance, customer satisfaction or quality level), the leading aim is to have more priorities compared to competitors. One of the approaches used in order to obtain competitive advantage is

functions advancement in operation management of the company in such a way that these current functions are competitive and more effective rather than in competitors' companies. Furthermore, production process enhancement will bring gains and competitive advantages for a company. For example, it can meet customer and market demands faster and in better manner, cost savings, flexibility, quality and ability to plan and implement production equipment and resources more efficiently.

The purpose of this thesis is to define, what makes company be sustainable competitor in the marketplace as well as to analyze resource allocation through operation strategies of the company. Analysis of the operational competitiveness will be held by two core methods: sense and respond (S&R) methodology and sustainable competitive advantage (SCA) method. In 1992 Haeckel (1992) firstly defined and mentioned the concept sense and respond method in his work "From "make and sell" to "sense and respond". Moreover, Bradley & Nolan (1998: 4–7) developed this S&R thinking in order to have a tool with the help of which business performances and strategies can be analyzed and defined. From S&R method Critical Factor Index (CFI), Balanced Critical Factor Index (BCFI) and Scaled Critical Factor Index (SCFI) indexes are proposed to optimize strategic adjustments, which can help and support for making right, fast and effective strategic decisions. With the help of calculation of BCFI there is a possibility to determine the critical performance attributes in the company, and which are considered to be the strength. Consequently, company can implement some improvements into the area which should be specially focused on.

In practice SCA is defined as a calculation of risk level which is presented in percentage, with the help of which it can be made a decision according operation strategy improving in order to have sustainable operation performance during the period of time taken into the consideration. SCA improvement process includes combination of reciprocally global operation strategy with resource allocation. In order to validate this SCA method, there are

several major methodologies utilized. They are Manufacturing Strategy Index (MSI), Analytic Hierarchy Process (AHP) and method of finding of a leading while at the same time superior strategy type through S&R methodology usage.

1.2. Research questions

This thesis pays attention on performance detection through resource allocation, strategic decision making and possibilities of sustainable competitive advantage, which can make a company to be competitive enough compared to its own rivals. Thus based on background and objectives, the research formulated the following research questions:

RQ1. How to optimize resource allocation in the company?
RQ2. How can sustainable competitive advantage be defined and evaluated in the company?
RQ3. Is there relationship between sustainable competitive advantage and sense and respond resource allocation profiles?
RQ4. What is the most effective operational strategy can be implemented by a company in a housing business in a way to achieve better performance?

Efficient implementation of the method depends on both theoretical background and empirical research, based on the case company. In order to answer these research questions the work starts from analysis and defining of resource-based theory, operations strategies and their competitive advantages. Then based on these, it makes the model of defining the operations performances of the company and as a result determination of the company's operations strategy and competitive advantage with risk level of it. This process can be done by S&R methodology which optimizes resource allocations and with the help of SCA

method, which adopts strategies in such a way that operational competitiveness is improved in a sustainable manner.

For the answer validation, with the help of empirical research analytical models are implemented and tested within one case company, which shows how operational sustainable competitiveness can be identified, implemented and improved in practice.

1.3. Structure of the thesis

This thesis consists of five chapters as follow:

Chapter 1. introduces background and goal of this thesis, where the study area and research objectives as well as the structure of this paper are presented. Also four main research questions were formulated based on the background and objectives of this research.

Chapter 2. presents theoretical basics of the research and further description of core idea of this thesis. In addition, analytical models and background of housing business are described in detail.

Chapter 3. depicts analytical models with the help of which theoretical background can be implemented in practice. Five main methods are defined and described in this chapter.

Chapter 4. describes the case company and the process of data collection and analysis of the results. It also reveals the related analysis and findings based on the case company.

Chapter 5. is dedicated to general findings as well as to essential conclusions of this research. The aim of this chapter is to explain of the research paper findings in a more

detailed view, validation and reliability of the work, and the recommendations for further research.

2. THEORETICAL FRAMEWORK

2.1. Theoretical review

2.1.1. Concept of strategy and its place in the company's structure

Strategy is one of the most useful words in the business environment. Therefore there is no proper agreement on what this term "strategy" actually means, and what constitutes a firm's strategy. No one disputes that this term "strategy" has a direct connection to the military area, where it is used in the situation when a commander may deploy his resources (i.e. armed forces) in order to achieve special objectives (i.e. vanquish enemies or even conquer territory). However, the roots of strategy defining and researching as an independent area dates back from 1960s, when time of first popularization of techniques of long-term business planning started (Johnson, Scholes & Whittington 2008: 16–19). Since then many different interpretations of the concept of "strategy" started to be developed. There are some examples presented below of the "strategy" definition:

- "the formulation of basic organizational missions, purposes, and objectives; policies and program strategies to achieve them; and the methods needed to assure that strategies are implemented to achieve organizational ends" (Steiner & Miner 1997: 7);
- "a pattern in a stream of actions or decisions" (Mintzberg & Waters 1982: 466);
- "the direction and scope of an organization over the long-term, which achieves advantage in a changing environment through its configuration of resources with the aim of fulfilling stakeholder expectation" (Johnson et al. 2008: 3), which is considered to be widely accepted concept.

However, there is not much general agreement about the definition of "strategy" concept, but there is a general understanding of it. Each definition pays attention on different aspects

of strategy which is presented and used in the organization. In addition, the "strategy" concept relates to company's mission, objectives and tactics/policies. In the figure 1. it is shown the hierarchy of the definition approach, where strategy will appear when the company fulfills its mission and then reaches its objectives, and at that time the chosen strategy or/and strategies will be implemented through specific tactics or policies (Barney 1997: 10–11).

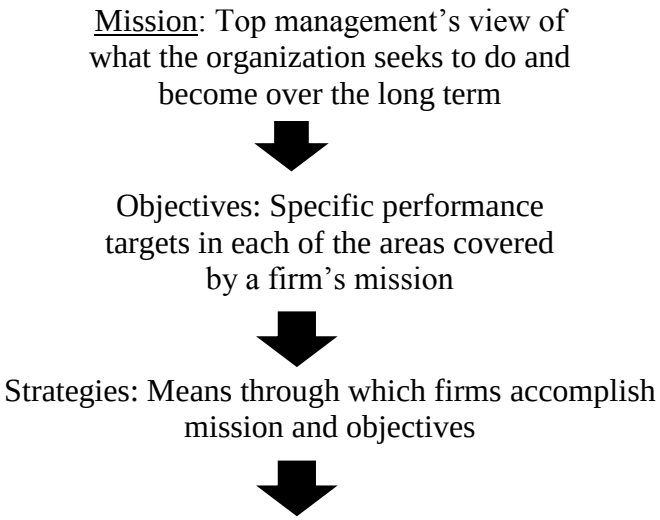

Figure 1. Hierarchical definitions of strategy (Barney 1997: 11).

These levels of strategic analysis can be also matched to three levels of authority of multifarious companies. The three levels of authority in the formal hierarchy are presented in the figure 2., where in the corporate level of management the efforts are paid attention towards the defining and clarifying a company's mission and objectives. Hitt, Ireland & Palia (1982) call the results of these efforts as "grand strategy" in their work "Industrial firms, grand strategy and functional performance: Moderating effects of technology and uncertainty". In business division level of management there is an attention on creating a

specific strategies of the company that will be used in order to reach a company's early defined objectives and missions (Thompson & Strickland 1987: 22–23). Finally, within functional levels of management inside different business divisions, there are efforts focused on tactics/policies which can be implemented based on formulated strategies.

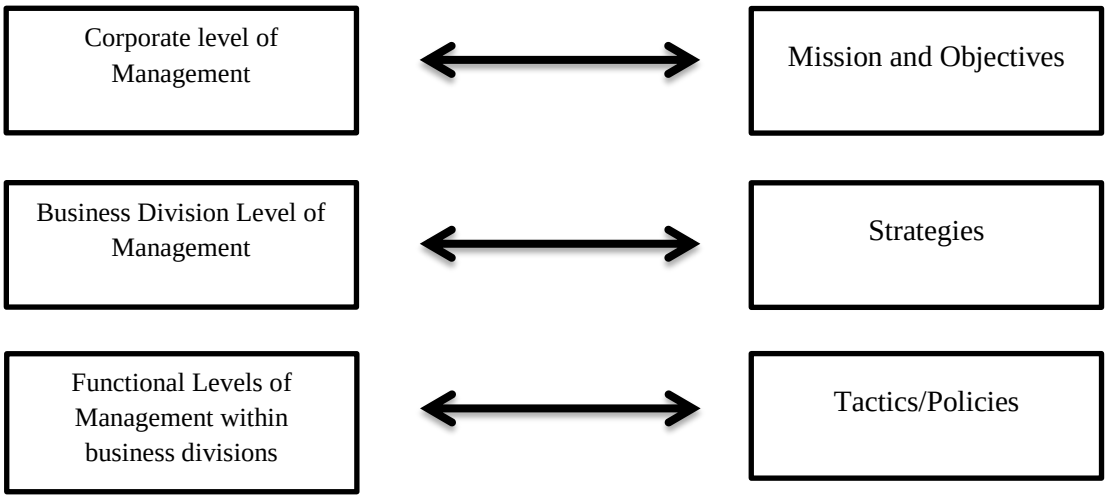

Figure 2. Levels of analysis in the hierarchical definition of strategy in company's formal hierarchy.

2.1.2. Operations strategies

After distinguishing the meaning of strategic concept and position in the company's structure, there is a necessity to define the concept of operations strategy. Slack, Chambers & Johnston (2010: 62) claim that operations strategy is "the pattern of strategic decisions and actions which set the role, objectives and activities of operations". According to Chase, Jacobs & Aquilano (2007: 24–25) operations strategy is a set of wide range policies and plans in order to use effectively resources of a firm to best support its long-term competitive advantage of the company. Operations strategy is a part of general strategy of

the company. The formation of the content of operations strategy is belonged to four perspectives, which are:

- top-down perspective – clarifying and defining the actions and operations which the business would like to do;
- bottom-up perspective – suggestion of operations actions in daily experience;
- market requirement perspective – market requirements concerning the operations decisions;
- operations resources perspective – exploiting the potential resources in the chosen markets. (Thompson et al. 1987: 29–35)

Different researchers have identified the classification of operations strategies based on general models of practice, purpose and performance in different businesses. For instance, Michael Porter (1985: 11–16) classified three strategies, which are mainly towards to competitive positions of the company. These strategies are:

- cost leadership – focuses on widening of market share by keeping the costs quite low compared to competitors in order to be competitive enough;
- differentiation – provides different types of product/service or difference to the product/service, which will be paid extra by customers;
- focus – focuses on a specific marketing region or customer group. (Daft 2009: 67–70)

In “Organizational Strategy, Structure, and Process” work Miles, Snow, Meyer & Coleman (1978) defined and explained a new strategy typology extracted from the study about business strategies. This new strategy typology relies on product development, adaptability and entrance to a new marketplace or to unclear competitive environment. As all the companies compete in different ways in the market, environmental estimation is based on various factors from every company’s perspective and thus decisions concerning about resource allocation are made on the basis of these factors. According to Miles et al. (1978:

550–558) the main four strategic types (namely, prospector, analyzer, defender and reactor) are presented and characterized in the table 1.

Table 1. Characteristics of strategy types.

Strategy Type	Definition	Examples
Prospector	Oriented on innovative and growth, looking for new market places and opportunities.	Nike and 3M
Analyzer	Oriented on current market places and current customer satisfaction, temperate orientation on innovation.	IBM and Amazon.com
Defender	Oriented on protection of current market place and current customers; maintaining stable growth.	BIC and Paramount Pictures
Reactor	No clear strategy plan, reacts accordingly to market needs.	International Harvester (1960s and 1970s), and Dell

Prospector. Prospector is a strategy, which main characteristics are that a company explores and finds new market opportunities in order to develop and innovate its product/service. The environment in such companies with prospector strategy is growing and dynamic, where creativity is paid more attention to rather than efficiency. Compared to defender strategy, prospector has a wide variety and flexible product/market domain and uses different technical bases. Prospector strategy can be called as a creator of changes in the market place, as companies with such strategy have possibilities to react fast to current or early signs and movements in the market or areas of opportunities and are eager to be number one in entering into a new marketplace. The organizational structure of a prospector company is flexible, with a low level of routinization, concentration and

formalization. There are two open communication ways: vertical and horizontal. It is considered to be the most market oriented strategy. (Flouris & Oswald 2006: 35)

Analyzer. Analyzer strategy is a strategy, with the help of which companies are able to maintain a high level of competency by investigating and duplicating of the main competitive advantages and priorities of competitors. This strategy is considered to be in the middle between prospector and defender strategies. It means that analyzer company takes some good ideas and main characteristics from both strategies and then implements them in its own way. The main requirements for this strategy are flexibility and stability inside and outside the company. There are two major directions of targeting the products:

- towards stable environment (keeping current/existed customers);
- towards new, growing and more dynamic environment.

The organizational structure of the company is flexible enough in order to react to changing domains. (Daft 2009: 71–72)

Defender. Defender strategy is a strategy, which main characteristics are market stability and narrow product in the market. In comparison with the prospector strategy, the core fears of defender companies are balance and economy. In most of the cases companies with such a strategy type do not look for new market opportunities, therefore they try to keep the current customers and keep stability in a company by paying attention mainly on internal performances and its efficiency, as well as high quality of products/services production. Thus it can be concluded that defender companies are greatly dependent on their own narrow product/services field. For protection its sphere of influence, defender companies implement and use low prices with high quality and short-time delivery of products/services. The organizational structure is usually inflexible, formal and centralized. Consequently, it is difficult to keep competitive advantage based on price, quality and

delivery as all these factors can be easily copied, which make some difficulties to sustain for a long period of time in the market. (Flouris et al. 2006: 35)

Reactor. Reactor strategy is a strategy, which does not have a steady and permanent strategic plan or plan about ways and methods needed to be used for competing in the market. From sustainable competitive advantage perspective, reactor strategy is not suggested to be used as a competitive strategy. The main reason of it is that this strategy is inactive in facing market opportunities and changes. While top managers are trying to identify a strategic plan or accurate mission, vision and goals, company is performing in the market place in such a way that can meet important and current needs of the market. (Daft 2009: 72)

2.1.3. Competitive priorities and capabilities

Taking into the consideration operations strategy from companies' perspective, depending on different sectors of industry, company sizes etc., every company defines and concentrates on its own competitive priorities and capabilities. The core of success and prosperity in defining and implementing of operation strategy depends on distinguishing and prioritizing the choices as well as in guidance the guarantees of trade-off. Furthermore, companies make decisions on the basis of the market needs and requirements. Different customers can be attracted by different attributes of the product or service. For example, some customers are interested in the cost of a product or service; therefore some companies position themselves in the market with lower prices, which can be a competitive advantage in the market place. So that there are five things should be done in order to contribute to competitive level:

- to do things right – the company would like to make less or even no mistakes that could fully satisfy its customers by providing error-free goods or services. As a result it will give the company a quality advantage;

- to do things fast – the company would like to minimize the time between making an order and receiving the product or service, thus it will increase the availability of company products and services. As a result it will give the company a speed advantage;
- to do things on time – the company would like to keep the delivery promises on time. As a result it will give a dependability advantage to its customers;
- to change what you do – the company would like to be able to vary or adapt to market requirements as fast as possible, to cope with unexpected situations. As a result it will give the company a flexibility advantage;
- to do things cheaply – the company would like to have such level of prices which could be priced accordingly to the market when at the same time to have enough return for the organization. As a result it will give a cost advantage. (Slack et al. 2010: 40)

Quality as an advantage. Quality advantage relates to "doing things right" (Slack et al. 2010: 40), but there are two directions of implementing actions: design quality and process quality. Design quality is considered as a collection of characteristics which belong to the product/service. Thanks to the design quality, it is easier for customers to make a decision, conclusion and formulate its own opinion about product/service. However, overdesigned product and/or service which includes a lot of inappropriate features will be understood as excessively expensive. On the other hand, under designed product and/or service will effect on losing customers' satisfaction as it does not give greater value for the product and/or service. (Chase et al. 2007: 25)

Similarly to design quality, process quality plays an important role as the main aim of it is the inner quality of operations which can bring cost reduction and constancy increase. During the production and operation process, if the company does less production errors

and mistakes as a result fixation time will be lessened along with customer complaint. (Slack et al. 2010: 40–41)

In any case, high quality product and/or service means high level of customer satisfaction which gives high possibilities that the same customer will come back to get more products and/or services.

Cost as an advantage. The main feature of cost as a competitive advantage is waste liquidation. Lower costs are in production processes of product/service, the lower price can be defined for the product and presented to a customer. Nonetheless, it does not always assure the high profitability and prosperity for a company. Products and/or services are considered to be commoditylike when they are sold based on cost, thus it means that customers cannot recognize and differentiate the difference between the product and/or service of one firm from another. Even though the segment of the market is usually very big and many companies are attracted by gaining more profit, the competitions in this segment is very fierce, which can even lead to failure rate or bankruptcy in general. Moreover, even other companies which compete based on other competitive advantages are interested in keeping their costs in a low level. (Chase et al. 2007: 25)

Time as an advantage. Time as an advantage is divided into two ways: quick delivery and delivery in time. The core goal of competitive company in the market is able to deliver the product/service more rapidly compared to other competitors. In addition, for example, the repair service within 2 hours has a significant advantage over a competitor which offers repair service only during 24 hours. Therefore a small conclusion can be made that more quick company delivers product/service to customers, customer will have more willing to buy it and eventually will return to buy more. Moreover, it brings more advantages such as company reliability, respect and satisfaction from customers. (Slack et al. 2010: 42–46)

Flexibility as an advantage. Such an advantage is based on production of various types of product, enhance the current one, innovate new products/service in order to introduce them to the market and finally, fast respond to customer needs and requirements. There are four types of requirements of flexibility:

- product/service flexibility – ability to introduce new products and services in the market;
- mix flexibility – ability to provide a wide range of products and services;
- volume flexibility – ability of the operation to change its level of activity or output;
- delivery flexibility – ability to change the time of delivering: earlier than expected or with a small delay. (Slack et al. 2010: 46–47)

In accordance with internal environment, there can also be following benefits brought from flexible operations. They are responses' acceleration, time saving, and maintaining dependability. (Slack et al. 2010: 48)

In a conclusion, the performance objective all these competitive advantages includes both an external side, which leads to customer satisfaction and an internal aspect, which can lead to efficient and stable organization process.

2.1.4. Resource-based theory

In order to reach competitive advantage in the company many researchers pointed out that competitive advantage of company depends and is based on the resources used in the company and capabilities (Wernerfelt 1984; Prahalad & Hamel 1990; Peteraf & Barney 2003: 312–316). According to Amit & Schoemaker's (1993: 35) definition, firm's resources can be considered as "stocks of available factors that are owned or controlled by the firm". While Daft (2009: 76) stressed that resources are any company's resources,

which can be used in order to implement strategies and improve efficiency and effectiveness of the company.

In spite of diverse classification of firm's resources, there is a created list of resources, which enable company to implement creating of additional value for the competitive advantage. Caves (1980: 64) classified company's resources into tangible and intangible. Tangible resources are resources, which have unchangeable sustained capacity, which include land, equipment, buildings etc. and also include long-run capacity (Wernerfelt 1989). From the competitive advantage perspective, such resources are transparent and easy to be duplicated by the competitors (Grant 1991: 119). In contrast, intangible resources can be described as intellectual property, which includes brand, patents, and trademarks etc., which also include the ownership properties (Hall 1992). Compared to tangible resources, intangible are durable in copying efforts by company's competitors (Perrini & Vurro 2010: 25–26). At the same time Barney (1991: 101–102) divided resources into three categories such as human (knowledge and experience of employees, employees' training), physical (raw materials, technology and equipment, plant and geographic location) and organizational (structure, social relations inside the company and between firm and external environment, planning and controlling systems) resources.

However, capabilities are pointed towards the company's capacity to plan, implement and coordinate different resources. In order to have an influence on outcome or the results capabilities use organizational processes (Prahalad et al. 1990; Amit et al. 1993; Grant 1996: 377–379). According to Amit et al. (1993: 35) capabilities are information-based, which are developed during some period of time with cooperation company's resources.

On the other hand, there are two main characteristics which differentiate capabilities from resources. Firstly, capabilities always exist inside the company and its processes if only the company is liquidated, while resource can survive even after general reorganization of the

company and obtaining a new owner (Makadok 2001: 388). Secondly, the main goal of capabilities is to increase effectiveness and productivity of resources that exist in the company in order to reach its objectives (Amit et al. 1993: 35).

Explanation for the gaining a sustainable competitive advantage by firm can be found in the resource-based view (RBV) theoretical framework. RBV was firstly coined in the work "A resource-based view of the firm", written by Birger Wernerfelt in 1984 (1984), where he clarified that the main goal of RBV is to explain the way of creating, developing and maintaining the competitive advantage in the company by using the resources and capabilities. This new theory attracted a lot of attention and after RBV appeared a lot of management researchers started to develop this area of research. For instance, Selznick (1957: 42–56) proposed an idea of company's "distinctive competence". Then Chandler (1962: 14) pointed out on the "structure follows strategy". Nevertheless, the founder of RBV idea was Penrose (1959).

In 1991 Barney offered more details and conditions upon which the firm resources can become a source of sustainable competitive advantage for organization. In this case the company resources should have such characteristics as value, rareness, inimitability and non-substitutability (Barney 1991: 105–112). Furthermore, many authors contributed and developed Barney's ideas. For instance, according to Grant's point of you (1991: 123–128), durability, transparency, transferability and replicability are the main characteristics for company's resources. Collis & Montgomery (1995: 120–124) argued that resources should have such determinants as inimitability, durability, competitive superiority, appropriability, and substitutability while Amit et al. (1993: 37–40) made a list of eight criteria of resource attributes: complementarity, low tradability, scarcity, limited substitutability, inimitability, durability, appropriability, and overlapping with strategic factors. In short, all these resource characteristics meet the requirements of sustainable competitive advantage.

2.1.5. Sustainable competitive advantage

Defining and distinguishing between competitive advantage and sustainable competitive advantage have become an important area of research in the strategic management.

Peteraf et al. (2003: 314) give a definition of "competitive advantage" as such as: company "has a competitive advantage when it is able to create more economic value than the marginal (breakeven) competitor in its product market". There are two major features belonged to competitive advantages of the company: temporary and long-lasting periods of time. According to the main characteristics of sustainable competitive advantage, on the basis of resource theory, more economic value is created in the presence of sustainable competitive advantage, while company's competitors are unable to copy and implement these advantages in its own strategies (Barney & Clark 2007: 52). Moreover, there are many discussions about the period of time when the company can have the sustainable competitive advantages. For instance, Jacobsen (1988) mentioned in his work that sustainable competitive advantage can be described as competitive advantage that continues for a long period of time of the company's calendar, rather than in short-run. Therefore, following features described belonged to such a competitive advantage: sustainability (a company should perform and sustain in a long period of time), uniqueness (a company has to have advantages which are possessed by a company itself, or similar benefits can be presented in a small amount of companies), and substantiality (a company should have a considerable gap with its own competitors) (Lee & Hsieh 2010: 112). On the other hand, Lippman & Rumelt (1982: 418–421) believe that sustainable competitive advantage does not depend on the period of calendar, but rather on opportunities duplication of competitors or potential competitors.

In conclusion, according to Barney believes (1991: 105–112), there are three core conditions which should be presented in the resources in order to reach sustainable competitive advantage:

- positive value should be added to the firm by the resources;
- company's resources should include uniqueness and rareness compared to other competitors' resources;
- competitors are unable to substitute resources.

As not all the companies can have the resources which can be potential to generate sustainable competitive advantage, thus based on RBV framework, company resources should have to have such features for sustainable competitive advantage creation (Barney 1991: 105–112):

- value – valuable resources are resources which give an opportunity for the company of implementation the efficient strategies that can increase the effectiveness and efficiency of the company. The improvement can be reached by using the external opportunities and neutralizing environmental threats by the company; (Barney 1991: 106)
- rareness – rare resources are resources which are unique and should be possessed by a small number of current or potential competitors, therefore in this case these resources can generate a competitive advantage and might have the potential of generating a sustainable competitive advantage. Companies that do not want to generate accurate competition trends, have more opportunities to reach the potential of generating a sustainable competitive advantage; (Barney 1991: 106–107)
- imitability – imperfectly imitable resources are those resources which include valuable and rare company resources which other companies cannot not possess and obtain them. Imperfectly imitable resources should have such attribute as unique historical conditions; causally ambiguous; and socially complex (Dierickx & Cool 1989: 1507–1509);

- substitutability – according to Barney (1991: 111–112) "there should be no strategically equivalent valuable resources that are themselves either not rare or imitable". There are two forms of substitutability: first, the company might have an opportunity to substitute similar resources which can lead to the implementation of the same strategies; second, various types of company resources can be considered as strategic substitutes. (Barney 1991: 111–112)

Furthermore, Barney (1991: 99–101) proposed that the company can get a sustainable competitive advantage by applying the strategies that use the company internal strengths via reacting into the external opportunities, while not being affected by external threats and improve internal weaknesses (figure 3.).

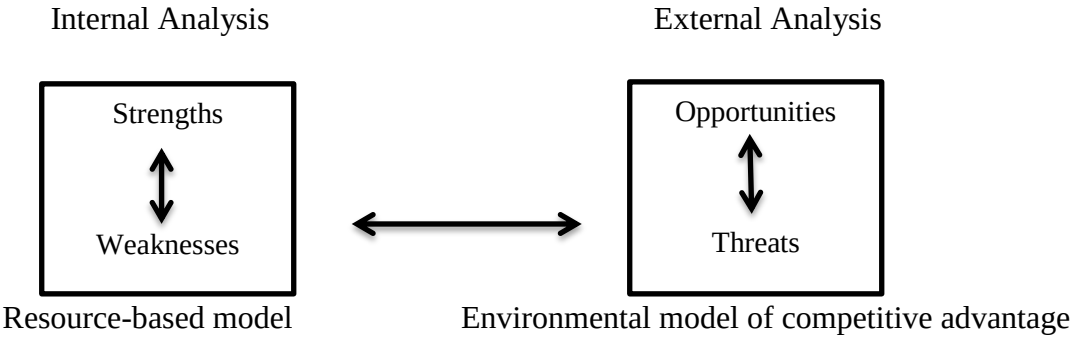

Figure 3. Connection of SCA with strategic management ("strengths – weaknesses – opportunities – threats" model (Barney 1991: 100)).

In a short summary, market requirements and business environment are changing all the time. It does not mean that if the company has a sustained competitive advantage now, then its competitive advantage will last and be suitable for market requirements forever. Different changes (for example, in technology or demand) can all make what "used to be a source of sustained competitive advantage no longer valuable" (Barney et al. 2007: 53).

2.2. Housing business in Finland

Housing business in Finland is considered to be the main factor in welfare guarantee of all citizens of the country. The main aim of Finnish housing policy is to ensure everybody to have a chance to receive a reasonable and acceptable accommodation concerning both price and quality. According to the Constitution Act of Finland, (19/1999), public institutions and authorities have a duty to promote the Finnish citizens' right to housing and support efforts to find the housing on their own initiative. At the same time national housing policy pays attention on further socially sustainable development in direction to greater social equality.

Time when Finland became urbanized came quite late. It started in the 1960's when people migrated from rural areas to the cities, and lasted until the 1970's. Before migration period, Finnish people used to live in isolated houses made of wood in the rural areas. Due to migration, construction of big and compact concrete outskirts was begun. Most of the cities started making extensive areal development contracts with construction companies in the growing areas because not all cities had enough resources for planning and controlling these construction works. Construction companies planned and built the necessary infrastructure and the residential and tenement buildings. As a consequence of fast migration and construction works, well-functioning private housing market in the cities was created. During the period from the 1970' until 1980's there was a tendency of Finnish families moving from blocks of flats into terraced houses, single family dwelling and other detached houses. (Viitanen, Palmu, Kasso, Hakkarainen & Falkenbach 2003: 21–23)

After the Second World War until the beginning of the 1980's the main plan in housing policy in Finland was about the quantity of new houses. However, during the last twenty years it has changed, the main interest was paid attention on quality, which means better construction design, living areas, functionality of the buildings and infrastructure. (Viitanen et al. 2003: 21–23)

Ruonavaara (2008) presented three main features of the Finnish housing regime. First one is about that Finnish regime is based on the assumption that families are satisfied with their housing needs primarily by relying on other than public supply of housing. Second feature of the Finnish housing regime is that housing policy is considered to be as a branch of social policy. Social policy main aim is to help households that are unable to help themselves to acquire an appropriate housing. Third one is about that Finnish housing system includes two separate and individual sectors, such as one where there is a relatively free market influence, and another where market access is regulated by waiting lists and means testing. Consequently, Finnish housing system can be seen as a dualist one. (Ruonavaara 2008: 8–9)

The dualist theory in housing system belongs to Kemeny (2006). His work "Corporatism and housing regimes" is dedicated to the description of two types of rental housing systems: integrated and dualist. Integrated system means that there is no definite distinguish between profit-oriented private rental and non-profit housing as they both serve to the whole population of the country and usually compete with each other (Kemeny 2006). On the other hand, Kemeny (2006) believes that dualist rental housing system means that there are two distinct forms of rental housing which are consisted from two different form of ownership: profit-oriented rental housing which is distributed through market and social rental housing which is distributed through testing means.

According to Oxford dictionary, social housing is defined as "housing provided for people on low incomes or with particular needs by government agencies or non-profit organizations". Social housing is considered to be one of the most important tools which is used by governance in order to provide well-being for all citizens and guarantee economic stability in the country (Hills 2007: 11–12). Social housing policy provides quality service to about 15% of Finnish citizens and as a result it has achieved a high level of social mixture, compared to other countries where social housing is associated only with poverty,

isolation and unemployment (Andre & Garcia 2012: 14–15). Social housing policy in Finland plays an important role to guarantee the broad variety of access to appropriate housing. However, social housing business should be improved in cost-effectiveness, especially through better targeting to those households most in need.

In order to improve the housing system in Finland, there are some instruments are used in housing policy. Finnish government provides several forms of support for housing such as housing allowances, subsidy, government loans, motives for first-time buyers, tax motivation, and different types of grants. Private Banks usually finance renovation, production and particularly purchasing of housing. On the other hand, commercial banks provide grants of loans to households. In addition, special-purpose mortgage organizations have an important role in Finnish housing finance. (Asselin, Murray, Tom & Streich 2002)

3. METHODOLOGY

3.1. Sense & Respond methodology

Sense and respond (S&R) business concept was firstly described in 1992 by Haeckel (1992) in his work "From "make and sell" to "sense and respond"" dedicated to S&R concept. Furthermore, Bradley et al. (1998: 4–7) developed and improved this concept with the help of which trends of business strategies can be analyzed and described. In addition, the core idea of Bradley et al. (1998: 4–7) is that "sense and respond" model is replacing "make and sell" model. Table 2. reveals the major distinction between "sense and respond" and "make and sell" concepts (Bradley et al. 1998: 6).

Table 2. "Sense and respond" vs. "make and sell".

"sense and respond"	"make and sell"
Dynamic, real-time resource allocation is the "heartbeat"	Annual budget resource allocation is the "heartbeat"
Real-time change	Glacial change
Sell, build, redesign	Design, build, sell
Act	Plan
Mind shape	Market share
Build to customer	Build to inventory
Create unimaginably complex products and services	Build reliable, complex products and services

"Make and sell" system includes budget and history knowledge which does not help for a fast adaptiveness in the marketplace. On the other hand, "sense and respond" system can predict for example, customer needs which have not happened yet. Based on this system company can easily find critical resources which can be developed and changed in the

future. Consequently, operation business process is executed sufficiently and customers are satisfied. (Bradley et al. 1998: 4–7)

S&R method is supported by the tool, which company can use for detection, prediction, adoption and responding to constantly changing of environment conditions and situations. The goal of this method is evaluation of business operation in the company, reaction to the signals received from the market as fast as possible and seeing weakened, continually changing or balanced areas of the company.

In order to implement "sense and respond" concept in the reality, based on it S&R questionnaire was developed by Rautiainen & Takala (2003: 3). Further improvement was carried out by Ranta & Takala (2007), which is mainly about evaluation of the company's internal and external areas from experience and expectation points of view (table 3.). The questionnaire form includes the numerical estimation of each attribute (criteria): the scale is from 1 to 10 which makes the form of questionnaire be easy answered and find differences between attributes (Ranta et al. 2007).

Table 3. Format of the questionnaire (adapted from Ranta et al. (2007: 316)).

Performance attribute	Scale: 1 - low, 10 - high		Compared with competitors			Direction of development		
	Expectation (1 – 10)	Experience (1 – 10)	worse	same	better	worse	same	better
Performance 1								
Performance 2								

The goal of this questionnaire is to develop a fast and reliable way of market needs detection and to respond to market requirements in a way that critical and unclear attributes can be developed and changed towards right direction in future.

There are two forms of questionnaire: one estimates day-to-day operations of the company (OP), and another one – company's activities in a more general level – Balanced Score Card (BSC). The main areas of evaluation are knowledge & technology management, processes & work flows as well as organizational and informational systems. With the help of OP form, critical attributes, which can be the reason of slow or ineffective production processes, are defined. Moreover, these critical factors help the company to arrange available resources in a better manner in the problematic areas. OP questionnaire includes twenty one attributes divided into four sections. The attributes of OP questionnaire are:

1. Knowledge & Technology Management:
    - Training and development of the company's personnel
    - Innovativeness and performance of research and development
    - Communication between different departments and hierarchy levels
    - Adaptation to knowledge and technology
    - Knowledge and technology diffusion
    - Design and planning of the processes and products
2. Processes & Work flows
    - Short and prompt lead-times in order-fulfillment process
    - Reduction of unprofitable time in processes
    - On-time deliveries to customer
    - Control and optimization of all types of inventories
    - Adaptiveness of changes in demands and in order backlog
3. Organizational systems
    - Leadership and management systems of the company
    - Quality control of products, processes and operations
    - Well defined responsibilities and tasks for each operation
    - Utilizing different types of organizing systems (projects, teams, processes etc.)

- Code of conduct and security of data and information

4. Information systems
    - Information systems support the business processes
    - Visibility of information in information systems
    - Availability of information in information systems
    - Quality & reliability of information in information systems
    - Usability and functionality of information systems

The second form of questionnaire is BSC, which determines and estimates the company's external structure, internal process, learning and growth, trust and business performance. Based on work of Kaplan & Norton (2005), it is significant to mention that BSC helps companies to reply into four critical performance questions. They are how customers see the company in general; what we must distinguish in ourselves; how company can continually improve, develop and create additional value; how we see our shareholders (Kaplan et al. 2005: 71). The attributes of BSC questionnaire are:

1. External structure: customer satisfaction; customer loyalty; brand.
2. Internal process: process improvement; innovation; information technology.
3. Learning and growth: know-how; knowledge; competence; engagement.
4. Trust: performance-to-promise; professional relationship; openness; benevolent collaboration; empathy.
5. Business performance: financial; sales; customer.

Each attribute in the questionnaire evaluates the importance of the company from their perspective, how well the tasks are measured and carried out in the company, the competitive ability of the company and developing and improving the situation compared to the situation 1 to 2 years before.

3.1.1. Technology rankings

According to Braun (1998: 8–12) technology can be considered as know-how based on human abilities, and an important part of resource allocation for strategy decision making. Technology plays a significant role in creating and maintaining the competitive advantage in every company. Morone (1989: 91–94) points out that the main skill of technology is giving different opportunities of competitive advantages to companies. Thus these opportunities can be integrated and formed to the main strategy of the company by decision makers.

There are three rankings of technology: basic, core and spearhead. Basic technology belongs to technologies which are normally used and also can be purchased or outsourced. Core technology belongs to company's current competitive advantage key feature – competitive technologies, while spearhead technology belongs to the technologies focused on the future, in other words it is a key factor to future markets and businesses. (Tuominen, Rinta-Knuuttila, Takala & Kekäle 2003: 5–8)

Defining technology level of the company can have a considerable influence on the strategy implementation and supporting company on chosen competitive level (Takala 2012: 12). There is a connection between technology life cycle and technology pyramid, which represents technology situation (figure 4.).

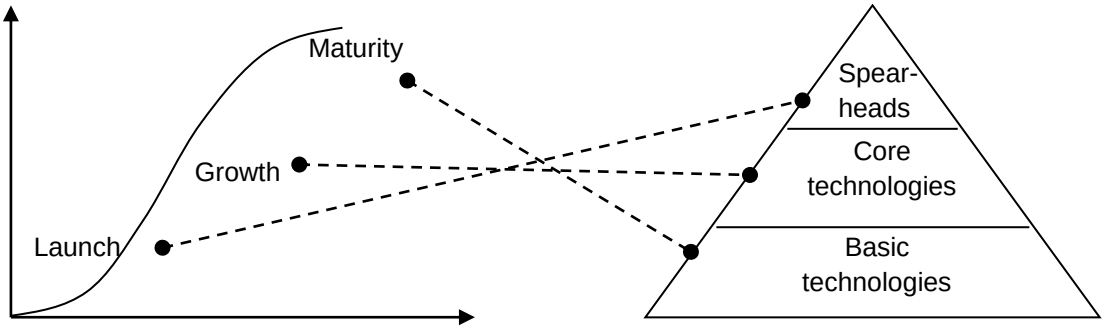

Figure 4. The connection between technology life cycle and technology pyramid (Tuominen et al. 2003: 5).

Technology requirement section has been added to the S&R questionnaire in order to make conclusions about technology rankings supported by company. Respondents should evaluate each attribute based on technology ranking (basic, core and spearhead technologies) in percentages, which sum of three terms should be 100%.

In order to calculate the values of technology rankings for each attribute, the following formulas are provided and used in prospective of two periods: past and future (table 4. and table 5.). It has been decided by Josu Takala (2012: 19) that the dominating technology is considered to be technology with value more than 43%. However, all values of technologies are lower than 43%, and thus the highest value should be chosen as a dominating technology.

Table 4. Technology rankings for OP and BSC questionnaires (Past).

	RED ATTRIBUTES	**YELLOW ATTRIBUTES**	**GREEN ATTRIBUTES**
Basic technology	(B)CFI / (B% / 100)	(B)CFI * (B% / 100)	(B)CFI / (B% / 100)
Core technology	(B)CFI * (C% / 100)	(B)CFI / (C% / 100)	(B)CFI * (C% / 100)
Spearhead technology	(B)CFI * $(SH\% / 100)^2$	(B)CFI / $(SH\% / 100)^2$	(B)CFI * $(SH\% / 100)^2$

Table 5. Technology rankings for OP and BSC questionnaires (Future).

	RED ATTRIBUTES	**YELLOW ATTRIBUTES**	**GREEN ATTRIBUTES**
Basic technology	(B)CFI / (B% / 100)	(B)CFI * (B% / 100)	(B)CFI / (B% / 100)
Core technology	(B)CFI * (C% / 100)^2	(B)CFI / (C% / 100)	(B)CFI * (C% / 100)^2
Spearhead technology	(B)CFI * (SH% / 100)^3	(B)CFI / (SH% / 100)^2	(B)CFI * (SH% / 100)^3

3.2. Critical Factor Index/Balanced Critical Factor Index/Scaled Critical Factor Index

According to Ranta et al. (2007: 122) critical factor index (CFI) is one of the means with the help of which attributes from the business processes can be calculated and indicated in order to define whether they are critical, or not-critical based on employees', customers' or business partners experiences and expectations. Further this indicator was developed and changed into balanced critical factor index (BCFI) by Nadler & Takala (2010). Scaled critical factor index (SCFI) was developed by Liu, Takala, Siltamäki, Wu, Heikkilä & Gauriloff (2011), which shows the direction of research in the area. With the help of these models, the results can be indicated as "traffic lights". For example, red attributes mean that they are critical and need to be reviewed again and put some resources. Green indicates that the attributes are in order. Yellow attributes mean that results are scattered and respondents have different understanding and view about the situation in the company.

S&R models include main indexes which are needed to be calculated: gap index, average of expectations, average of experiences, importance index, performance index, direction of development past and future, CFI, BCFI and SCFI (Nadler et al. 2010).

$$\text{Gap index} = \left|\frac{Avg(experience) - Avg(expectaions)}{10} - 1\right| \qquad (1)$$

Gap index assesses the difference between experience and expectations from employees' point of view. With the help of this formula, values of attributes, where experiences are more inessential for a company than expectations, can be calculated and identified.

$$\text{Direction of development index} = \left|\frac{Better\% - Worse\%}{100} - 1\right| \qquad (2)$$

Direction of development index shows development direction of each attribute from past and future perspectives. Also it reveals the positive or negative changes of the attribute performance.

$$\text{Importance index} = \frac{Avg(expectaions)}{10} \qquad (3)$$

$$\text{Performance index} = \frac{Avg\ (experience)}{10} \qquad (4)$$

Importance and performance indexes are very close to each other as they both are calculated by both expectation and experience perspectives. However, importance index shows the level of importance of the attribute among others while performance index shows the level of performance of each attribute in the company.

$$\text{SD expectation index} = \frac{Std\ (experiences)}{10} + 1 \qquad (5)$$

$$\text{SD experience index} = \frac{Std\ (experience)}{10} + 1 \qquad (6)$$

These two indexes explain whether the respondents have similar or controversial understanding and meaning concerning all the attributes' from expectations and experiences point of views. Table 6. below shows the values and meanings of indexes.

Table 6. Values and meanings of indexes.

Factor	Range of value	Meaning
Gap index	0.1 – 1.9	0.1 – low (not critical) 1.9 – high (critical)
Direction of development index	0 – 2	0 – low (not critical) 2 – high (critical)
Importance index	0.1 – 1	0.1 – low (not critical) 1 – high (critical)
Performance index	0.1 – 1	0.1 – high (critical) 1 – low (not critical)
Standard deviation index	1 – 1.5	1 – high (critical) 1.5 – low (not critical)

$$\text{CFI} = \frac{Std(experience) * Std(expectations)}{Gap\ Index * Direction\ of\ Development\ Index * Importance\ Index} \qquad (7)$$

$$\text{BCFI} = \frac{Std(experience) * Std(expectations) * Performance\ Index}{Importance\ Index * Gap\ Index * Direction\ of\ Development\ Index} \qquad (8)$$

$$\text{SCFI} = \frac{\sqrt{\frac{1}{n}*\sum_{i=1}^{n}[experience(i)-1]^2}*\sqrt{\frac{1}{n}*\sum_{i=1}^{n}[expectations(i)-10]^2}*Peforamnce\ Index}{Importance\ Index*Gap\ Index*Direction\ of\ Development\ Index} \quad (9)$$

CFI, BCFI and SCFI play an essential role in calculating and defining crucial or balanced attributes and areas in the company. The main difference between CFI and BCFI is that for BCFI estimation performance index is used in the formula. In this research BCFI is going to be used as a basis and main index in defining critical areas of the company. Main goal of SCFI is to resolve problems, which may happen when the respondent sample is too narrow and limited.

The interpretation of CFI, BCFI and SCFI results can be easily defined. Attribute which have a value below one is estimated as critical and therefore this area should be paid attention by putting more resources on it. More value of the attribute is going towards zero, more critical attribute is. If the value of attribute is one, such an attribute can be determined as balanced while "high performer" attribute is considered to be an attribute with value above one. On the other hand "high performer" expression does not automatically explain that the attribute has a high performance, it demonstrates that, for instance, expectations are met by experience and development direction is higher that one. (Nadler et al. 2010: 1334–1335)

3.2.1. Levels of criticalness

In order to indicate the levels of criticalness of each attribute in terms of business performance, limitations should be put, which indicate whether an attribute is red, yellow or green. The first step is to calculate the average resource level by dividing the whole value of resources (100%) to the total number of attributes. If the value of an attribute is situated between the range of 1/3 and 2/3 of the average level, it defines that this attribute is balanced or non-critical (green colour). On the other hand, if the value of an attribute is

lower than 1/3 of the average level, then it determines that this attribute belongs to critical ones (red colour). In addition, if the value of an attribute is higher than 2/3 of the average level, it explains that this attribute is considered to be soon critical or over-resourced (yellow colour). (Liu, Wu, Zhao & Takala 2011: 1013)

Table 7. and table 8. below show the limitations for each attribute from OP and BSC questionnaires, which will be used further in this study. According to OP questionnaire there are 21 attributes while according to BSC questionnaire – 18 attributes. Table 7. demonstrates that the upper limit is 6.35%, which will be indicated as yellow, green attributes will be indicated if their values are between 3,17% and 6.35%. And finally, the lowest level is under 3.17% – red. Similarly to table 7., table 8. represents that the upper limit for these attributes is 7.41%, which will be indicated as yellow, and the lower limit – 3.71%, which will be indicated as red. The values between upper and lower limits are for green attributes.

Table 7. Calculated indicators for attributes for OP model.

Item	Formula
Average level	$\frac{100\%}{21 \text{ attributes}} = 4.76\%$
Upper limit	4.76% + 1.59% = 6.35%
Lower limit	4.768% - 1.59% = 3.17%

Table 8. Calculated indicators for attributes for BSC model.

Item	Formula
Average level	$\frac{100\%}{18 \text{ attributes}} = 5.56\%$
Upper limit	5.56% + 1.85% = 7.41%
Lower limit	5.56% - 1.85% = 3.71%

3.3. Analytic Hierarchy Process

The concept of Analytic Hierarchy Process (AHP) was introduced by Saaty (1980), which allows to evaluate a big amount of attributes and to rank priorities based on ratio scale from pairwise comparison method. Consequently it helps to observe the efficiency of a decision. AHP method is going to be used further in this work. The objective of this method is to calculate the weighting of the main criterion which are belonged to competitive advantages. These criterion are cost, quality, time and flexibility. AHP utilizes pairwise comparison between all the factors to support decision-making process (Rangone 1996: 105–106). It analyzes the level of importance of the attributes and the main competitive priorities of the company.

There are three stages used for implementing AHP methodology described by Rangone (1996):

1. Setting up decision-making hierarchy – building a decision-making hierarchy as network structure, which can be illustrated by three levels: top of the hierarchy is final result/goal, middle is criteria with the help of which the final goal can be achieved and bottom level is listed by fixed alternatives, which have connection with middle and top levels (Rangone 1996: 106–108). Figure 6. illustrates that the

ultimate goal (top level) is defining competitiveness of the case company, which can be evaluated by competitive priorities (middle level), which are existed in every department (bottom level);

2. Defining the weights of alternatives – using pairwise comparison method in order to define comparative weights of the determined criteria. In order to be able to use questionnaire format in a correct way, firstly it is necessarily to compare two factors and define the importance of each attribute, i.e. which one is more important and then to weight within the scale from 1 to 9 for indication in what extent selected factor is more important than the other one (figure 5.); (Saaty 1980: 17–21)
3. Calculation and evaluation of alternatives in the rank – calculation of values of criterion and summing up the weights of all these criterion in the rank (Wedley, Choo & Schoner 2001: 342–343). Based on the figure 5. during this stage it is possible to evaluate and define which competitive priorities are prioritized in the departments, which further can define competitiveness advantage of the company.

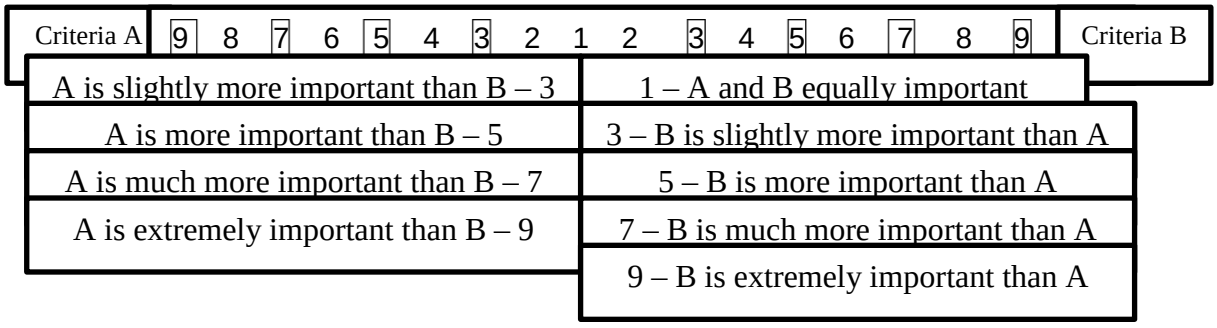

Figure 5. The form of pairwise comparisons.

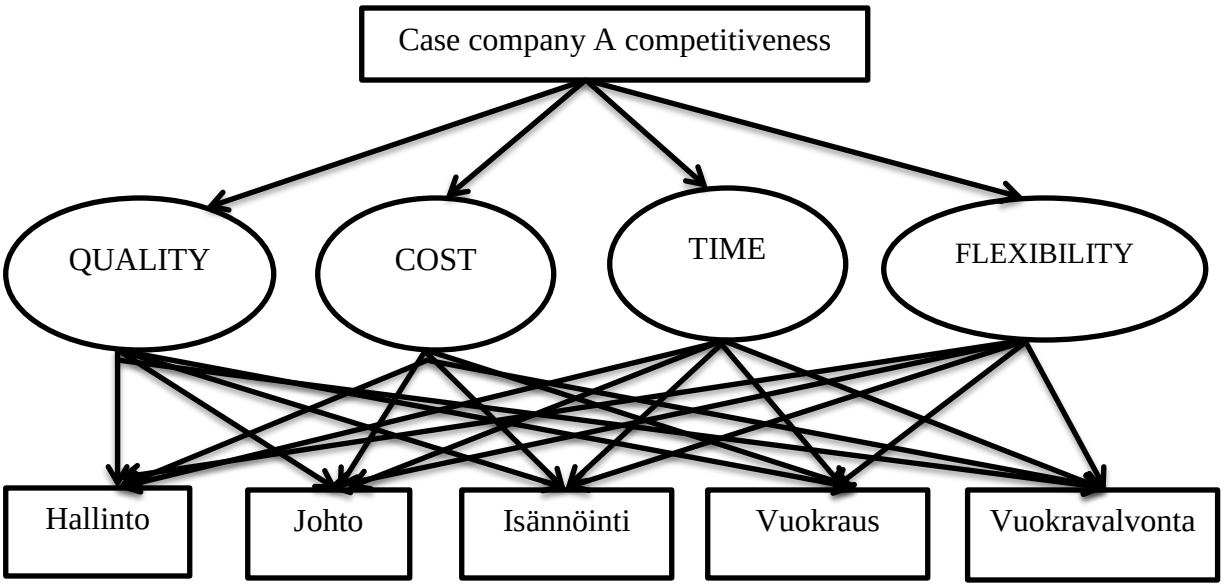

Figure 6. A hierarchical structure for case company A competitiveness.

In addition, it is very necessarily to calculate inconsistency ration (ICR) proposed by Saaty (1980: 6–7), which shows the answers' validity of respondents. It is essential to know the level of consistency of the answers in order not to make meaningless decisions. If the ICR is less than 0.30 then the answers are considered to be valid and reliable. Thus they can be used in decision-making process. For example, if respondent says that criteria A is equally important compared to another criteria B, and the criteria B is absolutely more important than criteria C, consequently, the criteria A should also be absolutely more important as the criteria C. If it does not happen, then it is considered to be inconsistency of the answers.

3.4. Manufacturing strategy

The first mention about the concept manufacturing strategy was in the paper "Manufacturing – the missing link in corporate strategy" written by Skinner (1969), where

the author defined the concept of manufacturing strategy as a model which evaluates the competitive priorities of the company in order to reach competitive advantages in the market. Competitive priorities demonstrate the main manufacturing objectives of the company. Porter's competitive priorities of company (1985: 11–22) belong to different competitive groups such as analyzer, defender, prospector and reactor (Miles et al. 1978: 29). On the other hand, the concept of manufacturing strategy can be described from different point of view. For instance, according to Swamidass & Newell (1987: 510–517) manufacturing strategy can be described as a tool with the help of which business and corporate goal can be achieved by using manufacturing strengths effectively. Also manufacturing strategy was described as consistent pattern of decision making which is offered by manufacturing objectives and linked to the business strategy (Hayes & Wheelwright 1984: 24–46). Generally, all definitions of the manufacturing strategy concept present one common idea that based on decision making performance objectives are chosen to reach an appropriate competitive level.

In this paper, the concept of manufacturing strategy is presented in practice as a manufacturing strategy index, which is used to evaluate and define the operational competitive indexes of the company in terms of four different competitive groups. According to Takala, Kamdee, Hirvelä & Kyllonen (2007) manufacturing strategy index (MSI) is modeled based on the multi-criteria priority weights of quality (Q), cost (C), time (T), and flexibility (F), which are evaluated with the help of AHP method mentioned above and presented as a function $MSI = f_{MSI}(Q, C, T, F)$.

The equations below present the calculation of normalized weights of main competitive priorities.

$$Q' = \frac{Q}{Q + C + T} \tag{10}$$

$$C' = \frac{C}{Q+C+T} \quad (11)$$

$$T' = \frac{T}{Q+C+T} \quad (12)$$

$$F' = \frac{F}{Q+C+T+F} \quad (13)$$

The equations (14 – 16) stand for the analytical models that provide the calculations of MSI of operational competitiveness in each group.

The MSI model for prospector group:

$$MSI_P = 1 - \left(1 - \mathrm{Q}\%^{\frac{1}{3}}\right)(1 - 0.9 * \mathrm{T}\%)(1 - 0.9 * \mathrm{C}\%) * \mathrm{F}\%^{1/3} \quad (14)$$

The MSI model for analyzer group:

$$MSI_A = 1 - (1 - \mathrm{F}\%)[\mathrm{ABS}[(0.95 * \mathrm{Q}\% - 0.285) * (0.95 * \mathrm{T}\% - 0.285) * (0.95 * \mathrm{C}\% - 0.285)]]^{1/3} \quad (15)$$

The MSI model for defender group:

$$MSI_D = 1 - \left(1 - \mathrm{C}\%^{\frac{1}{3}}\right)(1 - 0.9 * \mathrm{T}\%)(1 - 0.9 * \mathrm{Q}\%) * \mathrm{F}\%^{1/3} \quad (16)$$

3.5. Sustainable Competitive Advantage

In order to implement the concept sustainable competitive advantage (SCA) in reality in the company mentioned in section 2., the S&R method with operations strategies and competitive priorities, AHP and MSI methods are used. SCA can provide the basis of implementations of highly competitive operations strategy for managing the business situation in the marketplace.

The main goal of using such analytical models is to assess the overall operational competitiveness in the whole company by testing different performances before, during and after crisis. Identifying and implementing SCA make it possible to compare the level of risks of different attributes or areas of performances in the company. SCA can be actually identified by evaluating overall competitiveness to find out what is the best competitive strategy, at what level the competitiveness is in that strategy and how, when and why it can be improved.

The phases should be completed for reaching SCA results:

1) using of S&R method in order to evaluate the expectations and experience of resource allocation by defining the critical and non-critical areas of the company;
2) based on results from S&R method, operational strategy should be defined as well as competitive priorities such as quality, cost, time and flexibility, which are the main criterion for choosing an operational strategy;
3) calculation of SCA based on results concluded previously.

In order to complete the last phase of SCA three methods are used: MAPE, RMSE, and MAD. If SCA value is between zero to one, then the results are consistent. More SCA value is reaching one, better situation is and lower risk level.

MAPE (absolute percentage error): SCA = $1 - \sum_{\alpha,\beta,\gamma} \left|\frac{BS-BR}{BS}\right|$ (17)

RMSE (root means squared error): SCA = $1 - \sqrt{\sum_{\alpha,\beta,\gamma} \left(\frac{BS-BR}{BS}\right)^2}$ (18)

MAD (maximum deviation): SCA = $1 - max_{\alpha,\beta,\gamma} \left|\frac{BS-BR}{BS}\right|$ (19)

In this case B corresponds to angle (in radians), which are referred to analysis in prospector, analysis and defender categories. In addition, S refers to operational strategy (MSI) and R – to resource allocation evaluated by S&R (BCFI) methodology.

4. EMPIRICAL RESEARCH

4.1. Overview of analysis process

The data for analyzing and investigating company situation in general as well as defining the critical performance attributes was gathered by opinion survey questionnaire. The questionnaire which was developed by Ranta et al. (2007: 316–319) based on S&R method included two types of questionnaire: OP (twenty one attributes) and BSC (seventeen attributes). The questionnaire was sent to five departments of the case company, which are Hallinto, Isännöinti, Johto, Vuokraus and Vuokravalvonta. Based on answers from these departments, the data is analyzed and interpreted. The quantity of respondents was different in each department. For example, in Hallinto there were only 4 respondents, but in Vuokraus – 9 respondents.

Each performance attribute in the questionnaire is evaluated on how important the employees of the company see them from the department perspective, how well the tasks have been performed in their own department, how they see the company in general compared to their competitors and how they see each attribute developing compared to the situation from 1 to 3 years before in the scale of worse, same and better. In addition, the respondents were asked to evaluate experience and expectation of the performance attributes in their own departments. Expectation and experience for each attribute were assessed in a scale from 1 to 10. This wide range comparatively makes it easier to define divergence between expectations and experience. In the last part of the questionnaire the company's knowledge and technology affairs are estimated. Required technology is divided into three types: basic, core and spearhead technologies, which have been characterized above in section 3.1.1..

Every questionnaire which was sent included the response instruction in order to make it easier to answer to all the questions in the form. Questionnaires are filled row by row finishing one attribute before moving to the next one. The headings are not taken into the consideration. Each question should be completely filled to be sure that the results and finding will be valid.

After receiving all the answers with the help of S&R method critical attributes and areas are defined and evaluated as well as technology ranking based on Johto department. The next step belongs to AHP analysis, which is implemented with the help of Expert Choice software in order to change qualitative criteria into quantitative values. During this stage, inconsistency ratios are defined and checked to ensure the validity of answers. The following step is defining company's organizational strategy (based on AHP and MSI methods) as well as defining the competitive priorities and the risks in every department of the case company. The final stages are interpretations of findings and making general conclusions of this research. Figure 7. represents the flowchart of data processing and analysis in this paper.

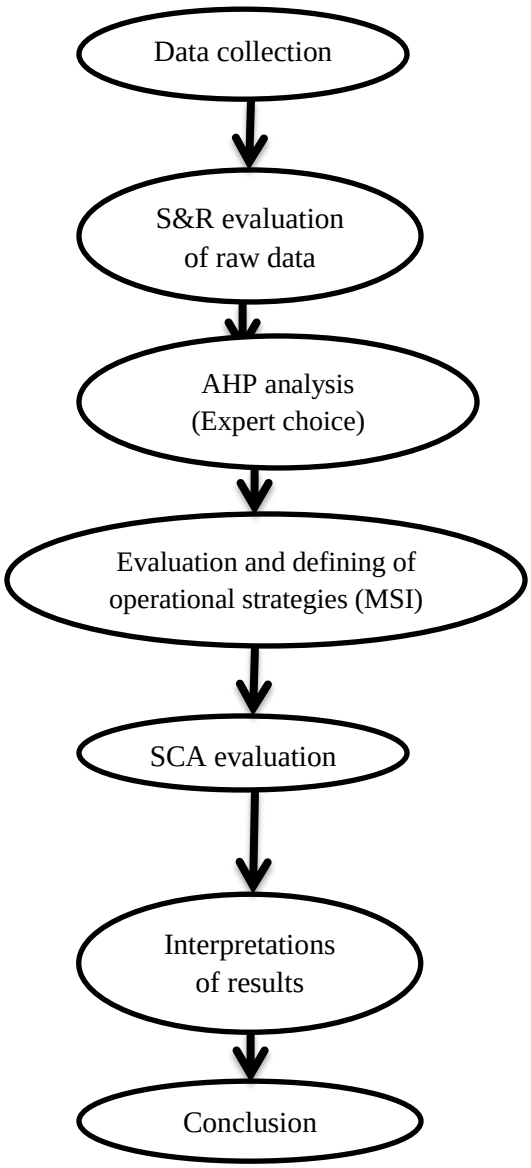

Figure 7. Flowchart of data processing and analysis.

4.2. Case company A

Case company A is a real-estate company established in 1944 and is situated and belonged to the city Turku. It is considered to be as a non-profit organization, which has government

restrictions concerning to operation profitability. The main goal of this company is providing rental housing. The mission of this organization is to “maintain and promote the welfare by housing means, and to contribute the local success”. In addition the vision 2020 is that “Case company A is the most attractive and largest of homes in Turku region; and to provide a comfortable living experience”, while the main mission is to combine the residents, owners and company vision for one mutual goal. (Case company’s official website)

The main services of case company A are offering safe and acceptable rental homes for people of different life levels, housing counseling property maintenance, care and repair, rent control, and property portfolio development. Moreover, it offers a wide range of houses such as blocks of flats, terraced houses and small private homes in Turku region. The company owns and manages approximately 11000 different types of homes, which are equipped with the basic utilities. The year turnover of the company is about 66 million euros and the general balance includes over 400 million euros. The company’s market share includes approximately 10% of all dwelling and around 25% of the entire apartments in Turku region. Consequently, it can be considered as the largest individual dealer in Turku. (Case company’s official website)

There are two directions towards which the company pays its own attention. They are short-term and long-term goals, which can be achieved through using and implementation of different principles. The short-term goals can be reached by identifying and using competitive rent and prices, good quality of homes, low vacancy rate, and good living communities. On the other hand, long-term objectives include the following market requirements, owners’ value and leasing implementation.

Furthermore, the sustainable competitive advantages of the case company A are, firstly, the company A provides affordable housing costs with versatile and abundant supply of homes

including different supporting services for housing and living. It is important to mention that customers are number one in the company A with proper personal attention and assistant provided for people in difficult life situations and in accordance their needs. Solutions to all life situations are found in cooperation with partners and company's creativity. Secondly, the company A has built and planned its houses and flats in such a way that it meets customers' needs and requirement.

4.3. Data processing and analysis

4.3.1. Hallinto department

It is reasonable to start from investigation of similarities in what the case company A expects to achieve in the future period and considers more important attributes or areas for the future competitiveness among different departments. The comparison of experience and expectation in every department means that it reveals the gap between experience and expectation, where the resources should or should not be put in the future period.

Four respondents working in Hallinto department were chosen for carrying out the research. Information received from these four workers is processed and analyzed.

Figure 8. and figure 9. demonstrate the comparison between the experience and expectations of the respondents for Hallinto department of case company A based on OP and BSC types of forms. According to these bar charts, level of most of the attributes increases for future and it means that the company expects to have enhancement in terms of different criterion in future period. However, in some cases experience is exceeding expectations in such attributes as design and planning of the processes and products; code of conduct and security of data and information; know-how; competence; engagement;

performance-to-promise; and professional relationship. It means that these attributes are not expected to have more resource investing in the future. Additionally, innovativeness and performance of research and development; quality control of products, processes and operations; utilizing different types of organizing systems (projects, teams, processes etc.); knowledge; and sales are considered to be in the same level in future and in past based on resource allocation.

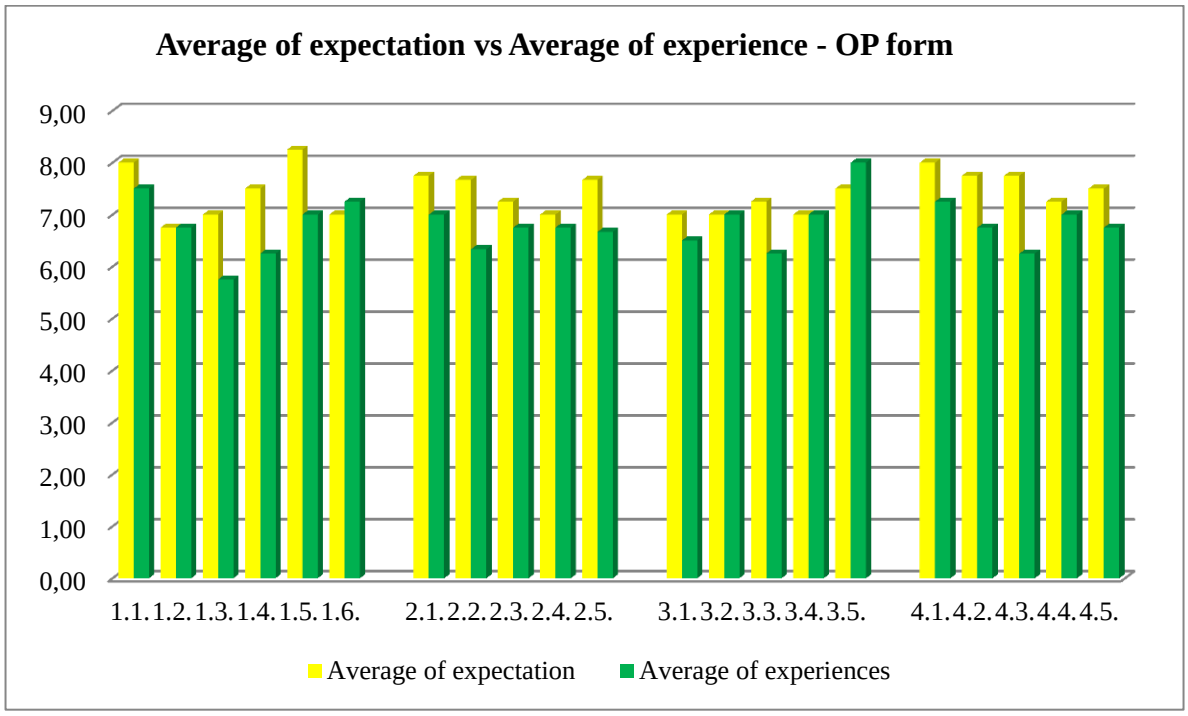

Figure 8. Hallinto: Average of expectations vs. Average of experience – OP.

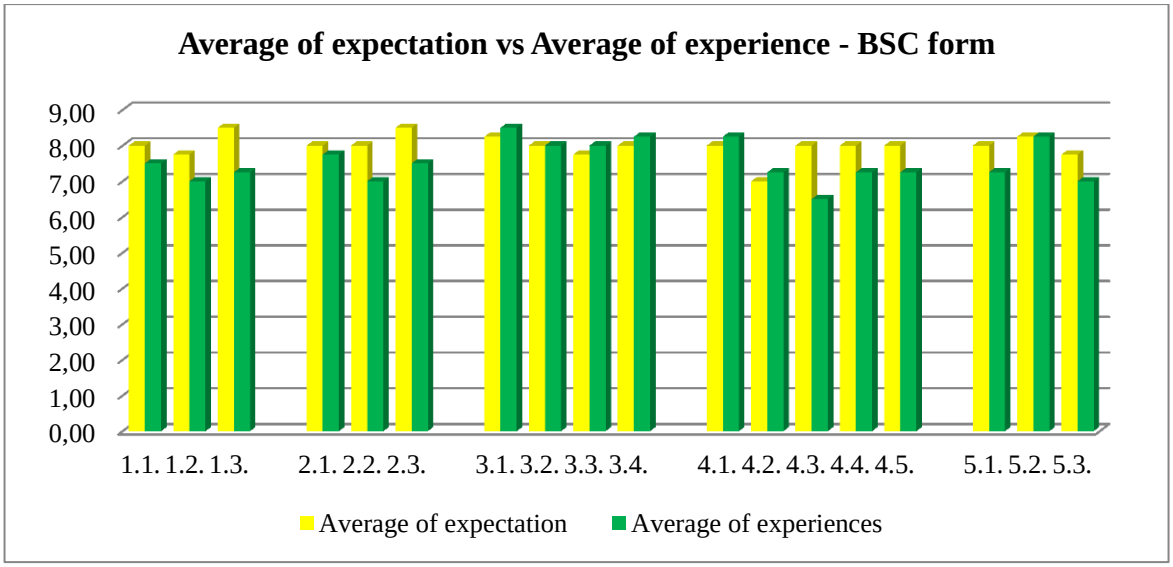

Figure 9. Hallinto: Average of expectations vs. Average of experience – BSC.

S&R evaluation of raw data is the second step of the process. Raw data from the questionnaire answers is processed by analytical models presented in section 3. in order to transform qualitative criteria into quantitative values.

There are two periods of time have been chosen for evaluation results, namely past and future. According to S&R method there are three main indicators were chosen: CFI, BCFI and SCFI. With the help of these indexes main critical areas will be evaluated and defined. Therefore, it will be shown which areas of the company should be invested more in future.

According to the results from OP questionnaire, figures from appendices 4., 5., and 6. represent the general operational performance situation of case company A in past. The results are slightly different between CFI, BCFI and SCFI calculations. BCFI results show that most of the attributes are critical, which means that these areas are under-resources. There are only one balanced attribute which is design and planning of the processes and products and only one yellow attribute: quality control of products, processes and

operations. On the other hand CFI calculations present that there are five balanced and seven over-resourced attributes. Resourced areas are innovativeness and performance of research and development; design and planning of the processes and products; on-time deliveries to customer; leadership and management systems of the company; and well defined responsibilities and tasks for each operation. Scattered attributes are short and prompt lead-times in order-fulfillment process; quality control of products, processes and operations; information systems support the business processes; visibility of information in information systems; availability of information in information systems; quality & reliability of information in information systems; and usability and functionality of information systems. Moreover, SCFI calculations reveal that in past the case company has all over-resourced attributes or they are considered to be unclear and difficult to evaluate for workers as everybody has different opinions about them.

In the same way based on the BSC questionnaire, figures from appendices 7. and 8. demonstrate that the case company has the most critical areas, except only uncleared attributes, which are brand and customer; and balanced attributes – customer loyalty and sales. Similarly, SCFI calculations (appendix 9.) show that in past all attributes are over-resourced.

Similarly to the past period of time, future has been evaluated as well based on the OP and BSC questionnaires. By summarizing the results from the OP questionnaire, figures from appendices 10. and 12. show entirely opposite situations: most of the attributes are red (except of training and development of the company's personnel and availability of information in information systems attributes, which are considered to be balanced) in the figure of appendix 10. and all yellow attributes are shown in the figure from appendix 12. Simultaneously, significant part of CFI results are considered to be balanced attributes, while there are scattered, such as visibility of information in information systems; availability of information in information systems; and usability and functionality of

information systems; and red – adaptation to knowledge and technology; design and planning of the processes and products; reduction of unprofitable time in processes; adaptiveness of changes in demands and in order backlog; quality control of products, processes and operations; utilizing different types of organizing systems (projects, teams, processes etc.); and code of conduct and security of data and information (appendix 11.).

Moreover, according to BSC questionnaire's results, in future most of attributes are going to be critical based on the figures from appendices 13. and 14. In spite of this, figure from appendix 15. reveals that nevertheless on the situation in past in future it will remain the same.

To summarize, BCFI method will be taken into account and will be used as a fundamental and most effective method of analysis further in this work. Thus, figures 10. and 11. reveal the trends of changing attributes from past into future period of time based on OP and BSC questionnaires. In this situation it can be seen that in future the general situation of the company will be developed and improved, although some of attributes will remain nearly in the same level. Organizational system and external structure of the company will not be developed significantly in future compared to past time. Meanwhile there are attributes which will remain in the same position compared to past period of time. They are visibility of information in information systems; process improvement; innovation; competence; and professional relationship.

Furthermore, manufacturing strategy can be defined as a third stage of the analysis process. In accordance with manufacturing strategy method, table 9. shows the values for identifying the type of strategy which is considered to be the main operational strategy of the company by Hallinto department. Hence the table presents that the company strategy is not sustainable in general even though there is no huge difference between values in past and in future. In terms of BCFI, CFI and SCFI calculations in past values show the position

of the company as prospector and analyzer, while in future it is defined as analyzer for certain.

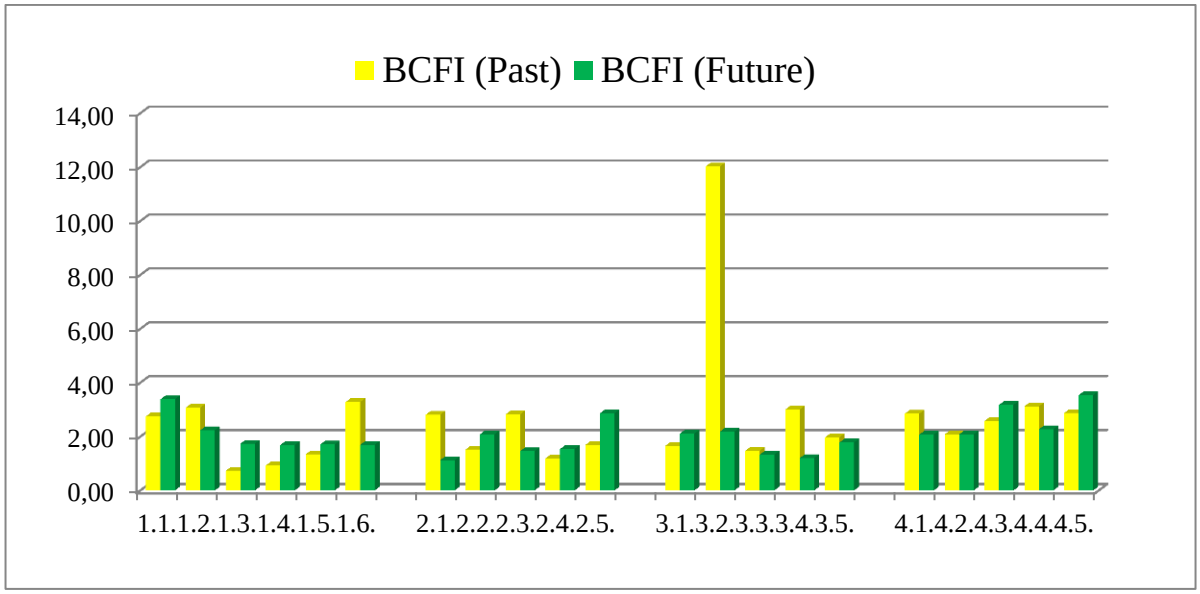

Figure 10. Hallinto: BCFI (Past) vs. BCFI (Future) – OP.

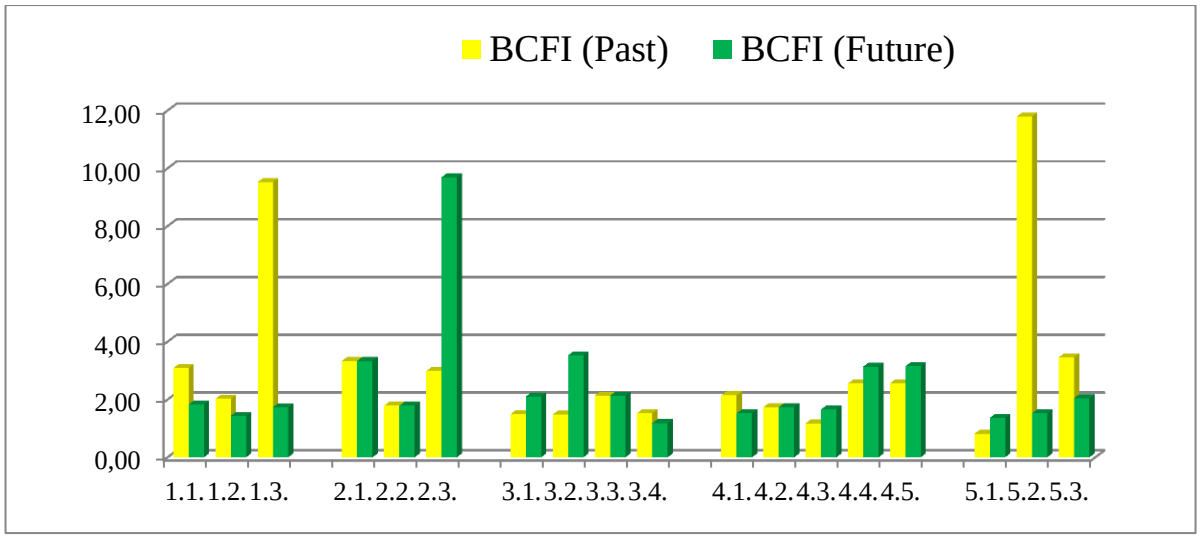

Figure 11. Hallinto: BCFI (Past) vs. BCFI (Future) – BSC.

Table 9. Hallinto: Values of the operational strategies.

		Prospector	**Analyzer**	**Defender**	**Reactor**
CFI	Past	**0.93**	0.90	0.90	0.91
	Future	0.92	**0.93**	0.91	0.92
BCFI	Past	0.93	**0.94**	0.90	0.92
	Future	0.91	**0.98**	0.91	0.91
SCFI	Past	**0.93**	**0.93**	0.91	0.92
	Future	0.91	**0.99**	0.91	0.91

4.3.2. Isännöinti department

There were five respondents chosen for carrying out a research from Isännöinti department. Answers received from these five employees are processed and analyzed.

Figures 12. and 13. show the matches between experience and expectations in terms of different attributes from OP and BSC questionnaires. According to these bar charts the average of expectations is more than average of experience and it means that case company A plans and prepares to have improvements in terms of different attributes for future. Moreover, most of attributes are expected to be improved considerably compared to past period of time. However, in terms of OP questionnaire significant development is expected to be in such areas as communication between different departments and hierarchy levels; adaptation to knowledge and technology; design and planning of the processes and products; and well defined responsibilities and tasks for each operation. At the same time based on BSC questionnaire there will be expected crucial improvements only in such attributes as process improvement; innovation; information technology; openness; benevolent collaboration; and financial.

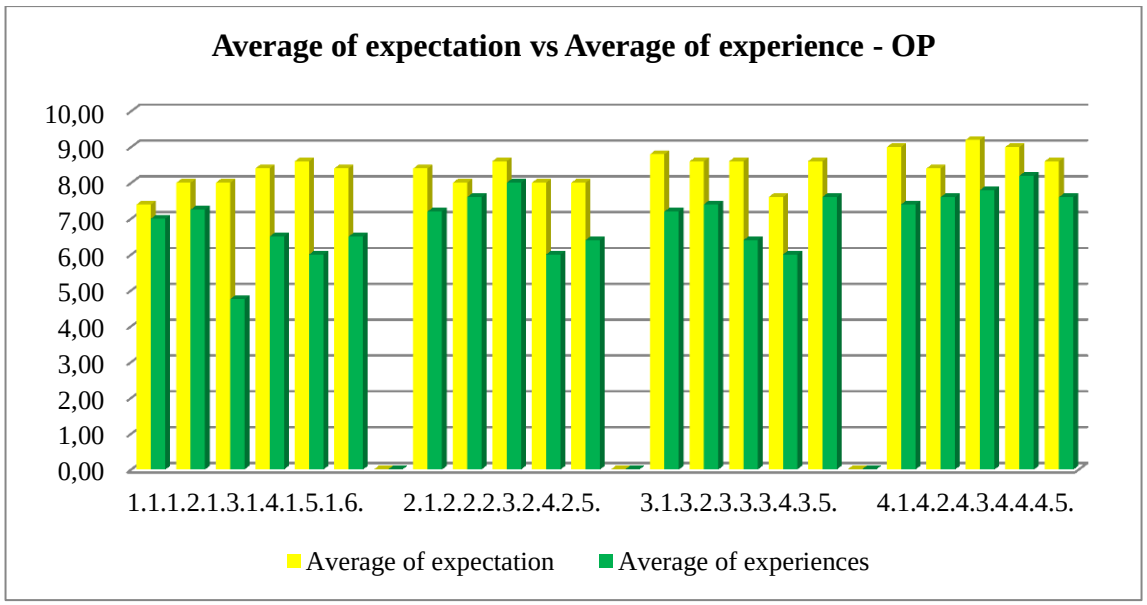

Figure 12. Isännöinti: Average of expectations vs. Average of experience – OP.

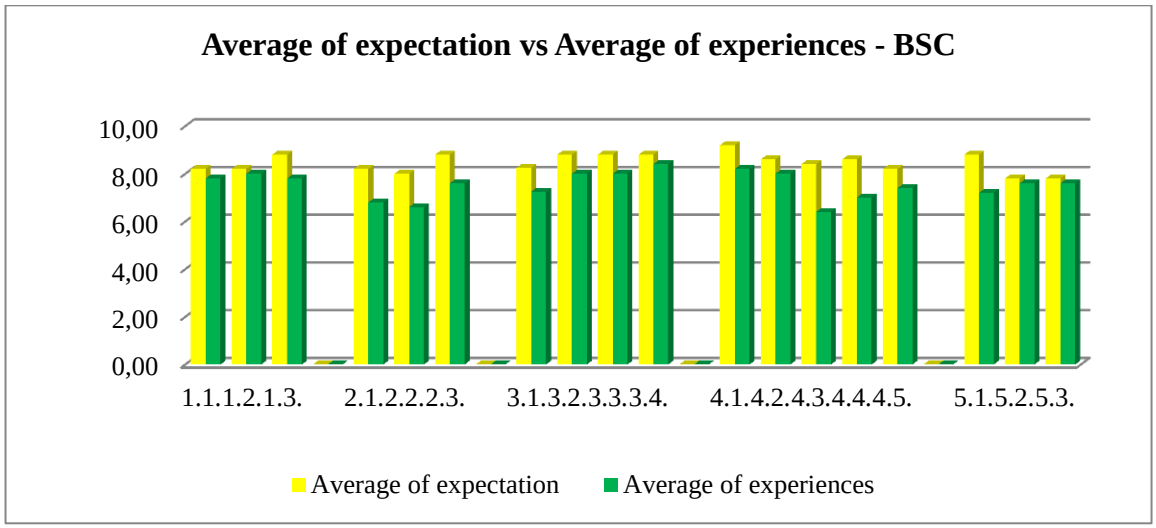

Figure 13. Isännöinti: Average of expectations vs. Average of experience – BSC.

Next step belongs to S&R method, which reflects important critical areas summarized by CFI, BCFI and SCFI indexes. According to the figures from appendices 16. and 17. based on answers from OP questionnaire, they represent merely the same results in past, which

are: all the areas are critical and needed to be improved and put resources there, except those, which are balanced: design and planning of the processes and products and adaptiveness of changes in demands and in order backlog attributes. Furthermore, based on results from SCFI calculations most of attributes are scattered (appendix 18.). Communication between different departments and hierarchy levels attribute is evaluated as critical and such attributes as knowledge and technology diffusion and well defined responsibilities and tasks for each operation are defined as in order.

Likewise results from BSC questionnaire were analyzed and concluded. In past both CFI and BCFI methods have similar results about the company, which are that all areas are needed to be invested, and improved (appendices 19. and 20.). Equally important that SCFI method shows slightly different results – most of attributes are over-resourced and can be potentially critical attributes (appendix 21.). Also based on this method, trust and financial areas are considered to be in balance.

In the same way as the past period of time future is analyzed on the basis of CFI, BCFI and SCFI indexes. Taking into the consideration of answers from OP form, in future situation will be slightly changed as based on CFI (Past) and BCFI (Past) most of the red attributes will stay as critical, but there will be some improvements in such attributes as innovativeness and performance of research and development; communication between different departments and hierarchy levels; knowledge and technology diffusion; utilizing different types of organizing systems (projects, teams, processes etc.); information systems support the business processes; and usability and functionality of information systems (appendices 22. and 23.). These attributes will become balanced. In contrast to CFI and BCFI outcomes, SCFI results will remain as unclear and scattered (appendix 24.).

Meanwhile the results from BSC form are following: figures from appendices 25. and 26. both represent that in future the attributes will be critical as in past period of time unless

process improvement attribute which will become unbalanced and over-resourced. Based on SCFI calculations, position of the most of attributes will not change and will stay scattered except financial attribute which keeps balance all the time (appendix 27.).

In order to summarize the situation, as it was mentioned above that BCFI is taken as the basis for further analysis and evaluation, figures 14. and 15. show the trends of changing values of attributes from past into future period of time according to OP and BSC questionnaires. From the figure 14. it can be seen that in future such areas as information systems and knowledge & technology management will be improved even though the attributes will be considered to be critical. Process & work flow and organizational systems areas will not be changed significantly but in some cases it will worsen. According to the figure 15. internal process and learning & growth will have some enhancements compared to other areas with low level of changes.

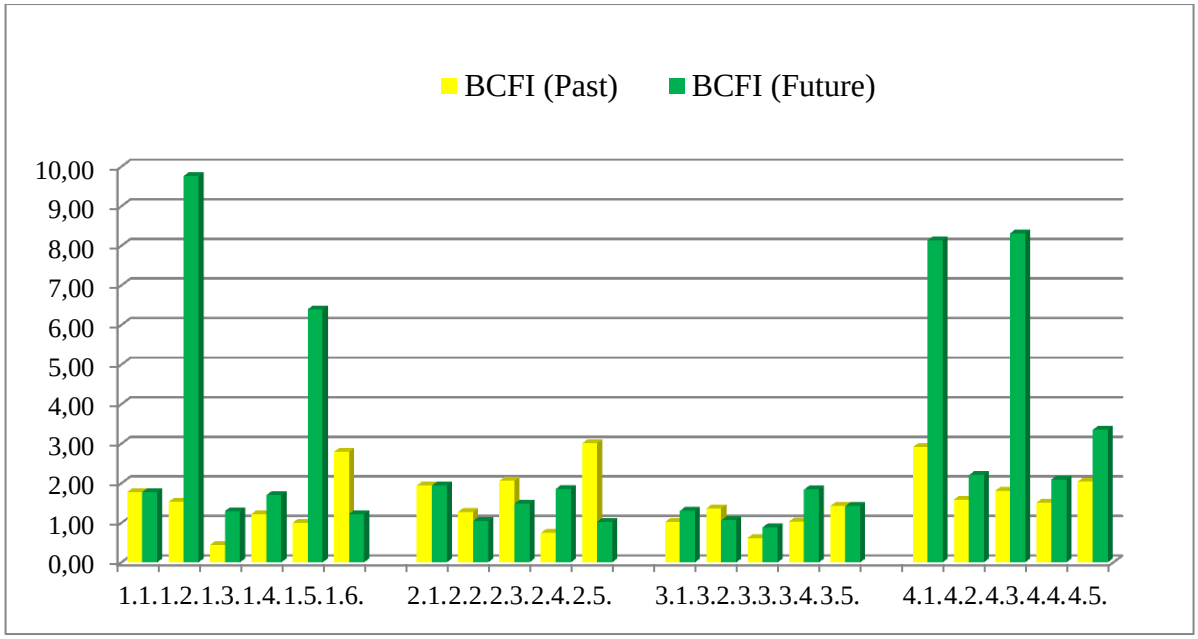

Figure 14. Isännöinti: BCFI (Past) vs. BCFI (Future) – OP.

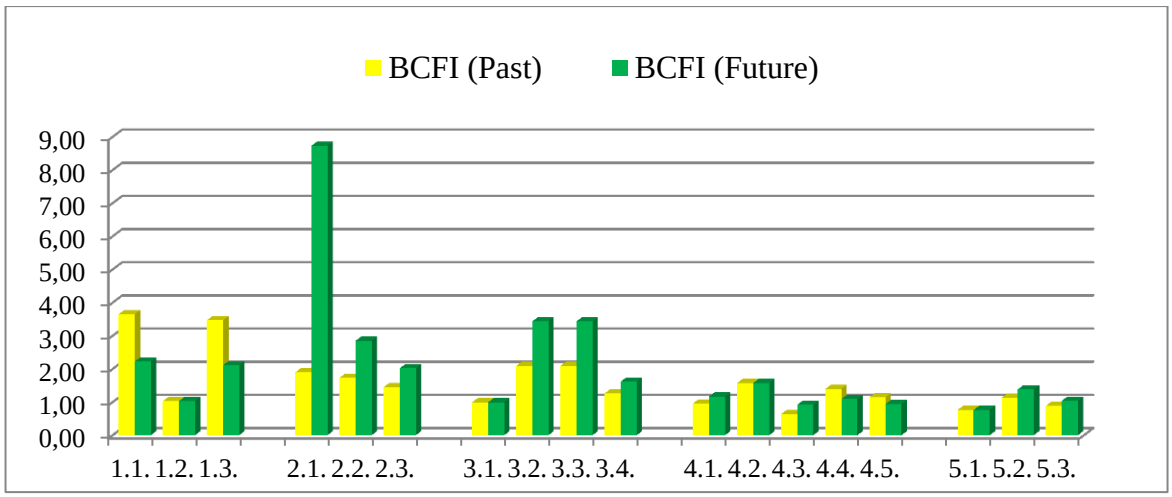

Figure 15. Isännöinti: BCFI (Past) vs. BCFI (Future) – BSC.

Further step is defining a manufacturing strategy. In accordance with manufacturing strategy method, table 10. shows the values for identifying the type of strategy which is considered to be the main operational strategy of the case company A by Isännöinti department. Hence the table presents that the company strategy is not sustainable in general even though there is no huge difference between values in past and in future. In past case company is considered to be analyzer simultaneously. However, in future the company will act in the market as a defender in terms of CFI and BCFI indexes while based on SCFI calculations the company will remain as an analyzer.

Table 10. Isännöinti: Values of the operational strategies.

		Prospector	**Analyzer**	**Defender**	**Reactor**
CFI	Past	0.88	**0.93**	0.89	0.88
	Future	0.89	0.89	**0.92**	0.90
BCFI	Past	0.90	**0.97**	0.90	0.90
	Future	0.91	0.91	**0.93**	0.92
SCFI	Past	0.90	**0.98**	0.89	0.90
	Future	0.91	**0.96**	0.93	0.92

4.3.3. Vuokraus department

There are nine respondents from Vuokraus department who participated in the survey. In the following part, the results of investigation of Vuokraus department are presented.

Figures 16. and 17. demonstrate the comparison between experience and expectations of the respondents from Vuokraus department. Similarly to previous departments which were presented earlier, there are enhancements observed for different attributes which will take place in future. It has found out that training and development of the company's personnel; communication between different departments and hierarchy levels; short and prompt lead-times in order-fulfillment process; well defined responsibilities and tasks for each operation; utilizing different types of organizing systems (projects, teams, processes etc.); information technology; performance-to-promise; and empathy are expected to have considerable improvements in these areas.

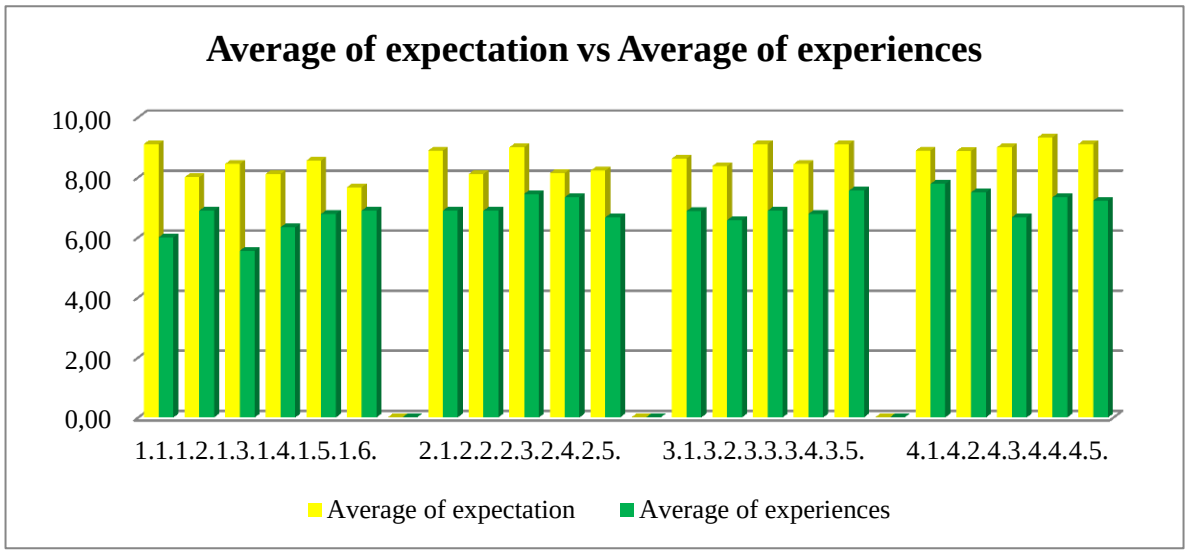

Figure 16. Vuokraus: Average of expectations vs. Average of experience – OP.

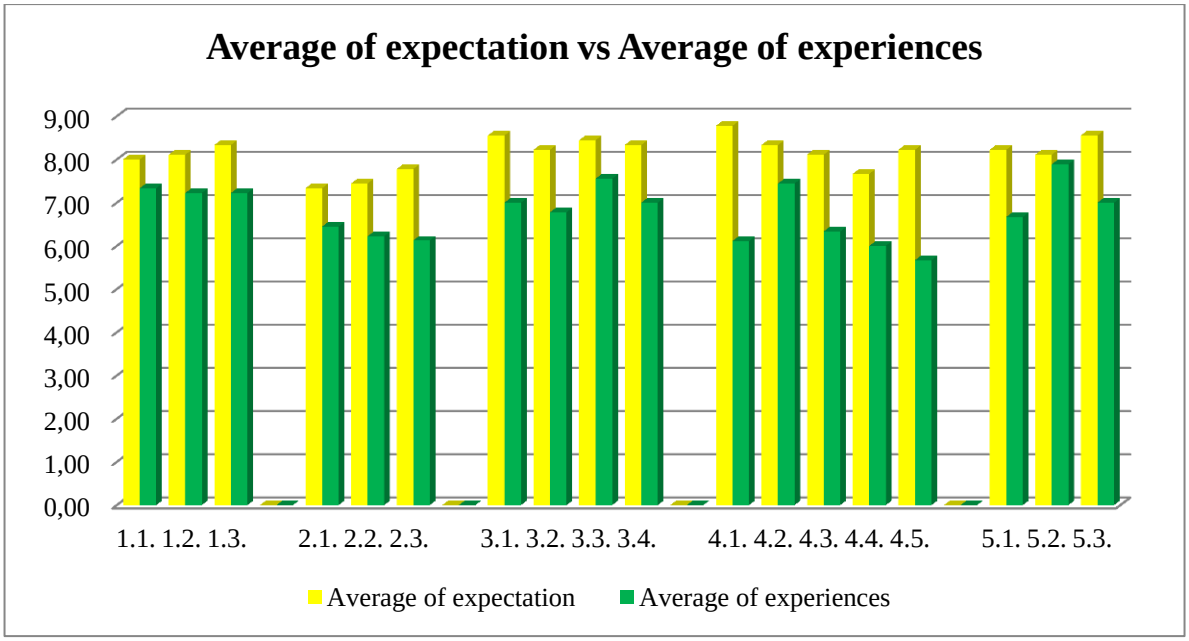

Figure 17. Vuokraus: Average of expectations vs. Average of experience – BSC.

S&R method is the second stage of the process analysis. Results from CFI, BCFI and SCFI indexes are presented in the following figures. Considering figures from appendices 28., 29., and 30. which show the results based on OP questionnaire in past period of time, it has been noticed that CFI and BCFI calculations have some similarities, such as: most of the attributes are critical and there are nine balanced attributes based on CFI method (appendices 28. and 29.). They are innovativeness and performance of research and development; adaptation to knowledge and technology; knowledge and technology diffusion; design and planning of the processes and products; reduction of unprofitable time in processes; adaptiveness of changes in demands and in order backlog; leadership and management systems of the company; quality control of products, processes and operations; and utilizing different types of organizing systems (projects, teams, processes etc.) (appendix 29.). As it has been noticed already that in most of the cases SCFI method gives similar results: the biggest amount of attributes are scattered and there are only three balanced attributes (training and development of the company's personnel; communication

between different departments and hierarchy levels; and availability of information in information systems) (appendix 30.).

Besides the results from OP questionnaire, there are results, which are presented from BSC form. Similarly to the results from OP, based on CFI and BCFI methods, there are more critical attributes rather than balanced (appendices 31. and 32.). However, in accordance with CFI calculations customer loyalty; brand; process improvement; benevolent collaboration; and financial are defined as in order attributes (appendix 32.). In addition there is only one scattered and unclear attribute: information technology. According to SCFI method, most of the attributes are yellow, although performance-to-promise and empathy are considered to be balanced attributes (appendix 33.).

After evaluating and processing results received about past period of time, the next step is processing of results from future perspective. Figure from appendix 34. shows that in future in operational performance there will not be big changes in terms of BCFI method. Specifically, most of red attributes from the past remain the same except of three attributes which will become stable and balanced. They are innovativeness and performance of research and development; adaptiveness of changes in demands and in order backlog; and information systems support the business processes. On the other hand, figure from appendix 35. demonstrates that the majority of attributes are balanced compared to past and there is only one critical attribute – control and optimization of all types of inventories. Finally, figure from appendix 36. shows similar situation as in past – over-resourced and unbalanced attributes.

Further outcomes are presented from BSC questionnaire. Here figure from appendix 37. reveals that situation will be improved slightly, which proves that two balanced attributes will appear: process improvement and information technology. In contrast figure from appendix 38. represents enhanced results: most of the attributes will become balanced and

there will appear two scattered attributes (process improvement and information technology) while other attributes are critical. In the same way as in past SCFI method shows that the results will not change significantly in future period of time (appendix 39.).

To sum up, BCFI tool is used as a basic index. Figures 18. and 19. demonstrate the direction of value changes from past into future in accordance with OP and BSC questionnaires. Based on figure 18. operational performance will be developed in every area of company, even though more improvements will be needed. Figure 19. represents changes in external structure, internal process, learning and growth, and trust areas. At the same time business performance will remain in the same level as in past, without any enhancements.

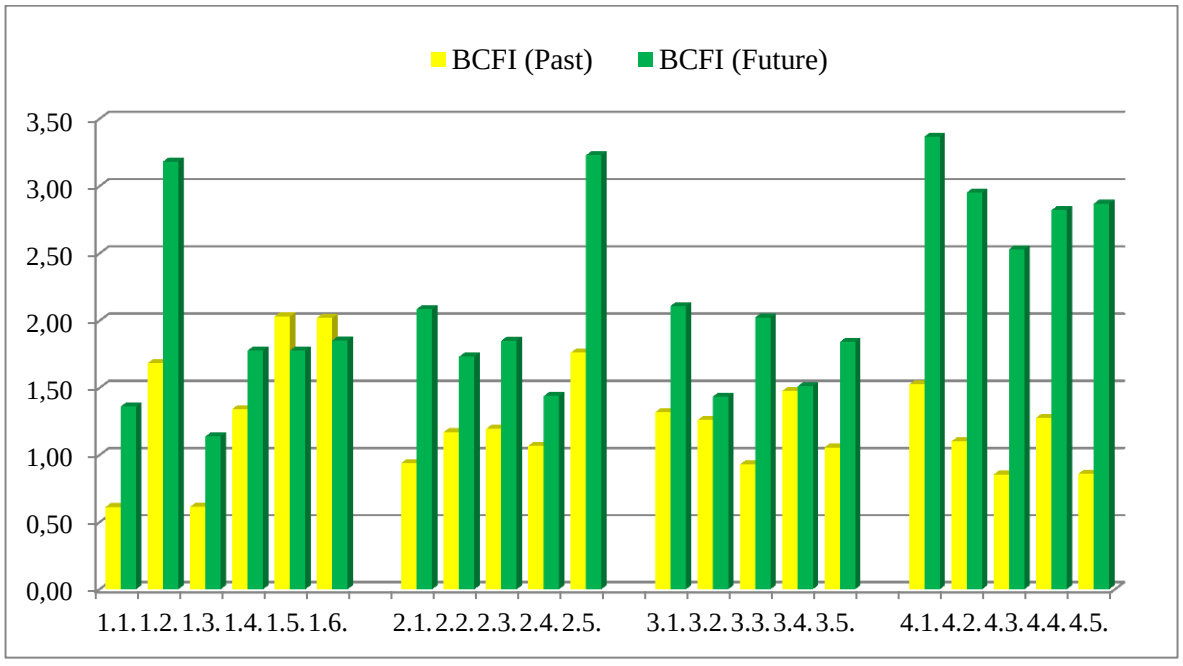

Figure 18. Vuokraus: BCFI (Past) vs. BCFI (Future) – OP.

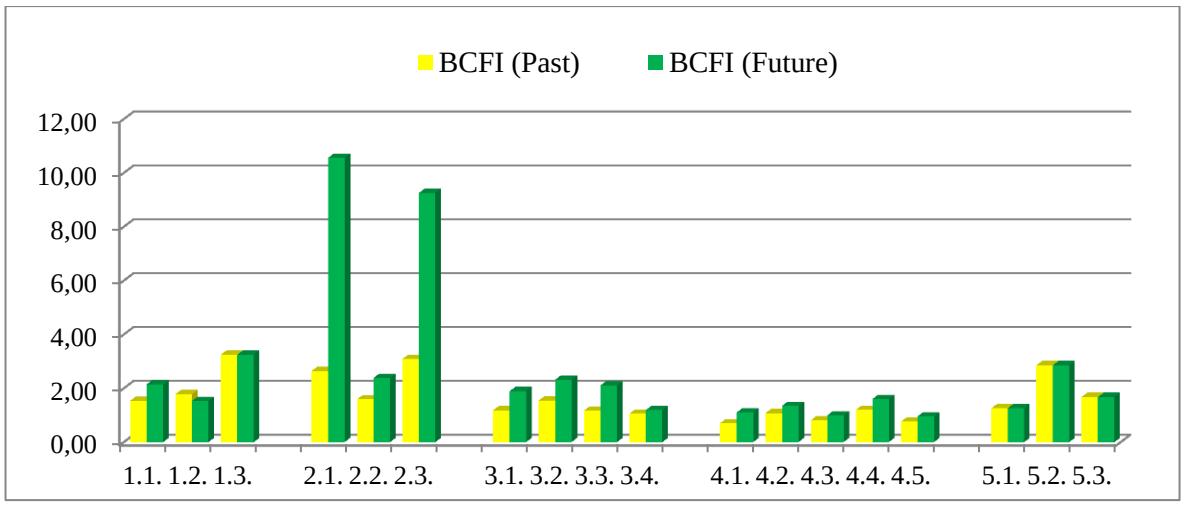

Figure 19. Vuokraus: BCFI (Past) vs. BCFI (Future) – BSC.

The following step is defining a manufacturing strategy. Table 11. presents the values for identifying the type of strategy which is considered to be the main operational strategy of the company by Vuokraus department. Therefore it can be noticed that, firstly, company strategy is sustainable and there is no huge difference between values in past and in future, and secondly, company strategy in past is analyzer and it remains as analyzer in future. In addition, it is worth to mention that according to the results, analyzer strategy is clearly defined here because it has the biggest value compared to others.

Table 11. Vuokraus: Values of the operational strategies.

		Prospector	**Analyzer**	**Defender**	**Reactor**
CFI	Past	0.90	**0.98**	0.91	0.91
	Future	0.90	**0.98**	0.91	0.90
BCFI	Past	0.90	**0.99**	0.91	0.91
	Future	0.91	**0.98**	0.91	0.91
SCFI	Past	0.91	**0.98**	0.92	0.91
	Future	0.91	**0.98**	0.91	0.91

4.3.4. Vuokravalvonta department

There were chosen five respondents from Vuokravalvonta department, who took part in research. Results will be defined and demonstrated further in the work.

Figures 20. and 21. show the comparison between experience and expectations of Vuokravalvonta department as a whole. Generally, there will be significant improvements for different attributes in future. According to the figure 20. training and development of the company's personnel; communication between different departments and hierarchy levels; design and planning of the processes and products; and usability and functionality of information systems attributes are expected to be essentially improved and invested some resources of case company. Nevertheless, it is reviewed that reduction of unprofitable time in processes is not expected to be enhanced in future. Taking into account the figure 21., Vukravalvonta department expects to pay considerable attention on such areas of the company as information technology; openness; benevolent collaboration; empathy; financial; and customer. The small changes in future will be expected in competence and sales areas.

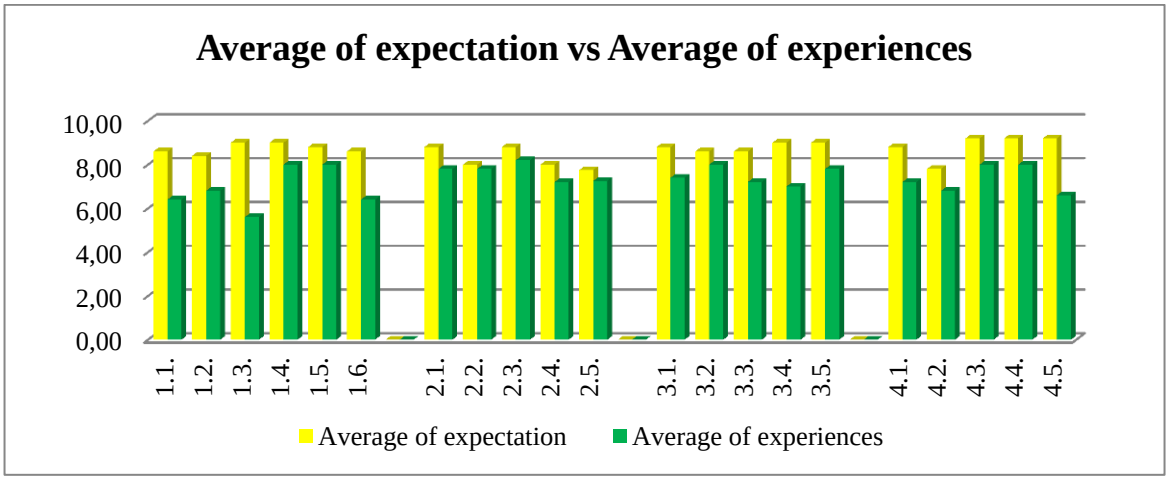

Figure 20. Vuokravalvonta: Average of expectations vs. Average of experience – OP.

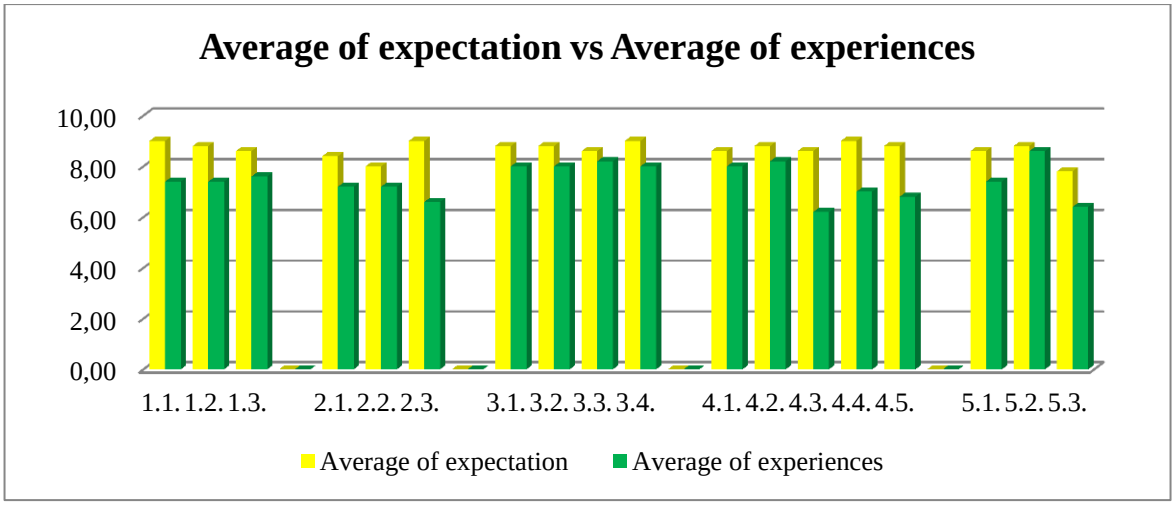

Figure 21. Vuokravalvonta: Average of expectations vs. Average of experience – BSC.

According to the second step of processing and analysis of raw data with the help of S&R method unbalanced areas of the company are determined by implementing CFI, BCFI and SCFI tools. Figures from appendices 40. and 41. expose that in past according to Vuokravalvonta department general situation of the company is not well-equilibrated. Based on BCFI method all attributes are defined as critical as well as based on CFI method. However, CFI calculations also demonstrate that there are six balanced attributes (training and development of the company's personnel; innovativeness and performance of research and development; design and planning of the processes and products; reduction of unprofitable time in processes; control and optimization of all types of inventories; and visibility of information in information systems) and one scattered attribute (adaptiveness of changes in demands and in order backlog). In addition, the figure from appendix 42. shows that all attributes are unclear and/or over-resourced. Nevertheless there are balanced (leadership and management systems of the company and information systems support the business processes) and critical (communication between different departments and hierarchy levels) attributes.

In addition figures from appendices 43. and 44. both reveal that the most of areas of the case company are critical with one scattered attribute – brand and one balanced attribute – process improvement. At the same time, according to the figure from appendix 45. the majority of attributes are scattered and uncleared with five in order attributes – customer loyalty; information technology; openness; benevolent collaboration; and empathy.

The following stage in S&R method is evaluating future period of time in accordance with OP and BSC types of questionnaires. In terms of OP questionnaire, figures from appendices 46. and 47. have the most of critical attributes. Moreover, adaptation to knowledge and technology and adaptiveness of changes in demands and in order backlog are defined as scattered and unclear attributes while training and development of the company's personnel; innovativeness and performance of research and development; design and planning of the processes and products; reduction of unprofitable time in processes; and visibility of information in information systems are defined as equilibrated and in order attributes. Besides that the figure from appendix 48. shows that there are only three balanced attributes (communication between different departments and hierarchy levels; utilizing different types of organizing systems (projects, teams, processes etc.); and usability and functionality of information systems among other over-resourced and potentially critical attributes.

Following analysis of the future period of time, in terms of BSC questionnaire the results are presented below (appendices 49., 50., and 51.). BCFI and CFI methods have the similar results which are that the majority of areas are critical and needed to be invested and put some resources in order to develop them. But there is the process improvement attribute which is defined as balanced (appendices 49. and 50.). On the contrary to the BCFI and CFI methods, SCFI method shows that balanced attributes such as customer loyalty; openness; benevolent collaboration; and empathy are presented and defined among all other uncoordinated areas of company (appendix 51.).

BCFI method is chosen as a main and basic method for further calculations, evaluations and making conclusions. Therefore, figures 22. and 23. below represent the trend of changes from past into future in terms of OP and BSC types of questionnaires. Figure 22. demonstrates that knowledge & technology management and information systems areas will be developed and invested more resources. Although most of areas in future will be need to be invested and changed of resource allocation. Process & work flows and organizational systems areas will not be developed significantly or entirely. Figure 23. represents modifications in learning & growth and trust areas, whereas there will not be any modifications in business performance area as the level of investing resources will remain in the same level. In addition, there will be slightly small changes in external and internal processes of the case company A.

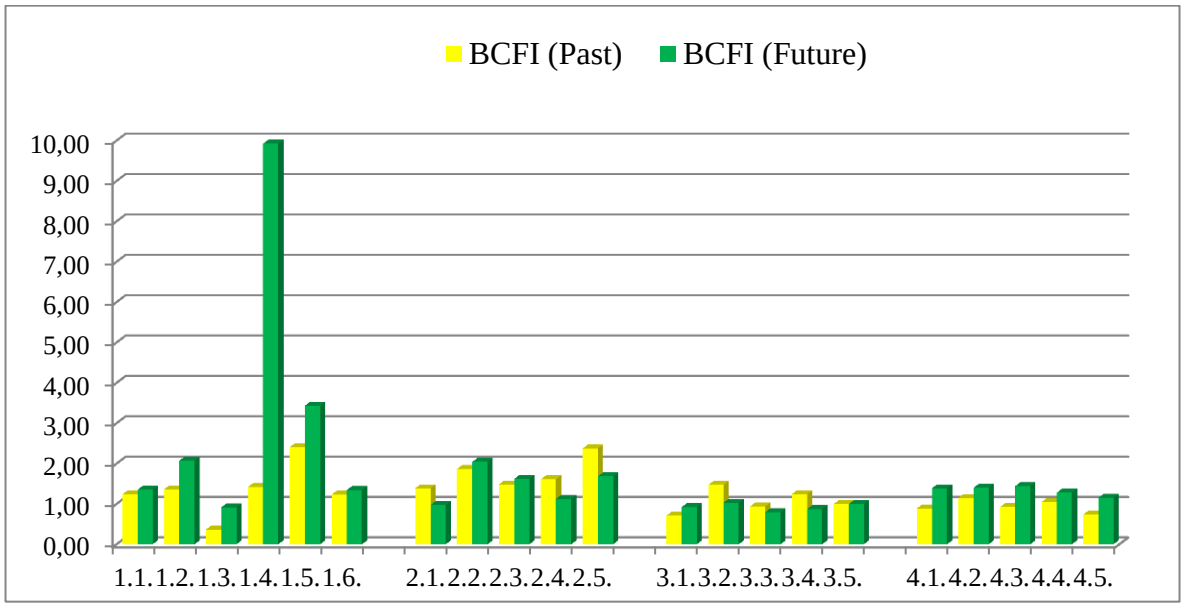

Figure 22. Vuokravalvonta: BCFI (Past) vs. BCFI (Future) – OP.

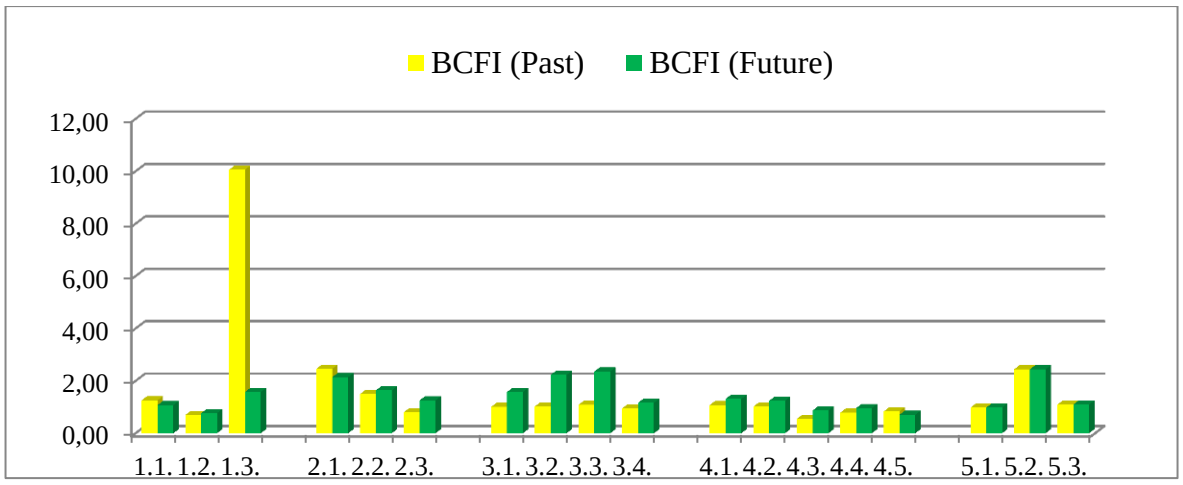

Figure 23. Vuokravalvonta: BCFI (Past) vs. BCFI (Future) – BSC.

In the final stage of analysis of Vuokravalvonta department, manufacturing strategy is presented. Table 12. demonstrates the values of the every strategy type which helps to identify the main operational strategy of the company based on Vuokravalvonta department. Indeed, based on results from the table 12., the company strategy is considered to be clearly analyzer from past and future perspectives. It can be concluded that analyzer strategy has the biggest values compared to other values. Moreover, in this situation, company strategy is considered to be sustainable because there are no huge gaps between past and future values and according to Vuokravalvonta department the company strategy remains the same.

Table 12. Vuokravalvonta: Values of the operational strategies.

		Prospector	**Analyzer**	**Defender**	**Reactor**
CFI	Past	0.89	**0.99**	0.90	0.89
	Future	0.89	**0.95**	0.91	0.90
BCFI	Past	0.90	**0.96**	0.91	0.91
	Future	0.91	**0.98**	0.92	0.91
SCFI	Past	0.90	**0.95**	0.90	0.90
	Future	0.90	**0.97**	0.92	0.91

4.3.5. Johto department

Similarly to Vuokravalvonta department there were five respondents from Johto department participated in the survey. Answers received from these participants are analyzed and processed in this chapter.

Figures 24. and 25. demonstrate the trend of changes between experience and expectations in Johto department in general. Consequently, based on the figure 24. some improvements will be implemented in all areas of operational performance, namely knowledge & technology management, processes & work flows, organizational systems, and information systems. On the other hand, figure 25. reveals that external structure and business performance areas are experienced more than will be expected to be invested and improved in future. Compared to other fields of business, only process improvement; information technology; knowledge; competence; and benevolent collaboration will be expected to be enhanced.

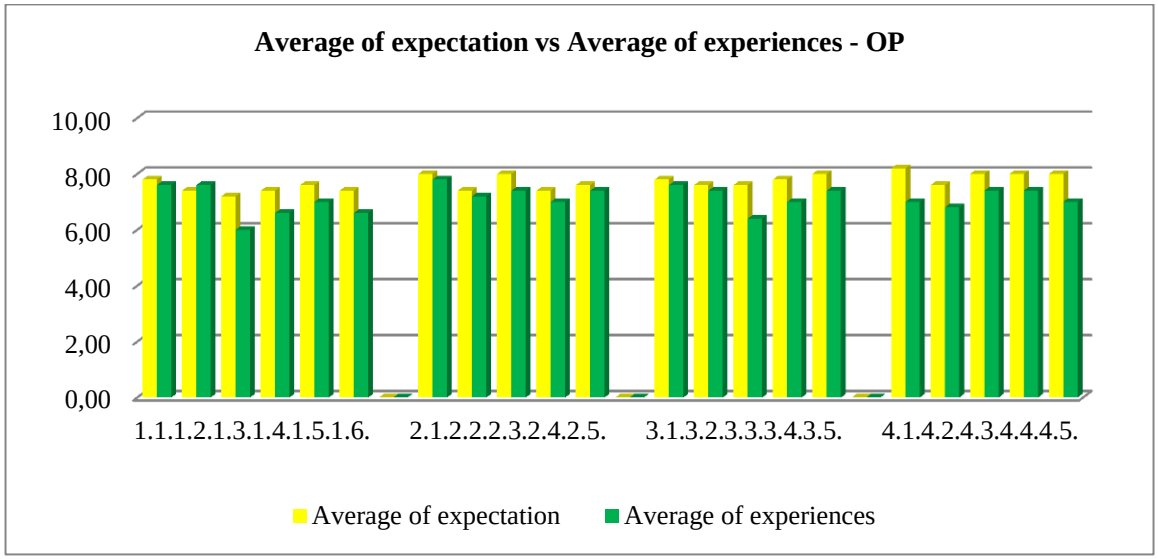

Figure 24. Johto: Average of expectations vs. Average of experience – OP.

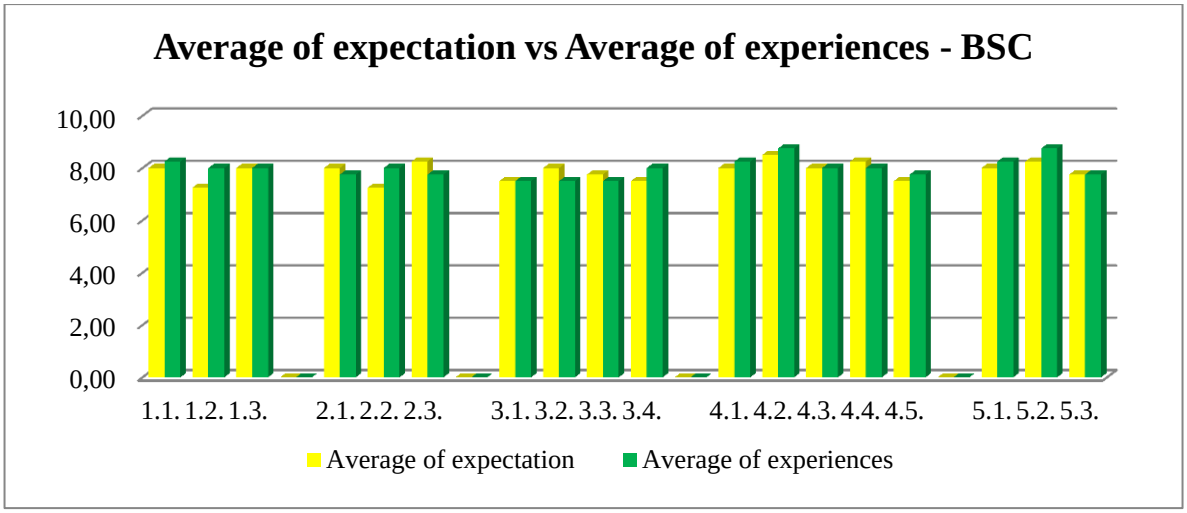

Figure 25. Johto: Average of expectations vs. Average of experience – BSC.

As it was mentioned above, the second stage of processing is S&R method. According to figures from appendices 52. and 53. both of figures show that the vast amount of attributes are defined as critical in past. However, there is a couple of attributes which are defined as scattered (innovativeness and performance of research and development and on-time deliveries to customer) and balanced (innovativeness and performance of research and development; short and prompt lead-times in order-fulfillment process; adaptiveness of changes in demands and in order backlog; and utilizing different types of organizing systems (projects, teams, processes etc.)) attributes. In contrast to figures from appendices 52. and 53., the figure from appendix 54. exposes that according to Johto all areas of operational performance are scattered and unclear.

Besides that based on BSC type of questionnaire, the past period of time is evaluated as well. Figures from appendices 55. and 56. both expose the results that almost all areas of the business are critical and needed to be resourced except four scattered (brand; process improvement; benevolent collaboration; and sales) and one balanced (innovation) attributes. According to the trend of SCFI calculations, similarly to the previous results,

figure from appendix 57. shows that all attributes are considered to be neither critical nor balanced attributes.

Afterwards, future period of time is analyzed and defined in the same way as past period of time. In terms of BCFI and CFI calculations showed in figures from appendices 58. and 59. identically to past period of time, most of attributes are red, but there are three scattered (knowledge and technology diffusion; design and planning of the processes and products and information systems support the business processes) and four balanced (which are represented in process & work flows and information systems areas) attributes. According to SCFI calculations compared to past in future all attributes will remain potentially critical or scattered (appendix 60.).

Equally important to analyze and process results from BSC type of questionnaire in future time perspective. Compared to past results, figures from appendices 61. and 62. have even more critical attributes and only innovation attribute stays as a balanced. In addition, yellow attributes in past have become red attributes in future, but still process improvement attribute stays in the same position and information technology attribute appears as an yellow in future. At the same time according to SCFI calculations, there are no considerable changes in future as attributes from the past remain the same in future, namely scattered and unclear (appendix 63.).

In order to make a small conclusion about general situation of Johto department, BCFI method is used as a primary tool for further analyze and processing. Figures 26. and 27. demonstrate the changes of values from past into future based on OP and BSC questionnaires. According to the figure 26., knowledge & technology management and information systems areas will have some enhancements. Process & work flows and organizational systems areas will not be improved significantly compared to two previous areas. In generally, based on OP questionnaire, the situation will be changed slightly as the

most of critical attributes will remain. Figure 27. demonstrates that generally most of areas will not be improved and developed. Only information technology and financial areas will have some enhancements, although they are slight. Moreover, there are attributes which will not be developed considerably because they will be in the same level. They are customer loyalty; process improvement; innovation; competence; engagement; and performance-to-promise.

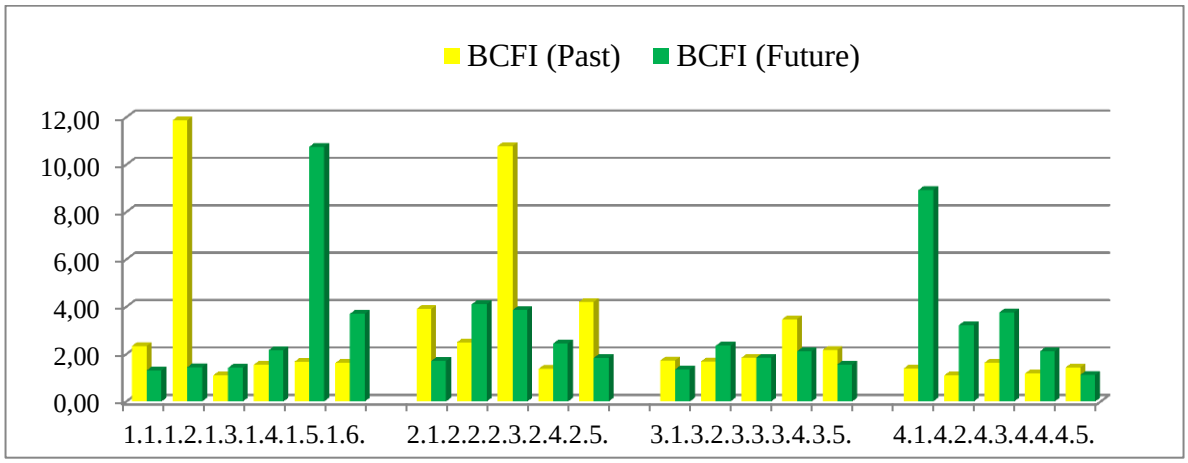

Figure 26. Johto: BCFI (Past) vs. BCFI (Future) – OP.

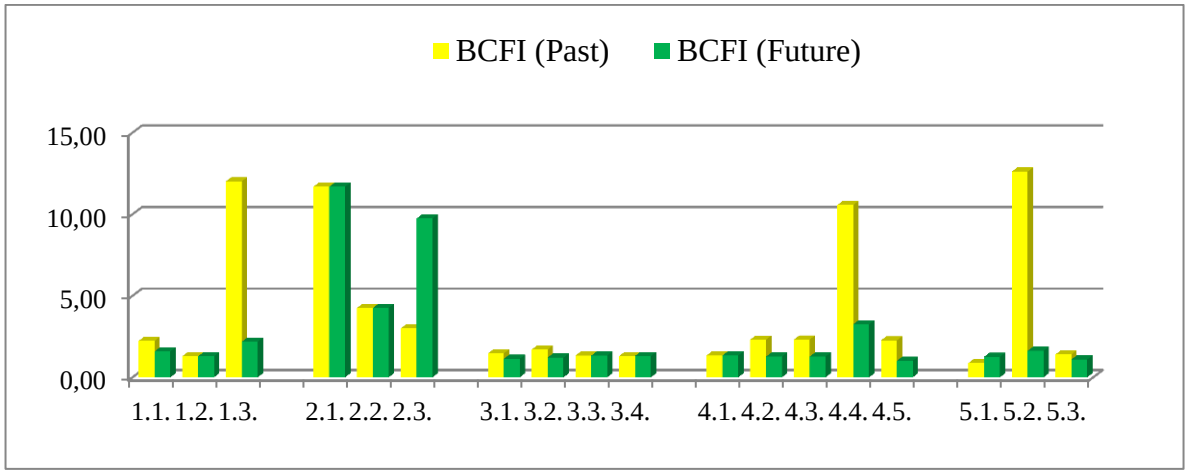

Figure 27. Johto: BCFI (Past) vs. BCFI (Future) – BSC.

Johto department is considered to be the main and leading department in the case company A. Therefore main decisions are made and confirmed in Johto division. Thus Technology and Knowledge ranking is defined in only Johto department as employees may be more aware about the whole situation of the company, than in previously mentioned departments.

The implementation index (IMPL) invented by Josu Takala and Teuvo Uusitalo (2012) is used in order to calculate the utility of the results which are received from AHP estimation. According to Takala et al. (2012) IMPL can be calculated by dividing the standard deviation of attribute estimation results by the value of the corresponding average value. Figures 28. and 29. show the deviation level between participants' responses. It has been decided that the lower value of an attribute (at least lower than one) the more trustworthy result is (Takala et al. 2012: 66). In this situation, based on the results from the figure 28., deviation of all attributes does not seem to be very good as more than half of values of attributes are over one but not much higher. However, engagement and empathy attributes from BSC questionnaire have the highest levels compared to others, which explains that there is much difference among respondents' answers (figure 29.).

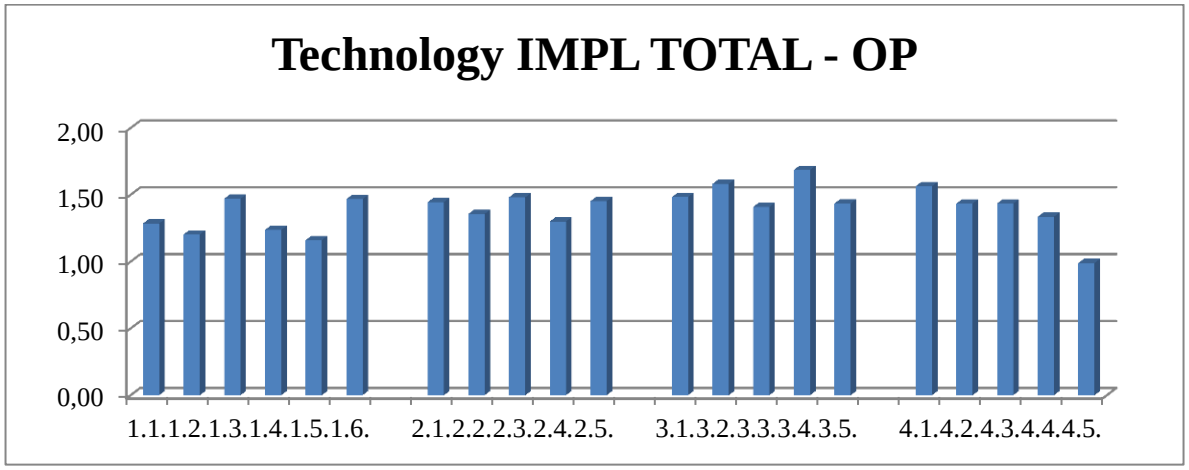

Figure 28. Johto: Technology IMPL Total – OP.

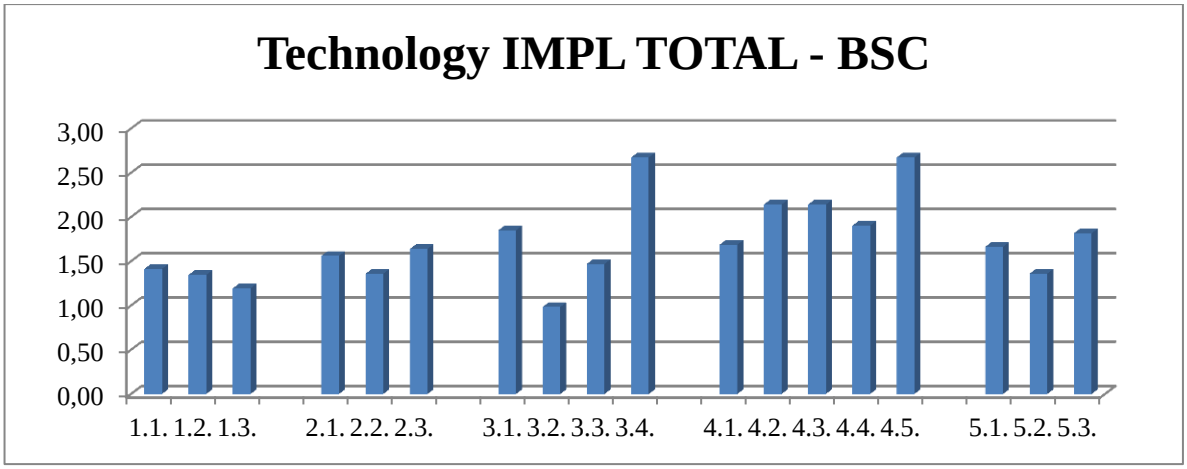

Figure 29. Johto: Technology IMPL Total – BSC.

Figures 30. and 31. present results from T/K ranking from Johto perspective. Based on figures below, case company's current competitive technologies (Core) are seemed to be around 60–70%, the technologies commonly used (Basic) vary from 20% to 30%, and the technologies focused on the future (Spearhead) are considered to be approximately 10% in average. In final consideration according to technology rankings, case company is found to be competitive and it can be seen that company's main aim is not to invest on the technologies focused on the future.

In addition, it is important to make comparison between BCFI (Future) and BCFI T/K. From the technology point of view, most of attributes are considered to be critical (as they are lower than 3.17), which explains that there is a lack of resource allocation. The values from BCFI T/K are even lower compared to values from BCFI (future). However, Knowledge and Technology diffusion is going to be over resourced. Company may concentrate more on both operational performance and right type of technologies for each attribute in order to make balance in general performance. Unfortunately, T/K has not provided a positive impact on the whole. (figure 32.)

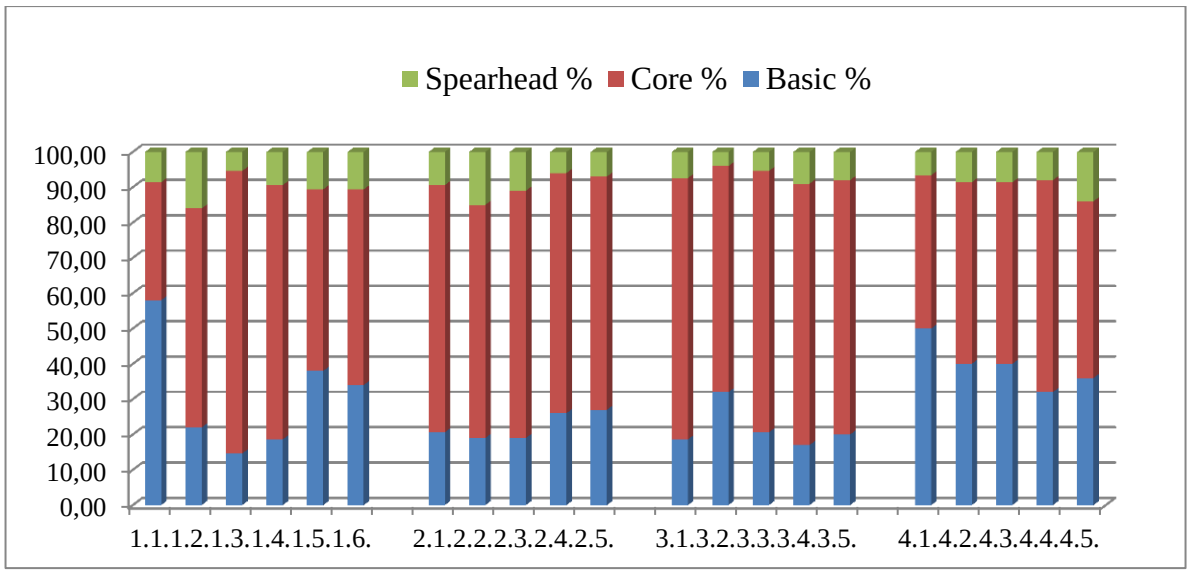

Figure 30. Johto: T/K ranking – OP.

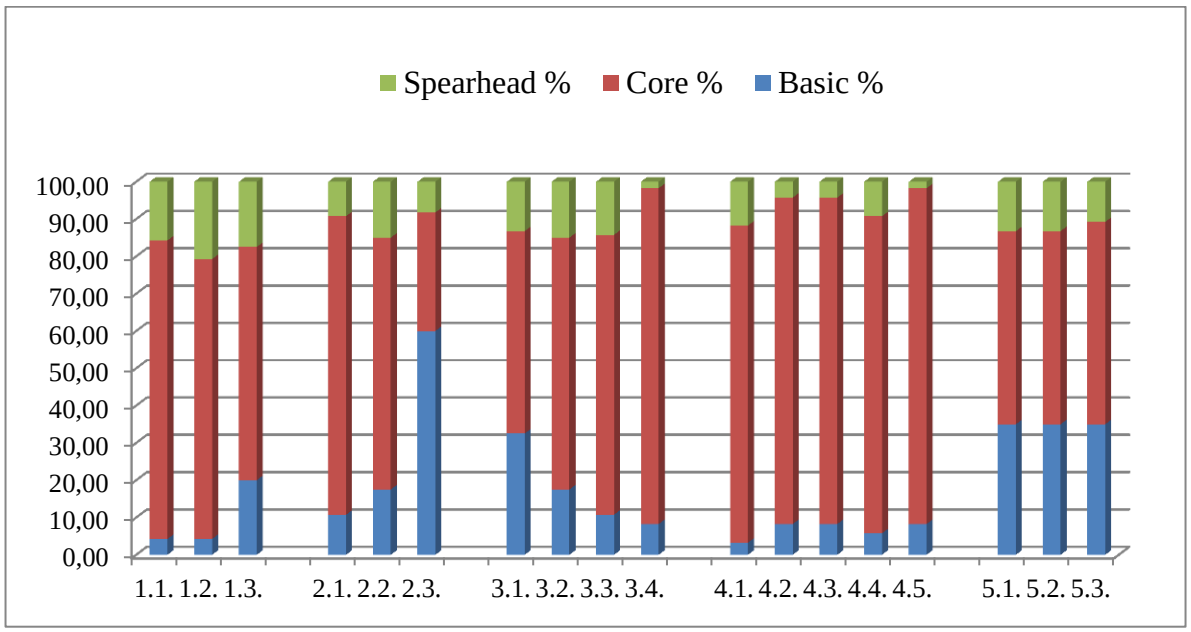

Figure 31. Johto: T/K ranking – BSC.

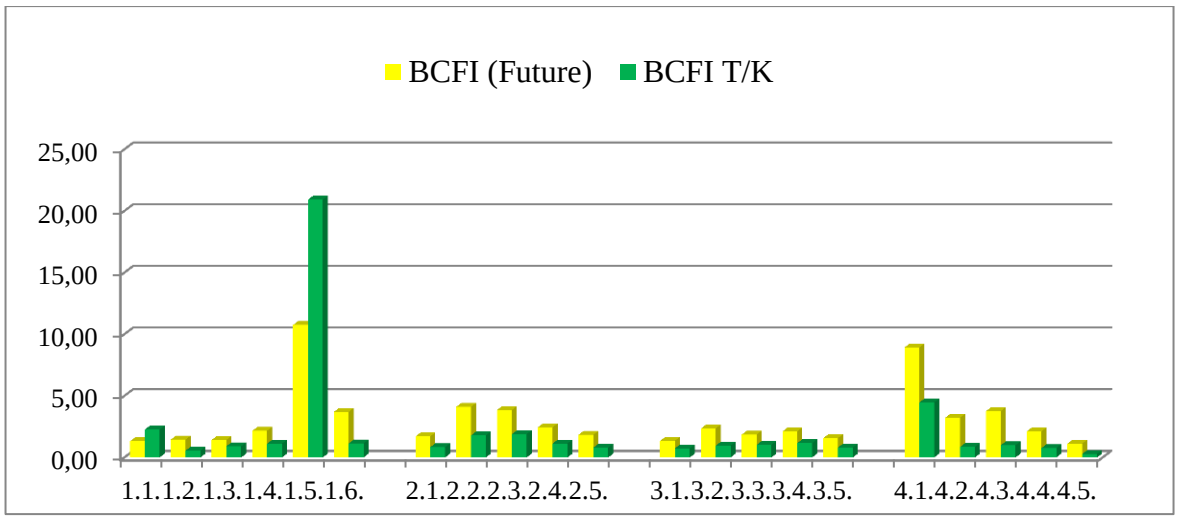

Figure 32. Johto: BCFI (Future) vs BCFI T/K.

The final step belongs to manufacturing strategy, with the help of which the company operational strategy is defined according to Johto department. Table 13. presents the values of the each operation strategy of the company based on Johto answers. Considering the values in the table below, in general the operational strategy is not sustainable. For instance, in past Johto department considers that company strategy is the combination of such strategies as analyzer, defender and reactor. In other words, based on CFI calculations the operational strategy is analyzer, based on BCFI – defender, and based on SCFI – combination of analyzer, defender and reactor. In future, situation is slightly different. Although the operational strategy in future is defined as the combination of analyzer, defender and reactor, but CFI calculations present that operational strategy is defender and reactor, BCFI calculations – analyzer, and SCFI calculations – analyzer. Another important fact is that considering Knowledge and Technology factor in BCFI calculations company strategy is considered to be defender whereas the position of company varies in absence of T/K factor.

Table 13. Johto: Values of the operational strategies.

		Prospector	**Analyzer**	**Defender**	**Reactor**
CFI	Past	0.92	**0.94**	0.91	0.91
	Future	0.92	0.92	**0.93**	**0.93**
BCFI	Past	0.91	0.91	**0.92**	0.91
	Future	0.91	**0.94**	0.92	0.92
SCFI	Past	0.91	**0.92**	**0.92**	**0.92**
	Future	0.91	**0.94**	0.93	0.92
BCFI T/K	Future	0.92	0.86	**0.95**	0.93

4.4. Findings

4.4.1. General performance of the case company A

In the final analysis summarized results of the whole case company A presented in this chapter are following. According to five departments of the company, namely Hallinto, Isännöinti, Vuokraus, Vuokravalvonta and Johto, improvements in operational and business performances are expected in the whole company. That can be explained by the respondents' answers about expectation and experience of the attributes. However, there are slightly different results based on Johto and Hallinto departments. For example, in terms of Hallinto department most of the areas are expected to be developed compared to past but in some attributes experience exceeds expectations. They are design and planning of the processes and products; code of conduct and security of data and information; performance-to-promise; professional relationship; and learning and growth area. At the same time Hallinto department believes that some areas of the company remain in the same level: innovativeness and performance of research and development; quality control of products, processes and operations; utilizing different types of organizing systems (projects, teams, processes etc.); knowledge; and sales. Similarly to Hallinto department, there is an opinion in Johto department that innovativeness and performance of research and development; innovation; engagement attributes, as well as external structure, trust and

business performance areas do not need any enhancements in future period of time. In contrast some attributes will stay in the same level. They are brand, know-how, openness and customer attributes.

To sum up the results made by S&R method past period of time of the case company A are described. As three tools were used (CFI, BCFI and SCFI) it can be concluded that operational performance need more accurate resource allocation among all attributes as well as investing and developing those areas in all departments. Both CFI and BCFI defined most of the attributes and areas as critical, while balanced attributes can be considered in such areas as technology and knowledge management (design and planning of the processes and products; innovativeness and performance of research and development; and knowledge and technology diffusion), process & work flows (adaptiveness of changes in demands and in order backlog) and organizational systems (leadership and management systems of the company and well defined responsibilities and tasks for each operation). Moreover, the most interesting finding within unclear attributes was that the case company A has not unified information systems area. Also, quality control of products, processes and operations and on-time deliveries to customer are defined as scattered attributes. On the other hand, based on SCFI calculations from all departments, all attributes are defined as scattered and unclear for employees, which in future should be put more attention on as they may become critical.

In the same way the results from BSC questionnaire are concluded. In past, in terms of CFI and BCFI calculations, similarly to OP questionnaire, most of the attributes and areas are critical. On the contrary such areas as external structure (customer loyalty), internal process (innovation and information technology), learning and growth (engagement), and trust (performance-to-promise, professional relationship, openness, and empathy) are defined as balanced. Unclear attributes for case company A are considered to be brand, process

improvement and sales. In addition, based on SCFI calculations, all attributes from BSC questionnaire are evaluated and defined as unclear and/or over-resourced.

Results concerning future period of time are made on the basis of S&R method. According to the OP questionnaire, both CFI and BCFI calculations represent outcomes following: majority of attributes will remain critical even though there will be carried out some improvements, whereas balanced attributes will appear in such areas as knowledge & technology management (training and development of the company's personnel; innovativeness and performance of research and development; knowledge and technology diffusion; and communication between different departments and hierarchy levels), process & work flows (on-time deliveries to customer and reduction of unprofitable time in processes) and information systems (availability of information in information systems; visibility of information in information systems; quality & reliability of information in information systems; and usability and functionality of information systems). Furthermore, scattered attributes are considered to be adaptation to knowledge and technology; adaptiveness of changes in demands and in order backlog; and information systems support the business processes. Besides CFI and BCFI indexes, based on SCFI calculations, all areas of the company are defined as scattered and unclear.

Equally important to results based on OP questionnaire, main outcomes based on BSC questionnaire are conducted. Both CFI and BCFI calculations demonstrate that greater number of attributes is determined as critical. During this time only few attributes are described as balanced (benevolent collaboration, innovation, and financial) and scattered (information technology and process improvement). In contrast to CFI and BCFI methods, SCFI tool presents such outcomes – total number of attributes is unclear and/or over-resourced.

In description of all departments BCFI method has been chosen as the main method of calculation and basis for further calculations and evaluations. Thus BCFI (Past) and BCFI (Future) outcomes have been compared in each department. By summarizing all the results mentioned above, generally in future situation will be improved significantly compared to past in terms of OP questionnaire. However, there will not be enhancements in future period of time in such attributes as design and planning of the processes and products; short and prompt lead-times in order-fulfillment process; on-time deliveries to customer; adaptiveness of changes in demands and in order backlog; quality control of products, processes and operations; and utilizing different types of organizing systems (projects, teams, processes etc.).

In accordance with results from BSC questionnaire, it can be summed that in future most of areas will be improved. Nevertheless customer satisfaction, brand and empathy will not be put resources and thus will not have enhancements. Additionally to that innovation, competence, customer satisfaction, sales and customer will remain in the same level, which means that the same amount of resources will be invested into such areas of company.

Johto department is considered to be the leading department among others. Based on answers of respondents from Johto department, core technology is defined as leading technology and main competitive advantage of the company.

4.4.2. Defining of operational strategy of the case company A

To summarize information presented above about the operational strategy of the company, it can be summed that according to the answers of five departments of the company A fundamental and leading operational strategy is analyzer in both periods of time, namely past and future. However, it is important to mention that according to past period of time there are some variances from Hallinto and Johto departments. Employees from these two

departments believe that operational strategy of the company is balancing between prospector, defender and analyzer. Similarly to past, the main strategy of the company in future varies according to Isännöinti and Johto departments, specifically it is determined as a combination of defender, analyzer and reactor strategies. Moreover, according to Technology and Knowledge criteria main strategy of company is considered to be defender. It means that even though company's primary strategy is analyzer, but it behaves in the market in terms of main technology as a defender.

For the case company this situation means that as an analyzer company is balancing between quality, cost and time main competitive advantages. It stays in stable environment by keeping already existed customers and by keeping stability in business processes as well as in the market but at the same time it is flexible for the slight market changes. According to Daft (2009: 70–80) analyzer company takes place in the middle of prospector and defender by taking some advantages from both strategies. For instance, company pays attention on quality of the services in housing business market, affordable prices as well as stable market share. However, meantime main operational strategy is analyzer, company implements Technology and Knowledge as a defender – the main competitive advantage is in low-cost prices.

4.4.3. Performance of Sustainable Competitive Advantage

In the final analysis SCA is calculated and interpreted (tables 14. and 15.). Two periods of time are introduced in these tables, namely before crisis (which means that it is a period of time approximately two – three years ago) and during crisis – present time. The values of SCA are between 0 and 1. Therefore, values which are close or greater than 0.97 are considered to be high, values which vary from 0.93 to 0.97 are defined as medium high and values which are from less than 0.93 – low values.

Table 14. SCA: Before crisis.

BEFORE CRISIS = PAST			
Hallinto			
	CFI	BCFI	SCFI
MAPE	0.95	0.93	0.94
RMSE	0.97	0.95	0.96
MAD	0.97	0.96	0.97
Isännöinti			
	CFI	BCFI	SCFI
MAPE	0.87	0.88	0.87
RMSE	0.92	0.92	0.91
MAD	0.93	0.94	0.93
Vuokravalvonta			
	CFI	BCFI	SCFI
MAPE	0.85	0.89	0.89
RMSE	0.90	0.92	0.92
MAD	0.93	0.94	0.94

Johto			
	CFI	BCFI	SCFI
MAPE	0.97	0.92	0.90
RMSE	0.94	0.95	0.94
MAD	0.96	0.96	0.95
Vuokraus			
	CFI	BCFI	SCFI
MAPE	0.87	0.87	0.88
RMSE	0.92	0.91	0.91
MAD	0.93	0.93	0.94

Table 15. SCA: During crisis.

DURING CRISIS			
Hallinto			
	CFI	BCFI	SCFI
MAPE	0.82	0.77	0.76
RMSE	0.89	0.86	0.85
MAD	0.92	0.89	0.89
Isännöinti			
	CFI	BCFI	SCFI
MAPE	0.87	0.86	0.81
RMSE	0.92	0.91	0.88
MAD	0.94	0.93	0.91
Vuokravalvonta			
	CFI	BCFI	SCFI
MAPE	0.79	0.77	0.78
RMSE	0.87	0.86	0.87
MAD	0.90	0.89	0.90

Johto				
	CFI	BCFI	SCFI	BCFI T/K
MAPE	0.97	0.83	0.83	0.89
RMSE	0.91	0.90	0.90	0.93
MAD	0.93	0.92	0.92	0.95
Vuokraus				
	CFI	BCFI	SCFI	
MAPE	0.76	0.76	0.77	
RMSE	0.85	0.85	0.86	
MAD	0.89	0.89	0.89	

On the whole situation, it can be concluded that in past resource allocation for attributes is strengthening the operational strategy of the company, which is analyzer, to a certain extend. It can be seen from the table 14., which shows that Hallinto and Johto departments have the lowest risk levels, which can be defined as medium. However, other departments have the highest risk levels – low levels – which are slightly lower than 0.10 but are not that significant taking into the consideration all positive results.

Table 15. demonstrates the situation which is that during crisis risk levels in all departments have increased considerably because of changes implemented in the whole company. Moreover, the highest risk level can be considered in Vuokravalvonta department whilst Johto has the lowest risk level – slightly less than 0.10. Thus resource allocation for the future period of time is insufficient and the operational strategy is unsustainable. There is a suggestion towards improvement this situation that is to focus on the proper distribution and allocation of the resources between all attributes as well as to dispose the technology ranking according to the critical resource allocation.

5. DISCUSSION AND CONCLUSIONS

5.1. General findings and contributions

This work studies the evaluation and validation of resource allocation from operational competitiveness perspective in the housing business. Sustainable competitiveness can be reached through defining the operational strategies which include competitive priorities. Therefore these entire criterion are based on resource allocation of company. It is vital for managers to make accurate and right decisions about resource allocation which can lead to the choosing right operational strategy and thus to sustainable competitiveness as it has a positive influence on the company's effective performance.

Analytical model was presented by S&R method with the help of which critical areas of company performance from experience and expectations point of views were indicated as well as SCA method with the help of which risk levels were calculated and defined. This analytical model presented in this work provides sources for discovering the strong and weak points in company performance as well as common strategy by effective resource organization. According to this method managers have possibilities to make right decisions and actions in order to grant sustainable process of company's development.

The empirical part is concentrated on one case study of company which is performing in housing market in Turku. In this case it helps with deeply analysis of the company, namely determining general company performance, organizational strategy as well as competitive levels before and during crises. Consequently, research questions have been brought for consideration and discussion in this paper.

Briefly, main findings explained and concluded in this work are following:

- Method of defining and evaluating of SCA

In order to succeed in evaluation and defining of SCA in the company the main steps have been implemented. Firstly, S&R method is implemented with the help of which main competitive priorities and thus operational strategy are defined. In addition, S&R method represents the whole picture of every department from good or bad performance prospective. Then AHP and MSI methods are used. It has been chosen the main and basic criteria for further calculations. Answers of CEO of the case company A were chosen as essential responses for AHP and MSI methods. Finally, formulas mentioned in the section 3.5. are executed to get the ultimate results.

- Relationship between SCA and S&R resource allocation

According to the results concluded from the case company A, better sustainable competitive level depends on the better resource allocation in the company. In both periods of time (past and future) all departments have low or middle level of risks. Only Johto department keeps itself in better position compared to other departments which can be explained of better performance and can be considered as a main decision maker.

From the mathematical point of view, there is no direct or indirect relationship between SCA and S&R resource allocation profiles. All departments have been noticed to have majority of the critical areas and thus low values for each attribute.

- Appropriate operational strategy of the company in the housing market

Case company A tries to keep a strong position as an analyzer. It has effective core ability in performing in the housing market while there are no powerful competitors. Strategic advantages of this situation can be following: prices meet the requirements by customers as well as by the company itself while the quality of services correspond to prices and can be considered to be high. However, from the technology point of view, company A believes that operating in the housing market as a defender may be more effective, where it is stable in the market and the main advantage is cost.

To conclude, all research questions can be summarized in the following conclusion. Sustainable competitiveness is estimated on the basis of the general competitive performance by defining core competitive priorities, core technology and operational performance. It can be achieved through utilizing of sense & respond method in order to divide and allocate resources in efficient way, pairwise comparison method in order to define the most acceptable competitive priorities and SCA method in order to see the risk level of the company. Implementing such a plan helps to make more productive and useful decisions by managers.

5.2. Theoretical and functional implications

An important implication of this study is to create a system for evaluation of the whole competitiveness of the company based on decision making and resource allocations of the company by implementing analytical models, which were proposed in this work. They are S&R, AHP, MSI and SCA methods. In addition, technology level model is used in order to support the competitive level of the organization. Such a system helps managers to understand general situation of the company as well as each department in it.

The practical implication of this work has possibilities to make it eventual from the whole company perspective. This micro/internal evaluation of the company helps to reduce information gap and ineffective decision making starting from the company operation performance to the strategic direction between departments. Every department is evaluated in order to see the general performance, how it deals with the new implementations from the top-management side, how efficient resources are located and used, what operational strategy is put to use as the main, and what the risk level is. Thus managers can make decisions for the future of the company based on this kind of information in order to develop and strengthen competitiveness of the company in the market.

The possible benefits of such system/model proposed in this study include:

- Optimization of costs spent on the appropriate and needed areas of departments;
- Efficient resource allocation inside every department;
- Having improvements in every department of the company;
- Competitive increase inside and outside the company.

5.3. Validity and reliability

Validation of results is significant in any research as it is very important to know whether results are applicable, durable and reliable. Moreover, it gives the possibilities of revealing the failings and assessments of the study for the future research works in such an area.

The validation method was organized within one company but among five different departments. The number of respondents from each department was satisfactory and acceptable in order to conclude secure statements. Respondents were chosen from each department as representatives of their own departments as well as person who are aware of the operational performance of the case company.

Equally important that the precise documentation has been used, namely forms and questionnaires from AHP and S&R methods. Respondents have been provided with necessary instructions for using forms and questionnaires in right way in order to avoid uncertainty in answers.

According to AHP method, inconsistency ratio is used for checking of answers' reliability. In this work, inconsistency ratio is less than 0.30 which proves that the answers are reliable and valid. In addition, validity of such factors as defined strategy and general operational

performance situation was supported by the top-managers of the case company A by agreeing and confirming the results and data.

5.4. Limitations and future research

In order to have success in implementing of the analytical models mentioned in this work it is essential to eliminate and/or conquer the limitation of these models. Such as:

- as the research method can be considered as qualitative, thus it means that generally not all respondents may have a full knowledge and enough professional qualification in the area, where they are performing now. It may lead to the detection of a wrong picture of business processes and general performance of the company. Moreover, more characteristics of respondents are needed. For example, name of the position, work experience in this area, age, sex, and educational background etc.
- even though at the beginning it is a qualitative method of the research, which transforms later into quantitative research method, with the help of S&R, SCA, MSI and SCA methodologies the reasons of the results cannot be seen, specifically why the company faces the problems in such areas, has such an operational strategy, and why the risk level is so high or low. Therefore, there is an suggestion which is that after making the full analysis based on the questionnaire, the interview with the top-managers should be arranged in order to confirm the results and more important to see the whole process: income-outcome;
- from S&R method three indexes have been used: CFI, BCFI and SCFI. These three tools should be further tested and developed in order to have the one which can be more accurate than others. The same issue applies to SCA. There are three methods are used in order to calculate the risk level, where the results do not vary significantly. However, these methods should be tested and improved more;

- the results of the case study cannot be generalized and implemented outside the company in the same market place. This case company does not represent the general situation and development in the whole market place.

Nevertheless, there is a certain number of ideas offered further for future research. As it was already mention in the part of limitations that this work is based on the case company, where research and deep analysis have been carried out inside the company. The main idea is about that the future research might be implemented outside the company: micro results are brought out to the macro-level. In this case, competitive level will be defined from both perspectives: internal and external sides. In addition to that, more companies should be analyzed and tested in order to see the whole situation in the market and thus to make wider and more universal conclusions.

Furthermore, S&R and SCA methods should be more developed and tested in more cases as it will help to define the accurate and the most efficient tool for detection of, for instance, critical areas of the company, company strategy and risk levels. Consequently, resource allocation can be divided and distributed more precisely within the company based on the proper decision making.

Additionally, environmental influence should be taken into the consideration in the future researches. The main purpose of this criterion is that government, politics, global crisis etc. can all have significant impact on the company performance (for example, deeper crisis, worse performance, lack of resources etc.) as well as on the competitiveness of the company in the market. Therefore the optimization of analytical method is needed according to the external environment influence. Moreover, the market research and market trends can be researched for easier adaptation of the company to the market and also for improving the competitiveness.

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APPENDICES

APPENDIX 1. S&R questionnaire – OP form.

	ATTRIBUTES	
	Knowledge & Technology Management	
1.1	Training and development of the company's personnel	← Flexibility
1.2	Innovativeness and performance of research and development	← Cost
1.3	Communication between different departments and hierarchy levels	← Time
1.4	Adaptation to knowledge and technology	← Flexibility
1.5	Knowledge and technology diffusion	← Cost
1.6	Design and planning of the processes and products	← Time
	Processes & Work flows	
2.1	Short and prompt lead-times in order-fulfillment process	← Flexibility
2.2	Reduction of unprofitable time in processes	← Cost
2.3	On-time deliveries to customer	← Quality
2.4	Control and optimization of all types of inventories	← Quality
2.5	Adaptiveness of changes in demands and in order backlog	← Flexibility
	Organizational systems	
3.1	Leadership and management systems of the company	← Cost
3.2	Quality control of products, processes and operations	← Quality
3.3	Well defined responsibilities and tasks for each operation	← Flexibility

	ATTRIBUTES	
3.4	Utilizing different types of organizing systems	← Flexibility
3.5	Code of conduct and security of data and information	← Cost
	Information systems	
4.1	Information systems support the business processes	← Time
4.2	Visibility of information in information systems	← Time
4.3	Availability of information in information systems	← Time
4.4	Quality & reliability of information in information systems	← Quality
4.5	Usability and functionality of information systems	← Quality

APPENDIX 2. S&R questionnaire – BSC form.

	ATTRIBUTES
	External Structure
1.1	Customer satisfaction
1.2	Customer loyalty
1.3	Brand
	Internal Process
2.1	Process improvement
2.2	Innovation
2.3	Information technology
	Learning and Growth
3.1	Know-how

	ATTRIBUTES
3.2	Knowledge
3.3	Competence
3.4	Engagement
	Trust
4.1	Performance-to-promise
4.2	Professional relationship
4.3	Openness
4.4	Benevolent collaboration
4.5	Empathy
	Business Performance
5.1	Financial
5.2	Sales
5.3	Customer

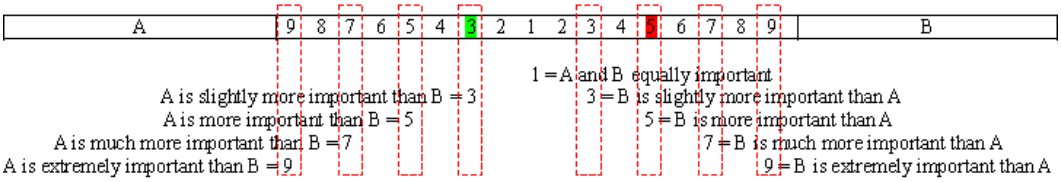
APPENDIX 3. Manufacturing Strategy questionnaire.

Company name_____Country_____
Main business area_____
Position and area in charge_____

All information provided by interviewee is kept confidential and will not be published anywhere.

INTRODUCTION OF USING AHP

AHP method uses pair wise comparison among all the factors to support decision making process. All questions in this questionnaire are designed to follow AHP logic. It takes two steps to answer each question. For instance, you are given two different criteria which affect manufacturing decision making. Firstly you need to compare these two given factors and select one factor which you considered as more important than the other (for example: A is more important than B or vice versa). Secondly you need to give a weight within scale of 1-9 to indicate in what extent you consider this selected factor is more important than the other one. If the factors are equally important, then select number 1. You can also use even numbers from the scale, if your answer is better suited between odd numbers.



EXPLANATION OF INCONSISTENCE RATIO (ICR)

In order to ensure the validity of answers, two incorrect examples with high inconsistence ratio (ICR) are illustrated below. By understanding the causes of ICR, informants are recommended to recheck the consistency after filling the answers.

Example 1:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

This means A>B & B>C & C>A which is logically inconsistence, so it causes high ICR.

Example 2:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

This means A is much bigger than B, and A is a little bigger than C, from these two conditions it can be concluded that C should be bigger than B, but last condition put B is bigger than C, which is contradictory and causes high ICR.

FILLING THE QUESTIONNAIRE

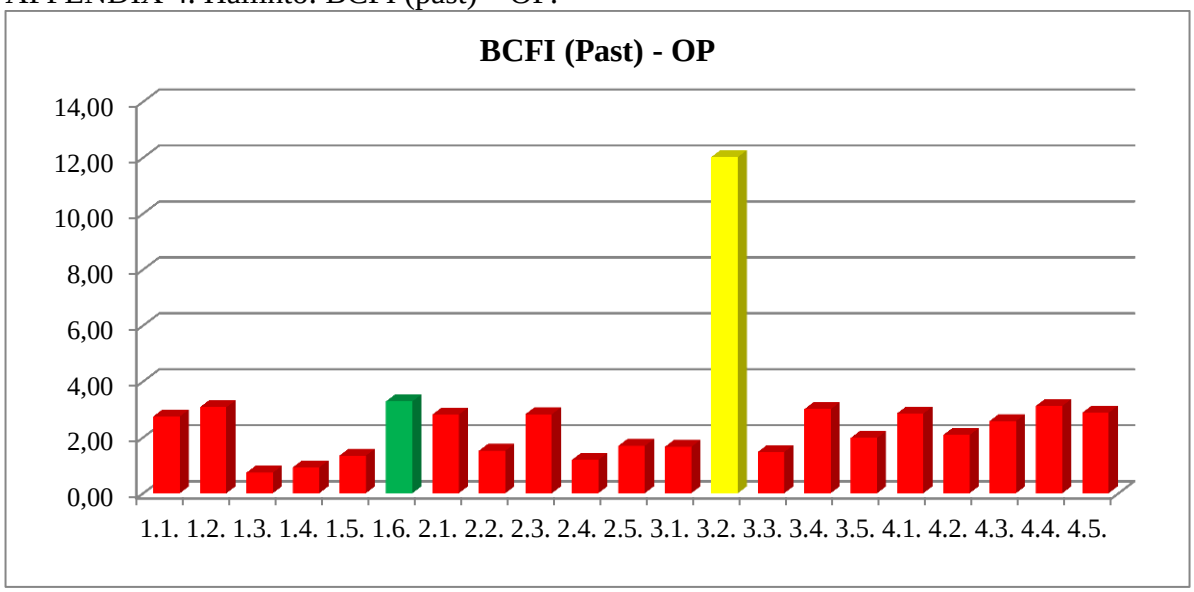
Please evaluate the following criteria in every pair wise comparisons what are more important in your opinion. Please mark the evaluation values in GREEN colour for normal business situation (before crisis) and in RED colour for crisis situation (during crisis). If they are happened to be the same value in both situations, please mark in YELLOW colour.

MANUFACTURING STRATEGY QUESTIONNAIRE

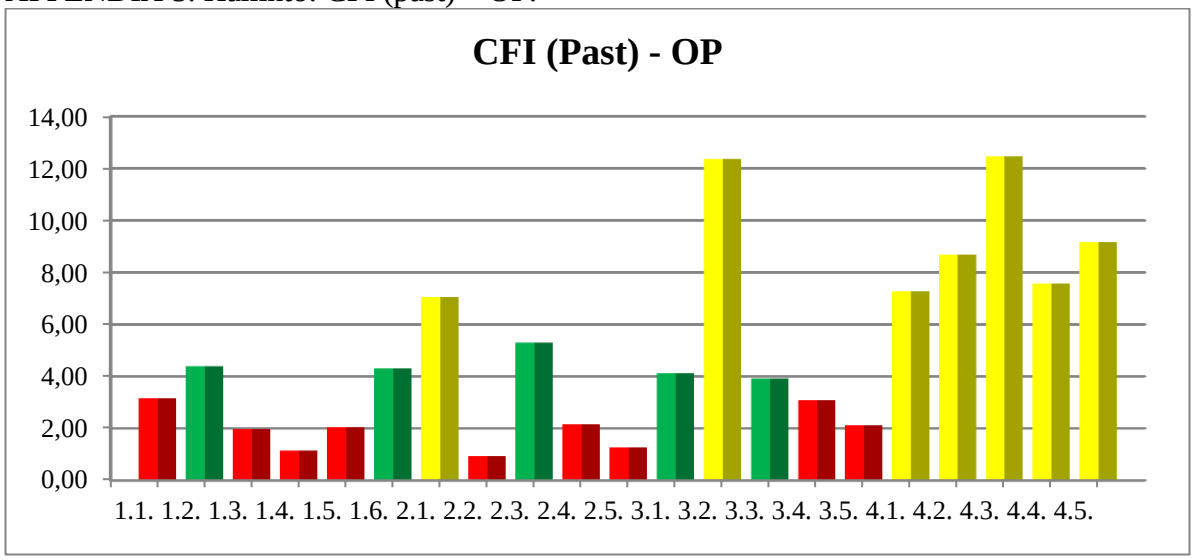
Costs	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Quality
Costs	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Delivery
Costs	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Flexibility
Quality	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Delivery
Quality	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Flexibility
Delivery	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Flexibility

THANK YOU FOR YOUR ANSWER!

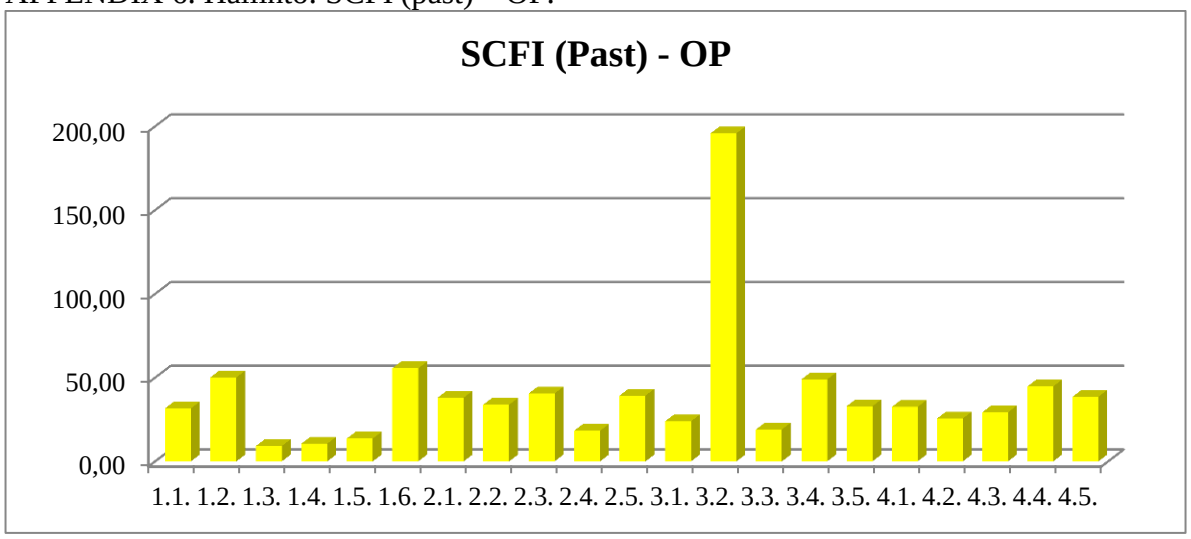
APPENDIX 4. Hallinto: BCFI (past) – OP.



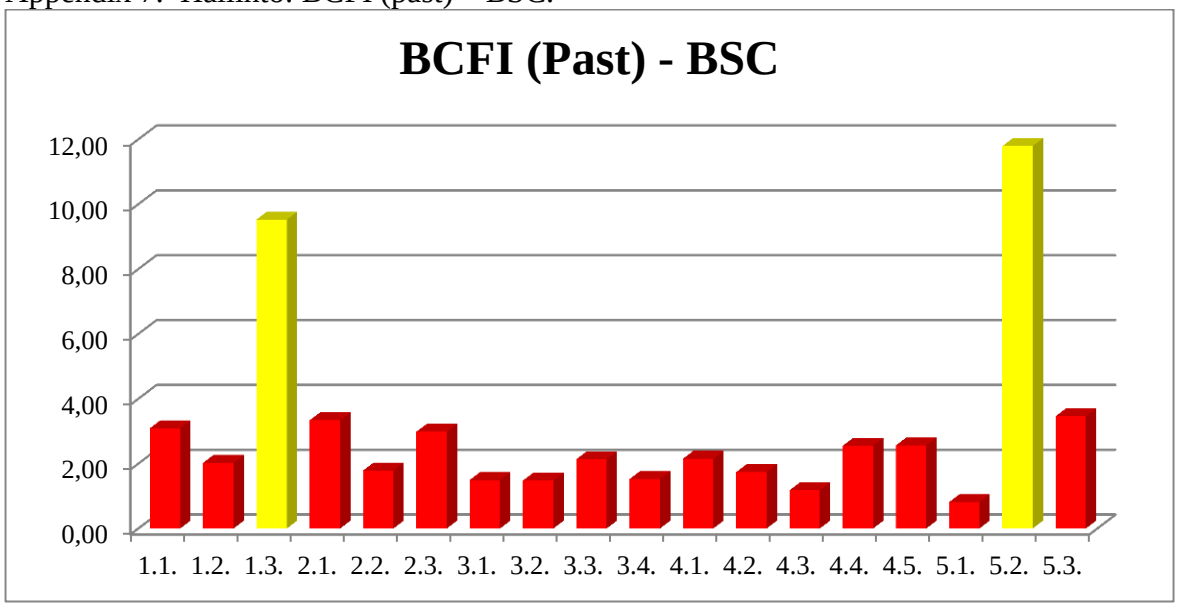
APPENDIX 5. Hallinto: CFI (past) – OP.



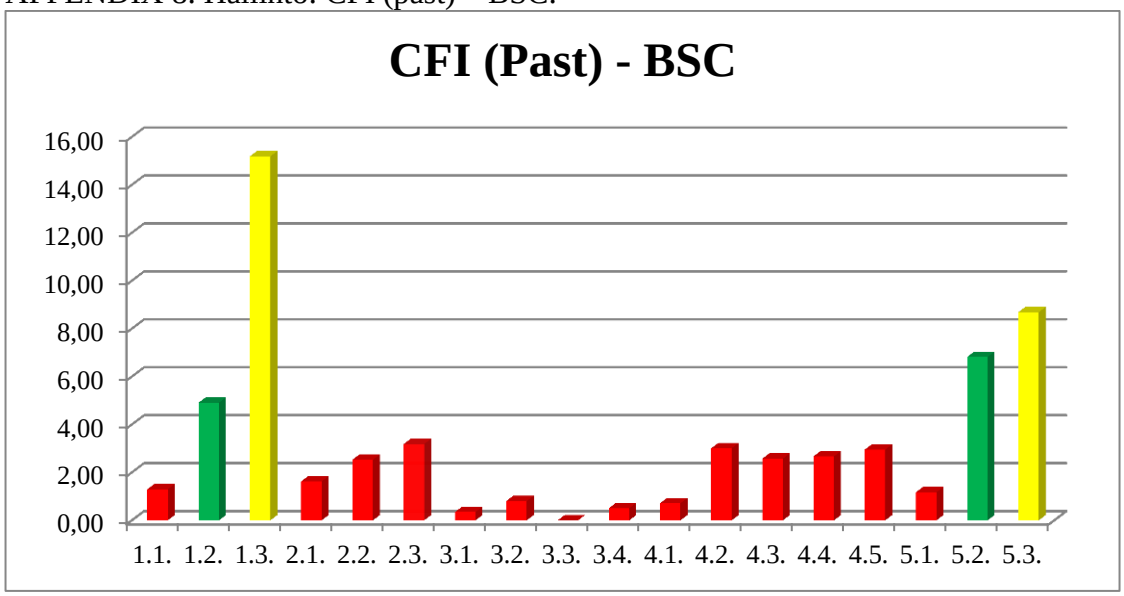
APPENDIX 6. Hallinto: SCFI (past) – OP.



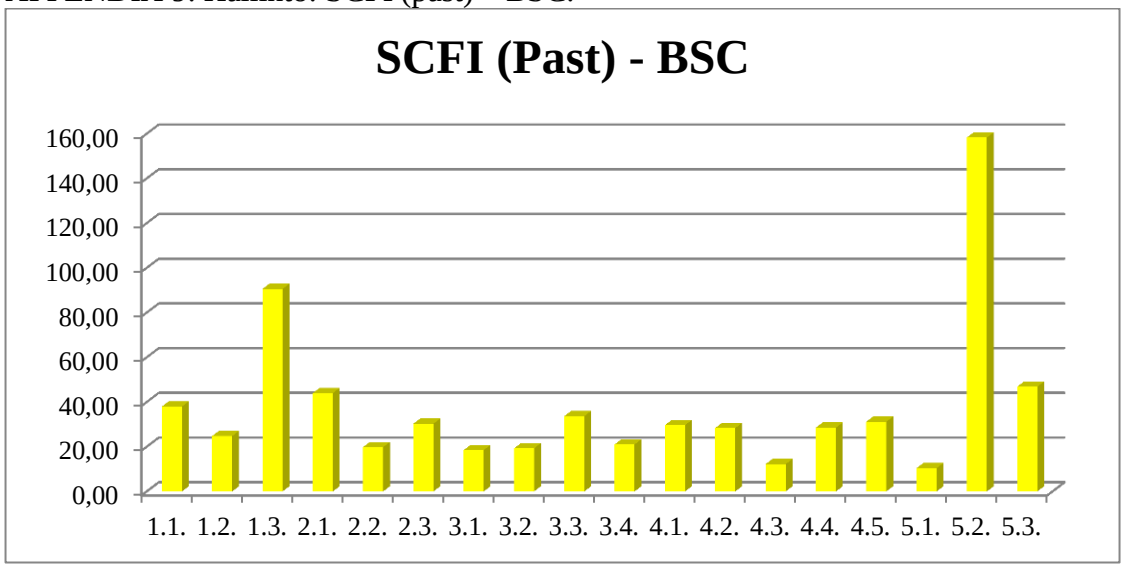
Appendix 7. Hallinto: BCFI (past) – BSC.



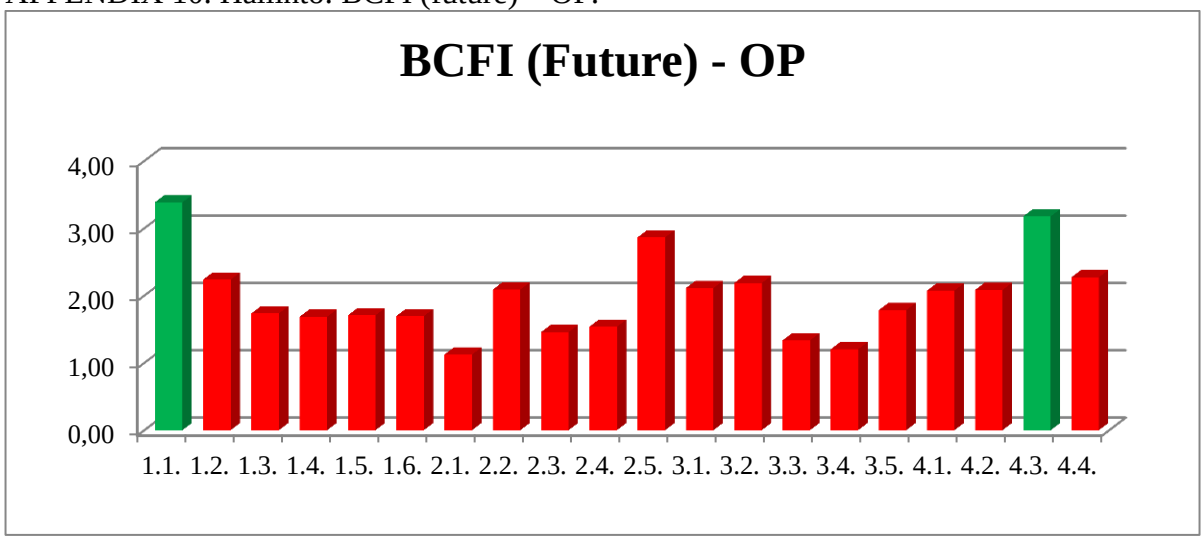
APPENDIX 8. Hallinto: CFI (past) – BSC.



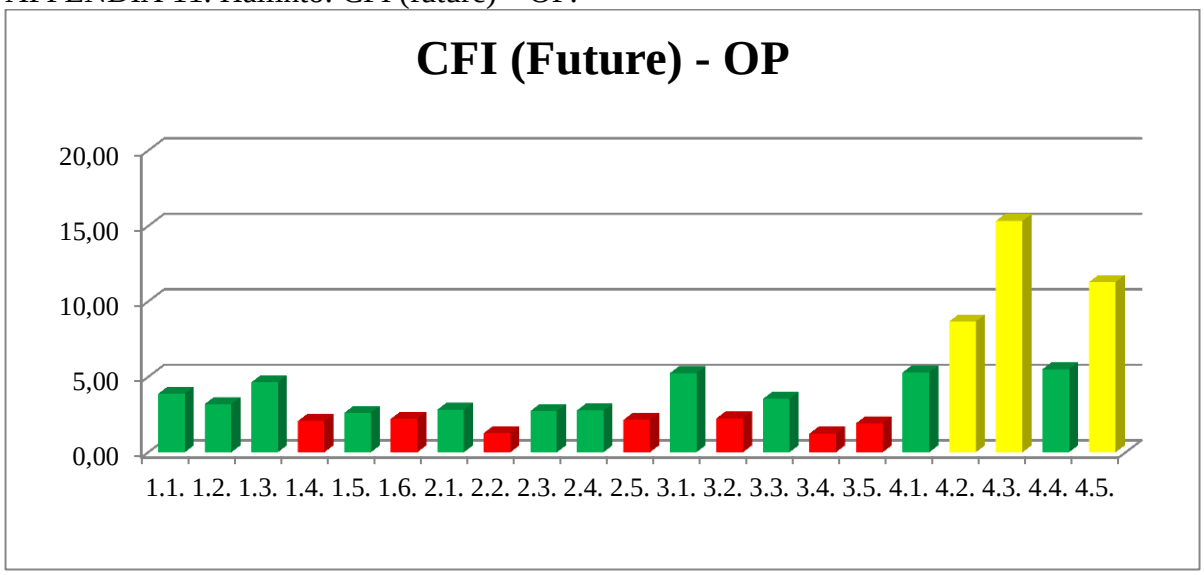
APPENDIX 9. Hallinto: SCFI (past) – BSC.



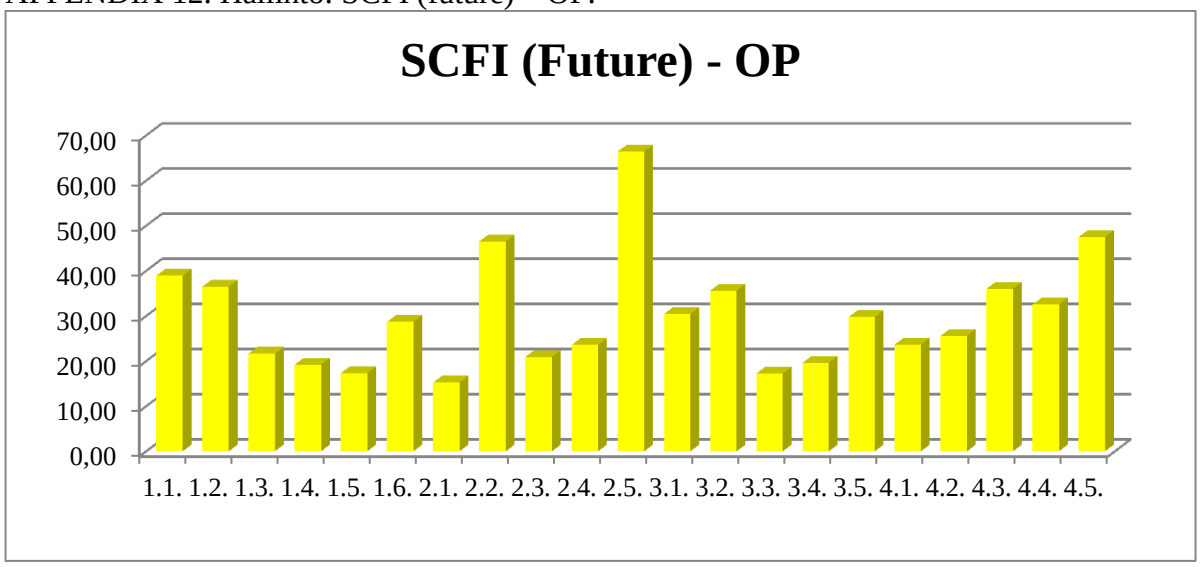
APPENDIX 10. Hallinto: BCFI (future) – OP.



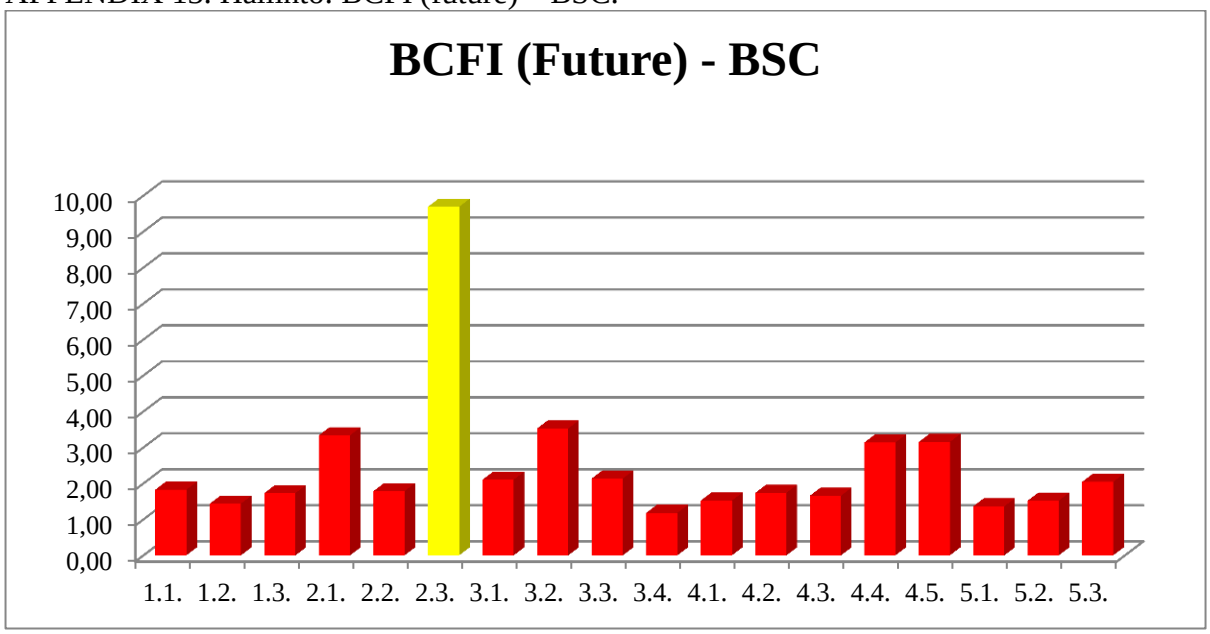
APPENDIX 11. Hallinto: CFI (future) – OP.



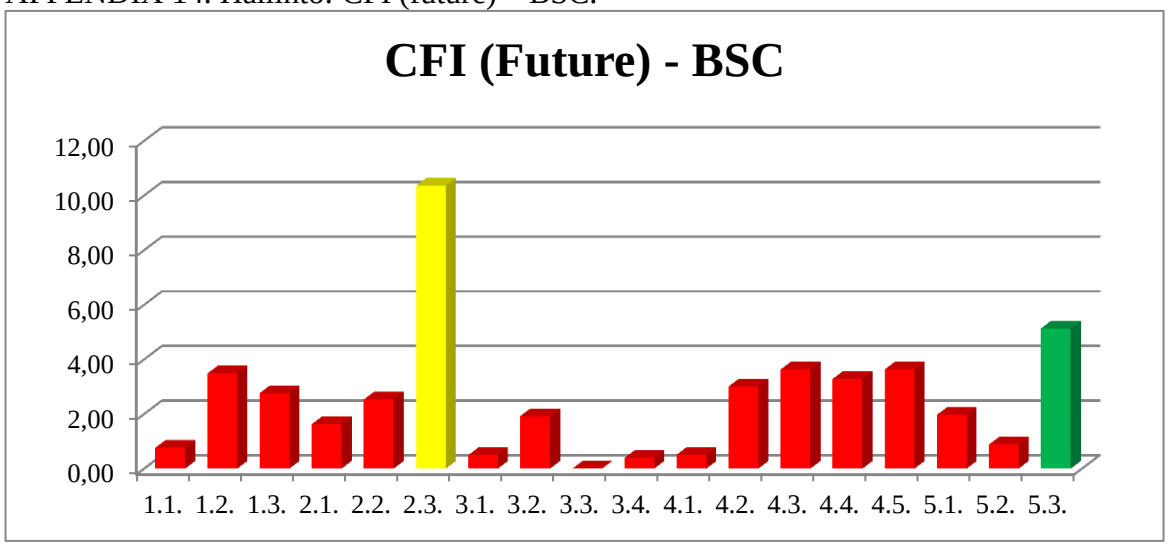
APPENDIX 12. Hallinto: SCFI (future) – OP.



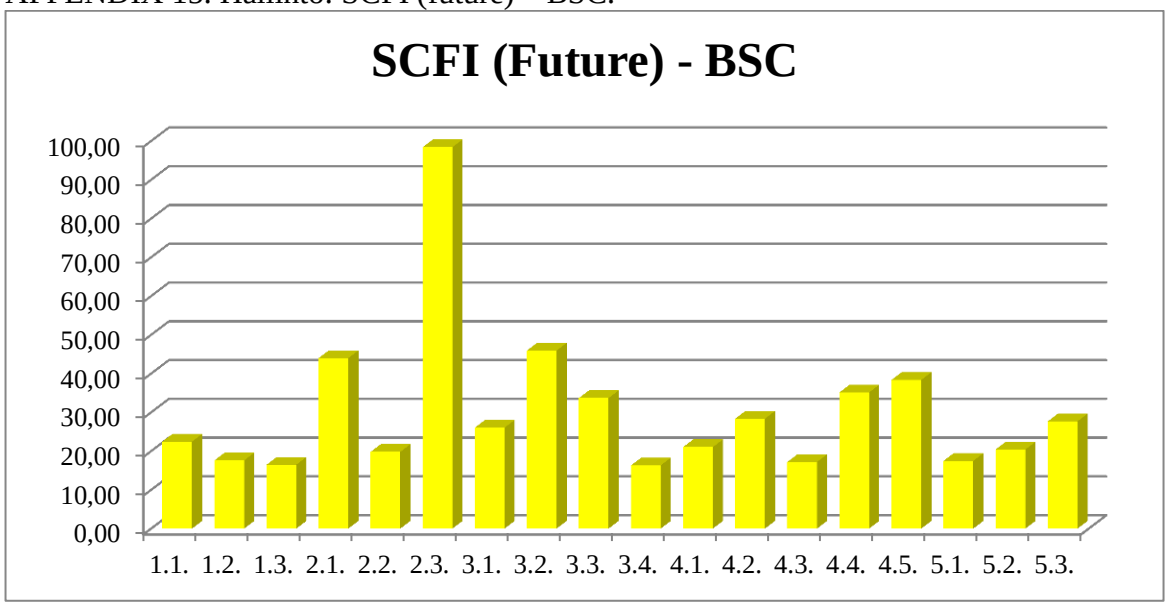
APPENDIX 13. Hallinto: BCFI (future) – BSC.



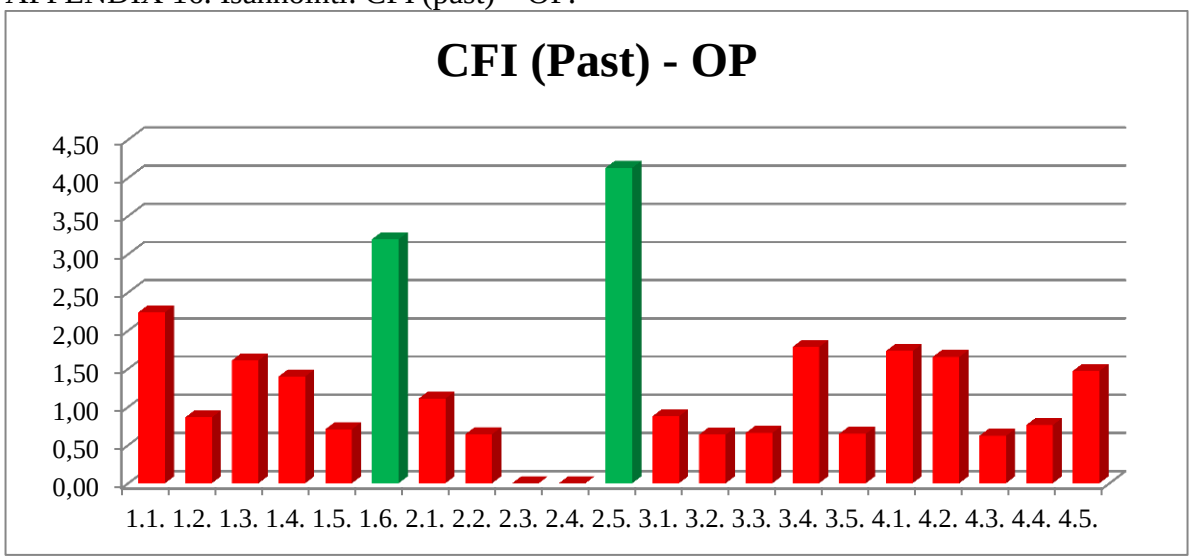
APPENDIX 14. Hallinto: CFI (future) – BSC.



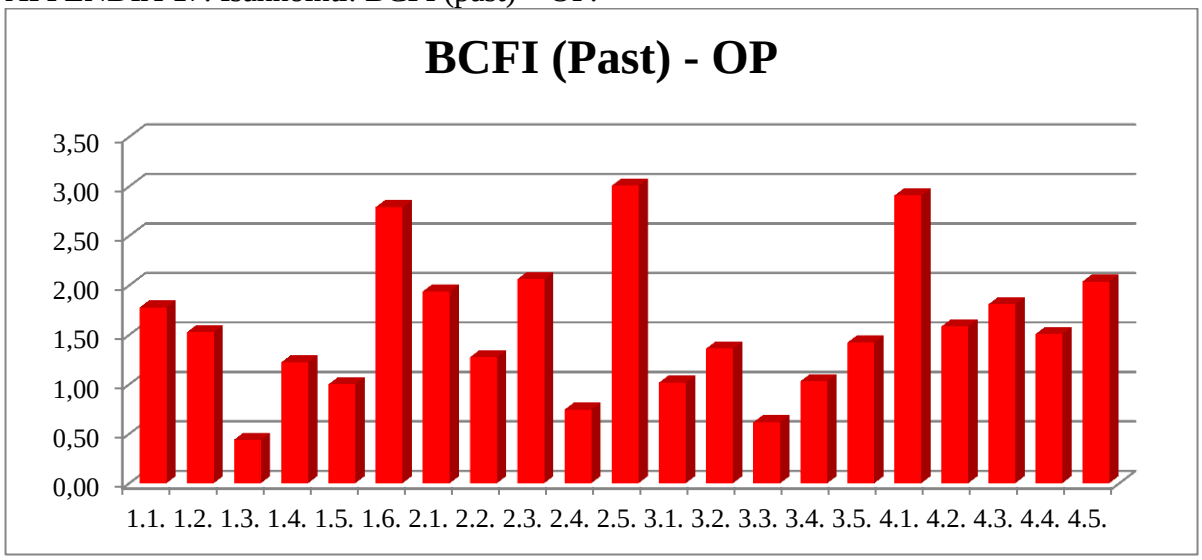
APPENDIX 15. Hallinto: SCFI (future) – BSC.



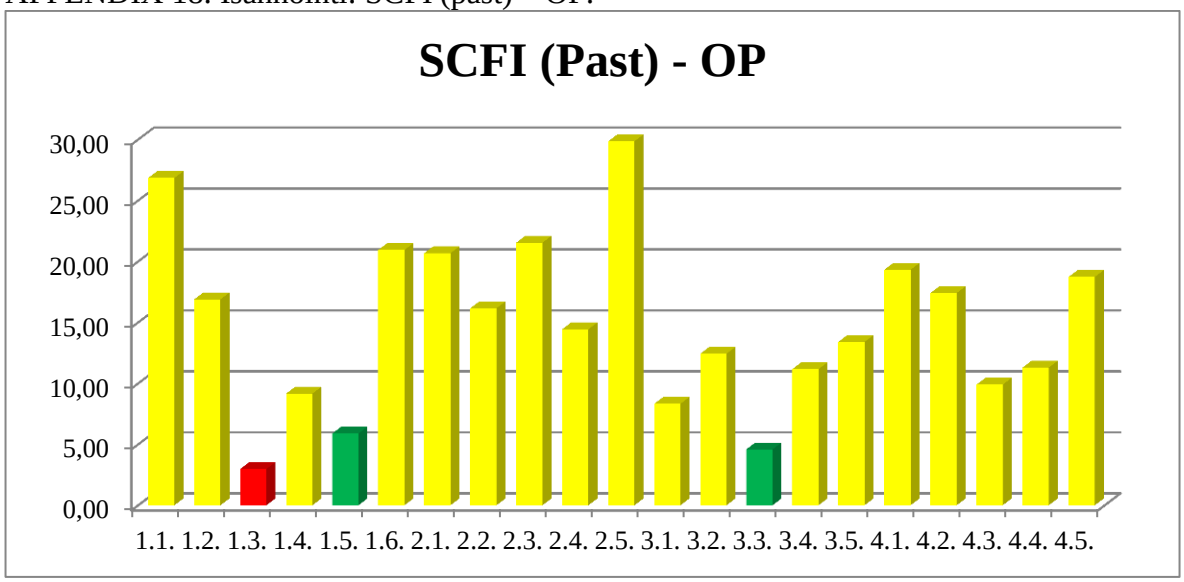
APPENDIX 16. Isännöinti: CFI (past) – OP.



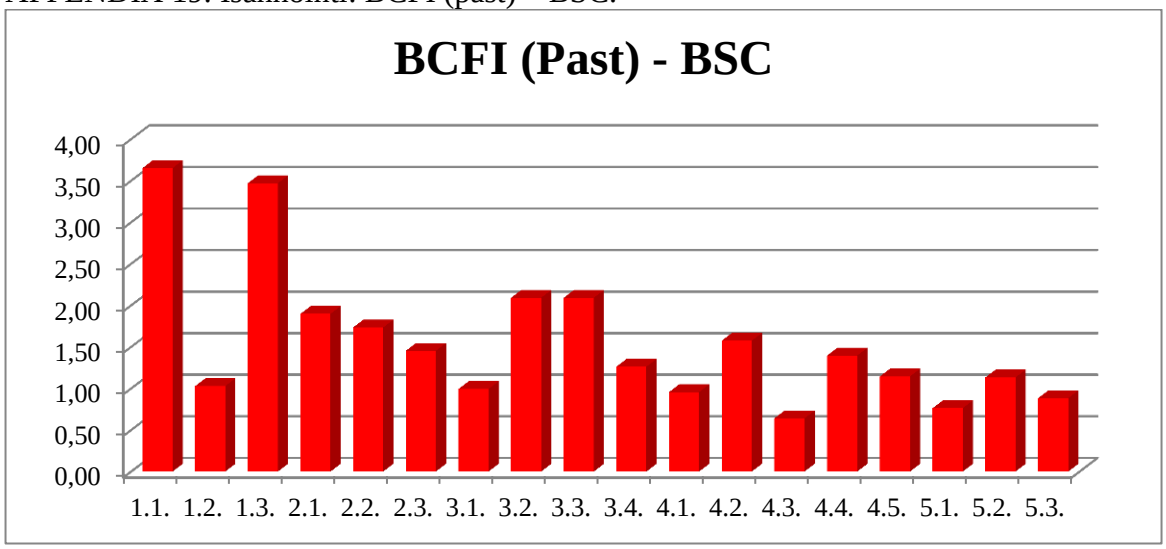
APPENDIX 17. Isännöinti: BCFI (past) – OP.



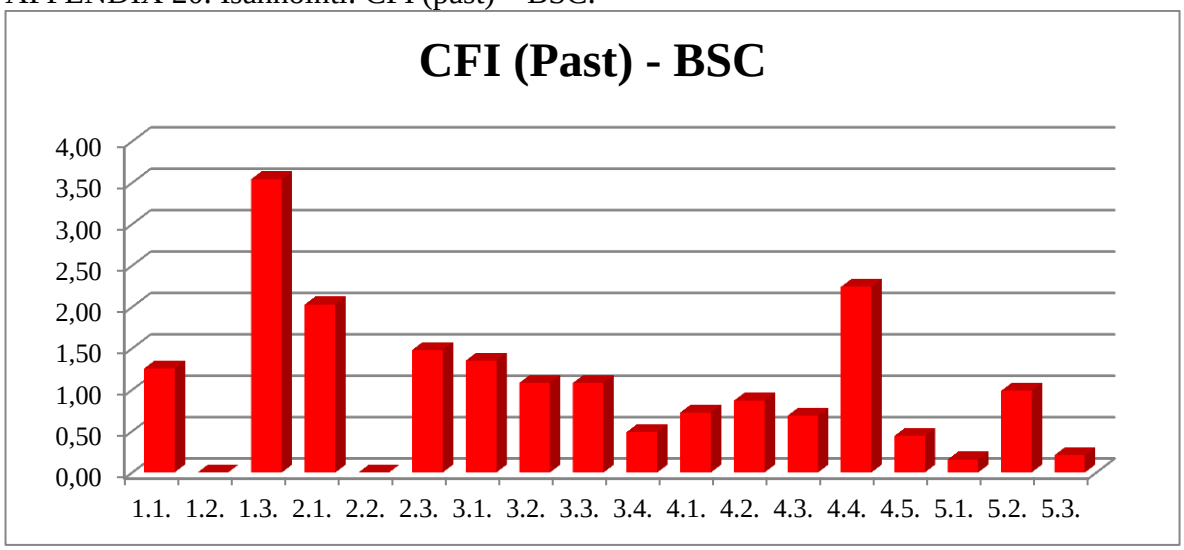
APPENDIX 18. Isännöinti: SCFI (past) – OP.



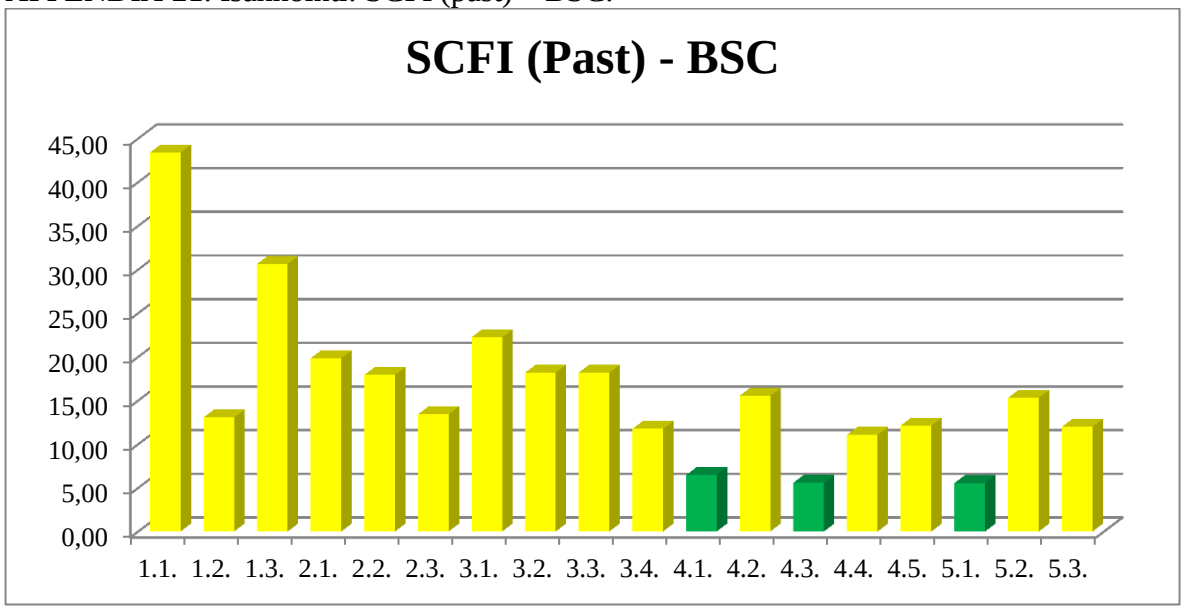
APPENDIX 19. Isännöinti: BCFI (past) – BSC.



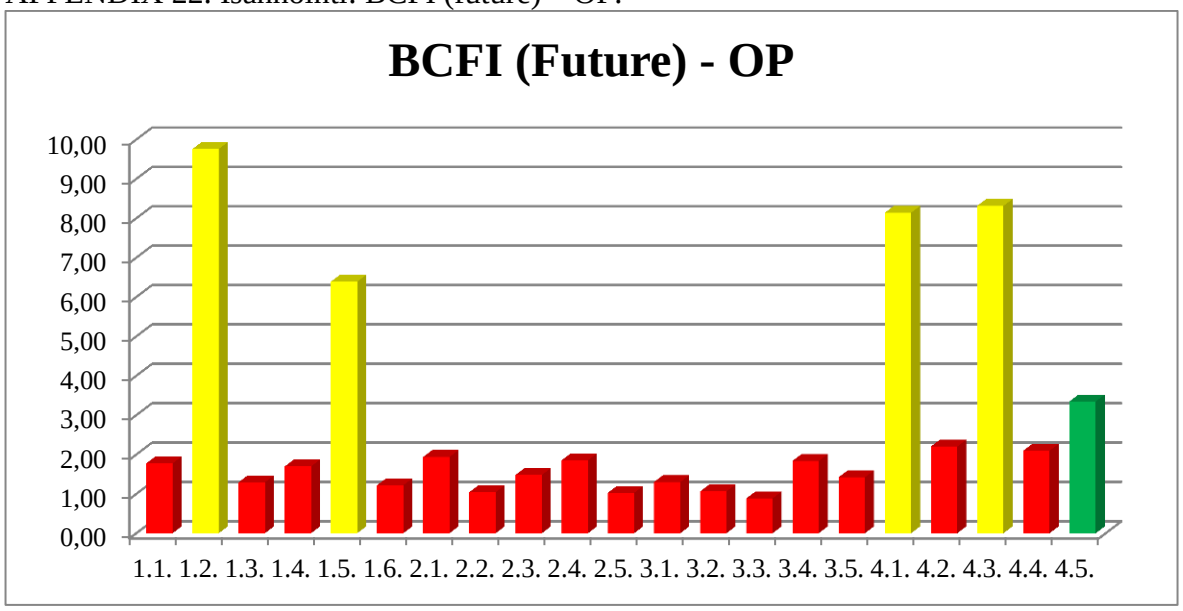
APPENDIX 20. Isännöinti: CFI (past) – BSC.



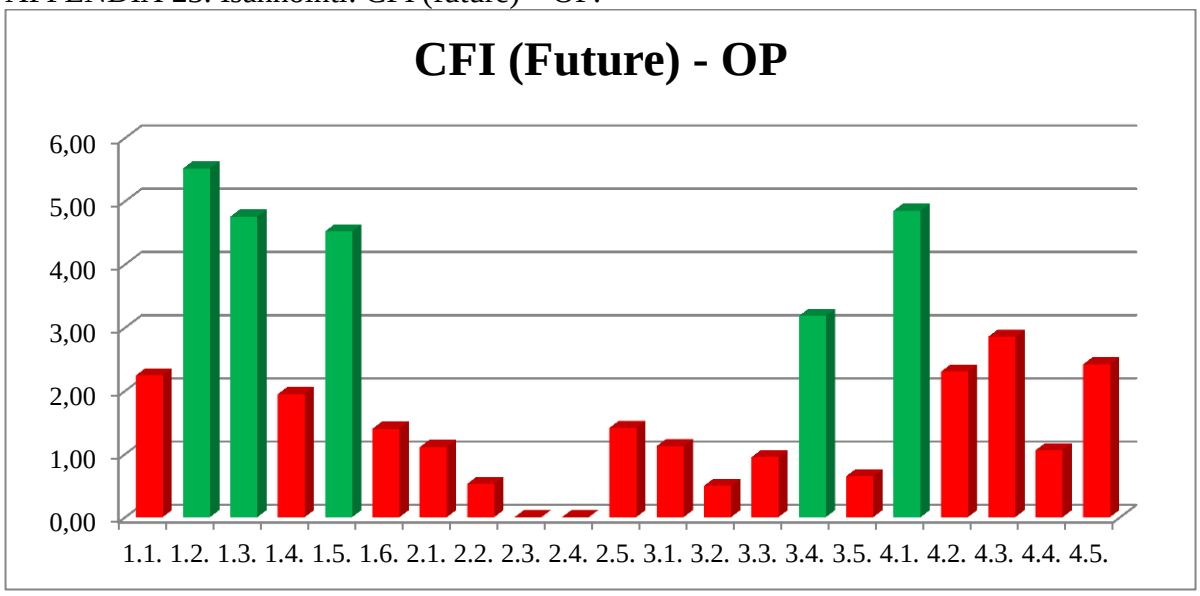
APPENDIX 21. Isännöinti: SCFI (past) – BSC.



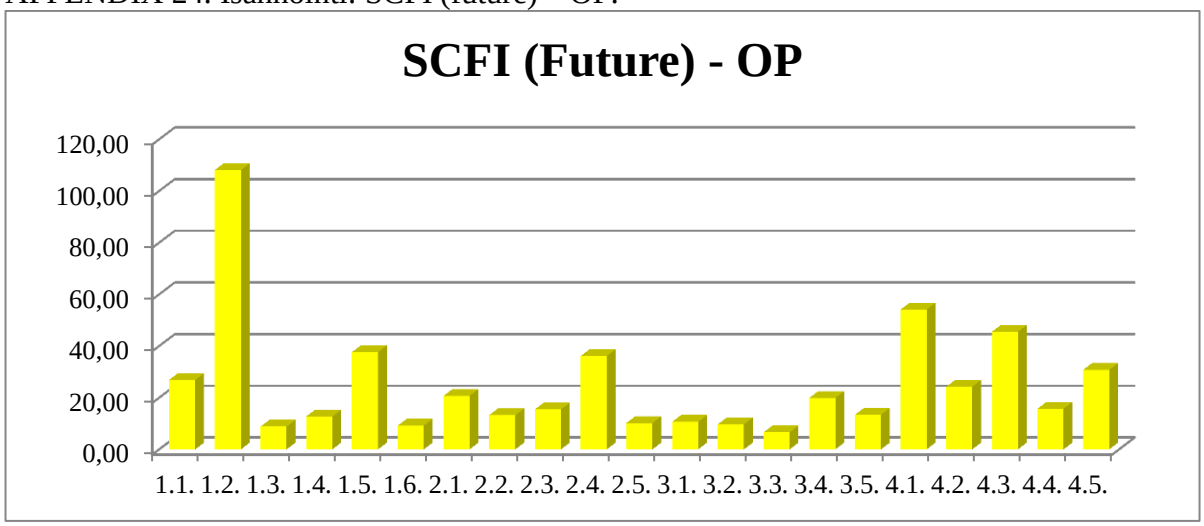
APPENDIX 22. Isännöinti: BCFI (future) – OP.



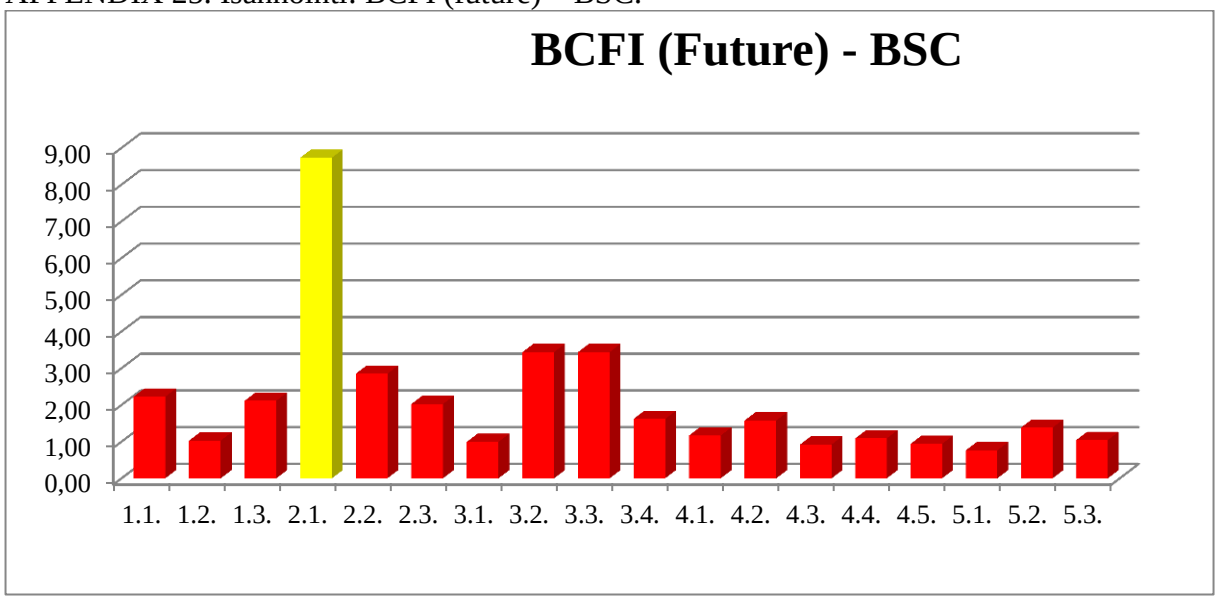
APPENDIX 23. Isännöinti: CFI (future) – OP.



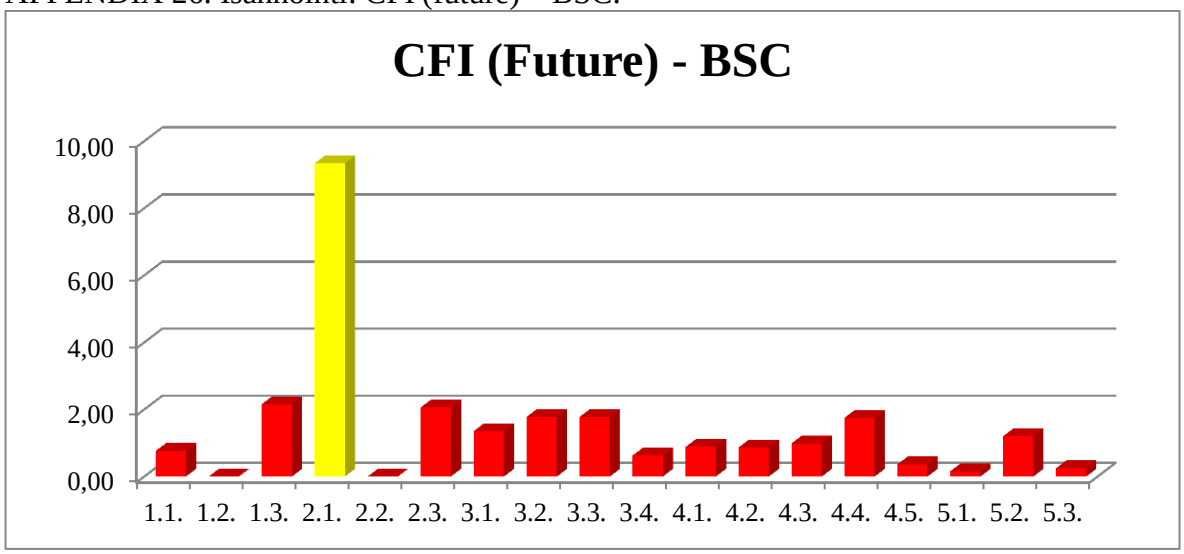
APPENDIX 24. Isännöinti: SCFI (future) – OP.



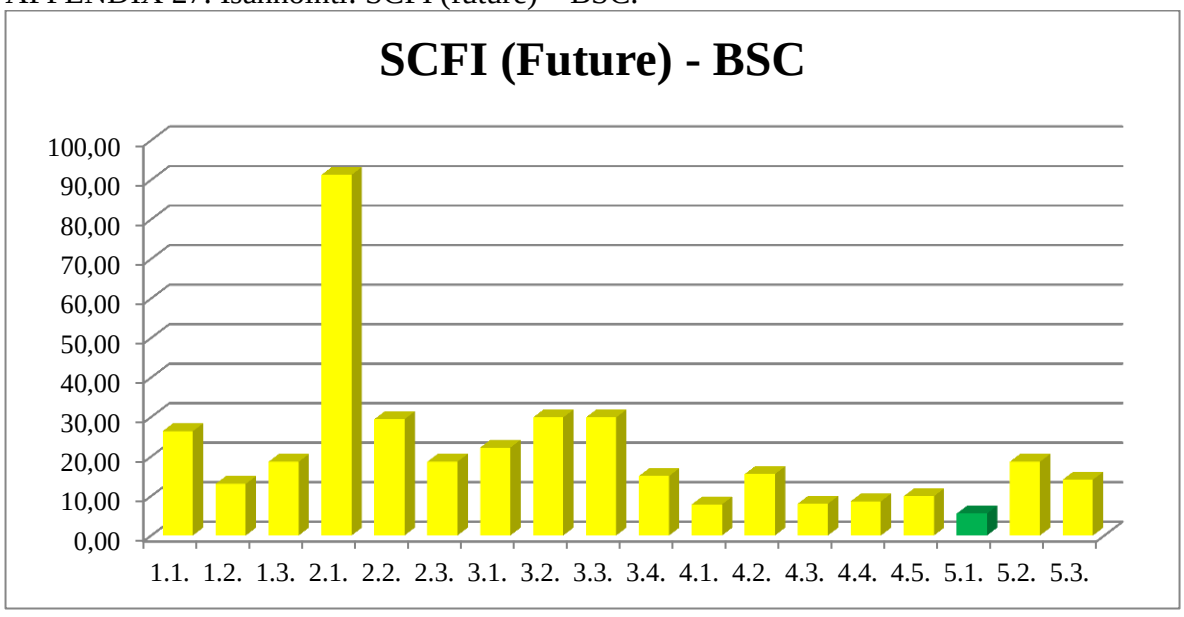
APPENDIX 25. Isännöinti: BCFI (future) – BSC.



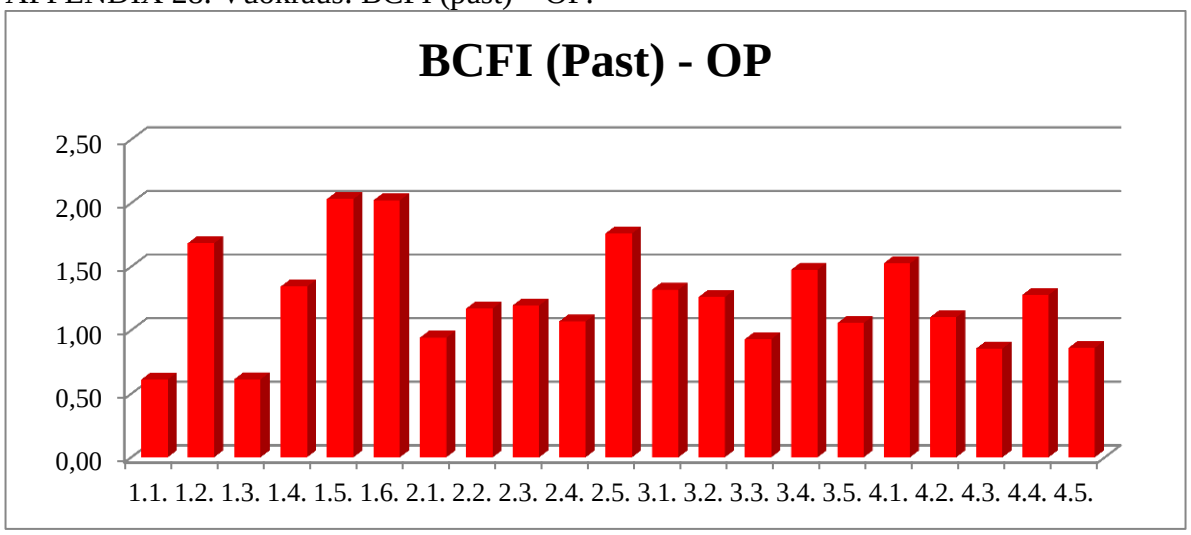
APPENDIX 26. Isännöinti: CFI (future) – BSC.



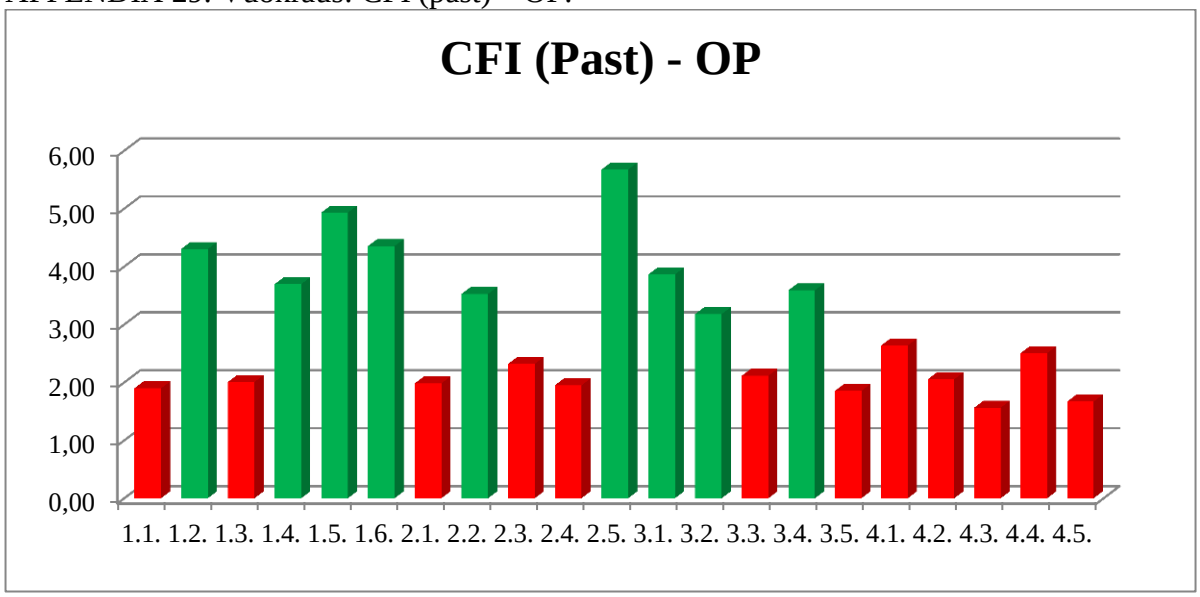
APPENDIX 27. Isännöinti: SCFI (future) – BSC.



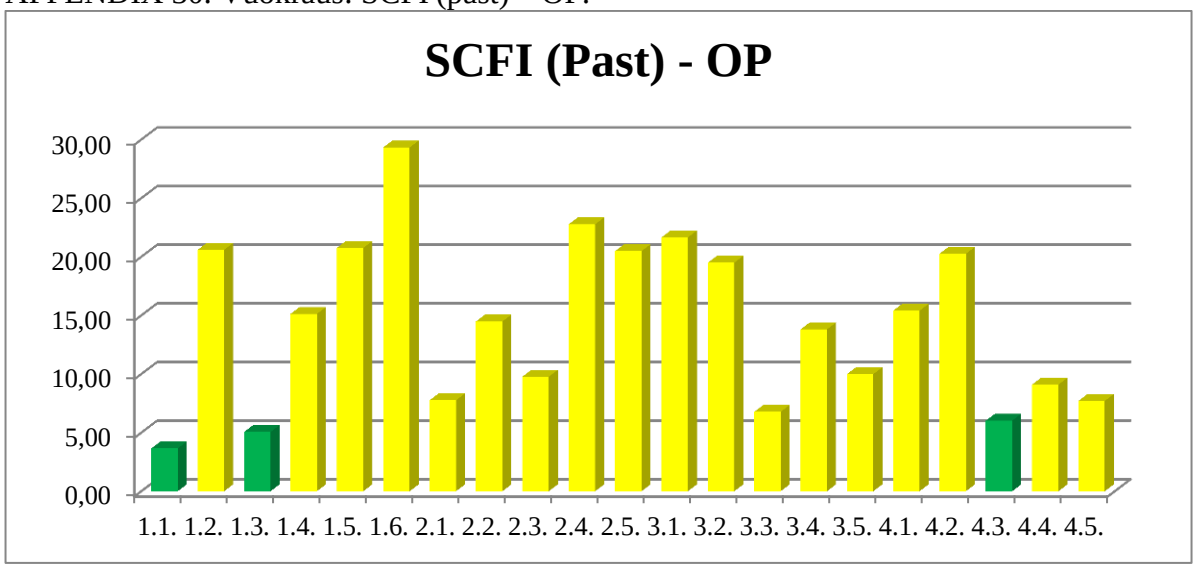
APPENDIX 28. Vuokraus: BCFI (past) – OP.



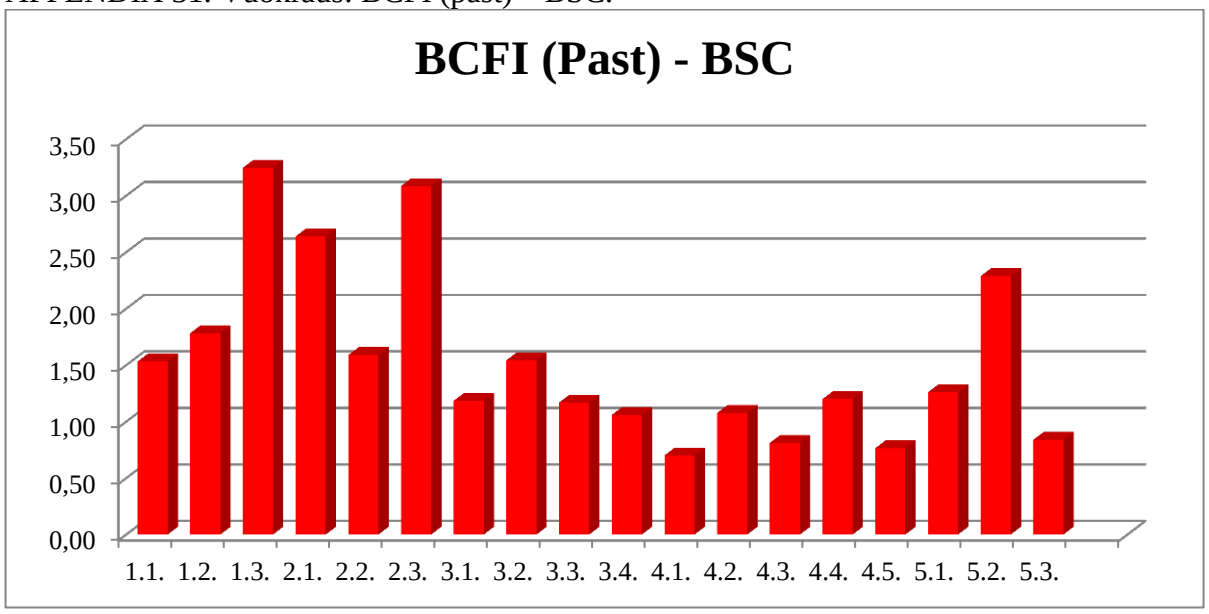
APPENDIX 29. Vuokraus: CFI (past) – OP.



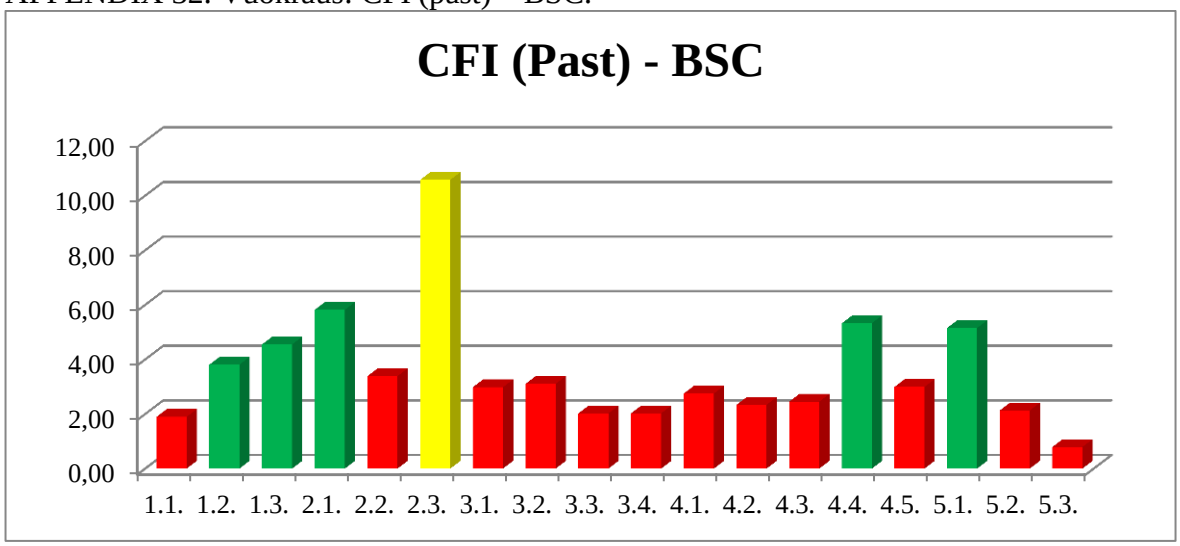
APPENDIX 30. Vuokraus: SCFI (past) – OP.



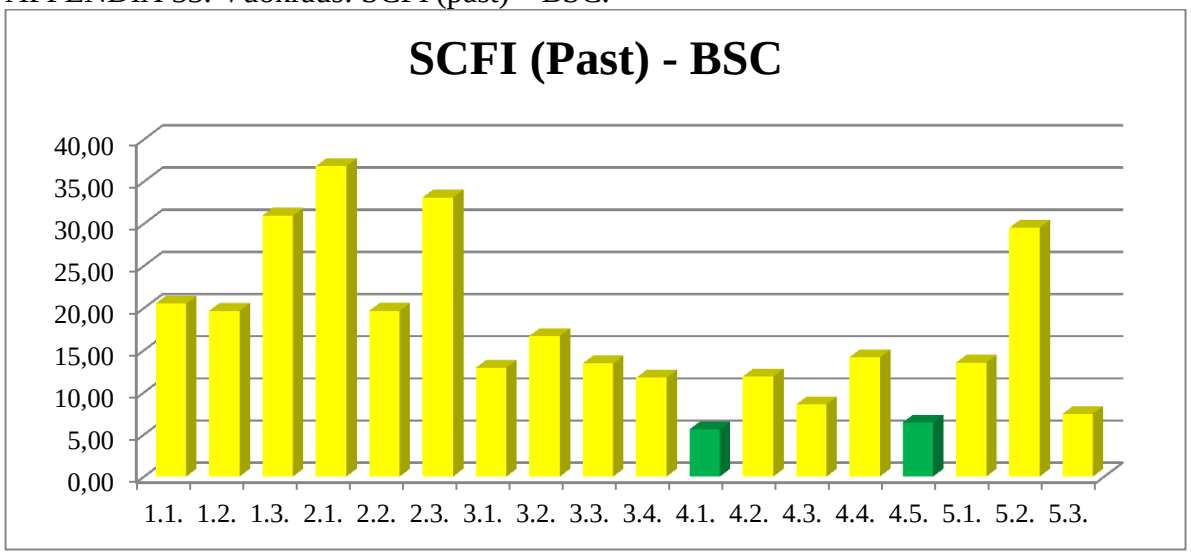
APPENDIX 31. Vuokraus: BCFI (past) – BSC.



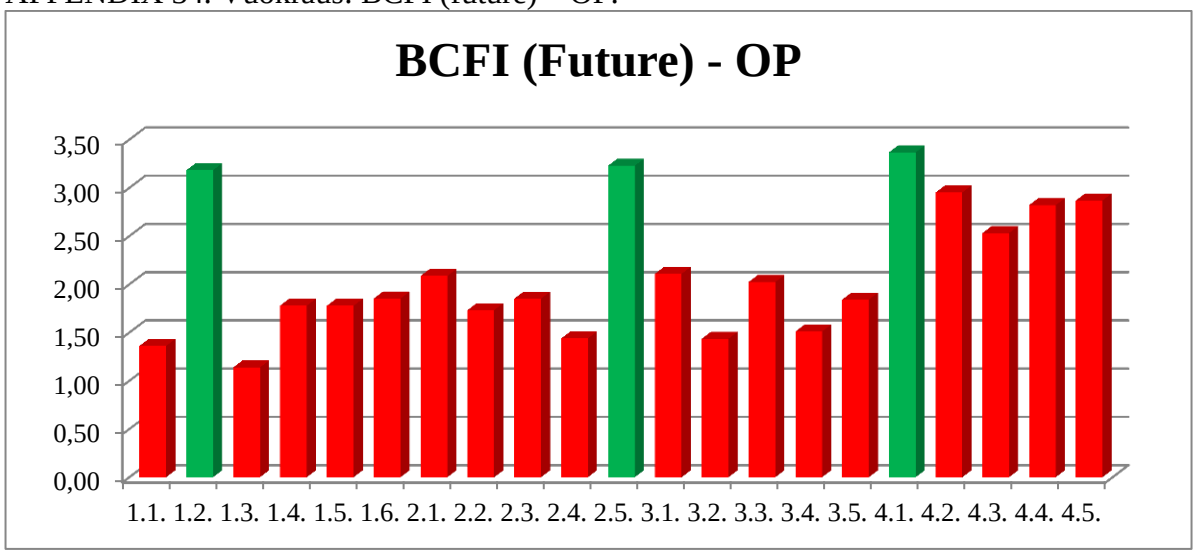
APPENDIX 32. Vuokraus: CFI (past) – BSC.



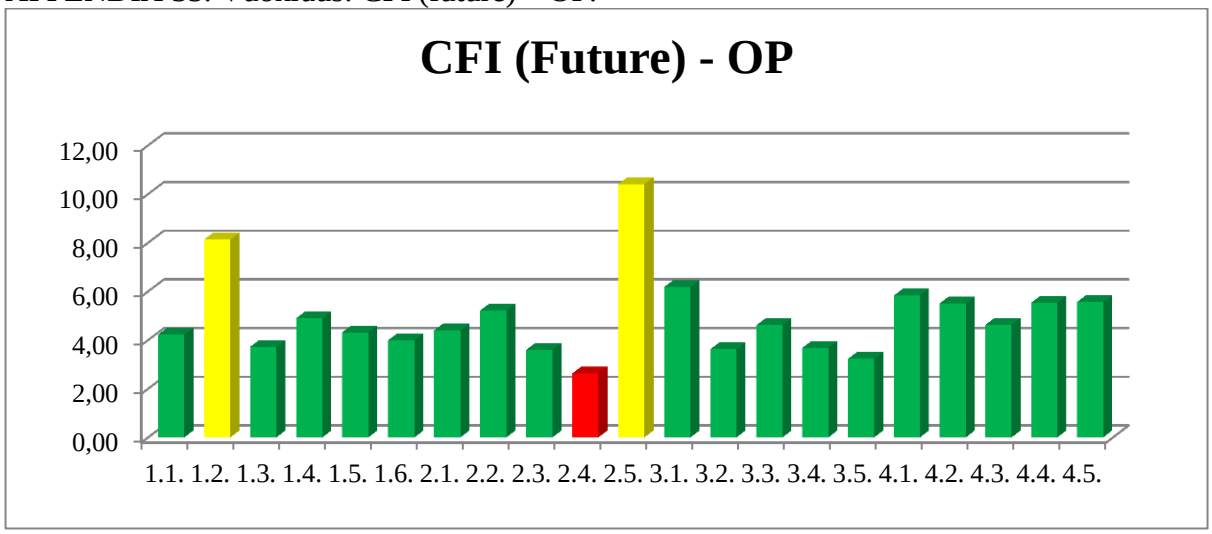
APPENDIX 33. Vuokraus: SCFI (past) – BSC.



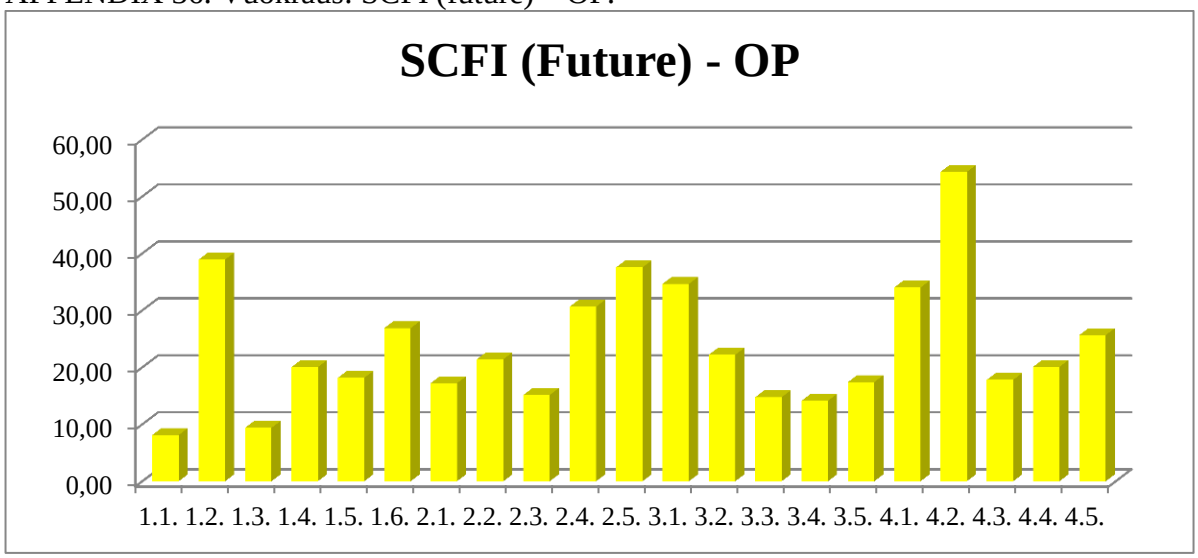
APPENDIX 34. Vuokraus: BCFI (future) – OP.



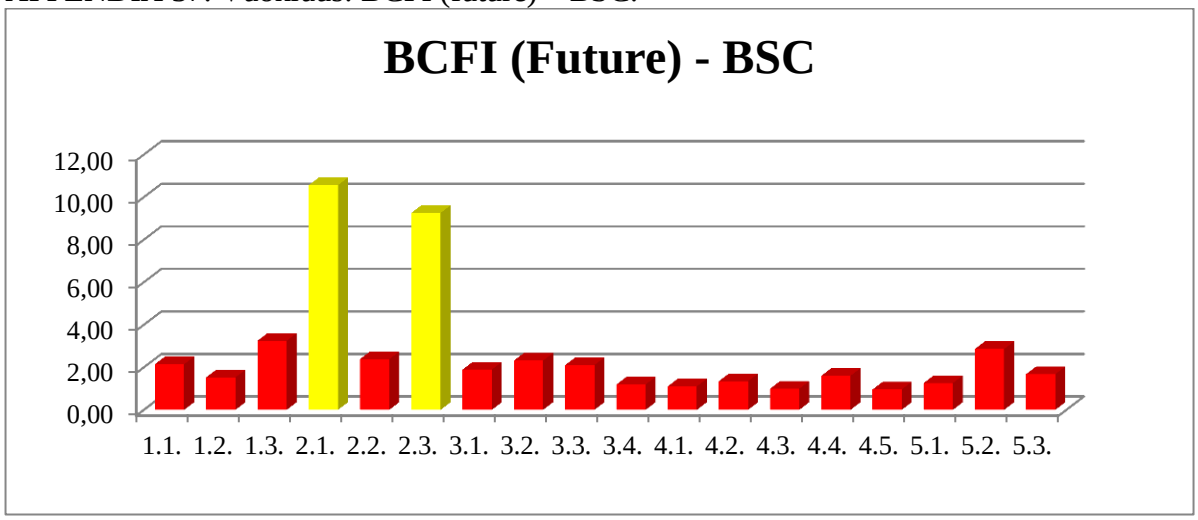
APPENDIX 35. Vuokraus: CFI (future) – OP.



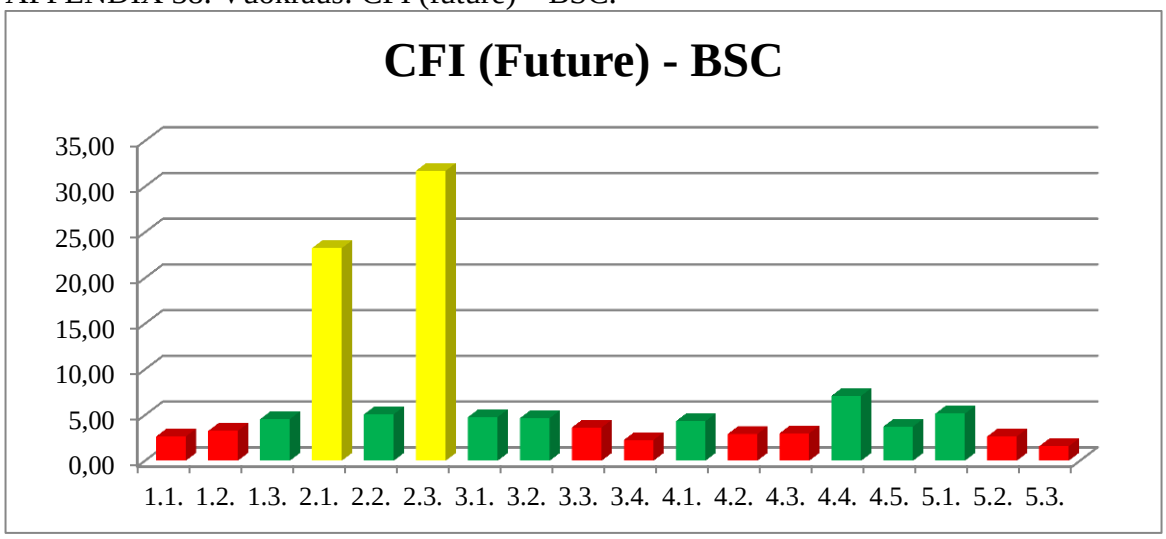
APPENDIX 36. Vuokraus: SCFI (future) – OP.



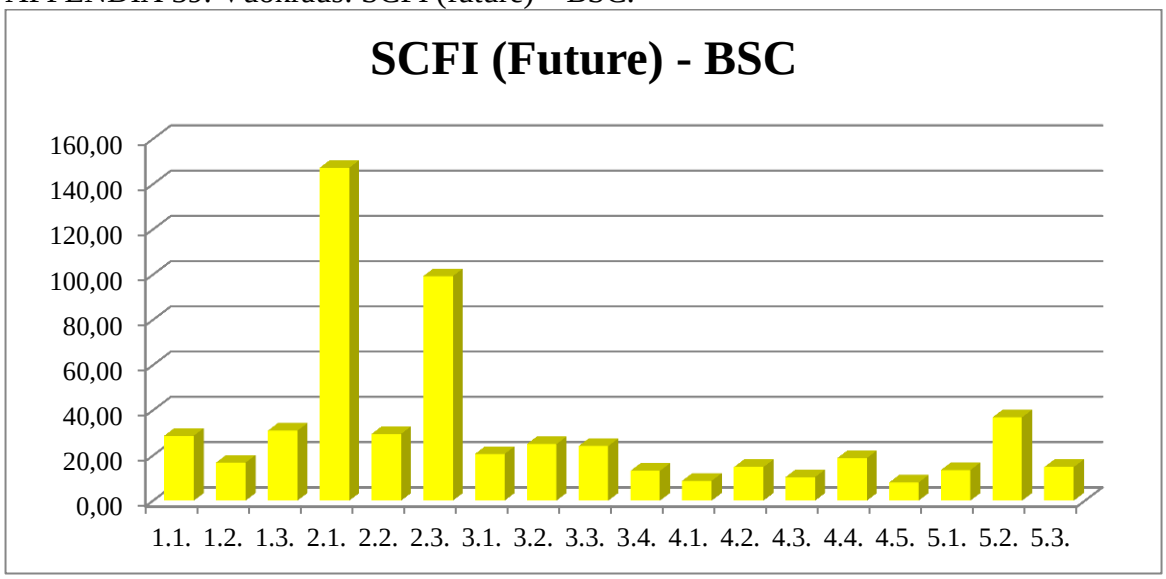
APPENDIX 37. Vuokraus: BCFI (future) – BSC.



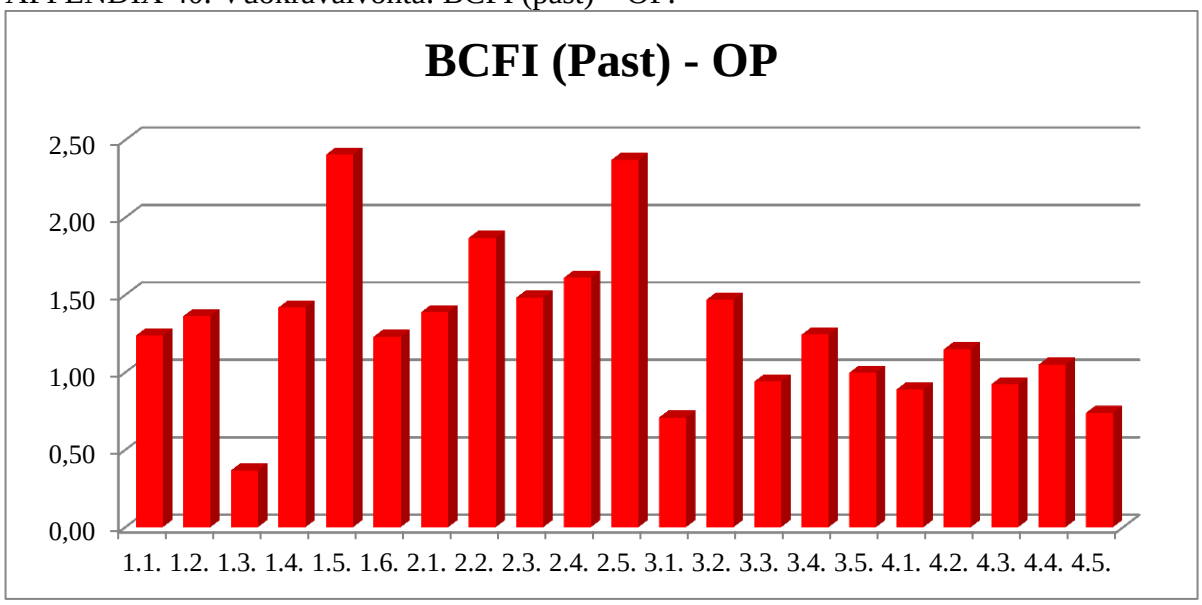
APPENDIX 38. Vuokraus: CFI (future) – BSC.



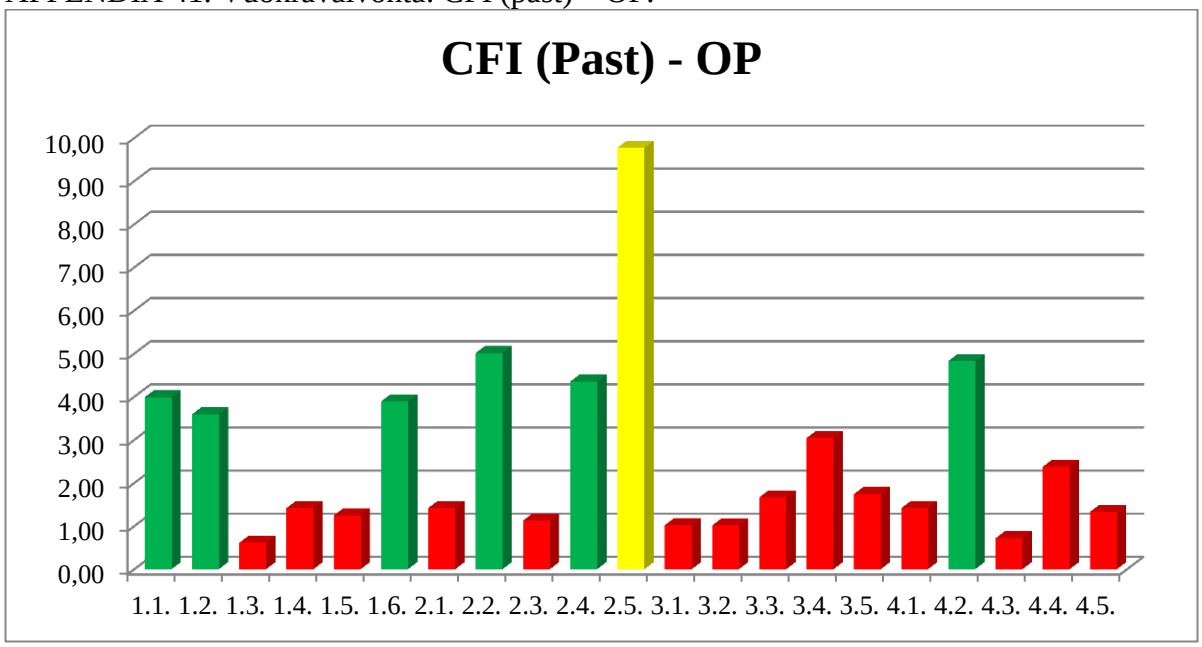
APPENDIX 39. Vuokraus: SCFI (future) – BSC.



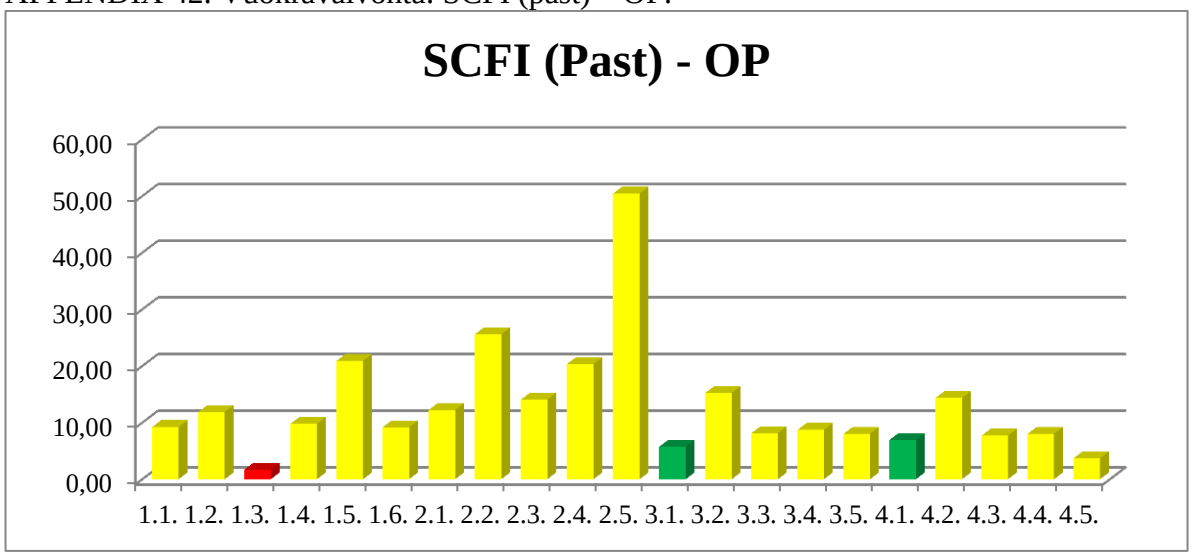
APPENDIX 40. Vuokravalvonta: BCFI (past) – OP.



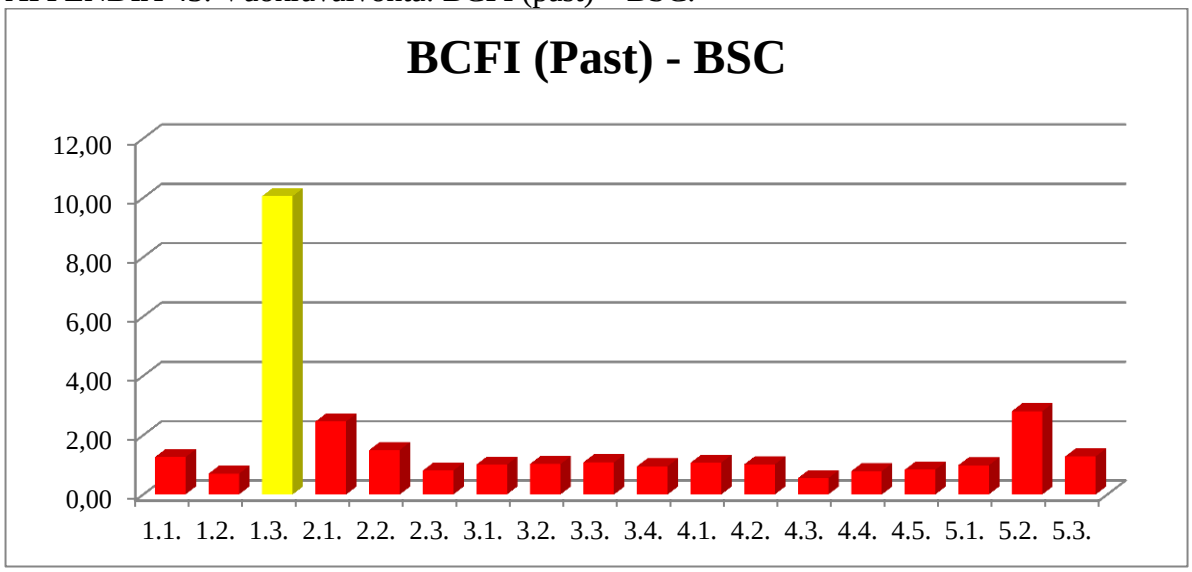
APPENDIX 41. Vuokravalvonta: CFI (past) – OP.



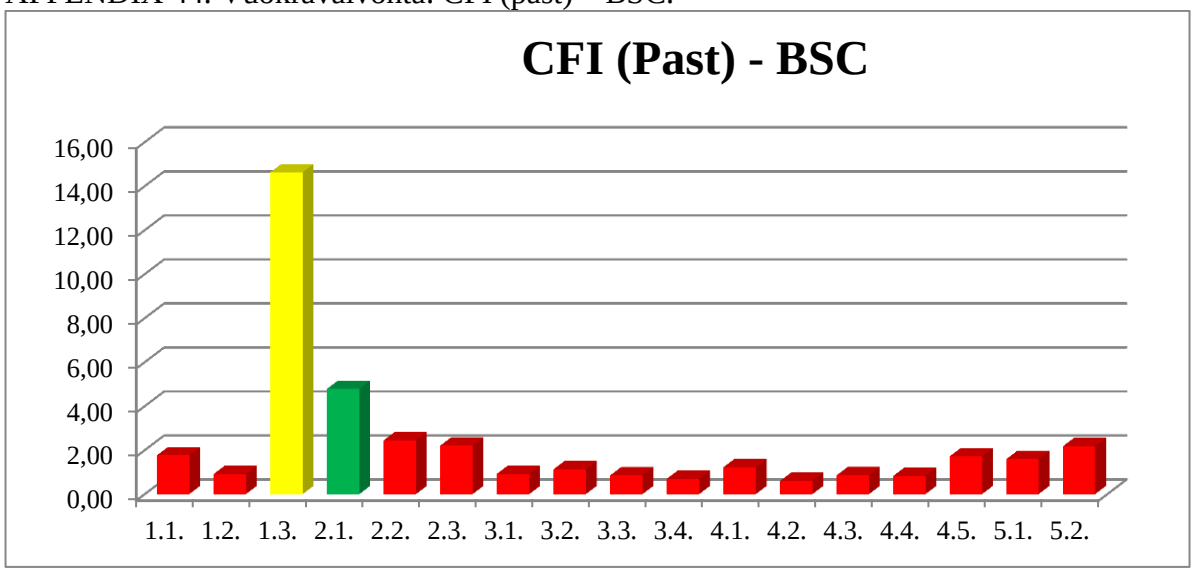
APPENDIX 42. Vuokravalvonta: SCFI (past) – OP.



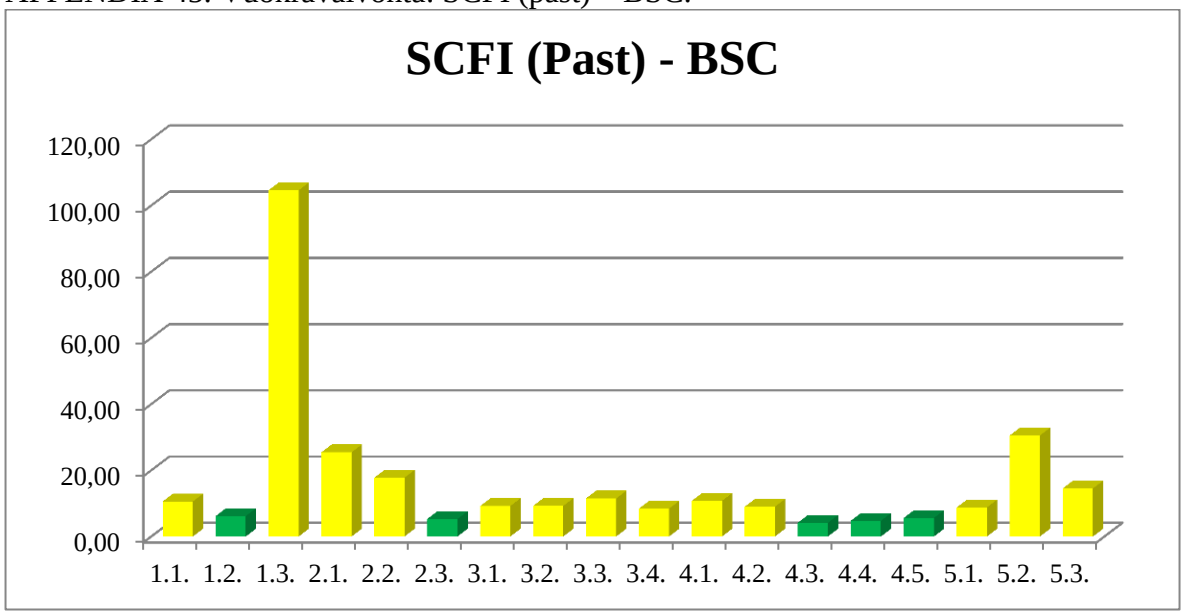
APPENDIX 43. Vuokravalvonta: BCFI (past) – BSC.



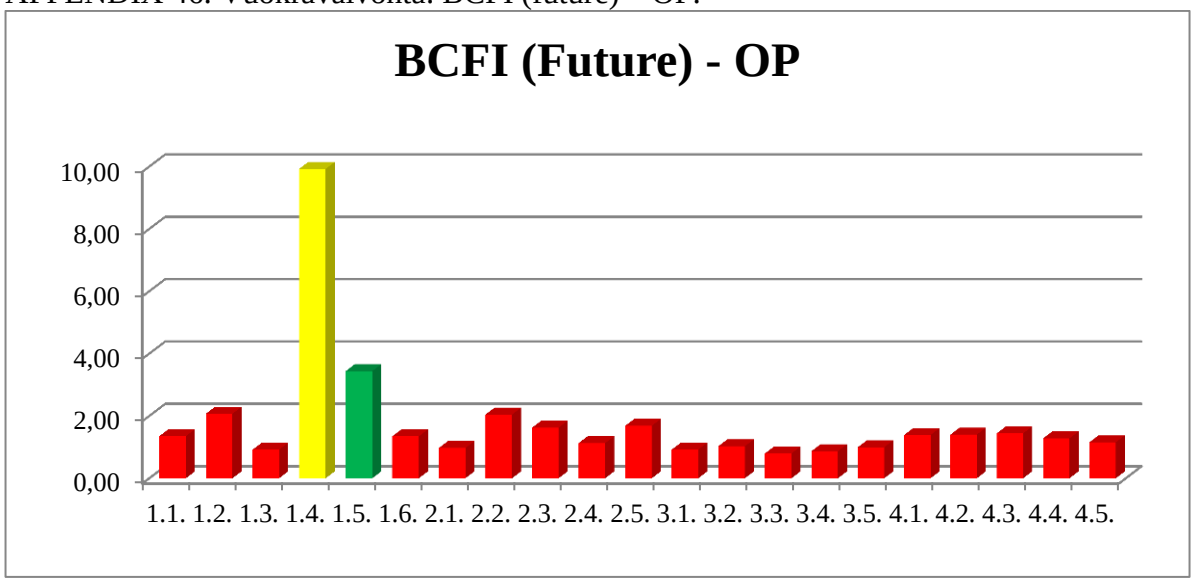
APPENDIX 44. Vuokravalvonta: CFI (past) – BSC.



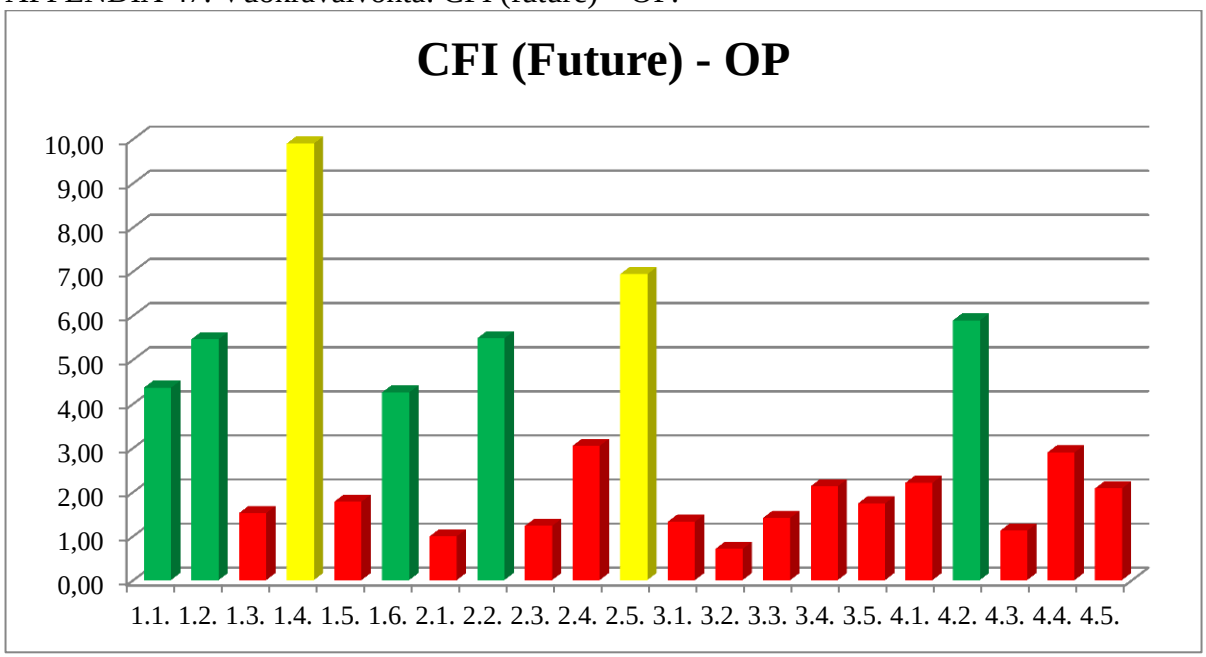
APPENDIX 45. Vuokravalvonta: SCFI (past) – BSC.



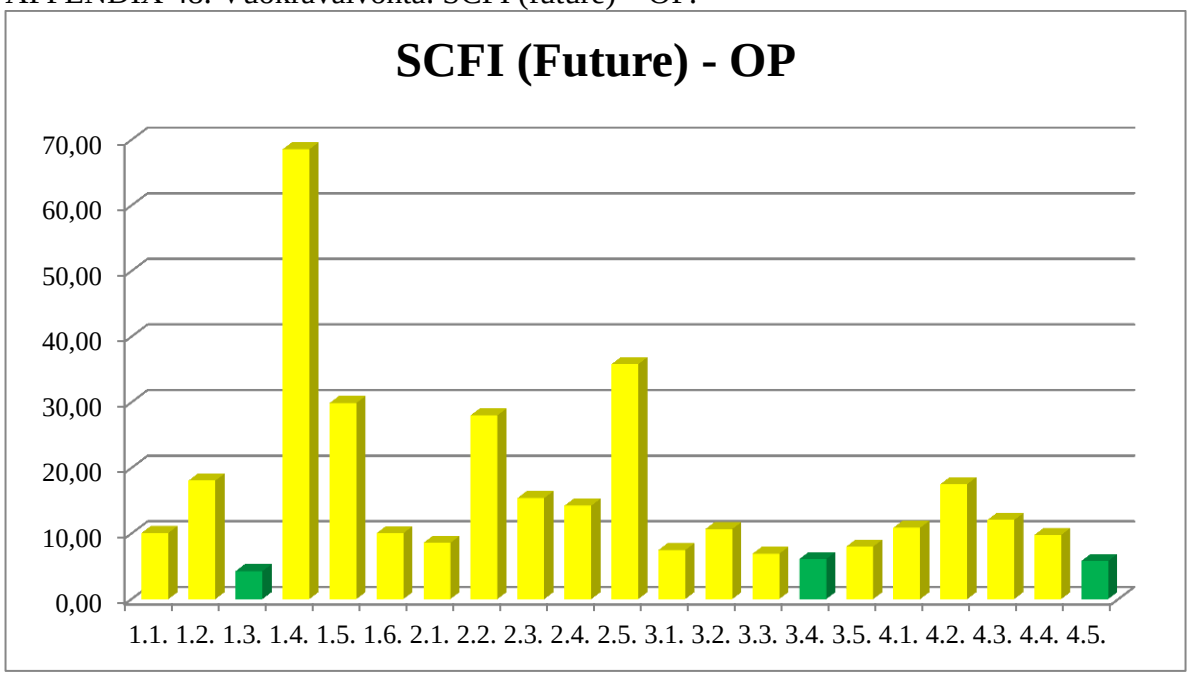
APPENDIX 46. Vuokravalvonta: BCFI (future) – OP.



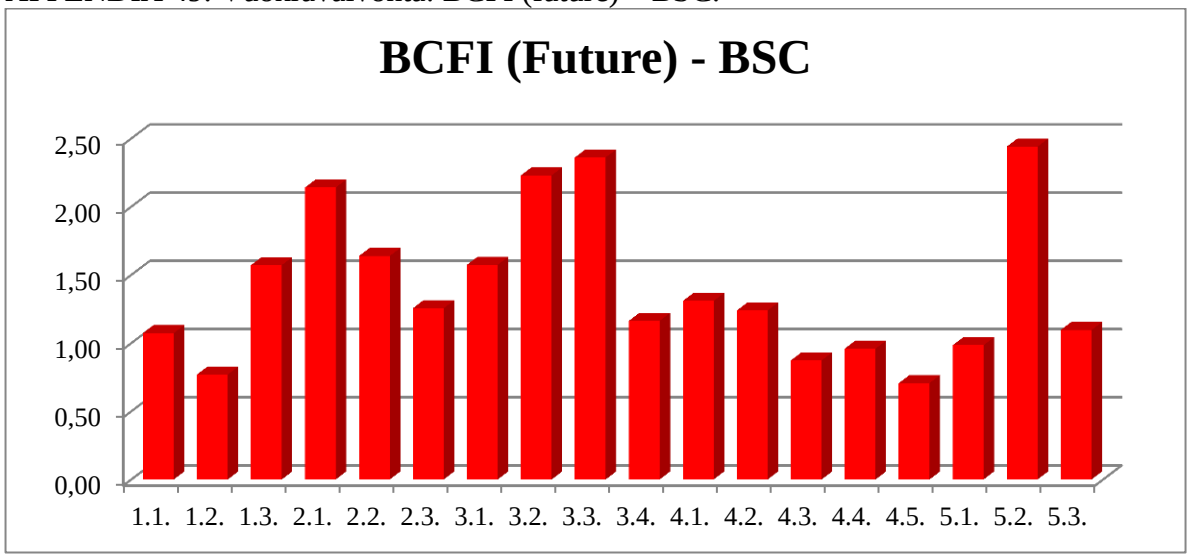
APPENDIX 47. Vuokravalvonta: CFI (future) – OP.



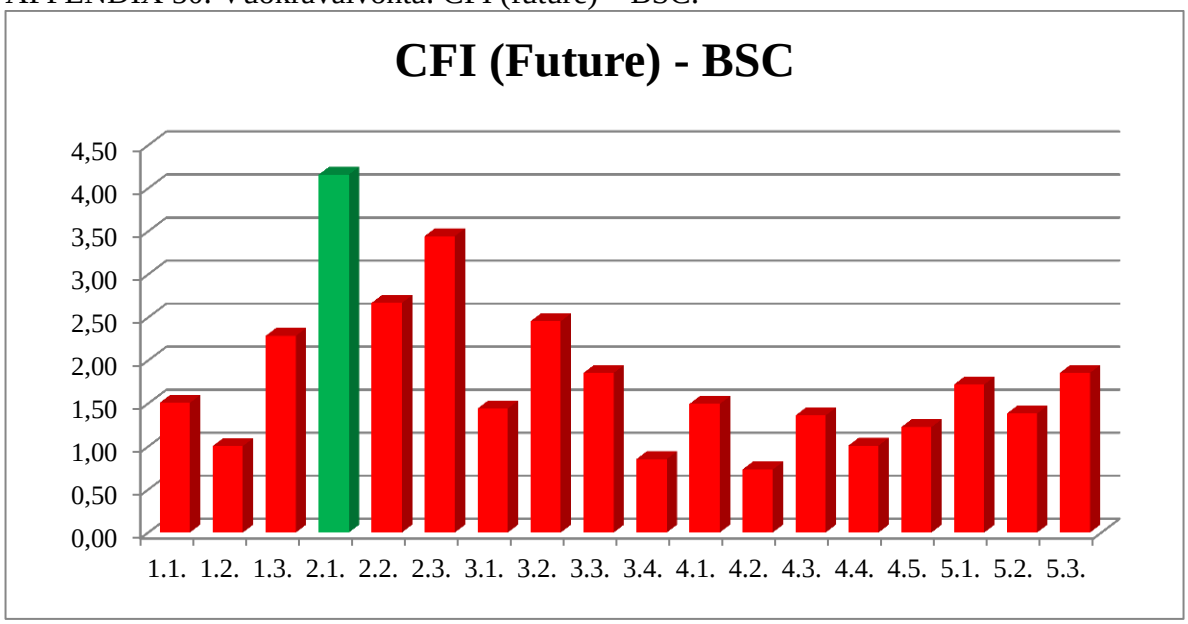
APPENDIX 48. Vuokravalvonta: SCFI (future) – OP.



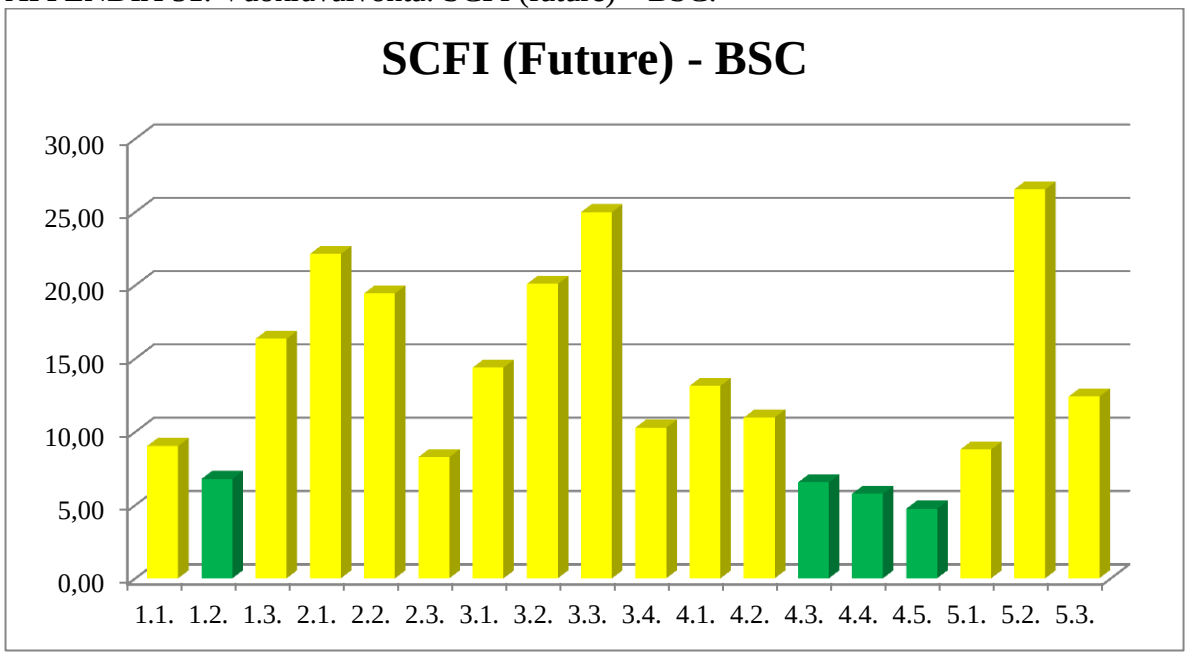
APPENDIX 49. Vuokravalvonta: BCFI (future) – BSC.



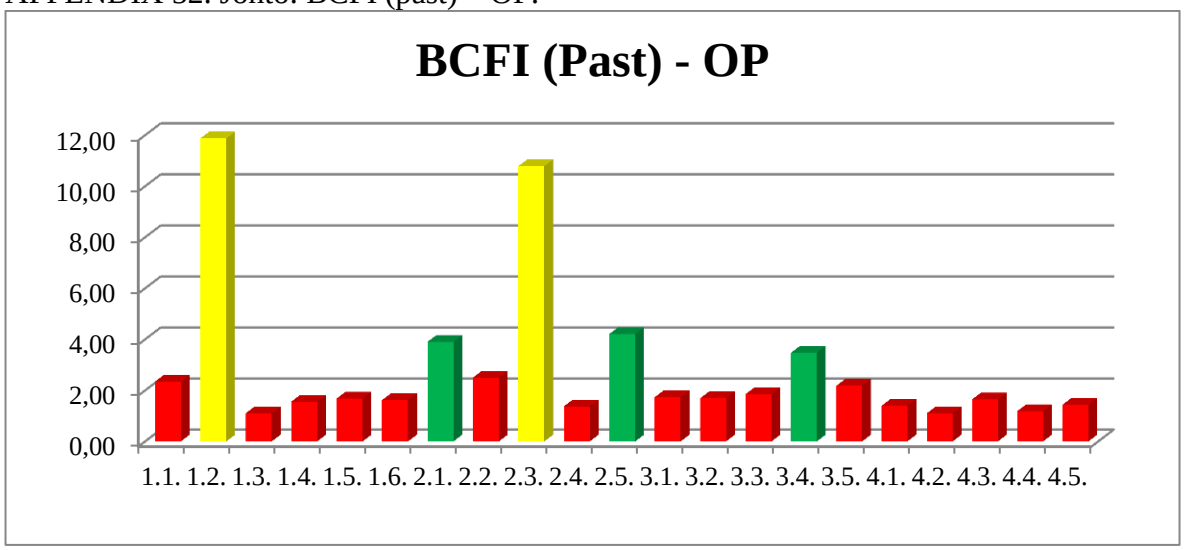
APPENDIX 50. Vuokravalvonta: CFI (future) – BSC.



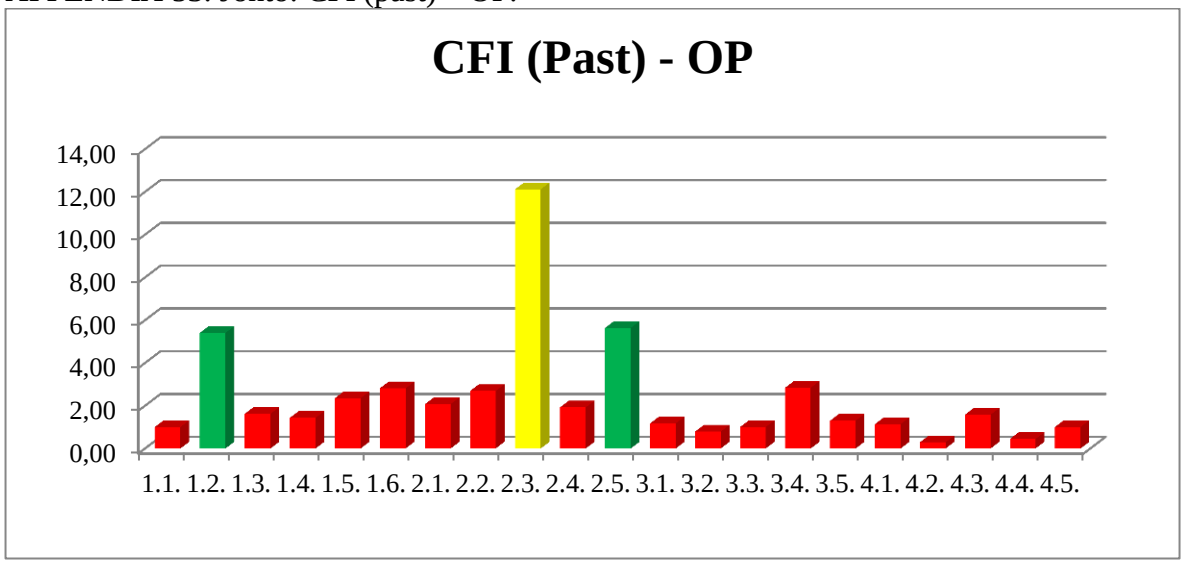
APPENDIX 51. Vuokravalvonta: SCFI (future) – BSC.



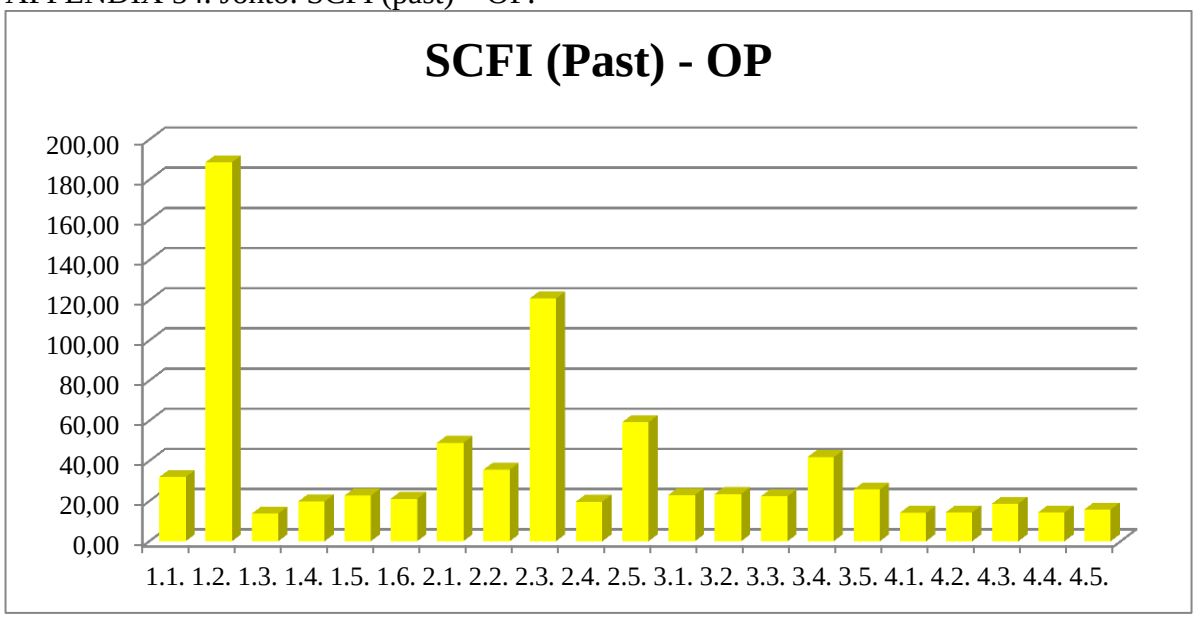
APPENDIX 52. Johto: BCFI (past) – OP.



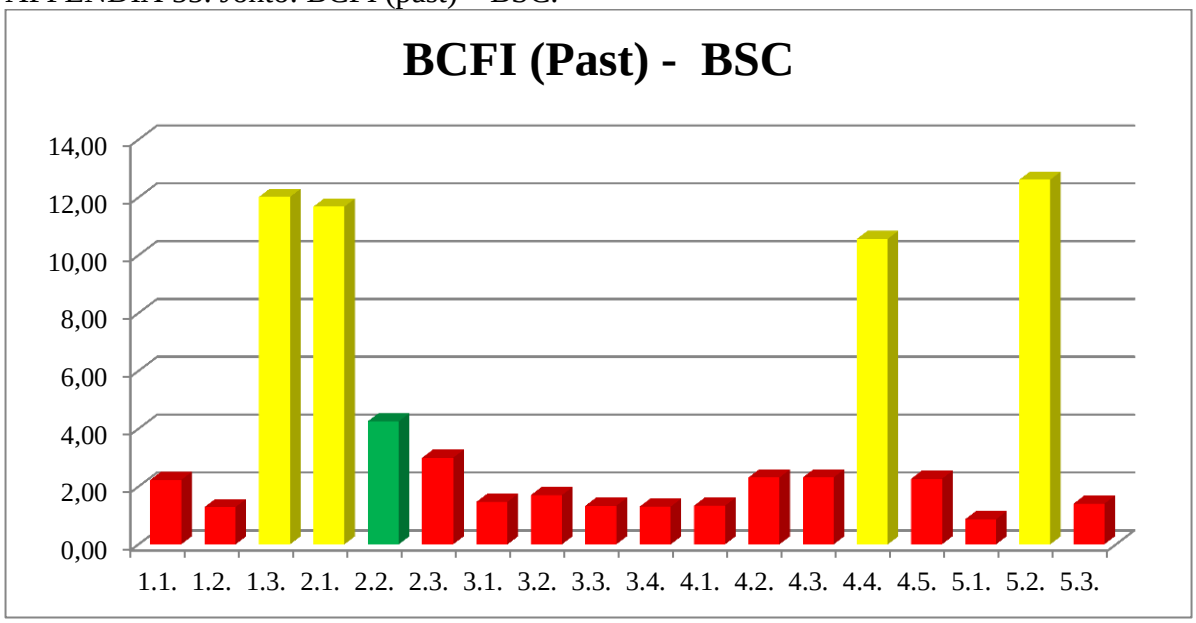
APPENDIX 53. Johto: CFI (past) – OP.



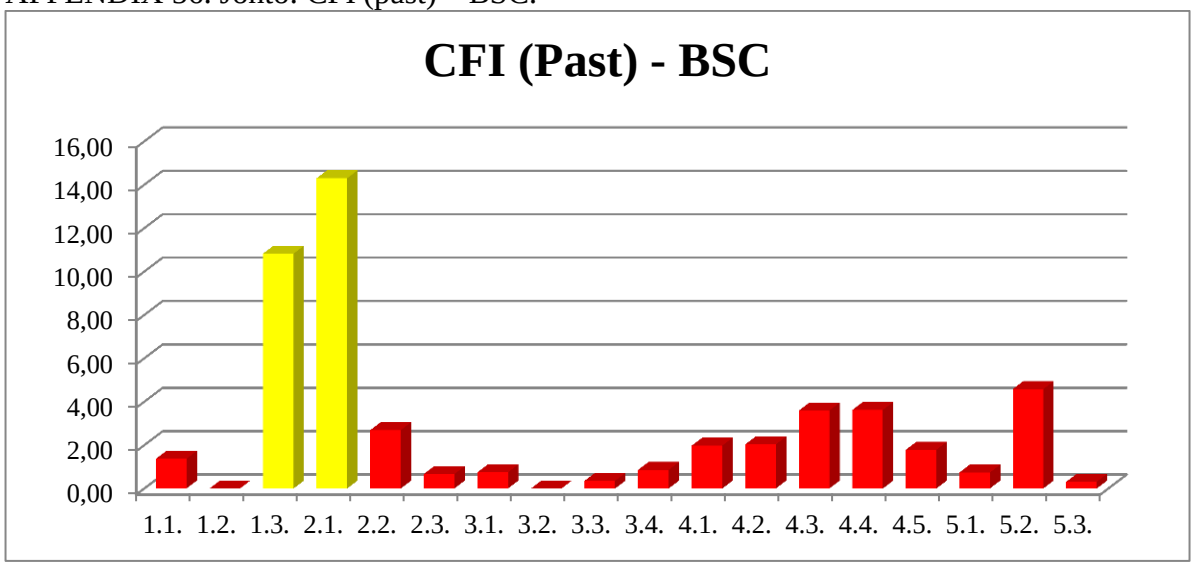
APPENDIX 54. Johto: SCFI (past) – OP.



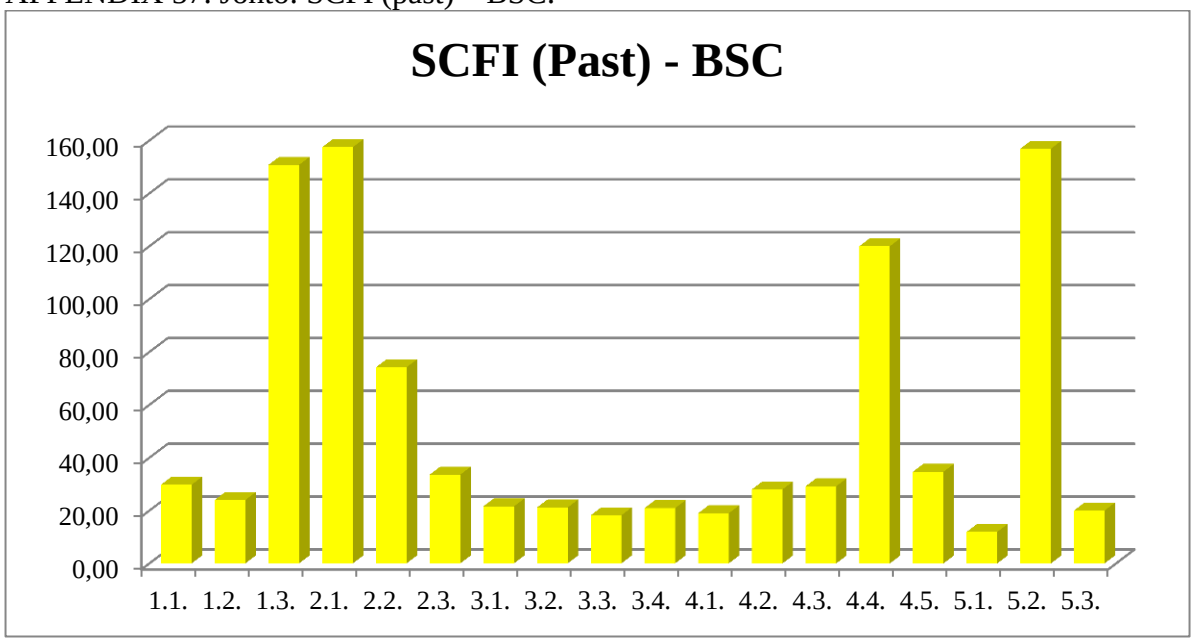
APPENDIX 55. Johto: BCFI (past) – BSC.



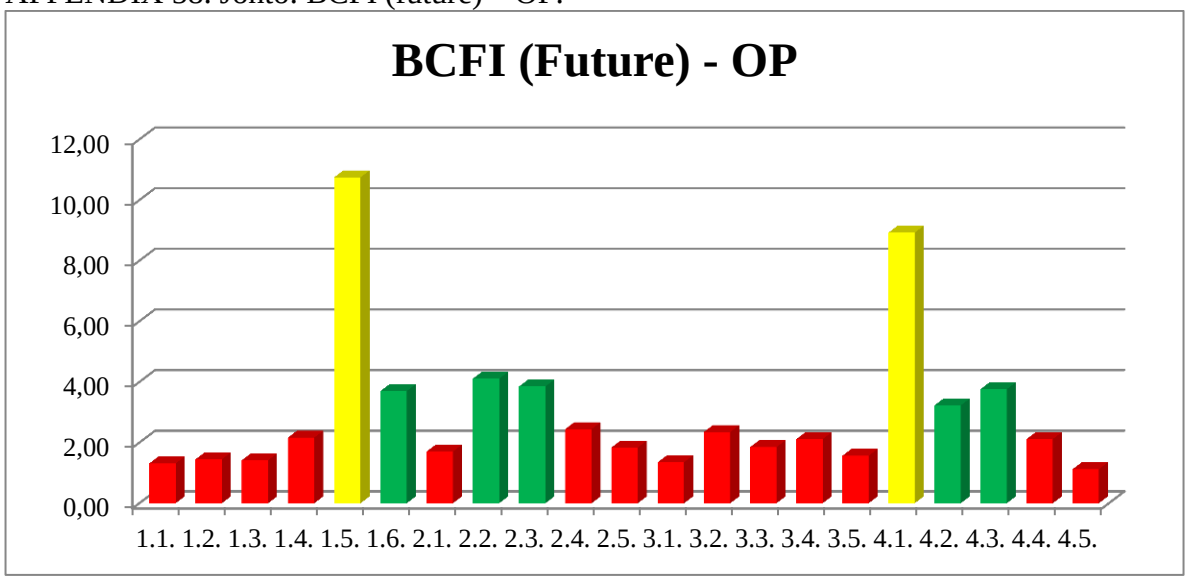
APPENDIX 56. Johto: CFI (past) – BSC.



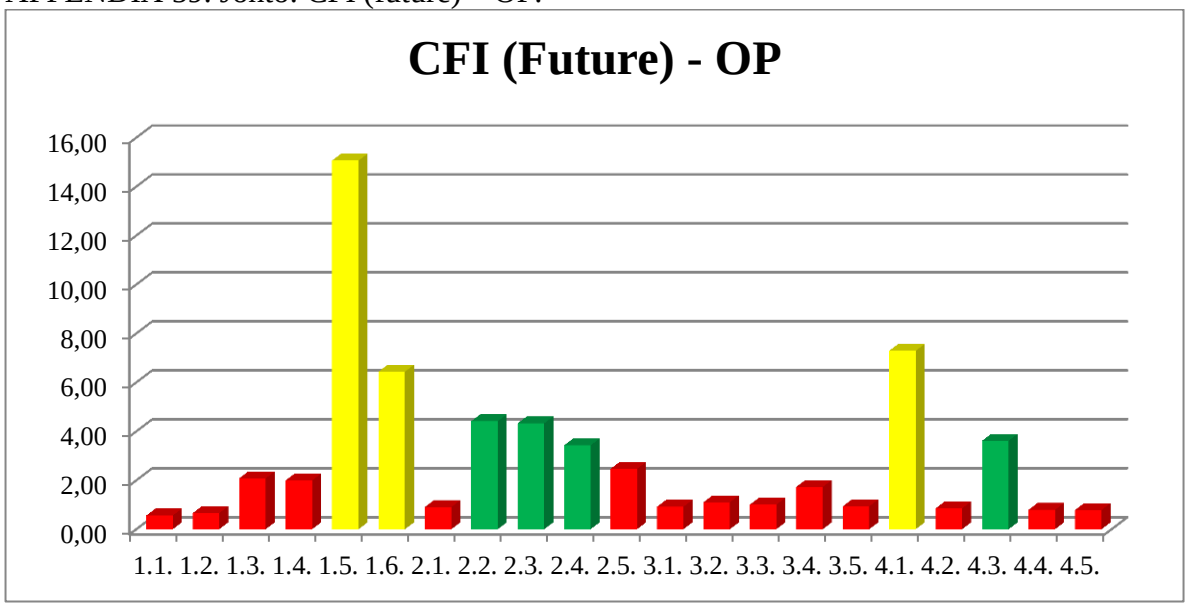
APPENDIX 57. Johto: SCFI (past) – BSC.



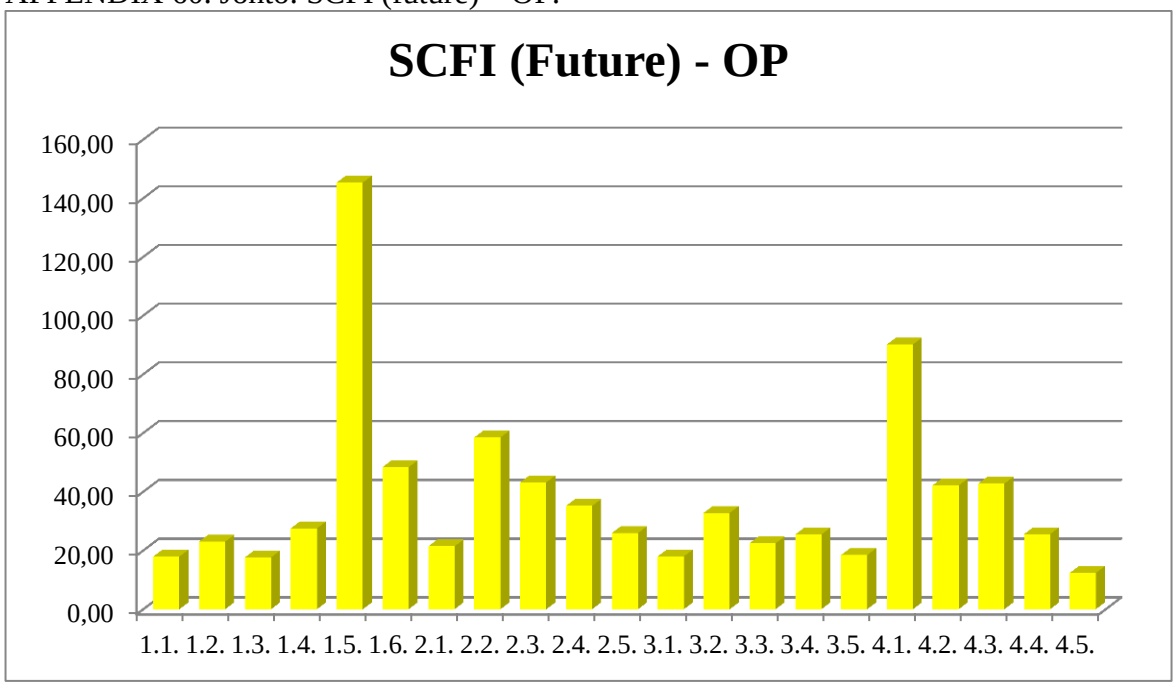
APPENDIX 58. Johto: BCFI (future) – OP.



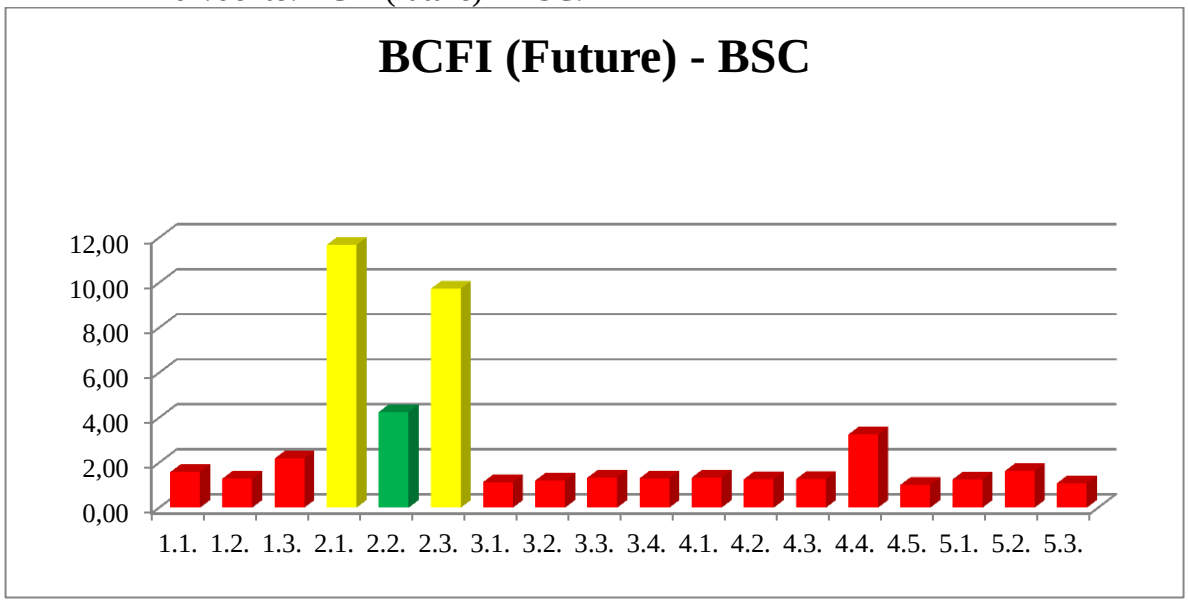
APPENDIX 59. Johto: CFI (future) – OP.



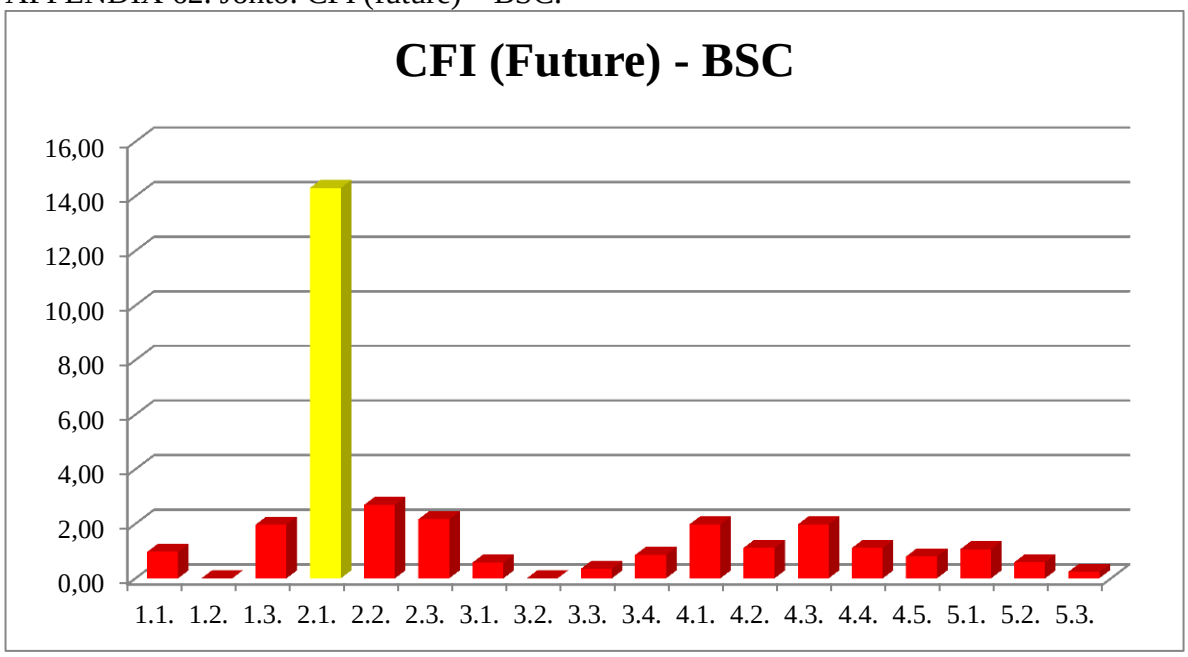
APPENDIX 60. Johto: SCFI (future) – OP.



APPENDIX 61. Johto: BCFI (future) – BSC.



APPENDIX 62. Johto: CFI (future) – BSC.



APPENDIX 63. Johto: SCFI (future) – BSC.