Resource Optimization for Sustainable Competitive Advantage in Residential Project Development: Empirical Evidence from Medium-sized Enterprise in Finland

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Chapter 9
Resource Optimization for Sustainable Competitive Advantage in Residential Project Development:
Empirical Evidence From a Medium-Sized Enterprise in Finland

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ABSTRACT

In today's highly competitive and fast paced world, it is important for a company to have a balanced strategy which is unified and precisely executed to gain a sustainable competitive advantage in order to outperform its rivals. The freedom of action of a company is limited to satisfying the needs of those entities outside the firm that give the resources it requires in order to survive and to be successful. The purpose of this research is to define and assess the resource optimization for sustainable competitive advantages and the direction of development, and potential improvements in a case company's Southern Finland residential project development division. The analysis of operational competitiveness focuses on detecting the right operational strategy and resource allocation by exploiting seven different kinds of methods and tools. The current operational model and resource allocation supports the operative strategy well in the case company and those resources which seem to be not optimally positioned are heading in the right direction.

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INTRODUCTION

The world is changing rapidly and this unstable environment affects corporations on a huge scale. Strategy is one of the most important components of the modern corporate environment which, in most cases, determines whether a company or organization survives or faces bankruptcy. Strategy is a gateway for any organizational development, modernization or competitive activities implementation as well as the key to competitive advantages (Christensen, 2011.) In this turbulent environment, operations strategy is one of the most essential tools which helps manage company position or even get more share in a nationwide market (Takala, Muhos, Tilabi, Serif & Yan, 2013b, p. 55). According to Si, Takala and Liu (2010), operational strategy can be seen as a pattern, consisting of decisions affecting the ability to meet a company's long-term objectives. The aim of operations strategy is providing a broad framework for defining how to prioritize and utilize its resources to have a sustainable competitive advantage. Moreover, economic recessions that affect firms regardless of their location, increased competition, and changes in customer expectations, all contribute to disruptions that require firms to be resilient (Acquaah, Amoako-Gyampah & Jayaram, 2011).

The general purpose of this research is to define and assess the resource optimization for sustainable competitive advantages and the direction of development in a case company's Southern Finland Residential Project Development department (RPD), which is operating in the construction industry. Analysis of the operational competitiveness focuses on detecting the right operational strategy and resource allocation by exploiting multiple types of methodologies and tools, such as The Analytical Hierarchy Process (AHP), Critical Factor Indexes (CFI), Sense and Respond (S&R), the RAL-concept, Manufacturing Strategy Index (MSI), and Knowledge and Technology (K/T) to guide the business towards sustainable competitive advantage. The research question and its sub-questions are presented below.

- How the case of company's Southern Finland Residential Project Development can be improved in the perspective of operational strategy?
    - What are the case company's critical resources and how should they be reallocated to achieve better performance?
    - What are the case company's success factors compared to competitors?
    - Which technologies boost the case company's business strategy and which of these bring uncertainty?

In the perspective of Sense and Respond (S&R) and Critical Factor Index (CFI), the research will focus on Balanced Critical Factor Index (BCFI) and Normalized Scaled Critical Factor Index (NSCFI) models, which are the most useful and used indexes in order to define the most critical factors, which have significant influences on the overall organization's performance. The research focuses only on the case company and on the previously-defined methodologies and models by which the results are obtained. Data is collected from a micro and macro level will be excluded from the study. Furthermore, the impact of technology and knowledge on uncertainty in the investment decision making process are modeled with the help of three methods: AHP, the Sand Cone model and the Knowledge and Technology rankings. This study is an overview of a Master's Thesis "Improving the Residential Project Development Process by Sustainable Competitive Advantage" created by Heimonen (2017), which is why the regional limitation is Finland. The research does not focus on building a new theory, but utilizing the existing theories in a new industry / environment.

The structure of this study is as follows. Section 2 reviews the related literature and introduces research methodologies and used tools. Section 3 presents the empirical research step-by-step, the related analysis and the findings. Section 4 discusses the findings, practical implications, research limitations and also recommendations for further research. Final section points out the study's conclusions.

THEORY BACKGROUND

Sustainable Competitive Advantage in the Strategic Optimization

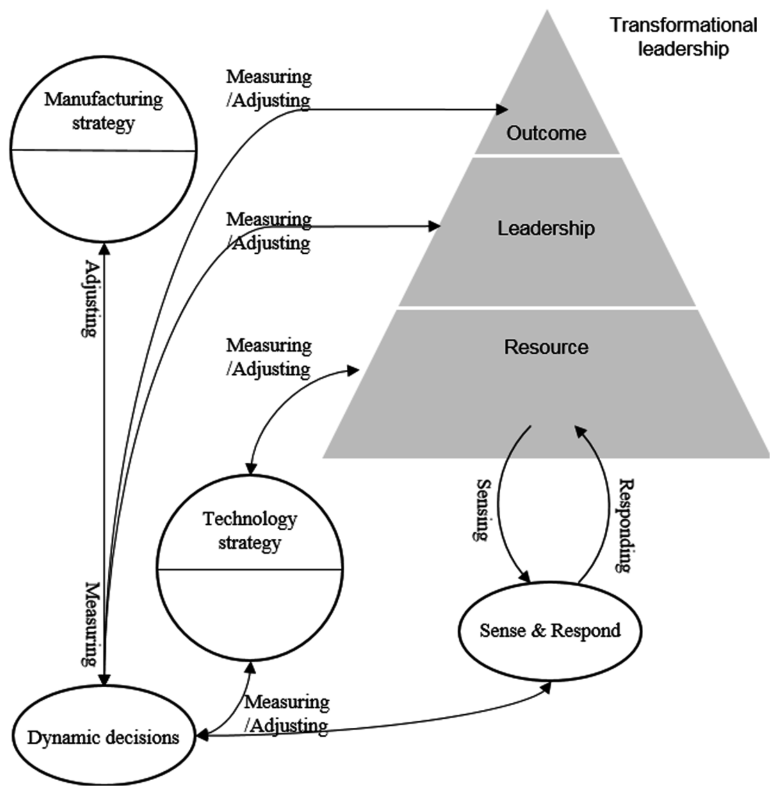
Competitive advantage has been studied extensively since the 1980's (Porter, 1980; Porter, 1985), when the notion of Sustainable Competitive Advantages (SCA) was developed for the first time by Porter (1985) and then complemented within resource based strategy by Barney (1991). Furthermore, Barney, Wright and Ketchen (2001) added to it a resource based view believing that the critical factors for success exist in the firm itself in terms of its resources and capabilities, where capabilities also define firm's disabilities (Christensen, 2011). According to Barney (1991), the core concept behind a resource based strategy relies on SCA, when it is derived from the resources. The resource based strategy's capabilities must have four attributes: rare, valuable, imperfectly imitable and not substitutable. In addition, technology as know-how is a relevant part of the resource based strategy. The perception of the SCA has changed over the years, from Porter's (1985) ideology on competitive business strategies which are based on differentiation by unique specialization in terms of quality, product, service technology or cost leadership to resource-based strategy ideology by Barney et al. (2001).

The benefits of implementing sustainable competitive advantage are demonstrated in Figure 1. The SCA functionalities can be explained as a closed-loop system, which contains a measuring Manufacturing Strategy Index, Sense and Respond, Technology Strategy, and Transformational Leadership within outcome, leadership, and resource. In order to find the critical factors, an organization should re-allocate resources and improve the lower level foundations, which in return improve the upper level strategies with the adjustments made based on the changes in the business environment. (Liu, 2013, p. 2829.) In other words, the organization should measure SCA functionalities and adjust these to dynamic decisions.

According to Liu (2013, p. 2822), Manufacturing strategy, Transformational leadership, Technology strategy, and Sense and Respond are the key aspects in achieving a competitive advantage. Furthermore, the future competitiveness of manufacturing operations under dynamic and complex business situations relies on forward-thinking strategies which should stay in balance with existing resources. Firms that can sustain their competitive advantage are able to outperform others in the long run. (Liu 2013, p. 2822.) In this research, the SCA is proposed and identified as a tool to create a resource-based strategy which is supported by the Sense and Respond idea of agile strategy implementations.

Strategy does not have an unambiguous definition, thus according to Quinn (1980) strategy means "A pattern or plan that integrates an organization's major goals, policies and action sequences into a cohesive whole". Furthermore, Operations strategy is defined as "the pattern of strategic decisions and actions which set the role, objectives and activities of operations", where patterns imply a consistency in strategic decisions and actions over time (Slack & Lewis, 2014). Miles and Snow (1978) have developed

Figure 1. The benefits of implementing sustainable competitive advantage
Adapted from Liu, 2013, p. 2829.



a comprehensive framework which states that the strategy type can be determined depending on the fixed proportions between RAL Model elements (Quality, Cost, Time/Delivery, and Flexibility). The topology is a dominant framework of the strategy types and the RAL abbreviation comes from Responsiveness, Agility and Leanness. In this framework, there are considered to be four different business strategy types in organizations. Three of the four types are stable groups, Prospectors, Defenders, and Analyzers. The fourth unstable group is called Reactors. The instability of the Reactors group resulted in its exclusion from this research. (Takala, Koskinen, Liu, Tas & Muhos, 2013a, p. 48.) The business strategy types according to Miles and Snow (2003) are shortly defined below.

A Prospectors' is a strategy for an organization which continuously improves and innovates products and services by discovering and exploiting new market opportunities. The Prospector's competitive strategy creates changes in the market place by responding quickly to existing or early signals concerning areas of opportunities. A Defenders' is a strategy for an organization which has narrow product-market domains. These organizations are focusing on product maturity and market operations as well as cost efficiency and improving processes. Defenders do not prefer to take risks but instead they intensify their efficiency and maintain their current customers. Organization with an Analyzer strategy is between the Defender and Prospector types. The analyzer is a unique combination of the Prospector and Defender types and represents a viable alternative to the two other strategies. An Analyzer organization attempts to minimize operational risk while maximizing the opportunity for profit by combining the strengths of two other strategies. The Analyzer strategy balances quality, cost and time, and does not focus on any specific attribute. Organization with a Reactor strategy has no consistent strategic approach in which case they react to changes in an environment and drift with events.

Sense and Respond (S&R): Critical Factor Index (CFI)

Modern organizations are moving from the traditional make and sell concept models towards a sense and respond way of thinking. The focus of the '*make and sell concept model*' was predicting customers' needs and then adapting production and inventory to meet the forecasts. The Sense and Respond method relies on real-time sensors of a customer's needs. (Bradley & Nolan, 1998.) The Sense and Respond (S&R) method was firstly described by Haeckel (1992), but developed further by Bradley and Nolan (1998), and Markides (2000) for targeting methods to analyze dynamic business strategies. Moreover, S&R is a widely customizable industrial operational strategy to deal with the current turbulent business environment. The main idea of S&R philosophy is the implementation of the best action by detecting changes (sensing) and reacting to them properly (responding). In other words, the method helps organizations to expect, foresee, adapt, and respond to changing business situations by converting threats into opportunities and drawbacks into strengths. (Takala et al., 2013a, p. 47.) The method is the starting point in implementing a sustainable competitive advantage.

The Sense and Respond method was utilized by Ranta and Takala (2007) in an operative management system when introducing the Critical Factor Index (CFI). "The CFI method is a measurement tool to indicate which attribute of a business process is critical and which is not, based on the experience and expectations of the respondents" (Ranta & Takala, 2007). The CFI is a supporting tool for the strategic decision-making and helps managers make decision fast and react better. Furthermore, the S&R model within the CFI method has gone through three stages of development, which are called the BCFI model, the SCFI model, and the latest NSCFI model (Liu, Wu, Zhao & Takala, 2011, p. 1012). All stages can be used in a research and the purpose of every stage differs from another. Generally S&R and CFI methods make it possible to gather data from the organization regarding employees' expectations and experience and how they see themselves compared to competitors by using a specific questionnaire (Ranta & Takala, 2007).

The questionnaire's structure was developed by Ranta and Takala and it consists of four phases which are demonstrated in Figure 2. The Sense and Respond questionnaire, has to correspond to the MSI, RAL and S&R boundaries. The following questionnaire integrates the AHP topology into the S&R methodology, which is divided in the attributes from OP (Operations Priorities) and BSC (Balanced Score Card) questionnaires and between the general points of RAL Model: cost, quality, time, and flexibility. A respondent evaluates both, expectation and experience in a scale of 1 (low) to 10 (high) and the direction

Figure 2. Format of the S&R questionnaire
Adapted from Ranta& Takala 2007.

ATTRIBUTES	Scale: 1=low, 10=high		Direction of development, experiences (past)			Direction of development, expectations (future)			Compared with competitors			Knowledge / technology requirement		
	Expectation	Experience	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Basic %	Core %	Spearhead %
Performance 1														
Performance 2														

of development (both, experience and expectations) by using a scale of "Worse", "Same", and "Better". In the fourth phase the respondent will compare own organization's performance to competitors by using the same criteria as in the previous phase.

The analytical hierarchy process (AHP) is used in this research to analyze the questionnaires and for calculating the weights of the main criteria's and sub-criteria's. The AHP method was developed by Thomas L. Saaty in the 1970s and it is a multi-attribute decision instrument that includes considering quantitative and/or qualitative measures and integrating the different measures into single overall goal. (Saaty, 1980.) The purpose of the AHP is to assist people in organizing their thoughts and judgments to make more effective decisions. The main criteria's are based on the manufacturing strategy and manufacturing capabilities; cost, quality, delivery, and flexibility. The AHP questionnaire is a pair-wise comparison questionnaire which uses a scale of 1 to 9 that ranges from equally important to extremely important. For example, a respondent will compare two different factors, A and B, in the pair-wise comparison. Figure 3 demonstrates AHP questionnaire's structure.

In order to analyze the questionnaires data, the following equations (1) – (8) are used in the calculations of CFI, BCFI, SCFI and NSCFI models (9) – (12) (Takala et al., 2013a, p. 49).

- **Importance Index:** Presents the level of importance of a criterion amongst others. This index reflects the actual expectations of the company regarding a criterion.

$$\text{Importance Index} = \frac{Avg\{\text{expectation}\}}{10}. \tag{1}$$

- **Gap Index:** Helps to understand the gap between experience and expectations of a specific criterion

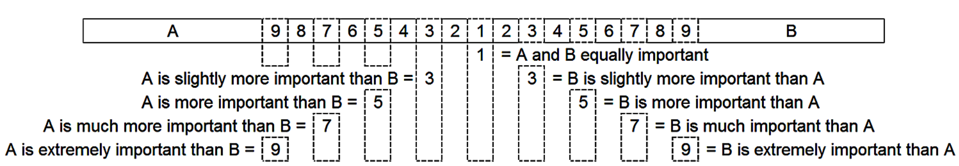
$$\text{Gap Index} = \left| \frac{Avg\{\text{experience}\} - Avg\{\text{expectation}\}}{10} - 1 \right|. \tag{2}$$

- **Development Index:** Demonstrates the actual direction of the company's development, the positive or negative change of a criterion's performance.

$$\text{Development Index} = \left| (better\% - worse\%) \times 0.9 - 1 \right|. \tag{3}$$

- **Performance Index:** Reflects the value of a criterion's performance based on the real experiences of the respondents.

Figure 3. AHP pair-wise comparisons



$$\text{Performance Index} = \frac{Avg\{\text{experience}\}}{10}. \tag{4}$$

- **Standard Deviation of Experience:** Reflects the case where the respondents have a similar answer or controversial meaning regarding to one attribute for what they have experienced.

$$\text{SD Experience Index} = \frac{Std\{\text{experience}\}}{10} + 1. \tag{5}$$

- **Standard Deviation of Expectation:** Reflects the case where the respondents have similar answer or controversial meaning regarding to one attribute for what they expect.

$$\text{SD Expectation Index} = \frac{Std\{\text{expectation}\}}{10} + 1. \tag{6}$$

- **Gap Index':** Is improved Gap Index for NSCFI.

$$\text{Gap Index'} = 2^{\frac{Avg\{\text{expectation}\} - Avg\{\text{experience}\}}{10}}. \tag{7}$$

- **Development Index':** Is improved Development Index for NSCFI

$$\text{Development Index'} = 2^{(worse\% - better\%)}. \tag{8}$$

After the raw data has been exposed to the previous equations, it will be analyzed by the equations of CFI, BCFI, SCFI, and NSCFI models which are listed as follows (9) – (12).

- **Critical Factor Index (CFI):** Is a measurement tool to indicate which attribute of a process is critical and which is not, based on the experience and expectations of respondents.

$$\text{CFI} = \frac{Std\{\text{experience}\} \times Std\{\text{expectation}\}}{\text{Importance Index} \times \text{Gap Index} \times \text{Development Index}}. \tag{9}$$

- **Balanced Critical Factor Index (BCFI):** Is the most useful and used index in order to define the most critical factors which have a significant influence on the overall organization's performance. The BCFI method was developed in the University of Vaasa in 2010 by taking the principle of the CFI theory into consideration (Takala, Shylina, Forss & Malmi, 2013c.).

$$\text{BCFI} = \frac{\text{SD Expectation Index} \times \text{SD Experience Index} \times \text{Performance Index}}{\text{Importance Index} \times \text{Gap Index} \times \text{Development Index}}. \tag{10}$$

- **Scaled Critical Factor Index (SCFI):** The main purpose is to solve the problems when the respondents sample is too narrow and limited. Liu et al. (2011) developed the SCFI model that accurately models the S&R theory.

$$\mathrm{SCFI} = \frac{\sqrt{\frac{1}{n}\times\sum_{i=1}^{n}\left[\mathrm{experience}(i)-1\right]^2}\times\sqrt{\frac{1}{n}\times\sum_{i=1}^{n}\left[\mathrm{expectation}(i)-10\right]^2}\times\mathrm{Performance\ Index}}{\mathrm{Gap\ Index}\times\mathrm{Development\ Index}\times\mathrm{Importance\ Index}}. \quad (11)$$

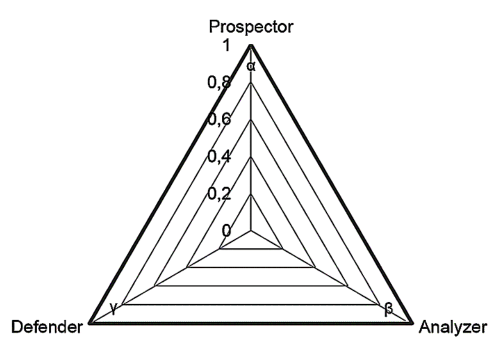
- **New Scaled Critical Factor Index (NSCFI):** Is an improved model based on the earlier SCFI model, developed by Liu and Liang (2015, pp. 1026-1027).

$$\mathrm{NSCFI} = \frac{\sqrt{\frac{1}{n}\times\sum_{i=1}^{n}\left[\mathrm{experience}(i)\right]^2}\times\sqrt{\frac{1}{n}\sum_{i=1}^{n}\left[\mathrm{expectation}(i)-11\right]^2}\times\mathrm{Performance\ Index}}{\mathrm{Gap\ Index'}\times\mathrm{Development\ Index'}\times\mathrm{Importance\ Index}}. \quad (12)$$

Manufacture Strategy Index (MSI)

Organizations continuously make decisions on resource allocation in order to succeed in the market in long-term. Based on these decisions, organizations can determine their operational strategy. The manufacturing strategy has an important role in this process. The concept of manufacturing strategy was defined by Skinner (1969) as a model which evaluates the competitive priorities of an organization in order to reach a competitive advantage in the current market. These competitive indexes of companies belong to different competitive groups such as Analyzers, Defenders, Prospectors and Reactors (Miles & Snow, 1978). According to Takala et al. (2013a) the Manufacturing Strategy Index (MSI) is supported by the RAL (Responsiveness, Agility and Leanness) model by taking four main criteria into consideration, cost (C), quality (Q), time/delivery (T) and flexibility (F), which are evaluated with the help of the AHP. Figure 4 demonstrates different positions of an organization considering their operation strategy. In the RAL model, Prospector is located at the top of the triangle with the quality attribute. Analyzer is located on the right angle of the triangle where the cost weight value is the most important. Defender and Time are located on the left of the triangle.

Figure 4. Manufacturing Strategy Index: Triangle



To calculate the MSI, there is a need for knowing all the basic equations which are introduced below. The equations to calculate normalized weights of core factors, competitive priorities, are as follows (Liu, 2013, p. 2827).

$$Q' = \frac{Q}{Q+C+T}, \tag{13}$$

$$C' = \frac{C}{Q+C+T}, \tag{14}$$

$$T' = \frac{T}{Q+C+T}, \tag{15}$$

$$F' = \frac{F}{Q+C+T+F}, \tag{16}$$

where Q stands for quality, C for cost, T for time and delivery, and F stands for flexibility.

The next equations stand for the analytical models that provide the calculations of MSI of operational competitiveness in each group. According to Liu (2013, p. 2827), the analytical model to calculate the MSI model for a Prospector, Defender, and Analyzer are presented in equations (18) – (20).

$$MSI_P = 1 - \left[(1 - Q'^{1/3}) \times (1 - 0.9 \times T') \times (1 - 0.9 \times C') \times F'^{1/3} \right], \tag{17}$$

$$MSI_D = 1 - \left[(1 - C'^{1/3}) \times (1 - 0.9 \times T') \times (1 - 0.9 \times Q') \times F'^{1/3} \right], \tag{18}$$

$$MSI_A = 1 - (1 - F') * \left(abs \left\{ \begin{matrix} (0.95 \times Q' - 0.285) \times \\ (0.95 \times T' - 0.285) \times \\ (0.95 \times C' - 0.285) \end{matrix} \right\} \right)^{1/3}, \tag{19}$$

where Q’, T’, C’, and F’ values are normalized values of Q, T, C, and F.

Resources, Technology, and Knowledge Required Enterprises

The increasing role of technology brings vast opportunities as well as threats and substantial requirements to an organization since they must continuously adapt to the technical requirements of the market. Technology has also been linked to an opportunity of gaining competitive advantage when the decision maker’s improvements are following the strategy. All things considered, technology is a source of business development, growth, profit, and competitiveness. (Takala et al., 2013a, pp. 45-46.) According to Mäntynen (2009), four factors are playing a role in achieving sustainable competitive advantages: core competence, time compression, continuous improvement, and relationships. Core competence helps organizations to differentiate themselves from competitors. Time compression means cutting, for example production and delivery times, to meet customers' expectations with fast delivery without the cost of lower quality of services. Continuous improvement comes from a mindset of "an organization can never be satisfied about its products and services because someone is always trying to do it better". Finally, relationship means networking to gain synergy benefits as well as in order to create even better services and products.

According to Lubit (2001, pp. 166-167) knowledge is defined as information that is difficult to express, formalize or share and it can be related to intuition. Sustainable competitive advantage requires knowledge and intellectual capital as the primary basis of core competencies. Knowledge must be spread within the organization in order to achieve a sustainable competitive advantage, since poorly distributed knowledge has only a limited impact on value creation. Knowledge is simultaneously always a risk since it can spread to other organizations and become the industry's best practice instead of one's own competitive advantage. Therefore, in order to achieve sustainable competitive advantage knowledge, skills, and resources should be relatively easy to share inside the company but difficult for other firms to copy (Lubit, 2001, pp. 164-166.). According to Tuominen, Rinta-Knuutila, Takala and Kekäle (2004, pp. 10-11), there are three different types of technologies: basic, core, and spearhead technology. Figure 5 illustrates the types of technologies with the connection to product life cycle.

Basic technology is referring to the most critical technologies for a business and these are the key foundations of a business, e.g. a car's engine. Core technologies include technologies that bring competitive advantages over competitors and enable an organization to grow, e.g. the car's environmental stewardship. To prevent the knowledge from leaking to competitors these kinds of technologies are kept inside a company. The spearhead technology focuses mainly on future and it is the most potential for bringing successful business opportunities in the future, e.g. a self-driving car (Tuominen et al., 2004, p. 10). In order to study the impact of technology and knowledge on uncertainty in the investment decision making process and apply knowledge and technology to the Sense and Respond method, respondents are required to assess the share of basic, core, and spearhead technologies in percentages for each attribute while the summation of the three terms should be 100 per cent (Takala et al., 2013a, p. 48). Format of the Knowledge and Technology (K/T) questionnaire, which is a part of the S&R questionnaire, is demonstrated in Figure 2. In order to analyze the Knowledge and Technology section, the respondents named a couple of examples for each K/T level (Table 1).

Figure 5. The linkage between the technology levels, technology pyramid, and technology life cycles
Adapted from Tuominen et al., 2004, p. 10.

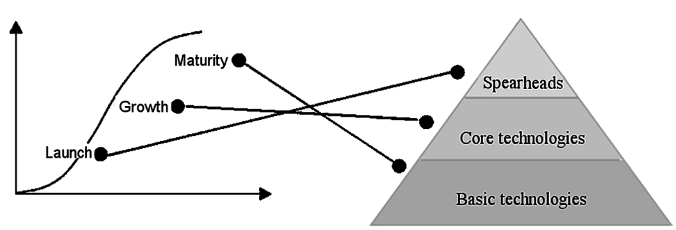


Table 1. K/T levels examples: Residential project development

Basic Technology	• Standardized operation • Personnel • Know-how • Customer focus
Core Technology	• Development • BIM (Building Information Models) • Sales Facilities
Spearhead Technology	• Self-healing Material • Advanced Building Material • IOT • 3D Scanning • Big Data & Analytic • Integrated BIM

Source: Author.

This research also exploits a Sand Cone Model in order to compare K / T attributes to each other. The model illustrates the studied object by showing its hierarchies as well as the relative importance and relationship of the sub-objects. Internally crucial factors for the organization are placed in the bottom of the structure and they are a base for value creation. The rest of the factors are then placed on this base. The top of the model shows the customer-oriented factors that result from internal factors. (Takala, Leskinen, Sivusuo, Hirvelä & Kekäle, 2006, p. 338.) The sand cone model exploits the analytical hierarchy process in order to detect crucial factors by their value weights.

The sand cone model can be used also as an uncertainty illustrator. Questionnaires data's uncertainty is determined with the help of the aforementioned knowledge and technology rankings (K/T) from which coefficient of variations (CV) are calculated using the following equation (Takala et al., 2006, pp. 338-339).

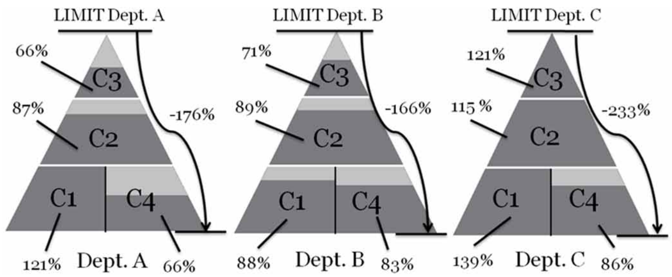
$$Coef.Var_{Basic} = \frac{\text{Standard Deviation}_{Basic}}{Average_{Basic}}, \tag{20}$$

$$Var\ \ C_{O1,O2,O3...} = \sqrt{\sum_{b_1,c_1,sh} Coef.Var_i^2}\ . \tag{21}$$

Furthermore, the coefficient of variations' results are inserted to the sand cone model in a form of risk that can cause a collapse in the model's layers. These collapses may happen due to the different technology and knowledge requirements of the different departments which are competing for the same investment budget. In addition, a figure can be calculated from the variability coefficients determining the amount of K/T affected risk in each group. This figure is called K /T –uncertainty and it describes how much in general the department "falls" under its competitive range when the K /T risk estimate materializes. The equation for the K /T–uncertainty is illustrated in (23) (Takala et al., 2006).

$$\text{K/T-uncertainty} = \sqrt{\sum_{o_1,o_2,o_3,o_4}\left[\left(\sum_{b_1,c_1,sh} Coef.Var_i\right)^2\right]^2}\ . \tag{22}$$

Figure 6. The Sand Cone Models with K/T collapse risks
Adapted from Takala et al. 2016: 29.



Hereafter, when K/T – uncertainties are calculated, the AHP is used to weigh the investment criteria. Calculated variability coefficients depicting the uncertainties are placed to the Sand Cone model to illustrate the weighted criteria and collapse risk caused by the uncertainty. Figure 6 demonstrates the model within three departments and four investment criteria. Selected criteria are organized to the model based on the criteria that is crucial for the department. Hereafter, the variability coefficients are added to the Sand Cone model in the form of collapses (the darker grey color). Criteria within over 100 percent variability question the whole evaluation based on that criterion. The right side of the model presents the K /T –uncertainty i.e. the total uncertainties as well as the graphical illustrations of the possible collapses of the department's sand cone (Takala, Zucchetti, Daneshpour, Kunttu, Välisalo, Pirttimäki & Kiiski, 2016).

Elaboration of Sustainable Competitive Advantage, Risk Level Optimization

The Sustainable Competition Advantages risk level method (SCA) is a risk measurement tool to estimate the functionality of the operations strategy. This tool helps understand if a company's internal resource allocation supports the company's strategy. For measuring the company's risk level of the operation strategy, the research uses three different indexes, which are Mean Absolute Percentage Error (MAPE), Root Means Squared Error (RMSE), and Mean Absolute Deviation (MAD). MAPE is a measure of prediction accuracy of a forecasting method in statistics. RMSE is a frequently used measure of the differences between values predicted by a model or an estimator and the values actually observed. MAD is the average distance of each data value from the mean. The SCA equations are designed to utilize the angle values, as they more accurately reflect the direction of strategy implementation. The SCA values are between 0 – 1 and therefore, the closer the risk value is to number one, the better it is. Closer to 0 means that the current strategy is not stable and there is a possibility of collapse. The following equations obtain data from CFI, BCFI, SCFI, NSCFI, and AHP. (Takala et al., 2013a; Takala et al., 2013b.)

$$\mathrm{MAPE} = 1 - \sum_{\alpha,\beta,\gamma} \left| \frac{BS - BR}{BS} \right|, \tag{23}$$

$$\mathrm{RMSE} = 1 - \sqrt{\sum_{\alpha,\beta,\gamma} \left(\frac{BS - BR}{BS} \right)^2}\,, \tag{24}$$

$$\mathrm{MAD} = 1 - \max_{\alpha\beta\gamma} \left| \frac{BS - BR}{BS} \right|, \tag{25}$$

where BS refers to the angel in radians in MSI and BR refers to the angel in radians in CFI, either in the past or future.

EMPIRICAL RESEARCH

The Residential Project Development's (RPD) core element is to improve and implement improvements to the whole concept in order to gain a continuous improvement cycle. The process is wide and for that reason it is divided into five phases (Figure 7).

The research exploits two different questionnaires in order to analyze the RPD comprehensively (the AHP-and the Sense and Respond questionnaire). The S&R questionnaire includes two sections, the first evaluates the division's daily operations (OP), and the second evaluates activities in a more general level (BSC). According to Kaplan and Norton (2005) a BSC (Balanced Score Card) helps companies answer critical performance questions such as 'How customers see the company in general?' and 'How can the company continue to improve, develop and create additional value?'. The research attributes for these questionnaires comes from Takala et al. (2013a), which are verified and validated to work in an operation strategy environment. The categories have a total of 43 attributes, which are evaluated by each respondent. Each attribute and category has a unique id-number, which are used in multiple figures and tables instead of the attributes' names. From Figure 8, the S&R questionnaire's Operations Priorities (OP) part evaluates knowledge and technology management, processes and work flows, projects, as well as organizational and information systems. The Balanced Score Card (BSC) section has the division's external and internal structure, learning and growth, trust, and business performance.

Sample and Analysis

The research sample consist 16 respondents from the RPD –divisions and analysis is made analyzing only the top level of division. The most respondents' job titles are Director or Manager. The respondents' high competence and expertise should be a representation of their knowledge on the operations of the studied divisions. In a perspective of Sense and Respond (S&R), the study will focus on the BCFI model and the AHP analysis is used for evaluating the attributes' priorities.

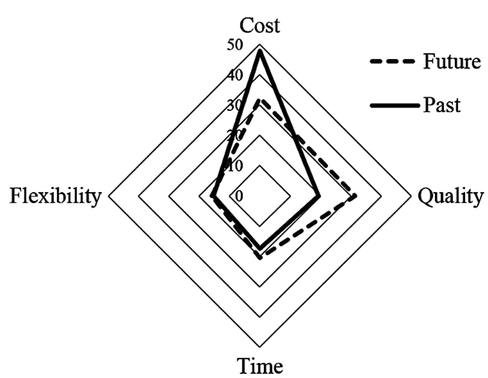
Figure 9 clarifies the total priorities in the RPD by modeling AHP. Based on the results, the main superior priority is cost and quality is the second in the past. In the future, quality will be worth the weight levels with cost. According to the case company, only focusing on operational excellence is not a part of

Figure 7. Residential Project Development divided into five phases

Figure 8. Questionnaires' attributes

Information systems		O4	Processes & Work flows		O2
Information systems support the business processes	← Time	T3	Short and prompt lead-times in order-fulfilment process	← Flexibility	F3
Visibility of information in information systems	← Time	T4	Reduction of unprofitable time in processes	← Cost	C3
Availability of information in information systems	← Time	T5	On-time deliveries to customer	← Quality	Q1
Quality & reliability of information in information systems	← Quality	Q4	Control and optimization of all types of inventories	← Quality	Q2
Usability and functionality of information systems	← Quality	Q5	Adaptiveness of changes in demands and in order backlog	← Flexibility	F4
Organizational systems		**O3**	**Knowledge & Technology Management**		**O1**
Leadership and management systems of the company	← Cost	C4	Training and development of the company's personnel	← Flexibility	F1
Quality control of products, processes and operations	← Quality	Q3	Innovativeness and performance of research and development	← Cost	C1
Well defined responsibilities and tasks for each operation	← Flexibility	F5	Communication between different departments and hierarchy levels	← Time	T1
Utilizing different types of organizing systems	← Flexibility	F6	Adaptation to knowledge and technology	← Flexibility	F2
Code of conduct and security of data and information	← Cost	C5	Knowledge and technology diffusion	← Cost	C2
			Design and planning of the processes and products	← Time	T2
Project		**O10**	**Learning and growth**		**O7**
Quality is equivalent to expected level	← Quality	Q11	Know-how	← Quality	Q9
Cost management	← Cost	C12	Knowledge	← Quality	Q10
Projects are possible to implement in time	← Time	T9	Competence	← Cost	C8
Projects are enough flexible to conform changes	← Flexibility	F11	Engagement	← Flexibility	F7
Business Performance		**O9**	**Trust**		**O8**
Financial	← Cost	C9	Performance-to-promise	← Time	T7
Sales	← Cost	C10	Professional relationship	← Time	T8
Customer	← Cost	C11	Openness	← Flexibility	F8
			Benevolent colaboration	← Flexibility	F9
			Empathy	← Flexibility	F10
External Structure		**O5**	**Internal Structure**		**O6**
Customer satisfaction	← Quality	Q6	Process improvement	← Time	T6
Customer loyalty	← Quality	Q7	Innovation	← Cost	C6
Brand	← Quality	Q8	Information technology	← Cost	C7

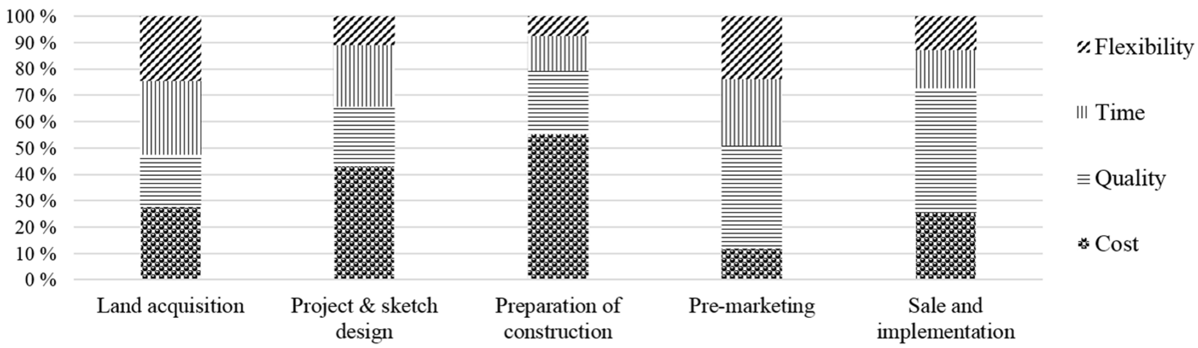
Figure 9. Priorities in the future versus past in RPD



the strategy and the company wants to do things cost-effectively with high quality from the start. Their strategy is to focus on reducing the waste of time and unnecessary work in order to effectively implement the best practices, procedures, systems, and develop people's skills. However, the weight of time is considerably smaller than cost or quality, thus weight priorities may not fully support the strategy's "reduce the waste of time and unnecessary work".

Figure 10 presents the priorities weight by the RPD's phases in the future. Primarily, it can be seen that the Preparation of construction phase and the Project and sketch design phase have the largest percentage in the cost factor (56 and 43 percentage). However, while Sale and implementation has prioritized the quality factor as the most important among others, the first three phases prioritized it as less important. In contrast, the time and flexibility factors are often prioritized as the least important in most of the

Figure 10. Priorities weight by phases in the future



phases. Furthermore, the factors are most evenly distributed in the Land acquisition phase. The concept of weight priorities is key to the field of SCA analysis as the MSI future values derived from the figure.

Figure 11 concludes the original OP priorities in the past and in the future. In the past, processes and workflows were the most important category in RPD. In the future, priorities sift towards knowledge and technology management and organizational systems, even though the processes and work flows stay to be the most important.

The S&R method is used to define critical and balanced areas of the Residential Project Development and the analysis contains two time periods, 3 years in the past (P) and 3 years in the future (F). The initial analysis focuses on the gap between past experience and expectations in the questionnaires, which Figure 12 illustrates. The greater the gap is, the more development the attribute needs. The most interesting attributes with the biggest gap between experience and expectations are information systems: T3 – information systems support the business processes, T4 – visibility of information in the information systems, T5 – availability of the information in information systems, Q4 – quality and reliability of information in the information systems, and Q5 – usability and functionality of the information systems.

Figure 11. OP priorities, past vs. future

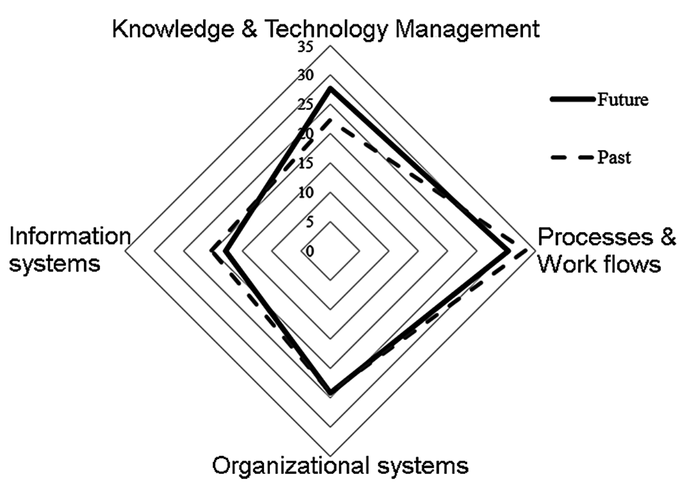
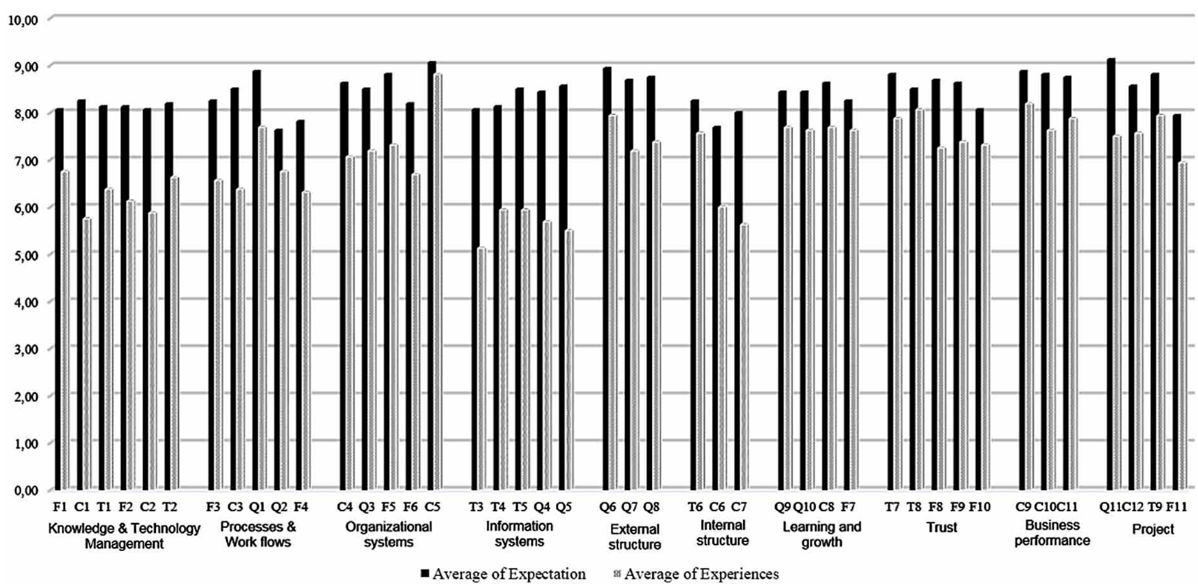


Figure 12. Average of expectation vs. experience in RPD



It means that the information systems are currently slowing down employees rather than giving opportunities. The respondents believe that these attributes will evolve within the next three years. Moreover, the general level of division (BSC categories) is currently on a better level than daily operations (OP categories) whereas more development efforts can be directly targeted to the daily operations. Though, expectations of the division are ranked relatively high, this is typical to a normal environment of many organizations where employees are expecting a better working environment in the future.

Figure 13 presents comparison of BCFI values in the past and future, where the division is analyzed as its entity. A lower horizontal line presents lower resource limit (an attribute falls lower than 1/3 of average resource level and is therefore critical) and upper horizontal line presents an upper resource limit (an attribute is higher than 2/3 of average resource level, and needs therefore more attention, over resourced). Attributes between these lines are in the balanced zone and are allocated correctly (an attribute falls between the range of 1/3 and 2/3 of average resource level).Taking the results from Figure 13into consideration the critical attributes in the present for the RPD are: C1 – innovativeness and performance of research and development, C2 – knowledge and technology diffusion, C7 – customer loyalty, Q4 – quality & reliability of information in information systems, Q5 – usability and functionality of information systems, T3 – information systems support the business processes, and T5 – availability of information in information systems. The number of critical attributes is smaller than the average number on its actual phases. Moreover, the attributes which need attention in the present contain only C5 – code of conduct and security of data and information, and T6 – process improvement and in the future, Q4 – quality and reliability of information in information systems. Table 2 collapses the results from Figure 13.

According to results, the situation for the RPD is considerably improving towards a better operation, although it needs a lot of effort in many phases and attributes. Figure 13 shows that the general situation in the future will be improved. However, there will be some difficult attributes in the future: C1, Q4, Q5, T3, T4, and T5, since each of these increases considerably versus the past. It means that the company

Figure 13. Comparison of BCFI past and future in Residential Project Development

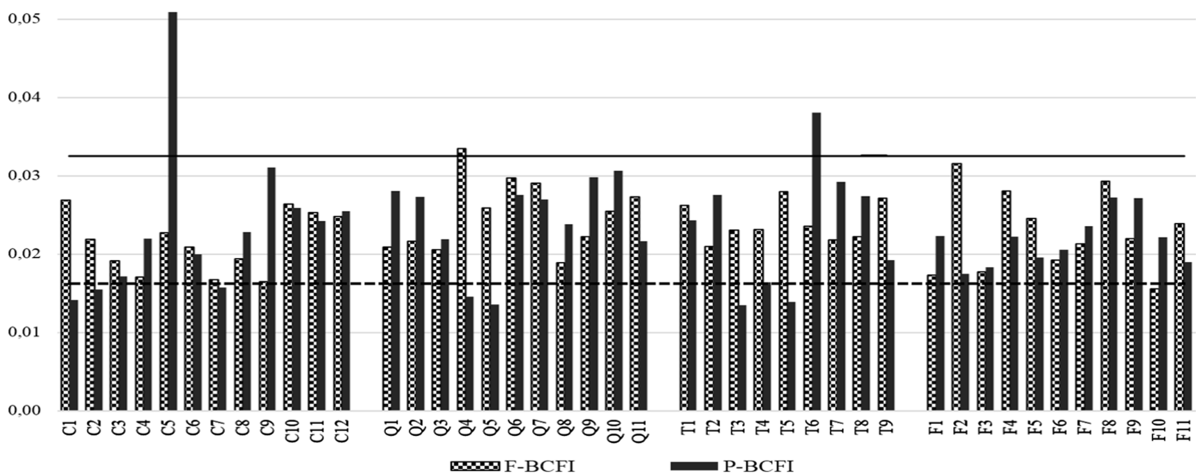


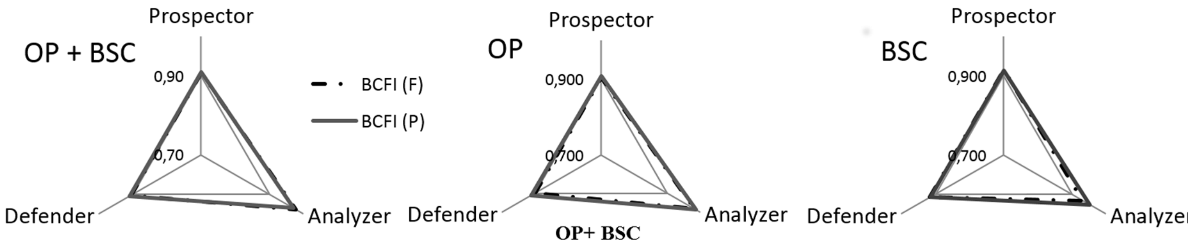
Table 2. Residential Project Development, critical attributes

Past	Future
Critical Resources	
C1 – innovativeness and performance of research and development C2 – knowledge and technology diffusion C7 – customer loyalty Q4 – quality & reliability of information in information systems Q5 – usability and functionality of information systems T3 – information systems support the business processes T5 – availability of information in information systems	F10 – empathy
Need Attention	
C5 – code of conduct and security of data and information T6 – process improvement	Q4 – quality & reliability of information in information systems

should pay more attention on such attributes and put more resources into improving and changing them as the respondents assume.

Figure 14 is divided to two parts; the triangle presents the distribution of operational strategies, and the table area presents the calculated values of the BCFI in the future and the past. The second row on the table presents the calculated values of the BCFI and the value on the black background provides the calculations of the MSI model of operational competitiveness for each group. The higher the value, the more significant role the particular strategy type has. Figure 14 presents similar results to the respondents' perception regarding the company strategy. From the respondents' point of view, an analyzer-type strategy has been the main strategy and will slightly decrease in the future in perspectives of OP and BSC, still remaining as the main. This also shows that the company will continue to operate routinely and efficiently through the use of formalized structures and processes. In their more turbulent areas, the top managers watch their competitors closely for new ideas, and then they rapidly adopt those that appear to be the most promising. An Analyzer organization attempts to minimize operational risk while maximizing the opportunity for profit, combining the strength of two other strategies. The growth nor-

Figure 14. Operations strategy of RPD in the past and the future: BCFI



OP+ BSC

Quality	Cost	Time	Flexibility	Quality	Cost	Time	Flexibility
22,43	20,99	17,62	20,42	13,43	13,59	10,58	11,21
Prospector	Analyzer	Defender	Reactor	Prospector	Analyzer	Defender	Reactor
0,909	0,977	0,906	0,908	0,910	0,971	0,911	0,911
Future				Past			

OP

Quality	Cost	Time	Flexibility	Quality	Cost	Time	Flexibility
12,21	10,80	12,12	13,23	6,42	7,33	5,80	6,16
Prospector	Analyzer	Defender	Reactor	Prospector	Analyzer	Defender	Reactor
0,904	0,983	0,900	0,902	0,906	0,986	0,911	0,908
Future				Past			

BSC

Quality	Cost	Time	Flexibility	Quality	Cost	Time	Flexibility
10,22	10,19	5,51	7,19	7,01	7,06	4,78	5,05
Prospector	Analyzer	Defender	Reactor	Prospector	Analyzer	Defender	Reactor
0,916	0,932	0,916	0,916	0,914	0,953	0,915	0,915
Future				Past			

mally occurs through market penetration and also through product and market development (Miles & Snow, 2003). From the results of the BSC perspective, the division sees the strategy not as clearly as in OP, because of almost balancing between Analyzer, Defender, and Prospector in the future.

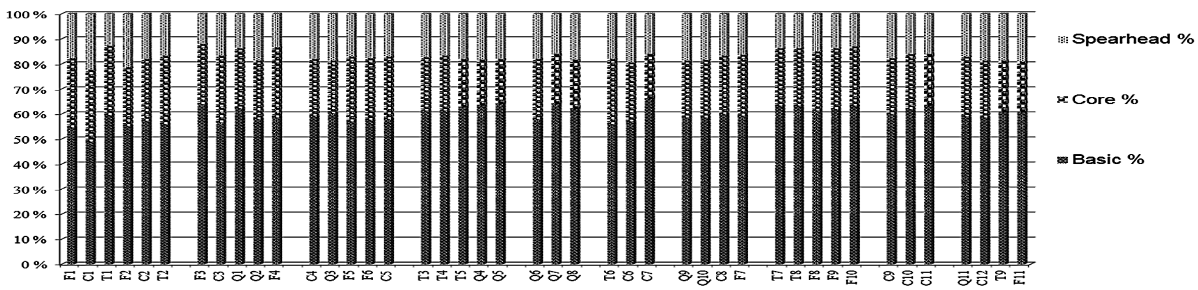
Table 3 presents the domineering strategy type order in the RPD, where 'P' stands for Past and 'F' for Future. It can be seen from table that the domineering strategy type order is Analyzer. Although the MSI past order differs from BCFI order, the strategy is Analyzer in the future. Since the MSI (P)'s order differs from the BSCFI (P)'s order, the respondents' thoughts about cost, quality, time, and flexibility differs slightly from division's operations.

Figure 15 concludes the technology ranking points and indicates that the basic technology is dominating in the RPD and the division is found to be somewhat competitive. However, the spearhead ranking shows that the RPD does not aim excessively to invest in technologies focused on the future. The construction industry's best practices, procedures, and systems can be seen to be similar regardless of the competing

Table 3. Domineering strategy type order: Residential Project Development

	Strategy Type	Strategy Type Order
MSI (P)	Defender	Defender > Prospector > Analyzer
MSI (F)	Analyzer	Analyzer > Defender > Prospector
BCFI (P)	Analyzer	Analyzer > Defender > Prospector
BCFI (F)	Analyzer	Analyzer > Prospector > Defender

Figure 15. Technology and knowledge level, Residential Project Development



companies, since Finland's regulations and laws strongly affect the operations. Each attribute is relying on over 50 percent on basic-technologies except C1 (average percent is 59.86). An average of the Core-technologies is 23.22 percent and the spearhead-technology average is 16.91 percent. Even though the operation strongly relies on basic-technologies, a competitive advantage can also be found in each attribute. On the other hand, it would be desirable to strengthen and create even more new competitive advantages for the future.

Figure 16 (left side) represent the coefficient of variation of the K /T by using the original OP attributes only. Often the greatest variation occurs in the spearhead while the smallest variation occurs often in basic. In order to reduce variation, operations need to be clarified and employees need to be informed more often to keep them up to date. Figure 16 (right side) represents the K /T Risk by using OP attributes only. As can been seen from the figure that the smallest risk occurs in basic technologies and the biggest risk occurs in spearhead technologies. Furthermore, when the strategy type of each phase is Analyzer, the employees are strongly following changes in the industry and not focusing on creating innovations by themselves, it is clear that the future K /T is more risky. The division or the case company does not lead the industry from the perspective of future innovations, which leads to doubt how they can keep up with the pace of change.

Figure 17 presents the variability coefficients of the RPD. As can be observed from the figure, all the coefficients are higher than 0.5 under each criterion. Additionally, all the criterions are distributed between 0.5 – 3.0. All five phases were assigned rather high variability under each criterion as can be seen from the figure. In this case, the Sale and implementation phase has the highest variability almost in every criterion. Furthermore, no criteria received variability lower than one in any of the five phases which makes the uncertainty rather high for every phase. In general, the BSC attributes' uncertainty is on a more tolerable level than the OP attributes' uncertainty since the BSC Var C values are smaller.

Figure 16. CV of K /T and K /T risk level: OP

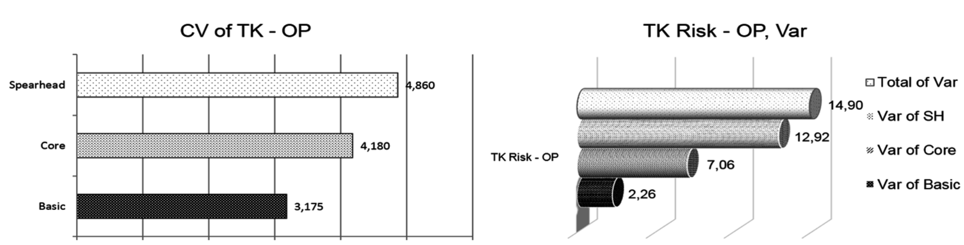
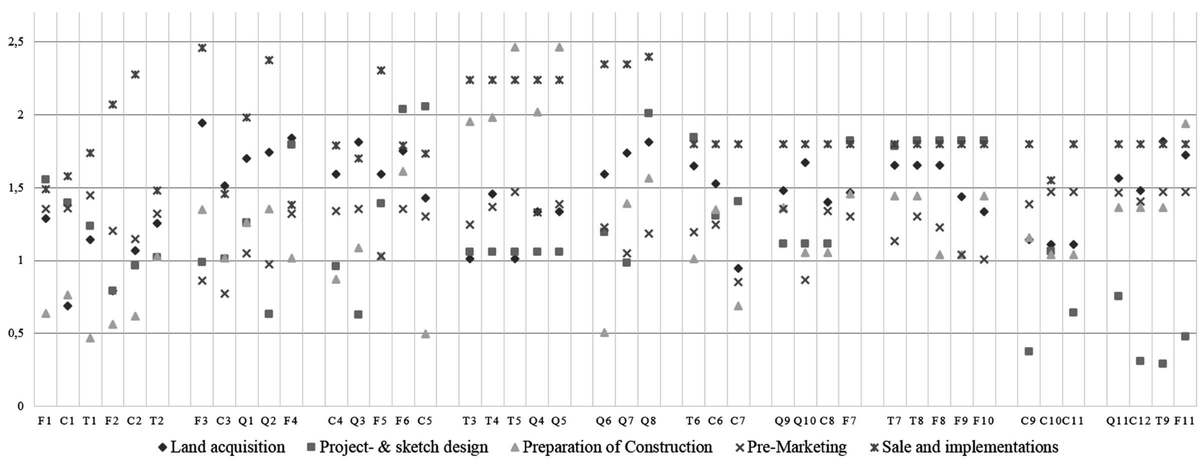


Figure 17. The variability coefficients in Residential Project Development

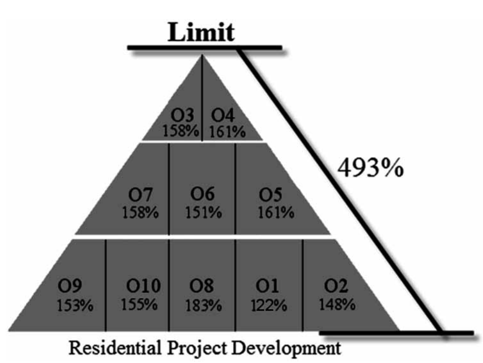


Altogether it can be said that there is a lot of uncertainty in investment decision-making in Residential Project Development.

After naming the technologies, the K/T rankings were gathered with a questionnaire and analyzed by using implementation indexes. The variability coefficients of the RPD's phases are inserted into the Sand Cone model to illustrate the form of collapses (darker grey in Figure 18). Those criteria with over 100 percent variability question the whole investment decision evaluation based on that criterion (Takala et al., 2016). As can be seen from the model, the K /T-uncertainty is over 100 percent which puts the whole decision evaluation under question as well as the comparison of different phases.

The image is very clear in this regard, as can be seen from Figure19, the spearhead technology and knowledge are the main sources of the uncertainty in each phase. Even the core technology returns rather high variability in every phase. Therefore, a conclusion can be drawn that the company relies on basic technologies (Figure 15) and bases its technology and knowledge management mainly on basic technology since uncertainty is high in the other two. This can be seen as a means of securing the distribution of energy to customers. Moreover, the percentage amount of spearhead technology is small compared to the basic technology, which decreases the total uncertainty in strategic decision-making since most decisions are based on common technologies i.e. basic technology.

Figure 18. The K /T-uncertainty and the sand cone collapses



Observed SCA Risk Levels

The potential outcomes out of the SCA analysis have a valuable practical nature. The operations SCA evaluation is defined as a risk probability that the division has to change its operations strategy during the period of time. The SCA analysis provides information about which strategy type may bring better business performance during the analyzed time, forecasting the future strategy (supported by the future critical attributes). The method has wide potential and a sufficient practical value for strategic decision-making process' and strategic analyses. Moreover, SCA validation brings better stability, sensitivity, flexibility and sustainability for the organization, as well as enlarges its performance and competitiveness. Besides the SCA method ensures that the different resources of the company are operating according to the company's strategy (Takala et al., 2013b). The risk levels of RPD are calculated by phases separately and together.

According to Table 4, almost all the risk levels in the future are over 0.90 which means that the company operation strategy is going to be sustainable. Meaning that, all the available resources are allocated in a proper way. Thus, the Project- and sketch design phase has the biggest risk-level since values are near or below 0.9 and it has the highest risk level compared to other phases. One of the reasons for this outcome could be based on the BCFI results where the company does not invest enough resources in supporting the work of this phase. The Preparation of construction phase has about the same risk level in the past and future, which can be explained by how the case company's changes have not influenced the phase considerably. Based on previous results, the Land acquisition phase used to focus highly on cost, even though its decisions needed more flexibility and time. This caused a high risk-level for the phase in the past. In the future, the direction will be better since other factors (quality, time, and flexibility) gain more weight which positively influences the risk-level.

According to the respondents, there are differences between the OP and BSC risk-levels. As can be seen from Table 5, the BSC's SCA risk levels are slightly smaller than in OP. Thus, it can be stated that the division's daily operations are riskier than the division's more general level. This is also noted in Figure 12, where the BSC is at a better level than the daily operations (OP), whereby there is a correlation between these two. Altogether, the risk-level is at a tolerable level and could be reduced by centralizing resources more on quality, time, and flexibility.

Figure 19. The source of uncertainty in RPD: OP

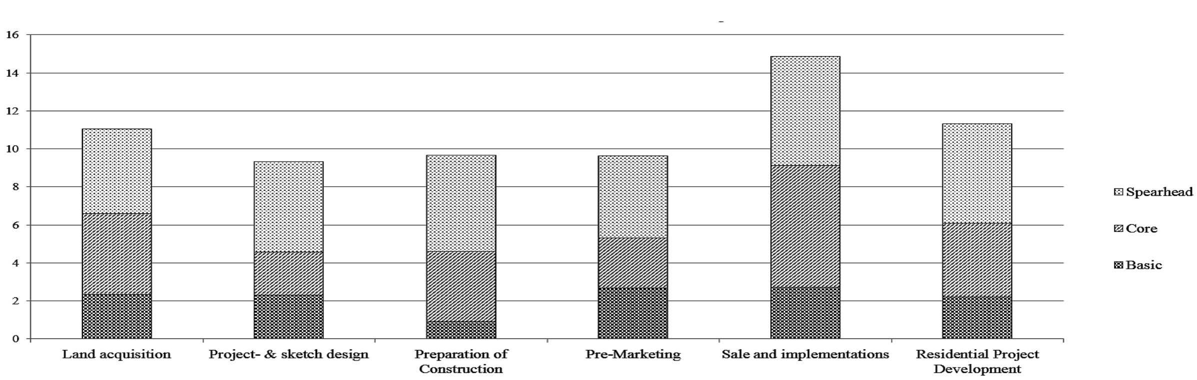


Table 4. Residential Project Development's SCA results

	Technique	MAPE	RMSE	MAD
Land acquisition	BCFI (P)	0,88	0,92	0,94
	BCFI (F)	0,97	0,98	0,99
	NSCFI (P)	0,87	0,92	0,94
	NSCFI (F)	0,97	0,98	0,98
Project- & Sketch design	BCFI (P)	0,81	0,88	0,91
	BCFI (F)	0,93	0,96	0,96
	NSCFI (P)	0,79	0,87	0,90
	NSCFI (F)	0,91	0,94	0,95
Preparation of Construction	BCFI (P)	0,85	0,91	0,93
	BCFI (F)	0,84	0,90	0,92
	NSCFI (P)	0,83	0,89	0,92
	NSCFI (F)	0,85	0,91	0,93
Pre-marketing	BCFI (P)	0,95	0,97	0,97
	BCFI (F)	0,94	0,96	0,97
	NSCFI (P)	0,96	0,97	0,98
	NSCFI (F)	0,94	0,96	0,97
Sale & implementation	BCFI (P)	0,88	0,93	0,94
	BCFI (F)	0,97	0,98	0,98
	NSCFI (P)	0,88	0,93	0,94
	NSCFI (F)	0,93	0,96	0,97
Residential Project Development	BCFI (P)	0,90	0,94	0,95
	BCFI (F)	0,94	0,96	0,97
	NSCFI (P)	0,89	0,93	0,94
	NSCFI (F)	0,94	0,96	0,97

DISCUSSION AND FUTURE RESEARCH

In order to survive in nationwide competition, the critical attributes should be determined in each of the division's phases individually and at larger entities on a division level. Since there are many variables involved and the period of time when the questionnaire was sent out has been exceptionally unstable, the overall situation in the future is expected to be improved, even though new critical attributes will appear. The study sample consists of 16 respondents from the Southern Finland Residential Project Development –division (RPD) and the most respondents' job titles are Director, Manager, or Developers' Agent. The respondents' high competence and expertise should be a representation of their knowledge on the operations of the studied divisions. The findings and contributions are gone through by answering the research questions. The sub-questions' answers are presented first in order to support the main question's answer. The first sub-question, "*What are the critical resources and how should they be reallocated to achieve better performance*" depends on each phase, since they operate very differently.

Table 5. SCA risk-level: OP and BSC compared

Technique	SCA OP			SCA BSC		
	MAPE	RMSE	MAD	MAPE	RMSE	MAD
BCFI (P)	0,88	0,92	0,94	0,92	0,95	0,96
BCFI (F)	0,93	0,96	0,96	0,99	1,00	1,00
NSCFI (P)	0,87	0,92	0,94	0,92	0,95	0,96
NSCFI (F)	0,93	0,96	0,97	0,98	0,99	0,99

On a general level, each phase was linked by a bigger critical factor, information systems, which can be the reason to take an in-depth look into the information systems and significantly invest on these. Personnel changes at a higher level have contributed to the recent rise in digitalization and the importance of knowledge in operations whereby development will take a better direction from many points of view (Table 2). The benefits of implementing better information systems increase other attributes as well, if correctly exploited. Moreover, the amount of employees and the reallocation of resources should be reviewed again since clear critiques are emerging in operations. Furthermore, the RPD's strategy type is Analyzer and it will become even more obvious in the future. Even though the RPD combines the strength of two other strategies and balance between quality, cost, and time, there is a concern that they do not systematically follow the changes in industry enough. Additionally, the criticalities in phases such as C1, C2, and F2 are in conflict with the strategy type, since even though the division keenly follows the changes in the industry, the implementation of innovations and development ideas is inadequate. Moreover, the overall situation in the RPD is satisfying even though there are multiple changes to be made in order to increase the sustainable competitive advantage.

What are the case organization's success factors compared to competitors? The division circumvents the greatest risks and prefers well-known and safe routines and action, which can be seen as an advantage since their focus is on what is best known. Based on the respondents' answers from S&R questionnaires, OP success factors are: F1 – training and development of the company's personnel, C5 – code of conduct, and security, and BSC factors are C9 – financial, T7 – performance-to-promise, and F10 – empathy. Based on results, the following attributes were not critical at any point and thus have a successful competitive advantage: F1 – training and development of the company's personnel, T1 – communication between different departments and hierarchy levels, T2 –design and planning of the processes and products, Q1 – on-time deliveries to customers, Q2 –control and optimization of all types of inventories, F4 – adaptiveness to changes in demands and in order backlog, Q7 – customer loyalty, Q9 – know-how, Q10 – knowledge, T8 – professional relationship, and F11 – projects are flexible enough to conform to changes.

Which technologies boost the case company's business strategy and which bring uncertainty? In the perspective of SCA, the risk is at a good level in several phases, excluding the Preparation of construction which has the highest risk level in the future. K/T perspective impairs the SCA values considerably since employees do not realize where their competitive advantage arises. Basic technologies clearly have the lowest K/T Risk and it is on a good level, while core and spearhead have mostly much higher risk (Figure 16). Hereby the high uncertainties are composed from core and spearhead uncertainties. The level of uncertainty is high since the coefficient of variation values and the variability coefficients values are exceptionally significant in each phase. Additionally, the collapse risks in the Sand Cone layers and the K /T -uncertainty figures question the investment decision-making evaluation and the comparison of each phase. The uncertainty is caused by the core and spearhead technologies as observed from Figure19, since the operation relies heavily on monitoring their competitors closely for new ideas, and then rapidly adopting those which appears to be the most promising. Even though, the operations circumvent the greatest risks and prefer a well-known and safe routine, and action, each phase contains significant uncertainty in investment decision making, which negatively influence gaining a sustainable competitive advantage. Moreover, operations need to be clarified and employees should be better aware of their competitive advantages which have been affected by unclear information and inconsistencies in operations.

How can the case company's Southern Finland Residential Project Development be improved in the perspective of operational strategy? Based on the results, the general view of the RPD is in clear vision since different phases see the operational strategy in same way as the whole division. It was found that the case company's division is mainly well balanced in its resource reallocation and those resources which have seemed to be out of place are definitely heading in the right direction. Despite the fact, that the direction of resource usage is mostly towards a good overall balance, the results clearly indicate that a thorough resource reallocation should be taken into consideration. According to the research results, each phase should be considered separately since each phase is facing different problems. Obviously, information systems need improvement on a bigger scale, but competitive improvement happens in each phase individually. The results should be interpreted by the best experts in the case company in order to find practical improvements with a reasonable level of investment. Moreover, the research can be used as a tool for strategic decision-making.

The field of current research is relatively wide, as it touches theories from decision making and strategic planning to strategy selection and performance improvement areas. Hence there are obvious research limitations which affect the end results and their usability. The overall competitiveness potential is limited to an operational strategy level, which does not necessarily reflect the real business potential. Thus, a good competitiveness ranking does not necessarily lead to higher business performance. The research is focusing only on the Southern Finland region, which is a rigorous limitation. All of the respondents (16), which is also a limitation, are working inside of this region, and were asked to evaluate the situation in their perspective. Secondly, each human with a different experience and educational background sees the questions differently, which affects the end results and generates limitations for the research. Therefore, the results of the research should not be generalized, since its relevant characteristics are completely specific to the Case Division.

This research itself should not be the last in this case and several future research ideas can be proposed as follows. For future research it is more reliable and desirable to have more participants from each phase. Furthermore, the research's region framing can be extended to cover the whole Finland. Since the Residential Project Development is divided into five phases, none of the outcomes of this research show how the operation is perceived from an external point of view. Hereby, a sixth group could be included in order to collect data from employees, whose work is significantly impacted by the RPD. Additionally, a macro-level research can also be implemented in order to gain a wider scope research, since competitors would be studied more specifically. Additionally, the used methodologies and their influences to the particular industry should also be studied more carefully since, for example, the K/T-uncertainty was notable. Moreover, it is recommendable to study the effect of the industry to the obtained results;

"How the used methodologies collide with reliability and such as the SCA risk-level". In general, the methodologies and tools are not tied to geographical location in which case this kind of study can be used anywhere in the world and in a different industry.

CONCLUSION

The study is a scientific paper which consists not only of a research work but also a personal contribution made by the writers into the development of the chosen topic. The main purpose of this research was to improve sustainable competitive advantages through resource allocation and optimization in the case company's Southern Finland's Residential Project Development. Analysis of the operational competitiveness focuses on detecting the right operational strategy and resource allocation by exploiting multiple methodologies and tools in order to gain an overall picture: The Analytical Hierarchy Process (AHP), Critical Factor Indexes (CFI), Sense and Respond (S&R), the RAL-concept, Manufacturing Strategy Index (MSI), and Knowledge and Technology (K/T) to guide the business towards sustainable competitive advantage. The research was carried out with 16 respondents in Southern Finland and the number of respondents, overall and per each phase, was sufficient for making strong statements.

As a result of the research, the type of operational strategy is identified to be Analyzer and the dominance order of strategy types is presented. From the S&R and K/T point of view, resource allocation and critical areas are discovered and suggestions for improvements are made by modeling AHP, MSI, S&R, and CFI. Additionally, modeling the K /T, the spearhead technology is the main source of uncertainty for this company, and factors' cause and consequences are presented as well as the risk-level of each phase by using SCA risk levels. The research gives an option to reallocate critical resources and an opportunity to gain increased sustainable competitive advantage. Overall, the research was challenging due to the scale of the division and the variety of the phases. Therefore, it is impossible to go deep in all the perspectives and details. Nevertheless, a further deeper investigation of the criticalities is recommended.

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KEY TERMS AND DEFINITIONS

AHP: The analytical hierarchy process (AHP) method is a multi-attribute decision instrument that allows considering quantitative and/or qualitative measures and integrating the different measures into single overall goal.

BCFI: Balanced critical factor index define the most critical factors which have significant influence on the overall organization's performance.

CFI: Critical factor index is a measurement tool to indicate which attribute of a process is critical and which is not, based on the experience and expectations of respondents.

CV: The coefficient of variation illustrates the homogeneity of the results by using an equation.

K/T: Knowledge and technology rankings are a required section of the Sense and Respond method, in which an organization's share of technology is evaluated in terms of basic-, core-, and spearhead technology.

MSI: Manufacturing strategy index model evaluates the competitive priorities of an organization in order to reach a competitive advantage in the current market.

NSCFI: New scaled critical factor index is an improved model based on the earlier SCFI, BCFI, and CFI models.

RPD: A case company's Southern Finland residential project development department.

S&R: Sense and respond (S&R) philosophy is the implementation of the best action in a turbulent business environment by detecting changes (sensing) and reacting to them properly (responding).

SCA Risk Level: Sustainable competitive advantages risk level is a risk measurement tool to estimate the functionality of the operations strategy.