

Aappo Kontu

**Sustainable
Competitive
Advantage in the
Industrial Service
Business**



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Tiivistelmä Sähkö- ja televerkkojen sekä teollisuuden kunnossapitopalvelujen rakenne on muuttunut merkittävästi viimeisen 20 vuoden aikana Suomessa. Verkkoyhtiöt ovat ulkoistaneet näitä palveluliiketoimintoja uusille perustetuille palveluyhtiöille. Uusi merkittävä palvelutoimiala on syntynyt. Nopean kasvujakson jälkeen palveluyhtiöt ovat kohdanneet monia haasteita kuten liikevaihdon ja kannattavuuden laskemisen sekä uusien kilpailijoiden tulon markkinoille. Tämä väitöskirja tutkii tätä liiketoimintamuutosta sekä palveluyhtiöiden että niiden asiakkaiden näkökulmasta. Tutkimuskysymykset ovat: miten kehittää palveluyritysten pysyvä kilpailuetu; ovatko palveluyhtiöiden ja niiden asiakkaiden tavoitteet ristiriidassa keskenään ja voidaanko yhteinen win-win asetelma luoda? Väitöskirja rakentuu teoreettiseen deduktiiviseen viitekehitykseen, kvantitatiiviseen ja kvalitatiiviseen analyysiin sekä poikittaistutkimusmenetelmään. Teoriaosa koostuu yritysstrategiaosuudesta, yrityksen johtamisteoria -osasta, kilpailuetu- ja pysyvän kilpailuedun malleista sekä pysyvän kilpailuedun menetelmistä ja työkaluista. Lähtötietojen keruussa käytettiin kyselyjä, syvähaastatteluja sekä julkisia yritysten tietolähteitä. Tutkimustyön päätulokset olivat: asiakkaat olivat erittäin tyytyväisiä palveluliiketoimintojen ulkoistukseen ja jatkossa isompia palvelukokonaisuuksia siirtyy palveluyrityksille. Palveluyritysten liikevaihdot ja kannattavuudet ovat laskeneet, liiketoimintojen ja osaamisen kehittämiseen ei panosteta juuri ollenkaan eikä erottautumista palveluissa kilpailijoiden kesken ole tapahtunut. Palveluyhtiöiden ja niiden asiakkaiden tavoitteissa ei ole juurikaan eroavaisuuksia, taloustavoitteissa luonnollisesti jonkun verran. Väitöskirjassa kehitettiin pysyvän kilpailuedun liiketoimintamalli, joka pohjautuu tutkittuun teoreettiseen ja konseptuaaliseen viitekehitykseen ja työkaluihin sekä tutkimuksen empiirisiin tuloksiin. Liiketoimintamalli sai nimen 'Älykäs palvelu -työkalu'. Se koostuu neljästä osaprosessista: Kannattavuus/Kasvu, Markkina-analyysi/Asiakasläheisyys, Kriittiset Osaamiset/Resurssit ja Palvelujen Kehittämissuunnitelmat. Tutkittu palveluliiketoiminta selkeästi tarvitsee uutta liiketoimintamallia parantaakseen pysyvää kilpailukykyä ja kannattavuutta.		
Asiasanat Kilpailuetu, pysyvä kilpailuetu, strategia prosessi, win-win		

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Abstract <p>Over the last 20 years, Finland's industrial service business – specifically its electrical and telecom network services and industrial services – has undergone a remarkable transformation. Network owners have outsourced these functions to newly established service companies, and a remarkable new service industry has resulted. After undergoing a rapid growth phase, it has faced numerous challenges, such as decreasing volumes and profitability, as well as new competitors. However, this service business transformation has not yet been the subject of theoretical nor practical research. This thesis examines this transformation from the perspective of service companies and their customers. The research questions are as follows: How can a sustainable competitive advantage for industrial service businesses be created? Do conflicts between service providers' and customers' targets exist? Can a win-win position be found? The research utilized theoretical approaches that were based primarily on deductive theory development, qualitative and quantitative methodologies, and a cross-sectional time horizon. The theoretical aspect of the research related to firm strategies, models of competitive and sustainable competitive advantage, conceptual frameworks, and methods and tools, all of which are applicable to the achievement of a sustainable advantage. The information was collected via questionnaires, in-depth interviews, and public reports.</p> <p>Based on the results, customers were very satisfied with service outsourcing and the larger service packages to come. However, service company volumes and profitability decreased, marginal business and competence development methods and investments were applied, and there was no service differentiation between competitors. Conflicts between service providers' and customers' competitive advantage targets were marginal and related solely to financials. A sustainable competitive advantage business model called 'Smart Service' was developed, and it comprises four sub-processes: profitability/growth, market analysis/customer proximity, critical competence/ resource, and service business development plans. The researched industrial service companies need to employ these new business approaches to recover their sustainable and profitable service business.</p>		
Keywords Competitive advantage, sustainable competitive advantage, strategy process, win-win		

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Over the last 20 years, the Finnish industrial service business has been reshaped, based primarily on market opening and efficiency requirements, and I have had the invaluable opportunity to be involved with these business changes in various management positions. The restructuring of the service industry has been executed based on short-term analysis and limited or no research has been performed. After retiring from full-time work, I determined to help eliminate this research gap in one business sector – network and industry services. My project is called ‘CHALLENGE,’ which it was indeed, as it explored a completely unknown world that included strategy and methodology theories, information collection methods, and writing efforts.

More than five years ago, I met Professor Hannu Vanharanta, to whom I presented my CHALLENGE idea. Hannu has had a key role in regard to scope and has given me ideas throughout my dissertation journey. Thank you, Hannu, for your supervision. I am also very grateful to my other supervisor, Professor Jussi Kantola, for his guidance and support. Additionally, I am thankful to pre-examiners Marjo Toivonen and Petri Paajanen for their professional remarks. I am also grateful to Marjo Toivonen and Pertti Järventaus for their work as opponents. As well as my great thanks the business colleges in the industry that was surveyed, as they openly shared the requested information during hundreds of discussions and interviews and via questionnaires. I am also thankful to the ST Pool for its funding and contribution in one part of this research, as well as to my co-researcher, master’s student Roope Seppälä; they boosted my work significantly.

The support of my wonderful family has been a key motivator for me. My lovely wife, Elina, has challenged and advised me as the researcher throughout my journey. I am grateful to my wonderful daughters – Eeva, Kaisa, and Katariina – and their families for their support as they cheered me on during this project. My sister, Kristiina; twin brother, Mauri; their families; and our energy cousin team were also a source of motivation for me. My thesis is dedicated to the Kontu family.

The project has a start and an end. It has been a wonderful journey involving a great deal of work, learning, and experiences, all of which have been worthwhile. It has been like a marathon, in that you cannot complete one without first undergoing long-term training; additionally, the more you train, the greater your results, enthusiasm, and satisfaction. But after you pass the finish line, you ask, can I be better and faster? This is the case in regard to my CHALLENGE project. But this project is now closed, and I am looking for new energizing and inspirational challenges. Thanks!

Mynämäki, October 30, 2019

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Abbreviations

ABC	Activity Based Costing
BPO	Business Process Outsourcing
BSC	Balanced Scorecard
B2B	Business-to-Business
CA	Competitive Advantage
CEO	Chief Executive Officer
CIO	Chief Information Officer
CSR	Corporate Social Responsibility
DAD	Dynamic Asset Development
DART	Dialogue, Access, Risk assessment, Transparency
DH	District Heating
EBNIT	Event-Based Narrative Inquiry Technique
EBIT	Earnings Before Interests and Taxes
EBITDA	Earnings Before Interests, Taxes, Depreciations, Amortizations
EU	European Union
EV	Economical Value
FMA	First Mover Advantage
HR	Human Resource
IT	Information Technology
KIBS	Knowledge-Intensive Business Service
M&A	Mergers and Acquisitions
MIS	Management Information System
MWB	Must-win-battles
PCS	Product oriented product Service System
N=1	Personalized co-created experiences

PE	Private Equity
P&L	Profit and Loss statement
R=G	Global access to resources and talents
RQ1	Research Question 1
RQ2	Research Question 2
RVB	Research Based View
SCA	Sustainable Competitive Advantage
SDL	Service-Dominant Logic
SWOT	Strengths, Weaknesses, Opportunities, Threats
TCE	Transaction Cost Economics
VRIO	Valuable, Rare, Imitable, Organization
WACC	Weighted Average Cost of Capital
WTP	Willing To Pay

1 INTRODUCTION

1.1 Background and research context

The industrial service business in Finland has evolved and grown significantly over the last two decades. This is mainly due to industrial companies concentrating increasingly on their own core business while outsourcing non-core functions and/or acquiring these services from the market. The main underlying reasons for these transformations are market-opening trends, in part because of regulatory requirements associated with Finland's accession to the European Union (EU) in 1995, and open market pressures to improve competitiveness. In particular, the Electricity Market Act (386/1995) has strongly influenced the transformation of the energy business, requiring the separation of monopoly network businesses from other business units in the energy utilities sector. Under the old business model, production, distribution, operation, maintenance and construction functions operated as internal services, but this ceased to be efficient as the market gradually opened up because the drivers of these various businesses were so different.

This transformation in the energy, telecom and process industries, which began about 20 years ago, triggered the emergence of the industrial service business, where services are the core business. Most service companies operate in a multi-customer market and develop their services to meet market needs (Aminoff et al. 2009). The business drivers in this sector are very different from those of asset owners in the electricity and telecom industries in this domain. The key drivers include flexibility of personnel and material resources, an efficient and mobile workforce, customer proximity and a light balance sheet (Kontu 2017). Margins (EBITDA) are low (0–10%) but investments quite limited. For these reasons, business and management models and tools differ from those of asset-based businesses.

For the most part, the newly founded service companies were originally outsourced from electrical and/or telecom utilities at the beginning of the industry's transformation. This foundation phase was followed by a highly active consolidation phase (1990–2010), with numerous mergers and acquisitions and rapid growth across the entire service industry. Additionally, there was internationalization of both ownership and business expansion, mostly to neighboring Baltic and Nordic countries.

In this research the above-described electrical and telecom network service business and industrial service business are called 'Industrial Service Business'. Today, Finland's industrial service business has a total turnover of three to four billion euros and has more than 10,000 employees. The largest of these service companies are Eltel, Empower, Relacom, YIT/Caverion, Maintpartners and Infratek, all of which operate internationally. There are many private or municipally owned service providers, as well as new companies offering new service models and products. All are specialized in terms of service concepts and products or via customer regions. Ownership has also diversified, and service company owners may now be private (management, private equity (PE)), energy companies, municipalities or some combination of these. In short, the last 20 years have witnessed the creation of an entirely new industrial service market across the Nordic and Baltic countries, with some of these companies engaging in cross-border activities.

Until now, this remarkable and large transformation in this specific context has not been the subject of theoretical or practical research. This present research study examines the related Industrial Service Business transformations from the perspective of service companies and their customers in the Finnish service industry market. While the corresponding transformation in the Nordic and Baltic countries is beyond the scope of this survey, brief views and experiences have been collected from neighbouring countries.

Having worked in a management position in the industrial service sector for more than 25 years, the researcher has direct practical experience of this business transformation in terms of business outsourcing, growth phases, mergers and acquisitions and internationalization, as well as the increasing competition, buyers' strong bargaining power and the many ownership changes (power companies, utilities, private equity, management).

This research concentrates on service industry transformation during last 20 years in Finland's electricity and telecom networks; the research covers more than 70% of these businesses, with some limited comments on industrial services in process industries and power production services. The main research focus is on the nature of sustainable competitive advantage in the industrial service business. As research results means and proposals for Sustainable Competitive Advantage (SCA) in the industrial service business are presented. Also, future development programs are proposed, including a specific development program of SCA software tools.

1.2 Problem formulation, implications and objectives

Occasional information is available on the influences of the Finnish industrial service business transformation (Aminoff et al. 2009; Makkonen et al. 2012). Such customer companies as grid companies have reduced their costs significantly, while improving efficiency. Some surveys are available on service purchasing and supplier relationship/procurement management with regard to customer and network distribution company views (Viljanen et al. 2009; Immonen et al. 2011). In this transformation a new growing service industry was born. Commonly available information and experiences indicate that service companies have very limited development resources and no systematic service development processes. Service business profit margins are low and are decreasing continuously compared to the original phase. The competition between existing companies has become harder and international players have also entered the market. Service companies have not reached their profitability targets. Many industrial service providers have not found the means to achieve SCA.

The main economic and operational frameworks as well as key data comparisons of studied service companies and their customers are described in Table 1. Customers are mostly asset-based, with high levels of investment, a small number of employees and higher profits. In contrast, service providers have more personnel, a light balance sheet, low margins and need for flexibility in variable costs. The finances of service companies are presented in section 4. For this research it is essential to understand the main differences between customer companies' and service providers' main economic drivers, see Table 1.

Table 1. Comparison of case study customer and service companies

Attributes	Customer company (electric utility)	Service company
Revenues	Stable revenues and personnel	Fluctuating revenues (volumes change)
	High revenues/person (€500–1,300 thousand)	Small revenues/person (average €170 thousand)
Profit	EBITDA 30–60%	EBITDA 0–10%
Competition	Natural monopoly	Tough competition, new competitors
Balance sheet	Strong assets (networks)	Reduced assets (leasing, cars for example)
	Strong balance sheet —typical	Weak balance sheet – low own capital
Regulations	Regulated business	Market-based; driven by customers' procurement regulations
Investments	Annual investments/revenues 20–40%	Annual investments/revenues 1–3%
	High investment level (weatherproof networks)	
Other	Network service functions outsourced	Cost flexibility needed (personnel costs), workload/order backlog changes

Investments in electricity distribution networks have grown substantially over the last five years to meet regulatory requirements for weatherproof networks, conversion of overhead lines to ground cables (see section 2.2.1) and telecom operators' fibre network investment. One element of the research addresses how these high investment volumes have impacted the service companies studied. The total annual network investment (transmission, distribution, telecom networks) is summarized in Figure 1 (Fingrid 2016: 57, Energiavirasto 2018: 49, Traficom 2019). For network service providers, total annual investment is now almost €2 billion, with investment in distribution networks increasing rapidly since 2013.

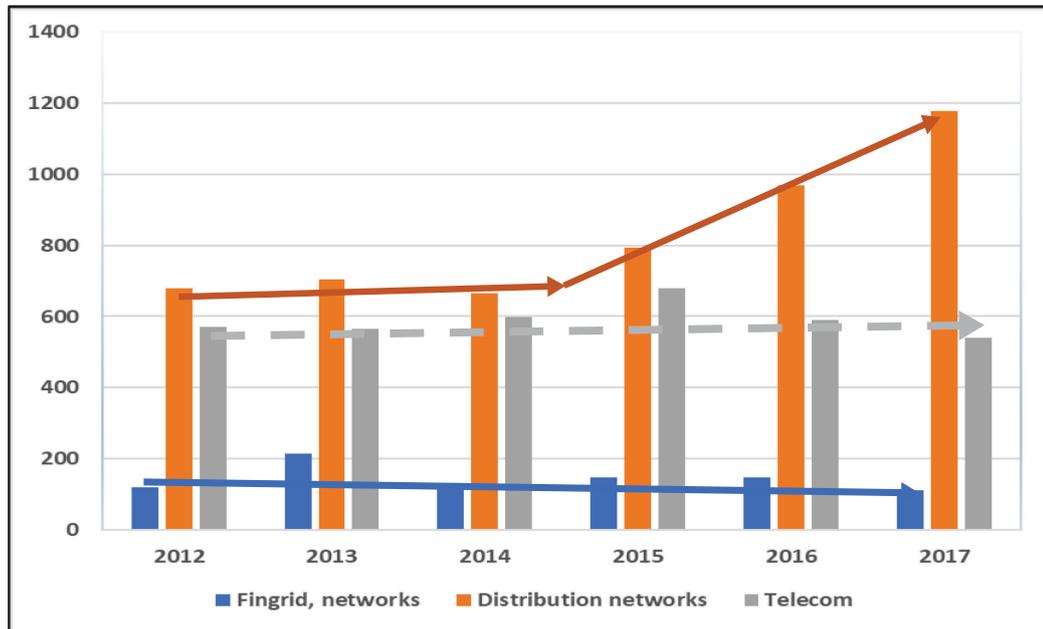


Figure 1. Electrical and telecom network investments in Finland 2013–2017

The service industry transformation has dramatically altered the structures and competence requirements for both asset-owning utilities and service providers at various stages, e.g. start-up/foundation and consolidation. However, there are no theoretical studies of SCA and success enablers for service providers or the effects of outsourcing on utility companies. Consequently, this is the main objective of the research. The present research examines this transformation from the perspective of service companies and selected industrial electrical and telecom network customers.

The study explores competitiveness in selected areas of the energy and telecom businesses and how service companies can create and sustain that competitiveness. The theory and literature sections describe competitiveness-related strategic approaches and tools.

The research strategy involves four phases:

- 1 The service business transformation over the last two decades and its implications for business are described from both customer and service provider perspectives.
- 2 Business data (financial and operational information) are collected from publicly available sources, along with questionnaires and interviews.

- 3 Data analysis of the collected information based on quantitative and qualitative methods.
- 4 A new business model for sustainable competitiveness is developed for service companies.

While the data suggest that customers have for the most part reached their economic targets in this regulated business, service providers continue to encounter profitability challenges. Buyers' bargaining power and increased competition have forced service companies to reduce prices, and providers have not yet identified methods and tools for reaching their profit targets.

The objectives of the research were the following: firstly, to explore the industrial service business transformation impacts on both customers and service providers during the last 20 years, using both theoretical and empirical approaches; secondly, to find out what sustainable competitive advantage means for service companies; thirdly, to explore means to achieve win-win results in the industrial service business for customers and service providers; and, finally, to generate new business models and tools for service providers to achieve sustainable competitive advantage and to create a win-win position for both service companies and their customers.

1.3 Research gap and research questions

There is already ample published research on the topics of competitive advantage (CA) and sustainable competitive advantage (SCA) in many industries. However, little of the published research focuses on the industrial service business, and almost none addresses Scandinavian and Finnish electrical, telecom and industrial services over the last 20 years of rapid and dramatic business transformation. This is a significant research gap in light of the emergence of a large service industry and dramatic changes in service provider and customer roles.

The study addresses two research questions:

Research Question 1 (RQ1):

What methods and tools can be used to create sustainable competitive advantage and enablers for the industrial service business?

Research Question 2 (RQ2):

Is there a conflict between service providers and customers in terms of sustainable business targets, and can a win-win position be found?

To acquire a deeper understanding of the above research questions, the service industry transformation and the research objectives as well as how to create sustainable competitiveness for industrial service companies, the study also addresses the following issues: a) what were the original drivers and objectives, and have the targets been achieved?; b) have the targets changed in operational and economic terms during the transformation journey, and in what way? c) what has happened to competence requirements? Have they changed?

Additional aspects of the research interest include a) the role of the authorities in the transformation; b) the influence of changes in ownership; c) competitive advantage as viewed in strategy plans; d) critical competence and resource requirements; e) service providers' plans and actions for differentiation from competitors; f) new service models and product development plans and resources; and g) digitalization/Internet of Things (IoT) plans for business development.

1.4 Research approach

The research approach can well be described by using either the research pyramid (Jonker & Pennink 2010:23), Figure 2 or the research onion framework (Saunders & Lewis 2012:124), Figure 3.

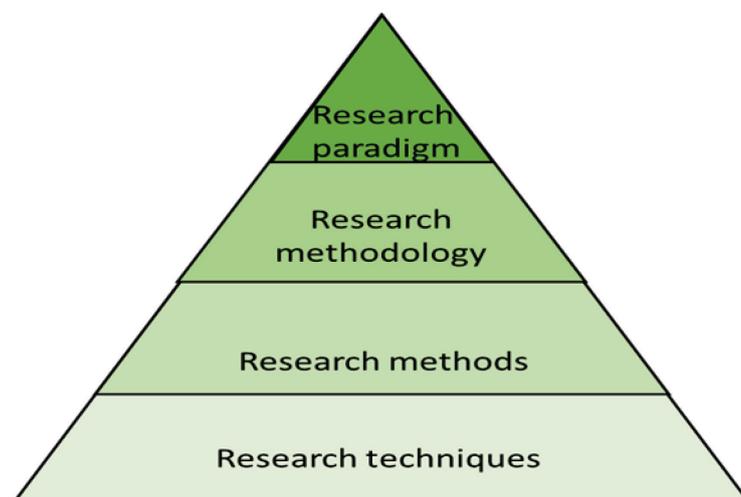


Figure 2. The research pyramid (Jonker & Pennink 2010:23).

The research pyramid is composed of four action levels considered as a logical chain of interconnected events ranging from rather abstract (paradigm level) to very concrete (technique level). On each of these levels choices need to be made. These levels are (Jonker & Pennink 2010:25):

- “The research paradigm: the ‘basic approach’, the philosophy
- The research methodologies: ‘a way’ to conduct the research that is tailored to the research paradigm
- The research methods: specific steps of action that need to be executed in a certain (strict) order
- The research techniques: practical ‘instruments’ and ‘tools’ for generating, collecting and analysing data”

The research onion describes more detailed actions of the research approach than the research pyramid. Figure 3 presents six research layers starting from the outer layer and ending in the core layer.

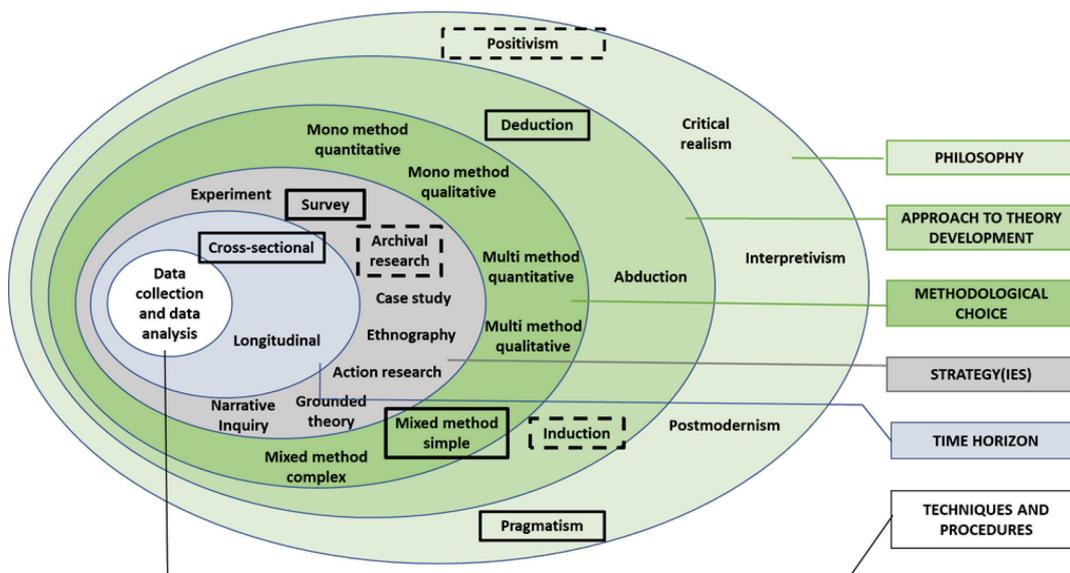


Figure 3. The research onion (Saunders M, Lewis P & Thornhill A 2016: 124)

The outermost layer of the research onion is the research philosophy (paradigm). In this research, pragmatism (partly positivism) was selected because of the following factors: the studied industrial service is in a state of flux regarding processes, experiences and practices; the RQs are very operational and empirical; as well as the researcher’s wide practical experience in the service industry. This philosophy choice is extensively followed by deductive and mixed qualitative and

quantitative research methods in the next layers. Other alternative philosophies (e.g. critical realism, interpretivism, postmodernism) did not fit the requirements of the research (Saunders M, Lewis P & Thornhill A 2016: 136-137).

The second layer in the research onion is the approach to theory development. In this research the deductive approach is mostly utilized, starting from extensive theory models and ending with the selected theories and methods applied for the service industry under study. A minor inductive theory process was invented. This research methodological choice, the third layer, is based on concurrent mixed methods combining both quantitative and qualitative data collection techniques and analytical procedures (Saunders M, Lewis P & Thornhill A 2016: 170).

The fourth layer of the research onion is the choice of the survey strategy. This is commonly used in business and management research and is most frequently used to answer 'what', 'where', 'how much' and 'how many' questions and uses questionnaires. However, the archival and documentary research strategy is also used in collecting information from annual reports and publicly available industrial information. The time horizon of the research, the fifth layer, is a cross-sectional study; questionnaires were distributed concurrently to all respondents (customers, service companies, consultants/advisors), who were asked for their views on the questions. In terms of the ethics of the research, all the results were published anonymously.

The core layer of the research onion is data collection and data analysis. The information collection methods used were questionnaires, in-depth interviews, public financial and performance data sets of the service industry and connected companies.

The research content must meet at least three of the conditions listed below (Rönkkö 2018). Most of these are covered in this study (see comments).

- Practical interest (analytical merit): this condition has been fulfilled (as described above).
- Theoretical interest (analytical merit): there is a gap in the existing research and theoretical analysis.
- Data availability (empirical merit): there is good access to needed data (as described later).
- Data validity (empirical merit): the required data are available (as described in section 5.3).

The study meets these key research design criteria. It identifies the root causes of the challenges in service business profitability and explores frameworks and methods for achieving sustainable competitive advantage. The aim of the developed service business model is to ensure a win-win position for customers (network owners) and service providers, and the study investigates whether there are any conflicts between the parties' targets.

1.5 Research hypothesis

The presented theory sections (2.1 and 2.2) clearly confirm that competitive advantage can be achieved by means of business differentiation or cost advantage. To select an appropriate strategy, firms need to conduct internal and external business analyses of the industry and the firm. Innovations play a key role in achieving SCA, and these analyses and innovations can be used to develop a model of SCA.

The research hypotheses are as follows:

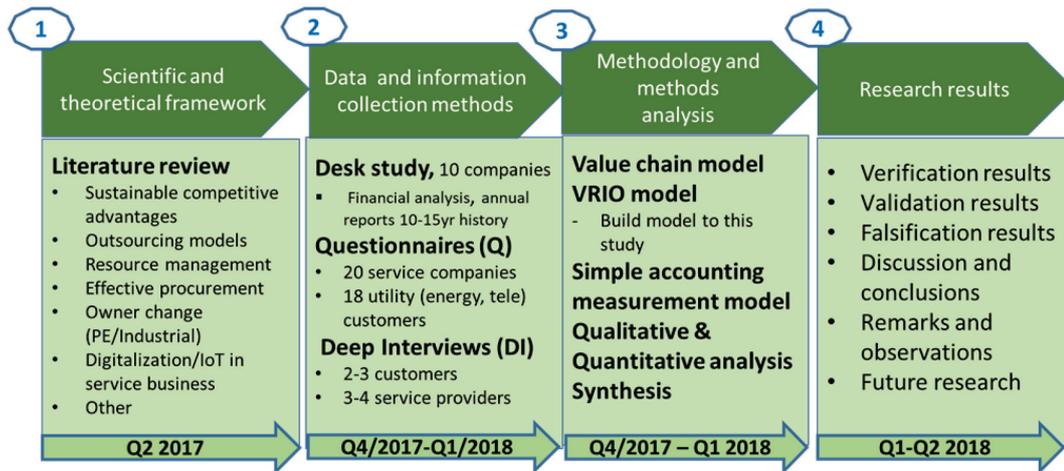
H1: The surveyed service companies have no differentiation strategy; their businesses are low-profit and compete on price, and SCA has not been achieved.

H2: Customers and service providers have different CA targets, giving rise to conflict.

H3: A sustainable win-win situation can be co-created by service providers and customers.

1.6 Research design and overview of the thesis

The research plan was divided into four parts: firstly, a scientific and theoretical framework; secondly, data and information collection methods; thirdly, methodology and method analysis, and fourthly, results. The research design is described in more detail in Table 2.

Table 2. Research design

After this introductory section, the content of the thesis is structured as follows:

- In section 2, the research framework first describes the main strategy theories as applied to the service industry by a number of authors (e.g. Barney, Day, Drucker, Grant, Kim and Mauborgne, Mintzberg, Porter, Ritakallio and Vuori, Scott). These represent different approaches to markets and industry environments, service selection and resources, as well as applied frameworks, processes and tools. These diverse frameworks offer a wide understanding of relevant strategy alternatives for service businesses. This section also introduces key CA and SCA concepts for the service industry as described by key researchers (e.g. Porter, Drucker, Collins et al., Hamel et al., Mintzberg, Barney, Grant, Day, Baghai et al.). Conceptual frameworks and tools applicable to strategy and CA/SCA implementation are also introduced, including service innovations, differentiation/cost leadership, execution/performance tools, outsourcing models, digitalization/IoT issues, service ecosystems/platforms and strategic agility/flexibility. Finally, this section describes various methods of analysing sustainable competitiveness (PESTEL, Value Chain, VRIO, SWOT, BSC, MWB, GS-matrix, AS-map, accounting tool) and identifies those of relevance for present purposes.
- Section 3 details the research methodology and information collection methods and how they are applied to address the research questions.
- Section 4 reports the results of the empirical studies and their implications and answers in relation to the research questions.

Finally, section 5 includes a discussion and conclusion, along with proposals in relation to the research questions.

2 RESEARCH FRAMEWORK

This section introduces the theoretical frameworks of the research: firstly, company strategy theories at a general level by many famous researchers; secondly, a strategy management approach and activities such as strategy processes; thirdly, competitive advantage (CA) and sustainable competitive advantage (SCA) theoretical models presented in the strategy process; fourthly, a review of conceptual frameworks which can be applied in strategy planning and execution and which are essential features in the studied industrial service business in relation to CA/SCA. Finally, this section introduces sustainable competitive analysis methods and tools which are feasible for achieving SCA in the industrial service business. Most of these theories and models are connected to industrial companies and do not refer very much directly to the service industry but are also applicable. The target of the theory section is to develop and construct a theoretical model and tools for industrial service business SCA.

2.1 Theoretical framework

The theoretical review starts by examining theoretical strategy frameworks and models including strategy processes and tools that are applicable to this study of industrial service business. This review is focused on theoretical approaches to CA as well as SCA referred to by many experienced researchers and their contributions to the studied topics and research questions.

2.1.1 Strategy theories

The strategy is a plan, direction, guide or course of action into the future, a path to get from here to there. A strategy is also a pattern, that is, consistency over time. Organizations develop plans for the future and evolve patterns out of the past. This is what Mintzberg called the 'intended' strategy and the 'realized' strategy, respectively. Mintzberg also explained that intentions that are fully realized can be called 'deliberate' strategy and those not realized can be called 'unrealized' strategies. Mintzberg has recognized a third case called 'emergent' strategy, which was not originally intended. The deliberate strategy added to the emergent strategy creates the 'realized' strategy (Mintzberg 1994: 24-25). "A strategy is needed to reduce uncertainty, provide consistency (however arbitrary that may be), aid cognition, satisfy an intrinsic need for order and promote efficiency under conditions of stability (by concentrating resources and exploiting past learning)" (Mintzberg 1987: 28-29).

Porter describes strategy as the method used by an organization faced with competition to achieve superior performance by producing the right mindset and the right analytics (structure of the industry, company's relative position). The author Porter explained strategy as (1) dynamic, determined by the attractiveness of the industry for long-term profitability; and (2) position change, which determines the relative competitive position within the industry; and (3), he asks whether a company shapes and influences both (Porter 1985: 1-2, Margareta 2012: 17).

When discussing strategy, Drucker (1999: 43) converts the theory of the business into performance to enable an organization to achieve its desired results in an unpredictable environment. The theory of the business is a set of assumptions about what an organization's business is, what its objectives are, how it defines results, who the customers are and what the customers value and pay for. For the company, it is necessary to create a strategy and a strategy process as a whole because a strategy gives the organization direction: it focuses and unifies organizational tasks, defines the structure of the organization, constructs organizational identity and creates consistency within the organizational operations. Drucker (1994: 99-101) stressed the importance of applying a strategy to organizational actions based on business theories and claimed that the strategy should comprise the organizational environment and conceptions of basic tasks and competences. He added that a strategy transforms a business theory into practical execution and gives the organization direction.

Day (1990: 6) explained that a competitive strategy specifies how a business intends to compete in the markets it chooses to serve. A strategy provides a conceptual glue that gives shared meaning to all the separate functional activities and programmes. Strategies are directional statements rather than detailed step-by-step plans of action. The direction of a strategy is determined by four choices: (1) the arena, which describes the market to serve and the customer segments to target; (2) advantage, which refers to the positioning theme that differentiates the business from its competitors; (3) access, which refers to the communication and distribution channels used to reach the market; and (4) the appropriate scale and scope of activities to be performed. Day (2006: 22) claimed that the core of the strategy should include (1) a business definition, such as customer segments, customer needs and technologies, the scale and scope of activities in the value chain, and the channels to be used; (2) the strategy thrust, which specifies how the business intends to gain and sustain a CA, investment volumes and required cash flow; and (3) the objectives, which are commitments to the performance results the business team expects to achieve in the future. Day (2006: 33) also proposed that company businesses have to translate them into targets such as market

position (share of units, share of revenues, total market and target segment share), rate of growth (revenue, unit sales), customer satisfaction, reliance on new products or new markets, risk exposure, cost reduction (overheads as a percentage of sales) and accounts receivable. Typically, the growth strategy is embedded in a business plan and serves to support the objectives and overall aims of the strategy of the business. Day (1990: 305-306) also illustrated how the growth plan is connected to the overall strategy, which is shown in Figure 4.

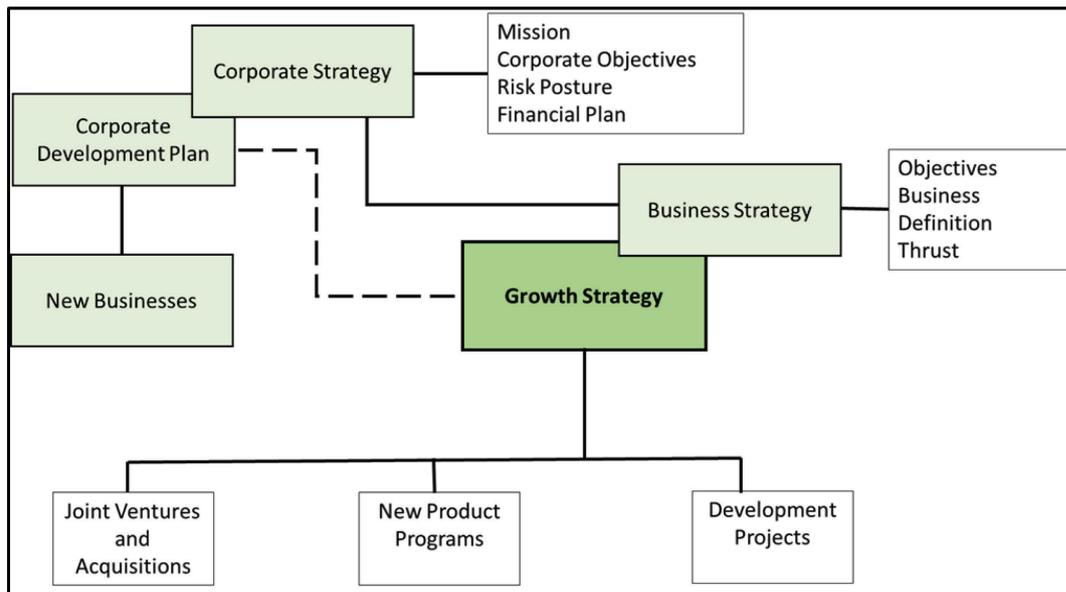


Figure 4. Linking the Growth Strategy to the Business Strategy (Day 1990: 305-306).

The direction of the growth strategy should answer the following questions: what are the growth objectives (how much, from which products and which market)? what role does growth play in the business strategy? what is the best growth path? should the business participate in growth by relying on internal development or external means such as alliances, licenses or acquisitions? (Day 1990: 306).

Hamel and Prahalad (1994: 42) argued that a strategy is as much about competing for tomorrow's industry structure as it is about competing with today's industry structure. Whose product concepts will ultimately win out? Which standards will be adopted? How will coalitions form and what will determine each member's share of the power? What is critical, and how do we increase our ability to influence the emerging shape of a nascent industry? If the goal is to compete for the future, we need a strategy that addresses more than just the problem of maximizing profits in today's market. Organizational transformation must be driven by a viewpoint about the future of the industry and how we want this industry to be shaped in five or ten years. Developing a viewpoint about the future should be an ongoing project

sustained by continued debate within a company (Hamel & Prahalad 1994: 127-128). It is not enough for a company to get smaller and better and faster by restructuring, downsizing and reengineering but it has to regenerate its core strategies and reinvent its industry and be capable of becoming different (Hamel & Prahalad 1994: 15).

Kim and Mauborgne (2005: 12-13, 2017: 15, HBR's 10 Must Reads 2011: 124) introduced the blue ocean strategy, which claims that the business universe consists of two distinct kinds of space: red and blue oceans (see Table 3).

Table 3. The Red Ocean versus the Blue Ocean strategy (Kim & Mauborgne 2005: 12-13, 2017: 15)

The Red Ocean Strategy	The Blue Ocean Strategy
Competing in existing market space	Create uncontested market space
Beat the competition	Make the competition irrelevant
Exploit existing demand	Create and capture new demand
Make the value-cost trade-off	Break the value-cost trade-off
Align the whole system of a firm's activities with its strategic choice of differentiation and low cost	Align the whole system of a firm's activities in pursuit of differentiation and low cost

The Red Ocean presents all the industries in existence today – the known market space, which most organizations fight over by building a defence position within the existing industry order – known as market-competing moves. When there is more competition, profits and growth are reduced. The creators of Blue Oceans do not use the competition as their benchmark; they follow a different strategic logic, which they call market-creating moves. They create new value innovations and uncontested market space for their customers and their company, and they view a strategy as creating differentiation and low cost simultaneously. Value innovation occurs only when companies align innovation with utility, price and cost positions. In Blue Oceans, organizations can invent and capture new demand, and they can offer their customers a leap in value while also streamlining their costs. Improved profit, speedy growth, higher brand value, not easy-to-imitate and leading-edge technology are sometimes connected with the creation of Blue Oceans, but these aspects are not defining features. Incumbents usually create blue oceans within their core business. The first principle of the Blue Ocean strategy is to reconstruct market boundaries to break from the competition and create a Blue Ocean (Kim & Mauborgne 2005: 47).

A firm's strategy is its theory of how to achieve high levels of performance in the markets and industries within which it operates, as stated by Barney (2007: 4).

Evaluating and choosing a strategy requires an understanding of both the economic logic from which a strategy is derived and an understanding of the organizational logic through which a strategy is implemented.

A strategy is the link between the firm and its environment, creating a strategic fit. The aim of a business strategy is to determine how the firm will deploy its resources within its environment to satisfy its long-term goals and how to organize itself to implement that strategy. “For a strategy to be successful, it must be consistent with the firm’s external and internal environments – its goals and values, resources and capabilities, and structure and systems” (Grant 2008: 12-13). Grant stated that the essence of a strategy is making choices about where to compete and how to compete, and he divided strategy into (1) a corporate strategy with industry attractiveness and (2) a business strategy with CA including a vision, mission, business models and strategic plans (Grant 2008: 19-20). Grant (2008: 265) emphasized the importance of understanding, predicting and managing changes in the industry and introduced the curve of the industry life cycle shown in Figure 3, which includes the introduction (or emergence), growth, maturity and decline phases. The different phases require different strategies, organizational structures and management systems for identifying and formulating actions. Figure 5 presents the importance of cashflow development during a product/service life cycle (Sipilä 1995:56). The industrial service industry examined in this study is currently in the maturity phase.

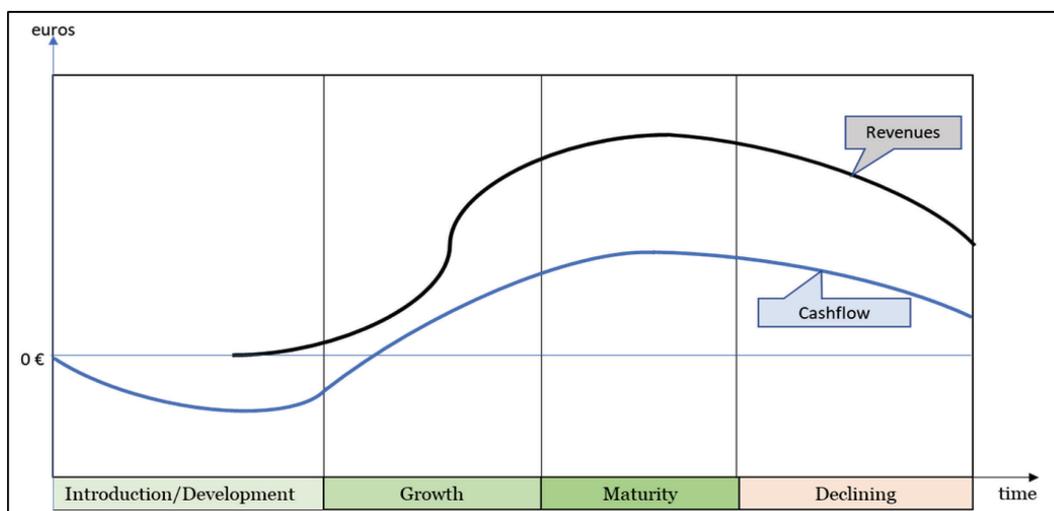


Figure 5. The service industry life cycle (adapted from Grant 2008: 265, Sipilä 1995:56).

All organizations need a proper strategy. If success is important, strategy is also important. The strategy process should be managed by the management team with the involvement of other personnel and the Board. On average, companies apply

five or six different strategy tools during the strategy process. In postmodern strategic management, the key questions include how to create and promote positive customer experiences and how the service organization understands the customers' final goals and needs (Juuti & Luoma 2009: 272).

Reeves, Haanaes and Sinha (2015:6-15) presented the following four strategy action imperatives: (1) match the strategic approach to the environment; (2) build adaptive capabilities (experiment, exploration, customer proximity, speed); (3) build shaping capabilities (orchestrate, ecosystem, non-directive); and (4) build ambidextrous capabilities. Correspondingly, Ritakallio and Vuori (2018:11) have introduced a new strategy concept called 'the living strategy'. It concludes that the new strategic management does not target the creation of a fixed definition of the strategy content but lives and takes care of continuous environmental changes and uncertainties and new creations. Core environmental megatrends include technology development and digitalization, increased knowledge, globalization, urbanization, climate change and age demographics. These interacting megatrends create discontinuities and are the reasons why strategy processes have to be renewed and rebuilt (Reeves, Haanaes and Sinha 2018: 11-13). Ritakallio and Vuori promote the creation of 'moving scenarios', which are based on the foundation that uncertainties will increase, and the strategy has to adapt according to the focussed assumptions (2018:24).

Mitronen and Raikaslehto (2019: 58) summarized the definition of a strategy as a set of selections which aim to reach CA, targeting the achievement of given destinations and executing the will of the company owners. The strategy is also the storyline of operations and the "golden thread" through which the CA can be implemented.

Many recent studies have examined platform strategies among businesses. Platforms do not produce anything, nor do they distribute goods and services. Instead, platforms directly connect different customer groups to enable transactions and create value by connecting buyers and sellers. Reillier and Reillier (2017: 26) claimed that platform businesses create significant value through the acquisition and/or matching, interaction and connection of two or more customer groups to enable them to transact (2017:6-7).

Platforms influence a firm's strategy and how they change the competition has been examined by Paker et al. Compared to Porter's 'five forces' (described in section 2.3.2) and resource-based models, two new realities are shaking up the world of strategies. Firstly, through network effects, platforms remake markets and do not just respond to them. Secondly, platforms turn businesses inside out by moving the managerial influence from inside to outside the firm's boundaries.

Within the business ecosystem, the lead firm negotiates dynamic trade-offs involving competition at three levels: platform against platform, platform against partner, and partner against partner. In this world of platforms, the nature of the inimitable resource shifts from physical assets to access to customer-producer networks and the resulting interactions. Control of relationships becomes more important than the control of resources (Paker et al. 2016: 210-212). Paker et al. listed industries in which the platform approach meets resistance, such as industries with high regulatory control and resource-intensive industries. The industrial service business studied here has these features. However, Paker et al. argue that the impact of these factors will change over time as more and more processes and tools become connected to the Internet and the industry becomes an information-intensive industry (2016: 263).

2.1.2 Strategic management approach and activities

Mintzberg (1994: 24-25) developed a strategy formation, called the ‘design school model of strategy formation’, which is presented in Figure 6 (1994:37).

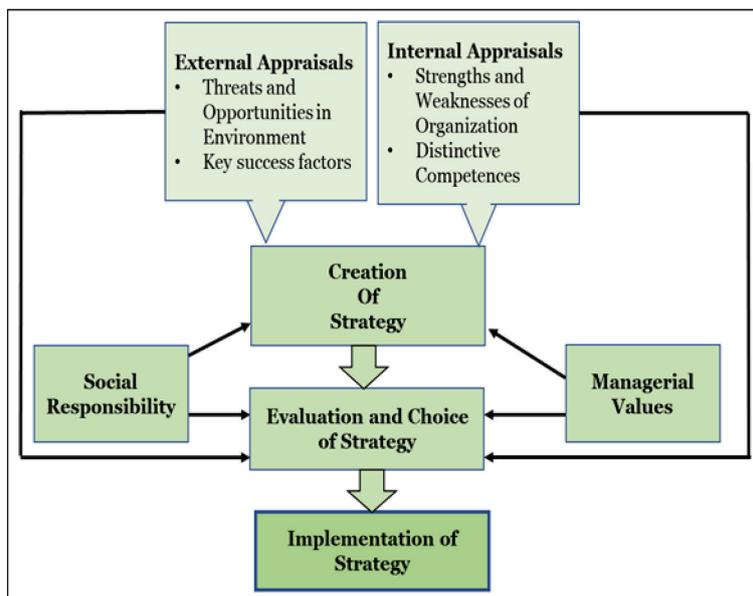


Figure 6. Core ‘Design School’ model of strategy formation (Mintzberg 1994: 37)

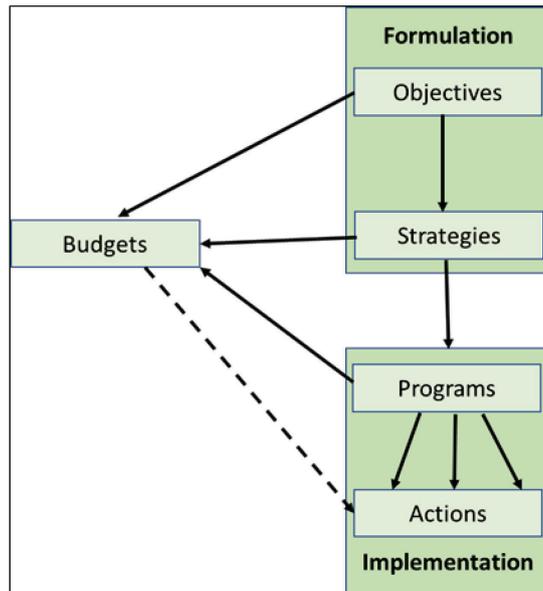


Figure 7. Conventional strategic planning (Mintzberg 1994: 82)

Mintzberg (1994: 38-39) summarized the premises for this ‘Design School’ strategy formation as follows: (1) it should be a controlled, conscious process of thought; (2) responsibility for the process must rest with the chief executive officer, who is the strategist; (3) the model of strategy formation must be kept simple and informal; (4) strategies should be unique: the best ones result from a process of creative design; (5) strategies must come out of the design process fully developed; (6) the strategies should be made explicit and, if possible, articulated, which means they have to be kept simple; and (7) once these unique, full-blown, explicit and simple strategies are fully formulated, they must then be implemented. Figure 7 presents the conventional strategic planning process (objectives, strategies, programmes, actions, budgets) (Mintzberg 1994:82).

Reeves, Haanaes and Sinha (2015:6-14) characterized the strategy process and alternative strategies based on business environments. They distinguished three strategy dimensions: predictability (can you forecast it?), malleability (can you shape it, alone or in collaboration with others?) and harshness (can you survive?). From these dimensions, the authors identified five forms of strategy: classical (predictable, be big), adaptive (unpredictable, be fast), visionary (predictable, be first), shaping (unpredictable, be the orchestrator) and renewal (constrained resources, be viable). The classical position can be based on superior size, differentiation or capabilities. Adaptive firms continuously vary their approach, successfully scale up and exploit, and rapidly iterate this loop to ensure they renew their CA. Visionary firms win by being the first to introduce new products, services or business models. Shaping strategy firms build new businesses jointly and are

orchestrators, evolving platforms and ecosystems rather than individuals. In the renewal approach, a company first recognizes and reacts to survive in a constrained business environment and economizes by refocusing, cutting costs and preserving capital but developing needed future capabilities and resources.

Christensen and Raynor (2003: 215) introduced the process by which strategy is defined and implemented (see Figure 8).

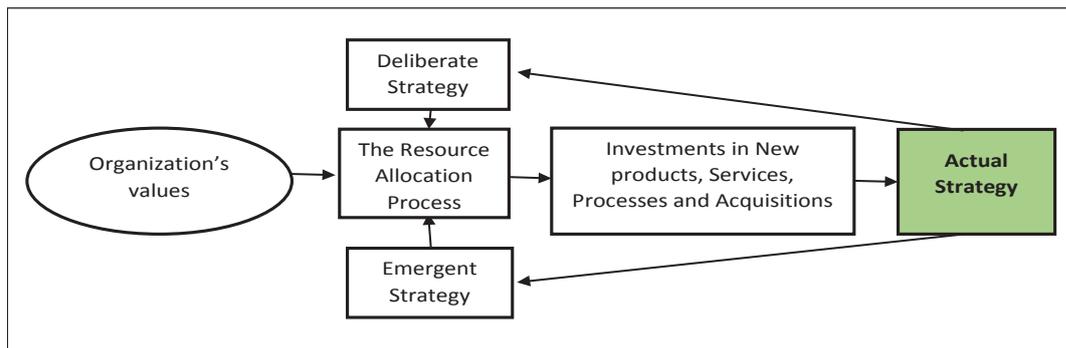


Figure 8. Strategy process described by Christensen and Raynor (2003: 215).

Deliberate strategies are an appropriate tool for organizing action if (1) the strategy must encompass and address correctly all of the important details required to succeed, (2) the organization is to take collective action and (3) the collective intentions must be realized with little unanticipated influence from outside political, technological or market forces. An emergent strategy is the cumulative effect of day-to-day prioritization and investment decisions made by middle management. These tend to be tactical, day-to-day operating decisions (Christensen&Raynor 2003: 215).

In the Blue Ocean strategy, three key components of successful blue ocean shifts have been identified: (1) a Blue Ocean perspective expands people's horizons and shifts their understanding of where opportunity resides; (2) market-creating tools, with guidance on how to apply them, can be used to build people's creative competence, open a new value-cost frontier and create new market space; and (3) 'humanness' in the process to inspire and build people's confidence so that they own and drive the process for effective execution (Kim & Mauborgne 2017: 23). The authors published the following five-step process of how to achieve Blue Ocean targets, including the process frameworks and tools: step 1, get started (right place and team); step 2, understand where you are now (strategy canvas); step 3, imagine where you could be (buyer utility map, three tiers of non-customers); step

4, find out how to get there (reconstruct market boundaries/six-path framework and alternative options/four-action framework); step 5, make your move (test, refine, launch, roll out) (Kim & Mauborgne 2017: 78).

To reconstruct buyer value elements, the authors developed a four-action framework comprising four key questions to challenge an industry's strategic logic and business model for creating Blue Ocean opportunities (Kim & Mauborgne 2017: 220-221), see Figure 9:

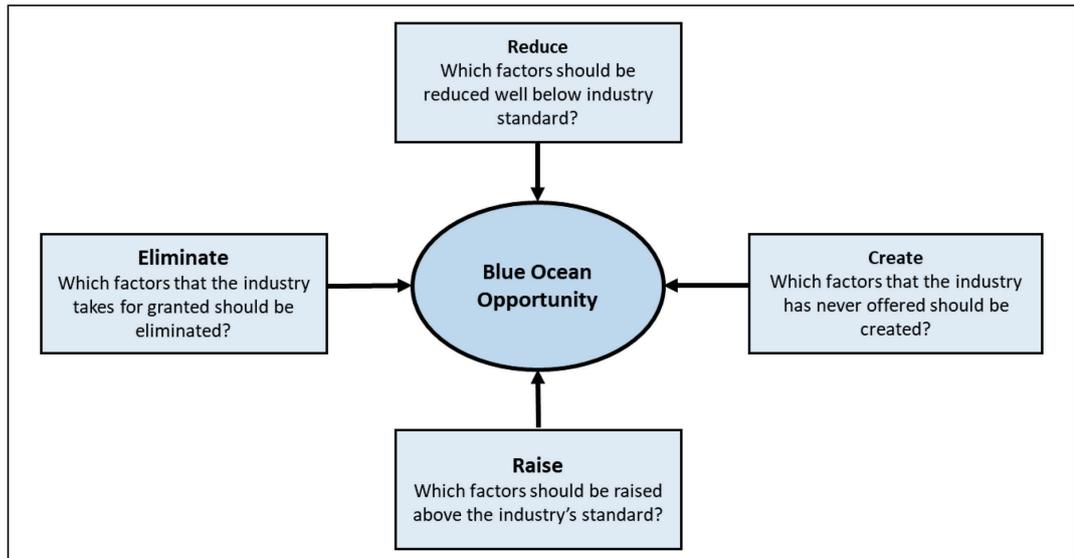


Figure 9. Four-action framework (Blue Ocean model) (Kim & Mauborgne 2017: 220-221).

The authors introduced the process of how companies need to build their Blue Ocean strategy in the sequence of buyer utility, cost and adaptation. The strategic sequence of fleshing out and validating Blue Ocean ideas to ensure their commercial viability is shown in Figure 10 (Kim & Mauborgne 2005: 118).

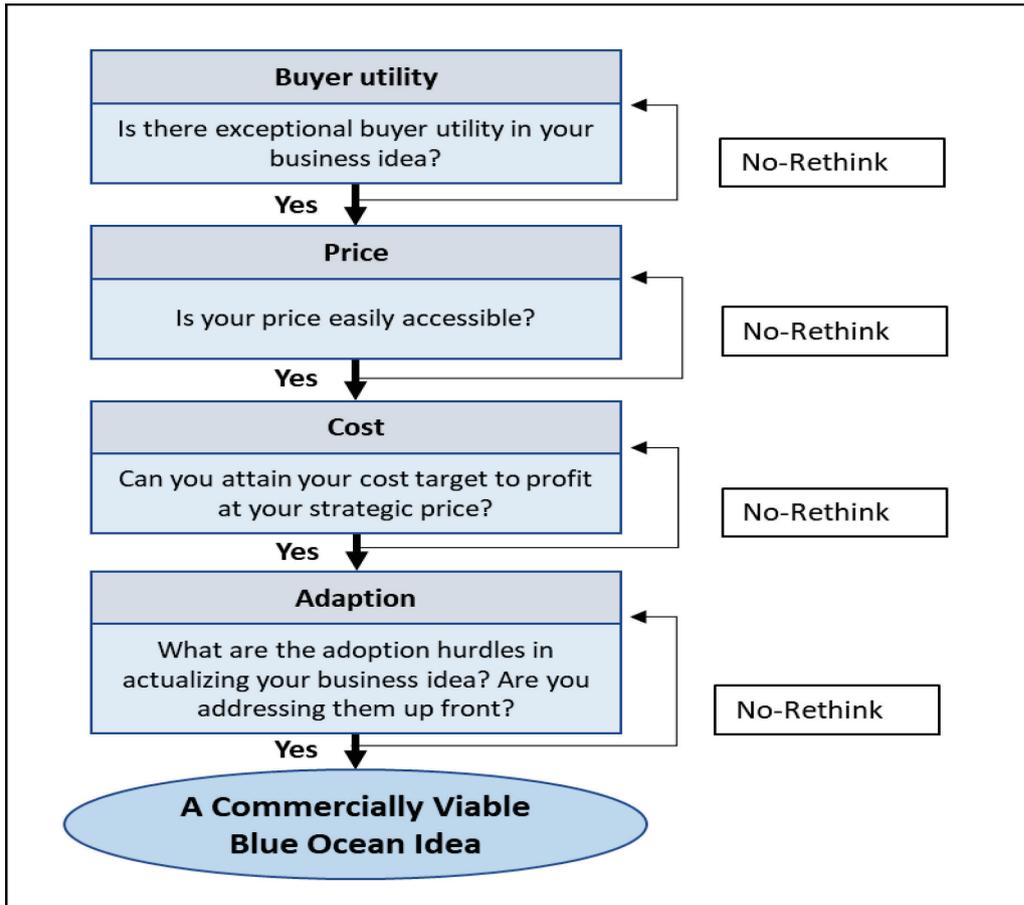


Figure 10. The sequences of the Blue Ocean strategy (Kim & Mauborgne 2005: 118)

The simplified Strategic Management Process is presented below (Figure 11). It is a sequential set of analyses and choices that can increase the likelihood that a firm will choose a strategy that enables it to perform well (Barney 2007: 6).

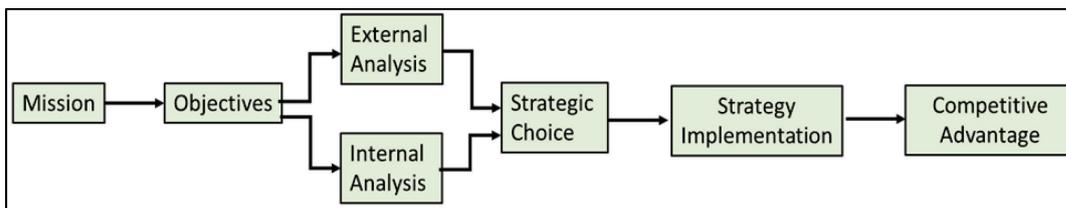


Figure 11. Strategic management process (Barney 2007: 6).

The way to define the situation assessment of a competitive strategy, including the external and internal factors, is summarized in Figure 12. The outcome is a set of valid assumptions about the environment, competition, and internal skills and resources (Day 1990: 66).

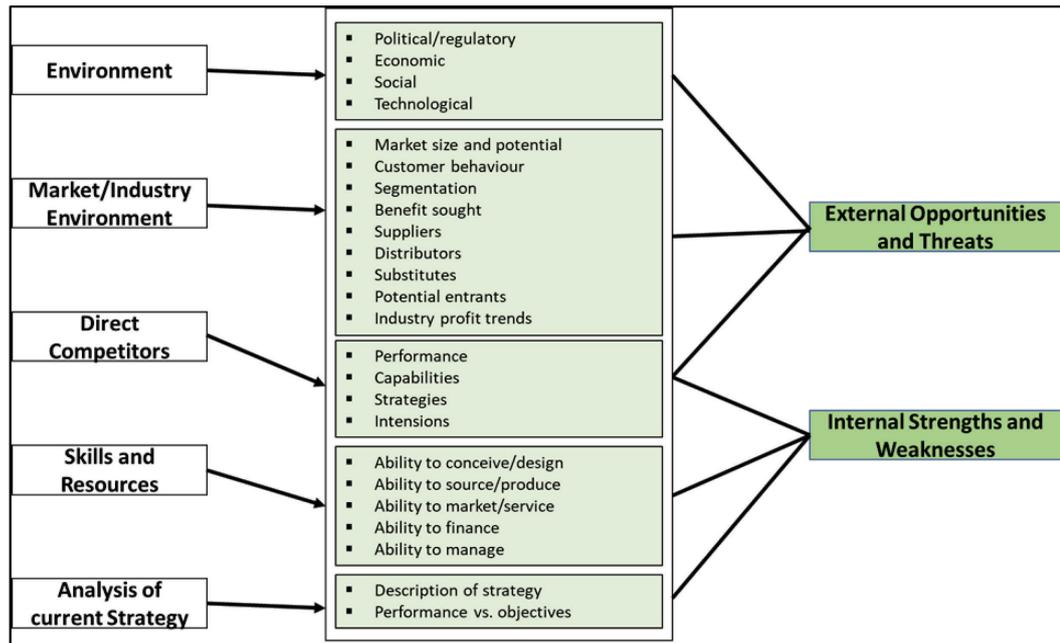


Figure 12. Overview of the situation assessment (Day 1990: 66).

Grant (1991: 115) introduced a five-stage strategy formulation procedure which involves (1) analysing a firm's resource-base – strengths and weaknesses relative to competitors, (2) identifying the firm's capabilities (efficiency compared to rivals), (3) appraising the rent-generating potential of the firm's resources and capabilities (potential for SCA and the appropriability of their returns) and (4) selecting a strategy which best exploits the firm's resources and capabilities relative to external opportunities and (5) identifying resource gaps which need to be filled. In a mature industry, the primary goal of strategy implementation is cost advantage through economies of scale, standardized services, functional departments, close monitoring of performance, incentives based on achievement of individual targets, vertical communication, and strategic decision-making and control by top management (Grant 2008: 330). In contrast, in a declining and shrinking industry, the following strategic features have met excess capacity: a lack of technical change, a declining number of competitors, a high average age of both physical and human resources, and aggressive price competition (Grant 2008: 331). In a declining industry, the identified strategic alternatives include gaining leadership, e.g. acquiring competitors, concentrating on a niche business by harvesting the best profit businesses and divesting the business in the early phase (Grant 2008: 333).

The 'living strategy' process chart is shown below (Figure 13), (Ritakallio & Vuori 2018:17):

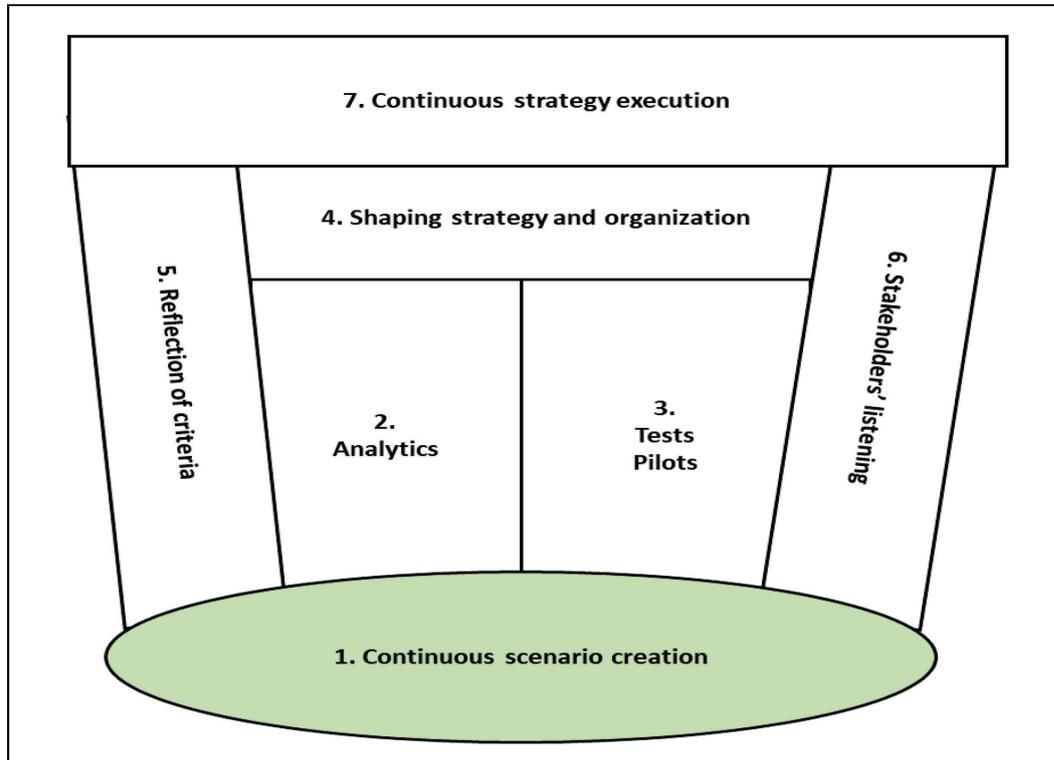


Figure 13. Living strategy process, seven basic principles (Ritakallio & Vuori 2018:17).

The strategy steps are as follows (Ritakallio & Vuori 2018:17):

- Scenarios create alternative strategy paths (step 1),
- Analytics (step 2) and tests/pilots (step 3) provide knowledge about which paths are worth investing in and executing,
- Restructuring the strategy and organization based on knowledge provided by analytics and pilots (step 4),
- Reflecting on criteria (step 5) and listening to stakeholders (step 6) improve the quality and utility of analytics (step 2), pilots (step 3) and scenarios (step 1).

2.1.3 Competitive advantage (CA)

Substantial research has been published on the subjects of 'business competitiveness', 'competitive advantage' (CA) and 'sustainable competitive advantage' (SCA). Four definitions of competitiveness provide the framework for the CA/SCA framework of this research.

1. "For a firm, competitiveness is the ability to produce the right goods and services of the right quality, at the right price, at the right time. It means meeting customers' needs more efficiently and more effectively than other firms do" (Edmonds 2000: 55).
2. "Competitiveness is a constantly changing feature, and therefore, a presently competitive firm may not be competitive in five years' time. The best description for competitiveness could be the firm's ability to get customers to choose just the company's products instead of competing products. To ensure a firm's future competitiveness, firms must also be competitive from their stakeholders' point of view as the firm's objectives and financing are strongly based on the company's attractiveness in the eyes of the stakeholders" (Feuer & Chaharbaghi 1994).
3. "You have a competitive advantage if your profitability is sustainably higher than that of your rivals and understand whether that advantage comes from higher prices, lower costs or a combination of both" Porter (1985: 11), (Magretta 2012: 90).
4. "The firm has CA when it is implementing a value-creating strategy that is not simultaneously being implemented by current or potential competitors" (Barney 1991: 102) and when it is able to create more economic value than its rival firms. Economic value is the difference between the perceived benefits gained by a customer who purchases a firm's products or services and the full economic cost of these products and services (Barney 2007: 22).

The following paragraphs introduce concepts from the main CA researchers about how to achieve CA.

CA is the core of a company's performance in an open market that enables a company to create and sustain competitiveness. The industry has a strong influence on the organization's competition rules and the content of the competitiveness. Forces outside the industry also have significant roles, which are reflected in the whole industry (Porter 1980: 3-5, 1985: 4-10). This method is discussed in more detail in section 2.3. The real point of competition is not to beat

your rivals, but rather to earn a profit (Porter 1980: 3). Competitive strategy aims to establish a profitable and sustainable position against the forces that determine the industry competition.

There are three potential approaches to outperforming competitors in an industry: overall cost leadership, differentiation and focus. Normally a firm can achieve one of these, but not more than one simultaneously (Porter 1985: XVI preface). Typical features of the cost leadership strategy are efficient production, tight cost and overhead control, low R&D investments, high market share and favourable access to raw materials. Resources for cost advantages include size difference and economies of scale, experience differences and learning-curve economics, and differential low-cost access to the factors of production (Barney 2007: 170-182). “Resources and capabilities can be heterogeneously distributed across competing firms; these differences can be long-lasting and can help explain why some firms consistently outperform other firms. From this perspective, the resource-based view consists of theoretical tools with which to analyse firm-level sources of SCA “(Barney 2001: 649).

By differentiating the product or service, an organization can create something unique for customers and the industry and thus create more value for the buyer. It may be the design, brand image, technology, customer service, or dealer network that can be made difficult and/or costly to imitate. Porter (1985: 162) identified the following steps for differentiation: (1) determine who is the real buyer, (2) identify the buyer’s value chain and the firm’s impact on it, (3) determine the ranked buyer purchasing criteria, (4) assess the existing and potential sources of uniqueness in a firm’s value chain, (5) identify the cost of existing and potential sources of differentiation, (6) choose the configuration of value activities that create the most valuable differentiation for the buyer relative to the cost of differentiating, (7) test the chosen differentiation strategy for sustainability, and (8) reduce the cost of activities that do not affect the chosen forms of differentiation. The sustainability of differentiation depends on its continued perceived value by buyers and the lack of imitation by competitors. Alternative businesses focus on selected targets such as a particular buyer group, product line or geographic market (Porter 1980: 35-40).

Magretta (2012: 32) introduced the required mindset for understanding Porter’s theories about competition: “First, Be the Best – be number one, focus on the market share, serve the best customer with the best product and compete by imitation; this is zero sum – a race that no one can win. Secondly, Be Unique – earn higher returns, focus on profits, meet the diverse needs of target customers and compete by innovation; this is positive sum – multiple winners, many events”.

This mindset provides the following economic equations: profit = price – cost, but it concentrates on the unit profit margin = price – cost. If an industry creates little value for its customers, the prices will barely cover the costs. By contrast, if it creates a lot of value, then the structure becomes critical in understanding who gets to capture it. Industries often create a lot of value for their customers or suppliers while the companies earn very little for their efforts. If rivalry is intense, companies compete away the value they create by passing it on to buyers through lower prices or dissipating it in the higher costs of competing (Magretta 2012: 40). Table 4 shows how and what is analysed by the five Porter forces and value chain tools in terms of the industry structure and the firm’s relative position.

Table 4. Analytics: Why some companies are more profitable than others (Magretta 2012: 65)

	Industry Structure	Relative Position
Porter’s framework	Five forces	Value Chain
The analysis focuses on	Drivers of industry profitability	Differences in activities
The analysis explains	Industry average price and cost	Relative price and costs

The main activities in a company’s value chain when seeking CA in operational effectiveness and differentiation alternatives are presented in Table 5.

Table 5. CA arises from the activities in a company’s value chain (Magretta 2012: 88)

Activities	Perform the SAME activities as rivals, but execute better	Perform DIFFERENT activities from rivals
Value Created	Meet the same needs at a lower cost	Meet different needs and/or the same needs at a lower cost
Advantage	Cost advantage, but hard to sustain	Sustain higher prices and/or lower costs
Competition	Be the BEST, compete on execution	Be UNIQUE, compete on strategy

Improved CA arises from the activities in a company’s value chain (Magretta 2012: 65, 88). CA enables a company to sustain higher relative prices or lower relative costs, or both, compared to its rivals in an industry. If an organization has CA, it will show up in the profit and loss (P&L) statement (Magretta 2012: 90). Porter defined the value proposition as being answers to the following three questions: which customers are you going to serve? (end user, channels); which needs

(products, features, services) are you going to meet? what is the relative price for a customer, for a company (premium, discount)? (Magretta 2012: 96).

CA depends on making choices that are different to those of rivals, on making trade-offs and choosing what not to do (Magretta 2012: 121, 137). Can the company create a willingness to pay (WTP) mechanism? This means that if the company creates more buyer value, it is possible to charge a higher price relative to rival offerings (Magretta 2012: 88). Industry leaders usually enjoy some advantages by defending their reputation and through their economies of scale, cumulative learning and preferred access to suppliers and channels. The condition for attacking a leader successfully requires that challengers possess: (1) SCA, (2) proximity in other activities, and (3) some impediments to leader retaliation and powerful reactions (Porter 1985: 514).

For fragmented industries, Porter (1980: 213) introduced six steps for formulating a competitive strategy in fragmented industries: “(1) what is the structure of the industry and the position of competitors? (2) why the industry is fragmented? (3) can the fragmentation be overcome and how? (4) is overcoming fragmentation profitable? (5) where should the firm be positioned in order to do so? (6) if fragmentation is inevitable, what is the best alternative for coping with it?” Typical features in a fragmented industry are low entry barriers and the absence of economies of scale and an experience curve (Porter 1980: 196). These steps are highly applicable to the studied fragmented industrial service business in Finland. Therefore, to overcome fragmentation, firms must first consolidate to create economies of scale and experience curves; standardize diverse market needs, which can be achieved through innovations, new products or services, and by standardizing to lower costs; making market acquisitions for critical mass; and recognising industry trends early (Porter 1980: 200-202). However, competitors can generate strategic benefits in the business by increasing CA, improving the current industry structure, adding market development and deterring entry (Porter 1985: 202). Many consolidations have been applied in the industry service business during the last 20 years.

In emerging industries, the rules of the competitive game are largely undefined. Thus, Porter (1980: 229-230) introduces a formulation of strategic choices to (1) reshape the industry structure, (2) modify the externalities in industry development, (3) change the role of suppliers and channels and (4) shift mobility barriers. The sustainability of a generic strategy requires that a firm possesses some barriers that make it difficult for another company to imitate it (Porter 1985: 20). Firms can influence an industry structure by effecting regulatory changes and

diffusing innovations. Industry evolution should not be greeted as a fait accompli, to be reacted to, but as an opportunity (Porter 1980: 187, 188).

Implementing cost leadership and product differentiation strategies requires different implementation means; see Table 6 (Barney 2007: 236).

Table 6. Organizational requirements for implementing Cost Leadership and product Differentiation strategy

Cost leadership	Product/Service differentiation
Organizational Structure <ul style="list-style-type: none"> - Few layers in reporting structure - Simple reporting relationship - Small corporate staff - Focus on narrow range of business functions 	Organizational Structure <ul style="list-style-type: none"> - Cross-divisional/cross-functional product development teams - Willingness to explore new structures to exploit new opportunities - Isolated pockets of intense creative efforts
Management Control System <ul style="list-style-type: none"> - Tight cost control system - Quantitative cost goals - Close supervision of labor, raw material, inventory and other costs - A cost-leadership philosophy 	Management Control System <ul style="list-style-type: none"> - Broad decision-making guidelines - Managerial freedom within guidelines - Policy of experimentation
Compensation Policies <ul style="list-style-type: none"> - Reward for cost reduction - Incentives for all employees to be involved in cost reduction 	Compensation Policies <ul style="list-style-type: none"> - Rewards for risk taking, not punishment for failure - Rewards for creative flair - Multidimensional performance measurement

Developing insights into a firm's strategic value involves analysing its competitive environment and organizational skills and capabilities; this is called a SWOT analysis, in the section 2.3.5 a more detailed description. The search for CA and superior firm performance must begin with an analysis of a firm's resources and capabilities (Barney and Clark 2007: 45-47). Most research on the sources of CA has focused either on isolating a firm's opportunities and threats (Porter 1980,1985), describing its strengths and weaknesses or analysing how these match chosen strategies. As shown in Figure 14, an internal analysis (strength/weaknesses) can be performed using a resource-based model and external analysis (opportunities/threats) can be conducted using environmental

models of CA. A SWOT analysis has no mechanism for how these strengths can be identified (Barney and Clark 2007: 49-50). However, Porter's five-force framework identifies the environmental opportunities and threats in rivalry.

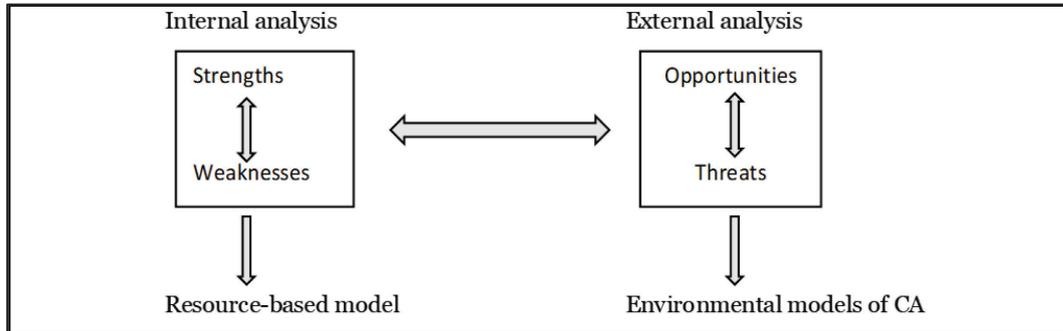


Figure 14. Internal and external analysis frameworks – a SWOT analysis (Barney and Clark 2007: 49-50).

In general, firm resources are all the assets, capabilities, competences, organizational processes, firm attributes, information and knowledge controlled by a firm that enable the firm to conceive and implement strategies designed to improve its efficiency and effectiveness. These resources can be divided into four categories: financial capital (e.g. all money resources, equity, retained earnings), physical capital (e.g. technology, buildings), human capital (e.g. managers, workers, training, experience, relationships) and organizational capital (e.g. culture, reputation, planning/ controlling/reporting systems). One way to identify resources and capabilities that have the potential for creating CA for a firm is to engage in value chain analysis (Barney 2007: 133-135). By conducting a Value, Rarity, Imitability, Organization (VRIO) analysis (see section 2.3.4), an organization can obtain deeper information about resource heterogeneity and resource immobility compared to its competitors (Barney 2007: 138; Chstzoglou et al. 2018: 46-52).

As stated above, a firm's resources can be classified into four categories: physical capital resources, financial capital resources, human capital resources and organizational capital resources. An enterprise with CA need not be the best performer in all dimensions. CA is expressed in terms of an ability to create relatively more economic value. To create more value than its rivals, an enterprise must produce greater net benefits, through superior differentiation and/or lower costs. There can be several different routes to CA (Barney & Clark 2007: 24, 26).

Barney and Clark presented the considerations when making a firm boundary decision concerning factors such as the available capabilities and resources of a firm, differences between firms, social complexity, owners' interests, strategic

differences and integration costs (Barney & Clark 2007: 162-180). A resource-based view (RBV) can be used to explain how firms leverage core competencies to operate in multiple businesses simultaneously and how corporate diversification can be used to develop core competence in firm-specific human capital investments, in the sense of the effect and the cause of core competencies.

According to Drucker (1999:61), “all organizations should make a global competitiveness strategy goal. Businesses cannot hope to survive unless they meet the standards set by leaders in their field, wherever they may be located in the world. Low labour productivity endangers a company’s survival, but low labour costs no longer give enough of a cost advantage to offset low labour productivity.” “One cannot manage change; one can only stay ahead of it. Being a change leader requires the willingness and ability to change what is already being done just as much as doing new different things. It requires policies to make the present create the future. The first policy is to abandon yesterday” (Drucker 2006:74). To create change, the leader should build and pilot a systematic policy of innovation. To try to make the future is highly risky but less risky, however, than not trying to make it (Drucker 1999:93). “Effective executives do not make many decisions; they concentrate on what is important and make a few important decisions at the highest level of conceptual understanding. Such leaders attempt to find the constants in a situation and to think through what is strategic and generic rather than solving problems” (Drucker 2006: 35). “They know they have ultimate responsibility, which can be neither shared nor delegated, but they have authority only because they have the trust of the organization. Therefore, they don’t think or say ‘I’, but rather they think and say ‘we’” (Drucker 2006: 124).

The creation and understanding of the business concept ‘how to go from good to great’ is presented in the Good-to-Great Matrix of Creative Discipline, three circles of the hedgehog concept (Collins 2001: 118, 122). These circles are: (1) what you are deeply passionate about; (2) what you can be the best in the world at; (3) what drives your economic engine. To go from good to great requires a deep understanding of these three intersecting circles translated into a simple, crystalline concept. New business models not only replace the former business model but they also create totally new opportunities (Collins 2001: 142).

CA is divided into two parts by Collins & Porras (2004: 139): (1) how to retain the core and (2) how to ensure promotion. The authors have summarized their five findings as follows: (1) challenging and brave targets; (2) great workplace; (3) supporting experiment culture, keeping what works; (4) managers from one’s own organization; and (5) not good enough, eager for continuous and persistent development.

Four core behaviour characteristics of top managers are uncompromising: discipline, experience-based creativeness, constructive paranoia and top-level ambition. The managers in the authors' study had outperformed the industry's competitors' achievements by a multiple of 10 (Collins & Hansen 2001: 47-48). The authors recommended building buffers and collecting cash reserves to meet unexpected surprises and minimize risks (Collins & Hansen 2001: 129).

Competitive advantage and core competencies

“To revolutionize its business, an organization has to break the old business model down into its core strategy, critical resources, customer relations and value chain” (Hamel 2000: 82). Evidence shows that CA is generated by management innovation and renovation. “The innovation hierarchy comprises operative, product/service, strategy and management innovations” (Hamel 2007: 43, 49). Thus, research should focus on intangible rather than tangible assets as a basis for CA when choosing and implementing a corporate strategy (Prahalad & Hamel 1990: 82; Barney & Clark 2007: 11, 12, 21). Tomorrow's growth depends on today's competence building. Thus, investment in new core competencies provides the seeds for tomorrow's product harvest. From a core competence perspective, there are five managerial tasks: (1) identifying existing core competences, (2) establishing a core competence acquisition agenda, (3) building core competencies, (4) deploying core competencies and (5) protecting and defending core competence leadership (Hamel & Prahalad 1994: 244-245). Core competence is about harmonizing streams of technology, organizing the work and delivering value. It is about communication, involvement and a deep commitment to working across organizational boundaries. Unlike physical assets, core competence does not diminish with use (Prahalad & Hamel 1990: 4-5).

“Business processes as a source of CA are relationships between a multitude of moving parts including ideas, information, knowledge, capital and physical products. These relationships define an organization and its extended network of collaborators, including suppliers and consumers” (Prahalad&Krishnan2008: 46).

CA can normally be traced to one of three roots: superior skills, superior resources and superior position. The critical question is ‘What sustains this advantage and keeps competitors from imitating or replacing it?’ A firm's skills can be a source of advantage if they are based on its history of learning-by-doing and if they are rooted in the coordinated behaviour of many people. The skills that build advantages tend to be organizational rather than individual (Mintzberg et al. 1995: 97).

Baghai, Coley and White (1999: 91) claimed that, to gain CA, all available resources are needed, and they introduced the following elements of a capability platform: “(1) special relationships (customer, suppliers, partners, government), (2) growth-enabling skills (acquisition and post-merger management, financing and risk management, capital management), (3) privileged assets (distribution networks, brand, reputation, customer information, infrastructure, intellectual property) and (4) operational skills (IT management, R&D, product design, low-cost manufacturing)”. Successful growth companies know the value of talent. The authors presented a talent management plan for different business development horizons involving operators, business builders and visionaries. “Without talented people, the most brilliantly crafted strategies falter and the most inspiring visions lose their sheen” (Baghai, Coley&White 1999: 125). One means of organizing for growth is described by the authors as creating small communities (companies, small groups/teams, spinouts), shaping new communities, connecting communities and inspiring the organization (Baghai, Coley&White 1999: 141-154).

“The soundness of a competitive strategy depends on how well it can satisfy the following tests: test one, does it create and maintain CA through some combination of lowest delivered costs or superior customer value?; test two, are the assumptions valid?; test three, is the strategy vulnerable to unacceptable environmental and internal uncertainties, and can these risks be avoided or contained?; and test four, what are the prospects for successful implementation (feasibility, supportability, consistency)?” (Day 1990:41). “The knowledge-based approach in renovating traditional organizational structures include delayering and empowerment and development of new organizational forms based on horizontal and team-based structures and interfirm alliances. The primary driving force behind corporate restructuring and strategic change has been the quest for shareholder value maximization and enhanced shareholder power. If the primary resource of the firm is knowledge, if the knowledge is owned by the employees, and if most of this knowledge can only be exercised the individuals who possess it – then the theoretical foundations of the shareholder value approach is challenged” (Grant 1996: 120). This view is an interesting one for analysing critical competences in a firm. According to Grant (2008:321), “a mature industry has two implications for CA: firstly, it tends to reduce the number of opportunities for establishing CA and secondly, it shifts these opportunities from differentiation-based to cost-based factors”. There are also three important cost drivers: economies of scale, low-cost inputs and low overheads (Grant 2008: 321-323).

The VRIO model (Valuable, Rare, Imitable, Organizational) described in the section 2.3.4 for analysing a firm’s competencies is an applicable tool for exploring the core competencies required to achieve CA/SCA as proposed in the above.

Dynamic capabilities

To survive competition, organizations need to possess dynamic capabilities, which refer to the firm's ability to integrate, build and reconfigure internal and external competences to address a rapidly changing environment (Leonard-Barton 1992: 111). A deep understanding of concrete dynamic capabilities requires a deep understanding of the market segment and change drivers. Basic theories of dynamic capabilities show that changes in market segments and competition are the main reasons why organizations must have dynamic capabilities if they want to survive competition. Dynamic refers to the organization's ability to renew their resource base or knowledge in a changing environment, which means that organizations are able to react promptly. Examples include the launch of new innovations or acquisitions. Dynamic capabilities cannot be copied from one organization to another; they are built in the organization over time and include organizational and strategic processes such as alliancing and product development, whose strategic value lies in their ability to manipulate resources into value-creating strategies (Sivusuo 2019: 31, 117). "However, long-term CA lies in resource configurations, not dynamic capabilities" (Eisenhardt et al. 2000: 1118).

"The service company's problem is to determine how to meet commitments for service performance (in the form of cost and speed) in the most effective manner as defined by the cost/service efficient frontier. Balancing the trade-offs between revenue, cost and service is challenging because of escalating service expectations, service supply-chain complexity and the uncertainty associated with a service event" (Cohen, Agrawal and Agrawal 2006: 259). The Dynamic Asset Deployment (DAD) method was developed to manage the deployment and use of service resources. In the DAD method, tools are presented for firms to adapt, such as customer commitment methods, feedback information collection, resource optimizing, integrated decision-support tools, utilizing new technologies (ICT), and design of the service supply chain. The horizon for planning and utilizing these are totally different, ranging from hours to years. Companies have to adopt a wholly new paradigm for service supply chain management. Implementing DAD requires probabilistic forecasting, optimized resource deployment (strategy), and optimized resource redeployment and material management (tactics) (Cohen, Agrawal and Agrawal 2006: 259-271).

In the world of corporate refocusing, downsizing and outsourcing, one of the most critical strategic decisions is to determine the firm's boundary, which is done by establishing which business activities belong within the company boundary, which business activities should be outsourced and managed through some form of

strategic alliance, and which can be performed in some kind of arm's-length process. A well-developed approach for determining a firm's boundary in the fields of strategic management and organizational economics is called transaction cost economics (TCE) (Williamson 1975: 1985).

Entrepreneurship

Penrose claimed that one of the primary assumptions of the growth of firms is that 'history matters'; growth is essentially an evolutionary process based on the cumulative growth of collective knowledge in the context of a purposive firm. Penrose examined the competitive implications of such inelastic productive resources as managerial teams, top management groups and entrepreneurial skills and she recognised that, even within this extended typology of productive resources, additional sources of firm heterogeneity might still exist as a possible productive resource, such as entrepreneurial skills. Penrose observed that some entrepreneurs are more versatile than others, some are more ingenious in fundraising, some more ambitious and some exercise better judgement (Penrose 1995: 182).

Strebel argued that "different types of competitors would dominate, depending on how conditions develop, and they will shape the conditions for others. The initiative and entrepreneurship of individual competitors will play a major, if not decisive, role in creating the trajectory conditions for others. One of the most fruitful bases for scenario development is through the eyes of different competitors, which shed light on the world they would like to create" (Strebel 2003: 121).

Siilasmaa, one of the top industrial directors in Finland, strongly supports the entrepreneurial management approach, which comprises ten elements: (1) sense of responsibility, (2) admit facts, (3) perseverance, (4) risk management, (5) hunger to learn, (6) keep the mind focused, (7) eyes on the horizon, (8) pleasant and appreciated team members, (9) ask why, (10) do not stop dreaming. Furthermore, this part of his phrase 'paranoid optimism', which means that you can be an optimist in the middle of a business hurricane and find new solutions to existing problems and challenges (Siilasmaa 2018:168-174).

The studied industrial service business includes service companies started by private entrepreneurs, which have transformed the industry both in terms of service concepts as well as service prices. More flexible and local services were created by entrepreneurs. Later, many of these smaller scale firms have consolidated into larger service companies.

Organizational activities and human resources as a source of CA

Barney and Clark stated that firms create value by either decreasing product and/or service costs or differentiating the product and/or service in a way that allows the firm to charge a premium price. Human Resource (HR) managers and researchers have long mentioned that the HR function plays an important role in the firm's performance. According to the VRIO model, a firm's resources can create SCA based on four attributes: firstly, the resource of the SCA must be valuable; secondly, it must be rare among competitors; thirdly, it must be imperfectly imitable; and fourthly, it must be able to be exploited by a firm's organizational processes. These four attributes of a firm's resources can be thought of as indicators of how heterogeneous and immobile a firm's resources are and how useful these resources are for generating SCA (Barney & Clark 2007: 57, 121-144). Previous findings indicate that some organizational cultures are valuable, rare and imperfectly imitable and are thus the source of SCA because a firm's culture evolves over time. The VRIO framework is discussed in greater detail in section 2.3.4. The authors consider two possible solutions to managing the risks to a firm's core resources and employee incentives when making firm-specific investments: (1) compensating employees directly to accept these risks and (2) using resource-based related diversification to mitigate these risks by exploring the applicability of core resources to other product markets (Barney & Clark 2007: 185-197).

How can an HR function assist in decreasing or increasing revenues? HR can create value by developing employee work satisfaction. Customer satisfaction stems from employee satisfaction. HR executives have a key role in nurturing, developing and managing the set of HR resources (e.g. human capital skills, employee commitment, culture, teamwork and so on) that are most likely to be sources of SCA for their organizations. The HR function can also adopt a strategic focus, applying the VRIO framework to identify specific HR resources that provide sources of temporary CA and/or SCA. "The ultimate quest should be for the HR function to provide the firm with resources that provide value, are rare and cannot be easily imitated by other organizations" (Barney & Clark 2007:140-141).

Fullan (2001) introduced five core capacities of leadership representing independent but mutually reinforcing forces for positive change: moral purpose, understanding change, relation building, knowledge creation and sharing, and coherence making. Fullan added that "all effective leaders possess the following personal characteristics: energy, enthusiasm and hopefulness. Leaders with these capacities evince and generate long-term commitment in those with whom they work" (Fullan 2001: 7). Fullan (2001: 51) also highlighted the importance of

relationships in successful enterprise operations, stating “if moral purpose is job one, relationships are job two”.

Argyris divided commitment into two parts: external and internal. External commitment is triggered by management policies and practices that enable employees to accomplish their task. Internal commitment derives from energies internal to human beings that are activated by the desire to get a job done. You have to create trust. (Argyris 2000:21). His strategy model results in the following: (1) define goals and try to achieve them, (2) maximize winning and minimize losing, (3) minimize the generation of the expression of negative feelings and (4) be rational (Argyris 2000:62).

Hamel and Prahalad stated that a core competence is a source of CA in that it is completely unique and contributes to customer value or cost. However, while all core competences are sources of CA, not all CAs are core competences (1994: 208). Hamel and Prahalad define a firm’s core competence as the collective learning in the organization, especially in terms of how to coordinate diverse production skills and integrate multiple streams of technologies. Core competence is communication, involvement and a deep commitment to working across organizational boundaries; it involves many levels of people and all functions (Prahalad & Hamel 1990; Mintzberg et al. 1995: 86).

In his book, ‘The New Organizational Wealth’, Sveiby (1997) discussed the content and value of knowledge as an intangible asset of companies, which he described as an external structure (relationships with customers, suppliers, brand, trademarks, reputation, image), an internal structure (patents, concepts, ICT and admin. systems) and the competence of personnel intangible assets. On the other side of the invisible balance sheet are shareholders’ invisible equity and obligations (1997: 9-12, 23). The economy of the knowledge era offers unlimited resources because the human capacity to create knowledge is infinite. Unlike physical resources, knowledge grows when it is shared. Human production can be seen as a creation of knowledge, while distribution can be seen as the creation of knowledge with customers. Knowledge provides the capacity to act (Sveiby 1997: 38-39). Managers need to identify the experts within their organization, get to know them personally, and create roles and tasks to their satisfaction. Companies compete in two markets: for people and for customers. It is therefore essential to create an explicit strategy for the personnel market that is linked to the strategy for the customer market (Sveiby 1997: 128).

Syrjälä (2006: 302) proved that the key driver in the organization transformation from postmodern to modern is the owners’ policy and strategy because it provides

the framework for change management and power relations, which are directly reflected in employee welfare, organizational culture and economic results.

Harisalo and Miettinen emphasized the importance of trust and building up trust equity in the organization, which is created by individuals' selections. When trust strengthens, it creates the preconditions for knowledge, understanding, and social and economic equity; knowledge equity drives innovations, and understanding drives interactions to look for new opportunities and to solve problems jointly. This understanding then reinforces social equity and networking, thus motivating people to utilize economic equity in sustainable directions (2010: 43-45).

Companies have different approaches to employee engagement. Some commonalities have emerged as motivators for employees in the workplace: (1) putting mechanisms in place that enable employees to easily communicate their ideas and concerns, (2) showing employees that their input is valued and may be acted upon, (3) giving employees greater autonomy, (4) rewarding employees for their productivity and for making the organization succeed, (5) showing employees that the company is a worthwhile investment of their time and resources and (6) finding and implementing an evolutionary process to increase employee engagement (Heyman and Barrera 2010: 170).

According to Drucker, "few people work by themselves and achieve results by themselves. Most people work with others and are effective with other people. Managing yourself requires taking responsibility for relationships by accepting that other people are as individual as you are and taking responsibility for communication" (Drucker 2006: 14). The starting point for competence development is an overall strategy (objectives) that can predict changes (the power of change analysis). A personnel development programme can be constructed based on this analysis (SCEMM 1998: 126).

2.1.4 Sustainable competitive advantage (SCA)

Baghai et al. claimed that SCA comes only when companies assemble difficult-to-imitate combinations of capabilities into bundles, controlling critical capabilities and bundling capabilities for enduring advantage. If the capability can walk out of the door with an employee, then it is the employee, not the corporation, that will appropriate the value (Baghai, Coley and White 1999: 100). An organization that is capable of outperforming its competitors over a long period has SCA.

"A firm is said to have SCA when it implements a value-creating strategy that is not simultaneously being implemented by any current or potential competitor and

when other firms are unable to duplicate the benefits of this strategy” (Barney 1991: 102). Additionally, firms can achieve SCA using mergers and acquisitions (M&A) as a strategic plan. However, often M&As do not generate planned targets. To gain CA and economic profits from M&A, these strategies must be either valuable, rare and private, or valuable, rare and too costly to imitate (VRIO model). Additionally, historical differences between firms are often too complex to implement strategies successfully (Barney 2007: 472). Firms can create SCA by creating strategic alliances with competitors because many companies like to exploit economies of scale, learn from competitors, manage risks and share costs, facilitate tacit collusion, have low-cost entry into new markets and manage uncertainty. In such cases, a strategic alliance attempts to exploit a potential synergy between independent firms. Symmetric alliances are most common among mature and fragmented or network industries. Incentives for strategic alliances are created when the value of combined resources and assets is greater than the values as separate operations (Barney 2007: 412).

CA is said to exist when the economic value created by a firm in an industry is greater than the economic value created by an average firm in the industry. Economic value is defined by the difference between the willingness of a firm’s customer to pay and the firm’s costs. SCA is essentially a CA for which other firms are unable to duplicate the benefits and which last for a long period (Barney & Clark 2007: 52, 252). SCA can be created by trust, which is the mutual confidence that no party to the exchange will exploit another’s vulnerabilities. Trust in a semi-strong form can be a source of CA if competing exchange partners vary in their skills and abilities in the conception and implementing of governance mechanisms. Strong-form trustworthy exchange partners may be able to discover other strong-form trustworthy exchange partners (Barney & Clark 2007: 95, 117). Information technology (IT) is a source of SCA that may create value for a firm by increasing the internal and external coordinating efficiencies such as through customer switching costs or IT managerial skills. If a firm possesses valuable proprietary technology (e.g. patents, IT systems, technical skills), it can obtain SCA. A firm has to find access to the capital (in the form of debt, equity or retained earnings) needed to develop and apply IT (Barney & Clark 2007: 145-160).

However, even when a firm has SCA, it does not mean that its CA will last forever. Changes in technology, demand and the broader institutional context can render the SCA no longer valid, i.e. “Schumpeterian shocks” (Schumpeter 1934, 1950). First-mover advantage (FMA) can elevate a company’s CA over other firms, enabling them to gain access to distribution channels, develop goodwill with customers or develop a positive reputation before other firms have implemented their strategies. FMA firms must be heterogenous in terms of the resources they

control. If companies have identical competitors, SCA cannot be achieved when the firm's resources are perfectly homogenous and mobile (Bain 1956). However, if there are strong entry or mobility barriers, a company can obtain SCA (Barney & Clark 2007: 55).

Day (1990: 36) presented the following "useful questions about sustainability: (1) will the strategy put the business in a position to ward off known threats, exploit opportunities, enhance current advantages or provide new sources of advantages? (2) can the strategy adapt to a broad range of foreseeable environments? (3) how difficult will it be for competitors to match, offset or 'leapfrog' the expected advantages?"

According to Grant, the key to a resource-based approach to strategy formulation is understanding the relationship between resources, capabilities, CA and profitability, as well as understanding the mechanisms through which CA can be sustained over time. Grant (1991: 115) introduced a practical framework for a resource-based approach to strategy analysis: (1) identify and classify the firms resources, (2) identify the firm's capabilities, (3) appraise the CA/SCA resources, (4) select a strategy and (5) identify resource gaps. "The key to resource-based approach to strategy formulation is understanding relationships between resources, capabilities, CA and profitability" (Grant 1991:133). CAs are sustainable as long as the resources and capabilities are durable and not imitable (transferable or replicable) (Grant 2008: 140).

A cost leadership business strategy focuses on gaining advantages by reducing its economic costs to below those of all of its competitors (Porter 1985). Examples of cost advantages are size differences and economies of scale, experience differences and learning-curve economics, and differential low-cost access to factors of production (Barney 2007: 170-182). Porter (1985: 12-13) defined that typical features of a cost leadership strategy are economies of scale, low-cost labour, efficient production and material procurement, tight cost and overhead control, low R&D investments, high market share and favourable access to raw materials.

2.1.5 Guidance of strategy theories for the research questions

The previous sections presented alternative theories on strategy structure development, all of which purport to understand the service industry, the business environment and conditions, external factors and a firm's internal status and competences. What is the business today? What is in the future? And how do we get there? Several researchers have recommended various strategy approaches

and processes (e.g. Mintzberg, Porter, Reeves et al., Day, Grant, Ritakallio & Vuori).

In their CA approach, most strategists present that if the firm selects the cost leader or the Red Ocean strategy, the company will face more competition and often the margins will be low. However, by selecting differentiation, focusing on the Blue Ocean strategy, a company can achieve new added value for its customers by shaping business models with new services. In this alternative, organizations need to develop a deep understanding of their customers' values and shape their competences (Porter; Barney; Kim & Mauborgne). The importance of available competences and management motivation and enthusiasm are central to building CA (Collins et al., Hamel et al., Barney, Baghai et al.). Because there are many discontinuities in continuous businesses, strategy shaping and adaptation as well as dynamic capabilities are recommended (Ritakallio & Vuori, Sivusuo, Baghai et al., Agrawal & Agrawal). Building service ecosystems and platforms will create new service concepts in the future and develop CA in industrial services, which are still not widely used currently (Reillier & Reillier; Paker et al.)

Most strategists promote differentiation, blue ocean and core competence development as a business model or concept for achieving SCA, giving the solution route to RQ1 – 'What methods and tools can be used to create SCAs and enablers for the industrial service business?' and partly to RQ2 – 'Is there a conflict between service providers and customers in terms of sustainable business targets and can a win-win position be found?' Sections 4 and 5 analyse and summarize these questions.

2.2 Conceptual frameworks

Conceptual frameworks create a deeper understanding and provide the basics for applied strategy planning and implementation tools and for constructing solutions for SCAs in industrial service businesses. Conceptual frameworks also describe some main features and conditions in the Finnish service industry and are taken account when constructing the answers to RQ1 and RQ2.

2.2.1 Regulation and ownership impacts

Most of the studied customer companies (electrical and telecom network owners) are operating in a strongly regulated natural monopoly business. The definition of a natural monopoly is a monopoly in an industry in which high infrastructural cost and other barriers to entry relative to the size of the market give the largest supplier

in an industry an overwhelming advantage over potential competitors. This situation frequently occurs in industries where capital costs predominate, creating economies of scale that are large in relation to the size of the market; examples include public utilities such as water, electricity and telecom services. These natural monopoly businesses are regulated by governments (Filipini & Massimo, 1988: 157). Laws and regulations by the EU and the Finnish government are applied to the electrical network industry studied here and have a driving influence on business development.

According to the Finnish Electricity Market Act (386/1995 with amendments), the licensed (granted by the electricity market authority) system operator is responsible for the distribution system in specified geographical areas where the system operator maintains, operates and develops its electricity system and connections. On request and against reasonable compensation, the system operator connects its electricity to its customers. This law details the system operator's unbundling requirements of other electrical network operations such as electricity trading.

The Finnish Electricity Act (588/2013) defines that the limitation to breaks in electricity supply in urban areas are set at a maximum of six hours and in rural areas 36 h stepwise, for 50% of distribution networks by 2020, 75% by 2024 and all of the defined distribution networks by 2029. This requirement includes extremely rapid weatherproof network investments by network operators, which means that the main part of the distribution network of overhead lines will be replaced by ground cables. The total investment volume is about €9 billion up to 2029, which means an average of €900 million per year.

The electricity transmission prices in Finnish distribution networks are regulated by the Finnish Energy Authority and were last published in 2018. Regulation methods are based on rather complicated calculations such as the unit-based net present value of the network, profit evaluations, incentives (investment, quality, efficiency and innovation), supply security, WACC (Weighted Average Cost of Capital) %, and inflation rate. Regulatory periods are four years, with the current period being 2016-2019. Using these methods, the authority has drawn up reasonable charges for network operators (Energy Authority 2015: 6). Appendix 4 presents the electrical distribution regulation control model. Network company earnings are based on how effectively investments are executed compared to the reference costs given by the authority. The earning model includes innovation, quality, efficiency, delivery security and investment incentive factors. For network service companies, it is important to understand the customers' earnings model and its repercussions on the service providers' operations. This regulated earning

model is the main driver for electrical network companies and creates the service companies' business framework.

The Act for the Public Procurement and Concession Contract (1397/2016) regulates the rules, sets the limits for the state and municipal authorities and other contracting entities on how tendering procurements and concessions should be carried out. Electrical and telecom utilities fall under these procurement laws and they correspondingly tender the processes of network construction and maintenance services.

Porter (1985: 83) claimed that many institutional (regulation, tax, union rules etc.) factors and locations have impacted most industries, which is very much the case in Finnish network services. The authority regulations described above strongly influence service industry performance.

Electrical network utilities are mostly owned by municipalities; however, the two biggest (Caruna, Elenia) are now owned by international private equity companies. There are no publicly owned electrical utility companies today in Finland. The three biggest teleoperators are public companies (i.e. DNA, Elisa, Telia). However, service provider ownership has widely spread to being municipality, public, private and management owned or a combination of these. Ownership has strongly influenced the company strategies, which has thus impacted the service industry transformation examined in this study. The findings are discussed in the results section 4.

2.2.2 Customer approach and experience

The shift away from formal, defined roles is already occurring in business-to-business (B2B) relationships. Major business discontinuities, such as deregulation, globalization, technological convergence and the rapid evolution of the Internet, have blurred the roles that companies play in their dealings with other businesses. Customers are fundamentally changing the dynamics of the marketplace. In the new economy, companies must incorporate customer experience into their business models. Prahalad and Ramaswamy (2000: 2-5) introduced the 'co-opting customer competence' process, as follows: (1) encourage active dialogue with customers, a dialogue with equals; (2) mobilize customer communities, through Internet connections online; (3) manage customer diversity; (4) co-create personalized experiences; (5) manage multiple channels of experiences; (6) manage variety and evolution; and (7) shape customers' expectations – harnessing customer competence and managing personalized

experiences requires cooperation from consumers; companies must be sensitive to 'what is next', which means they must shape their expectations.

Prahalad and Ramaswamy (2004: 2) developed a new framework of value creation for a company, which they called co-creation of value. "The framework begins with a shift in the role of the consumer in the industrial system from isolated to connected, from unaware to informed, and from passive to active." The future of competition, however, lies in an altogether new approach to value creation based on an individual-centred co-creation of value between consumer and company. In jointly creating the value that is unique to the individual consumer and sustainable for the firm, the firm can create not best practices but 'next practices' (Prahalad & Ramaswamy 2004: 13-15), with a focus on experience networks. The market is beginning to resemble a forum organized around individuals and their co-creation experiences. Dialogue, Access, Risk assessment and Transparency (DART) form the foundation for a co-creation of value. In the co-creation approach, interaction can take place repeatedly, anywhere and anytime in the system (2004: 49). To co-create a unique value with the customer, we must appreciate what constitutes a personalized co-creation experience, which develops from the interaction between a single consumer and an experience environment, personalizing the co-creation experience (Prahalad & Ramaswamy 2004: 75-90). The researchers (Prahalad & Ramaswamy 2004: 115-116) recommended building experience networks to deal with co-creation personalized experiences.

Prahalad and Krishnan introduced the fundamental transformation of a business driven by digitalization, ubiquitous connectivity and globalization. The authors stated that no industry is immune to these trends. Their model, called the 'New House of Innovation', is built on two pillars: the centrality of the individual ($N = 1$, one consumer experience at a time) and access to, rather than ownership of, resources ($R = G$, resources from multiple vendors and often around the globe). These $N = 1$ and $R = G$ are the next sources of CA. Companies should respond to continually changing customer demands, behaviours and experiences. The main conclusions are that (1) to access global best resources and talents ($G = 1$) and personalized co-created experiences ($N = 1$), the social architecture of the firm, such as the organization structure, performance measurement, training, skills, values, and the technical architecture of the firm form the IT backbone and that (2) the glue is flexible and resilient business processes and focused analytics (Prahalad & Krishnan 2008: 5-6). Additionally, three distinct transformations are taking place: (1) moving from selling a product to selling a service; (2) moving from a transactional relationship with a customer to a service relationship with a customer, to services and solutions and to superior experiences and (3) moving to a business-to consumer (B2C) organization (Prahalad & Krishnan 2008: 16).

The authors stated that the business process is the link between business strategy, business models and day-to-day operations (see Figure 15). No organization needs to know all the steps ahead of the transformation; the whole journey is about learning by doing, taking small steps and consolidating gains as you go along (Prahalad&Krishnan, 2008: 52).

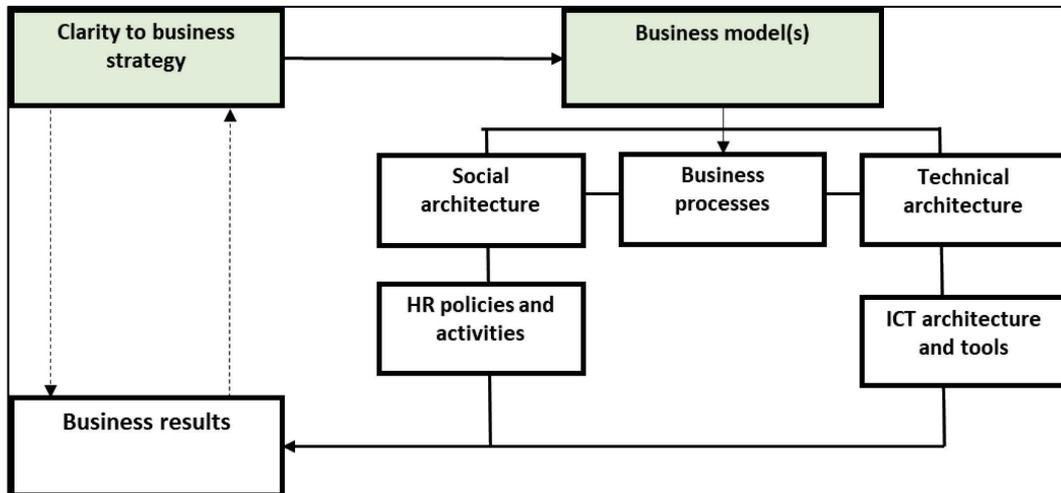


Figure 15. The world of N=1, R=G: A framework for capability building (Prahalad & Krishnan 2008:52).

Edvardsson, Enquist and Johnston (2005) claimed that business value is not merely economic value. From the customer's perspective, value is an overall personal assessment of the quality attributes of the market offerings in relation to the price and other sacrifices. Values can be understood as the principles, standards, ethics and ideas by which companies and people live. The authors have two distinct categories of value: company core values (basic to company culture) and foundation values (reflect the norms of society in general). The latter consists of so-called Corporate Social Responsibility (CSR), which refers to a company's ethical, social and environmental responsibilities. A value-based business is a combination of these two values. The authors present the application of Service-Dominant Logic (SDL) (Vargo & Lusch, 2004: 1-17). The main focus of the SDL paradigm is that value is co-created with customers and assessed based on 'value-in-use' and a synergy between corporate values, foundation values and customer values. To be successful, a value-based service business must seek resonance in terms of values; the firm and its stakeholders must have shared values. The following five principles have been derived for a sustainable values-based service business model: (1) strong values drive customer value, (2) CSR is a strategy for sustainable service business, (3) a value-based service experience is required for co-creating, (4) a value-based service brand and communication are needed for

values resonance and (5) value-based service leadership is essential for living with the values (Edvarsson&Enquist 2009).

One method to visualize the service process is blueprinting, which was invented by Schostack (1982) and developed by Kingman-Brudage (1995). Today, blueprints usually include the following type of action areas: customer actions, actions of front-office staff, actions of back-office staff, support processes and management processes in simple process charts. The productization of services has been presented as one solution to the problem of efficiency, linked to innovation: service concept – service process – service system. Applying the blueprinting method in service processes involves combining customer actions, innovation and productization (Schostack 1982; Kingman-Brundage 1995; Bitner, Ostrom and Morgan 2007).

Porter (1985: 257-263) introduced a segmentation tool for products, the buyer or customer, and the competitor and industry connected to the Five Competitive Forces business model, and he recommended plotting competitors on the segmentation matrix (products/buyers).

Gallouj (2002) developed six concepts of expressing customer participation in the production of services: (1) interface (point of contact between customer and service provider), (2) interaction (exchange of information, knowledge and performance of repairs), (3) co-production, (4) servuction (the process of creating a service by linking up various elements), (5) a socially regulated service relationship and (6) a service relationship (operational relationship). These concepts were developed to account for client involvement. Thus, customer relationship and proximity are essential to the production of 'servuction' and the real power of a service relationship in the economic system as a whole (Gallouj 2002: 38-40). Djellal and Gallouj (2015) introduced a Product-oriented product-Service System (PSS), which adds traditional services to a product. Examples include the addition of pre- and after-sales services. By adding services to products, companies can gain CA. Companies therefore seek to improve the quality of goods, reduce costs, boost sales and thus increase profits. In some cases, the services added to a product can even be more profitable than the products themselves. Companies also seek to lock down the relationship with customers to generate customer loyalty (Djellal&Gallouj 2015: 18).

In the industrial service business, companies should introduce more mobile applications especially in the retail business, which has created good customer value and positive business effects. These mobile services offer more personalized and updated features and more dynamic customer behaviour, interactivity and

usability (Turkia 2016: 86). Customer loyalty is built step-by-step by developing customer value, engagement and satisfaction.

Korhonen (2016) examined customer orientation in industrial service innovation and found that the importance of customer orientation for manufacturers has grown because they have turned to service providers and because open innovation has gained ground in industry. At the same time, industry has faced challenges in becoming customer-oriented in an innovating industrial service. Servitization is expected to accelerate in the near future. Thus, Korhonen suggested that wider customer-supplier interactions and service innovations should be used. Wider ecosystems are essential actors and beneficiaries. Customers and other stakeholders are inherently involved in innovation. Customer orientation requires not only a focus on value co-creation at multiple levels and in multiple directions but also the management of co-development (open and closed innovations) and the creation of favourable dynamics for interactive learning (2016: 141-156).

Edwardsdsson et al. (2003) demonstrated how service organizations can create value for their customers through the co-creation of pre-purchase service experiences. This is done while simultaneously reducing risk and increasing customer imagination and interaction with the organization. The dimension provides a starting point for discussing what values should be provided and how this might be achieved (Edwardsdsson et al. 2003: 11). This is an interesting approach for a new service idea for customer value co-creation.

Helkkula et al.(2012) surveyed the value of experience and found the following: when aiming to co-create value with potential or existing customers, service organizations are faced with questions about how, when, and the degree to which current and prospective service customers are willing to financially support or pay for current or imaginary future value experiences. Service managers should also consider how a richer understanding of past, current and imaginary value in the context of service customers' individual lifeworld and social networks might generate novel insights for service innovations. The authors recommended that service organizations not only research and identify the core values and experiences of service customers but also extend observations to include socially constructed experiences in order to successfully co-create relevant value propositions (Helkkula 2012: 69-70).

Helkkula and Pihlström (2010: 360-362) introduced the Event-Based Narrative Inquiry Technique (EBNIT) in service development and customer co-creation. The purpose of EBNIT is to ask for experiences on spoken and unspoken (tacit) needs and trigger ideas for new types of services. The interviewer and the storyteller construct an imaginary narrative with the help of metaphor. The authors suggested

that the EBNIT has potential as a manageable method of listening to customer experiences and is well suited to the early stages of concept development (Helkkula & Pihlström 2010: 365).

Helkkula & Kelleher (2010: 48-49) examined the circularity of customer service experience and customer perceived value and obtained the following results: first, the value perception process does not emerge as a linear value chain, but rather as a complex phenomenon which integrates the dynamic processes of experiencing and perceiving value within a circle of phenomenological understanding; secondly, value creation and value co-creation originate from the individual's experimental realm, and individual customer value creation processes potentially intertwine with the value creation process of other customers, thus creating a social value co-creation constellation in the form of a customer community; thirdly, the customer-perceived value cannot be solely related to the service provider's service offering as customers tend to make their own sense of their service experience.

Kingman-Brundage et al. (1995: 35) stated that service production is a multidimensional phenomenon with a high degree of intangibility. To complicate matters, services may be consumed as they are produced, which means that customers may play an active role in service production and are often physically present as the service is performed. These characteristics present special challenges for service management and leadership.

2.2.3 Service innovation

Today, services dominate the economic landscape and are associated with pivotal sources of growth, and service innovation is increasingly understood as a topic of utmost importance throughout the economy. In marketing, academics use the term 'New Service Development'. Extended value chain innovation means that more actors than just the representatives of a linear production line of the supply chain are involved, such as customers, subcontractors and even competitors. The research results produce the following factors that make the extended value chain innovation successful: (1) a fast, efficient innovation process – all relevant actors are involved in the innovation group and all elements are united; (2) material, service and experience – entrepreneurship and market acceptance are taken into consideration from the beginning and (3) composition of the innovation group, facilitator and incremental innovations (Sundbo & Toivonen 2011: 87-88).

Nambisan (2002) identified and discussed three roles that a customer can have in new product development: (1) the customer as the source of a new innovation, (2) the customer as the developer and (3) the customer as a user, for example, in

testing or support. In a 'Knowledge Intensive Business Service' (KIBS), one study showed that the customer predominantly acts as a user of new methods in the creation of service innovations that provide market value (Sundbo&Toivonen 2011: 103). Alam and Perry (2002) remarked that it is less costly and less time-consuming to engage customers in idea generation and testing than to engage them in the development phases. Osterwalder (2004) introduced a business model ontology in the user-based development of services (Sundbo&Toivonen 2011: 125; see Figure 16). This model is a combination of financial and physical aspects compared to models that mostly focus on the revenue of a business logic. Osterwalder and Pigneur (2010: 16-17) described the meaning of each building block of the business model.

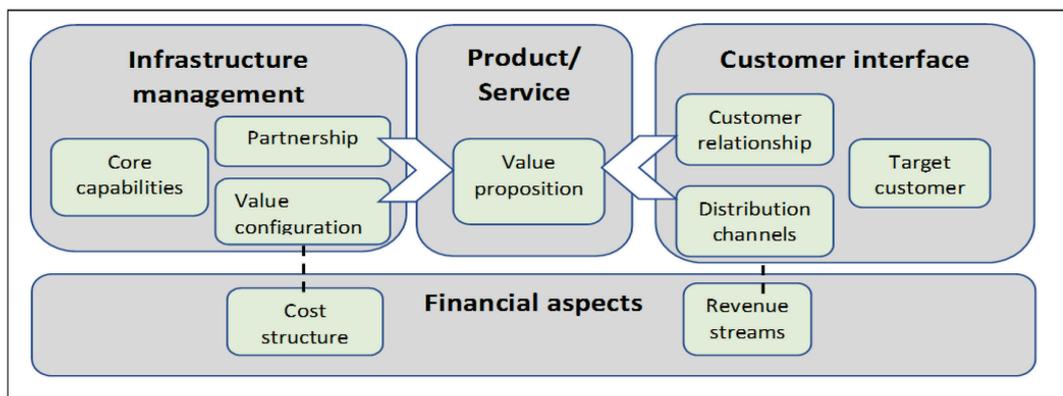


Figure 16. Nine business model building blocks and their relationships (Sundbo & Toivonen 2011: 125).

Olivia and Kallenberg (2003: 165) presented how to manage the transition from products to services, introduced the process and framework of servitization, and discussed further development ranging from separate services to integrated solutions. Common to this transformation is the movement from product-related services towards offerings where the service element gradually increases. Recent developments indicate that customers require increasingly versatile services based on their unique needs as well as integrated solutions, consisting of material and products and services.

Service innovation as an experience has measured the differences between employee and user narratives (Helkkula & Holopainen 2011: 299; Edvardsson, Gustafsson & Roos 2005; Helkkula 2010, 2011; Heiskanen & Repo 2007). Researchers claim that users' experiences should be integrated into innovation practices at an early stage to develop new services that users find beneficial. In innovation research, user experience has rarely been the starting point for the

creation of new services. Employee experiences in service innovation are mostly seen as a variable of service provider competences (Helkkula & Holopainen 2011: 284). Three user-based practices for how a service provider can involve users in service development and gain insights concerning user experience are listening, understanding and dialogue (Kaulio 1998; Nordlund 2009; Sundbo & Toivonen 2011: 350). In a service company, innovation processes vary in terms of technical processes, and competence characteristics in the 'front office' and 'back office' may be produced in many ways and include client's activities (Gallouj & Toivonen 2011: 20-21).

Bettencourt (2010) introduced the following steps for discovering service innovation opportunities: (1) new service innovation – discovering new jobs, (2) core service innovation – helping the customer get a core job done better by improving service, (3) service delivery innovation – improving how the customer gets core jobs done and (4) supplementary service innovation – getting the most value out of the product usage or consumption. Bettencourt explained that the company can move from innovation and growth objectives to developing unique and valuable service concepts by selecting the innovation focus, uncovering and prioritizing the customers' needs, and developing a service strategy (Bettencourt 2010: 8-25). Bettencourt (2010: 110) also introduced tools for discovering opportunities for supplementary service innovation. He used a universal job map to discover new core service innovation opportunities – define, locate, prepare, confirm, execute, monitor, resolve, modify and conclude (Bettencourt 2010: 136-155). Bettencourt also presented “the seven Ps of a service marketing mix: product, price, place, promotion, processes, physical evidence and people” (Bettencourt 2010: 188).

A technology and innovation strategy and its implementation have the power to influence industry structure and CA, which can be applied to cost leadership and to differentiation in product and process technology. Do you want to be a technological leader that influences a firm's competitive actions and takes account of the following factors: sustainability of technological lead, FMA and first-mover disadvantage (Porter 1985: 176-190)?

Kim and Mauborgne (2005: 12-13) introduced the Blue Ocean strategy through value innovation, which does not focus on beating the competition, as does a Red Ocean strategy, but rather focuses on creating a leap in the value of buyers and the company, thereby opening up a new and uncontested market space.

Value innovation is created in the region where a company's actions favourably affect both its cost structure and its value proposition to buyers. Cost savings are made by eliminating and reducing the factors on which an industry competes. The

first principle of the Blue Ocean strategy is to reconstruct market boundaries to break from the competition, i.e. Red Oceans, and create Blue Oceans. To achieve this, managers have to look at the following six paths: alternative industries, strategic groups within industries, the chain of buyers, complementary product and service offerings, functional or emotional appeal to buyers, and the timeframe (Kim&Mauborgne 2005: 49-77). Buyer value is increased by creating elements in the industry that have never been previously offered. Over time, costs are reduced further as the economies of scale kick in due to the high sales volumes generated by the superior value. The authors presented different tools, frameworks and action lists of how to create a Blue Ocean strategy and value innovation. At the beginning, they focus on the big picture rather than on the numbers and on reconstructing market boundaries. To prevent competitors from imitating the Blue Ocean strategy, barriers are built so that it does not fit the competitor's logic and so that it conflicts with their brand image, patents and customers' reactions. Another option to avoid imitation is to renew and rebuild the Blue Ocean strategy (Kim&Mauborgne 2005: 81-184).

Christensen (1997, 1999) developed tools to find a new market for new and disruptive innovations such as the shifting base of the competition, identifying what has been discovered and discovery-driven planning. The author argued that companies depend on customers and investors for resources and he proposed giving responsibility for disruptive technologies to organizations whose customers need them. Three factors affect what an organization can and cannot do: its resources, its processes and its values (1997).

Christensen and Raynor (2003: 101) discussed how to create new growth, and they stated that although sustaining innovations is critical to the growth of existing businesses, a disruptive strategy offers a much higher chance of success in building new-growth businesses. They recommend that managers target the segment markets that reflect the things customers are trying to achieve.

The New House of Innovation presented by Prahalad and Krishnan utilized their business transformation model $N = 1$ (personalized co-created experiences) and $R = G$ (global access to resources and talents) to connect to the social and technical architecture of the firm and form an integrated package that comprises flexible and resilient business processes and focused analytics, which require the management's commitment. The authors claimed that innovative culture cannot be created without these factors and that this transformation must be seen as a journey (Prahalad&Krishnan 2008: 11-16). "The firm needs administrative capacity to execute the change" (Prahalad&Krishnan 2008: 49); new innovations are critical success enablers (Hammel 2000: 290).

Gallouj and Weinstein (1997: 18-25) identified five forms of service innovation: (1) radical innovation (totally new creation), (2) improvement innovation (improvements to product/service characteristics), (3) incremental innovation (substitution or addition of characteristics), (4) ad hoc innovation (interactive/social construction of solution to a particular problem) and (5) recombinative innovation (exploits possibilities opened by new combination of characteristics or knowledge).

Korhonen (2016) explained that the managerial implications highlight the transformation of industry to servitization, which is forecast to accelerate in the near future. It is suggested that a wider view than customer-supplier interaction should be taken and that industrial service innovation should be seen as a nested system change. In that case, innovation encompasses not only products and services but also wider ecosystems where humans and society are essential actors and beneficiaries. Customers and other stakeholders are inherently involved in innovation. This new approach to customer orientation requires a focus on value co-creation at multiple system levels and in multiple directions. It also requires the management of co-development utilizing both open and closed innovation and the creation of favourable dynamics of interactive learning (Korhonen 2016).

Innovations based on new knowledge – whether scientific, technical or social – rank highly. Such innovations are the superstars of entrepreneurship; they get the publicity and the money. Knowledge-based innovations differ from others in terms of the time they take; they have the longest lead time of all innovations. To become effective, innovation of this sort usually demands not one kind of knowledge but many (Drucker 2006: 75-76).

Heiskanen and Repo (2007: 183-184) researched the involvement of users in the innovation process and concluded that better utilization of user involvement can be achieved by developing a better understanding of a company's internal and external barriers to user involvement. They also explained that “a fundamental gap may not exist between innovation-orientation and customer-orientation; there is no automatic alignment between these perspectives. There may be genuine conflicts of interests between innovators and users, and user involvement will not make them go away” (Heiskanen & Repo 2007: 183-184).

Kaulio (1998) conducted a review of the different methods that support customer involvement in different phases of the design process in product (and service) development. He specified three particular phases: the specification phase, the concept development phase and the prototyping phase. He also identified three types of design: design for the customer, design with the customer and design by

the customer. However, he stated that increased customer focus is needed (1998: 141).

Kostama & Toivonen suggested that co-innovation requires a reciprocal dialogue with the users, so that ideas may be refined iteratively. The personal characteristics and enthusiasm of involved customers are highly important for the tempo of the co-innovation process and for the wealth of the derived material (Sundbo & Toivonen 2011: 369).

Nordlund explored how to construct understanding at the front end of innovation and determined that the concept of customer understanding encourages organizations to go beyond the needs, wants and requirements of the customer to consider what can be offered within the limits set by the customer's objectives and possibilities. Customer understanding emerged as a shared understanding, which managers should support. In the absence of right answers and absolute truths, developing new concepts can be understood as a collective commitment to making a desired future happen (Nordlund 2009: 173-174).

2.2.4 Service Management

Grönroos (2000) presented three important requirements for a customer relationship marketing strategy as service perspectives: firstly, redefine the business as a service business and the key competitive element as service competition; secondly, examine the organization from a process management perspective and not from a functionalistic perspective; and thirdly, establish partnerships and a network to handle the entire service process. Partnerships and networks of firms are formed horizontally and vertically in the distribution and supply chain. The author also recommends making direct contact with customers to develop a customer database. The concepts of trust, commitment and attraction play an important role in relationships. Trust can be divided into four categories: generalized, system, personality-based and process-based trust; commitment is defined as an enduring desire to maintain a valued relationship; and attraction means that there should be something that makes a supplier interesting to a given customer or vice versa, which can be based on, for example, financial, technical or social factors (2000: 27-31, 37).

Based on a well-defined benefit concept appreciated by the customer, managing the service offering requires four steps: (1) developing the service concept, (2) developing a basic service package, (3) developing an augmented service offering and (4) managing image and communication (Grönroos 2000: 165).

Grönroos (1990: 128) summarized the principles for service management as follows: firstly, decide on the business and profit models; secondly, set the decision-making level (decentralized); thirdly, focus on the flat organization; fourthly, focus on control functions (but not too regulated); fifthly, create a rewarding incentive system based on service quality and sixthly, measure the service quality, productivity and customer satisfaction.

Normann (1993) explained that value creation in today's economy is increasingly related to intangibles, and that managers who do not have a systematic language for looking at those processes will inevitably lag behind. He defined the service management system as comprising five components: (1) the market segment (client type), (2) the service concept (benefits to the client, core and/or peripheral services), (3) the service delivery system (personnel, client, technology and physical support), (4) the image and (5) the culture and philosophy (overall principles in services linked to the four previous components) (Normann 1993: 46-48). The so-called S-curve is typical of service business growth, e.g. innovation, reproduction, operational efficiency improvements, refined market segmentation and diversification. Normann (1995: 117) identified the following service diversification strategies: client-based diversification, main/core and auxiliary/peripheral services, and basic knowledge collected per market segments, whereas Kotler and Bloom (1984: 157) presented the service life cycle as a typical revenue/time dimension S-curve in four stages: introduction, growth, maturity and decline; see Figure 5 (section 2.1.1).

Service competition can be divided into three categories: customer-driven, competition-driven and technology-driven (Grönroos 2007: 10).

Empowering employees gives them the authority to make decisions and take actions in problematic cases using agreed legal or monetary limits. However, empowerment cannot function without simultaneously providing employees with management support, knowledge support and technical support. The benefits of empowering service employees are a quicker and more direct response to customer needs and to dissatisfied customers in a service situation. Employees are more satisfied with their job and feel better about themselves, so they will treat customers more enthusiastically. They can be a valuable source of new ideas and they are instrumental in creating good word-of-mouth referrals and increasing customer retention (Eloranta & Turunen 2015: 394-425; Grönroos 2007: 402).

Shostack (2007) claimed that, in service design and planning, modular models and service blueprints encourage creativity and promote pre-emptive problem-solving and well-controlled implementation. A refined service blueprint can be distributed

and implemented at any number of sites and acts as a tool for service innovation and development (Shostack 2007: 63).

In developing an individual service to a market, three levels of service concept have been distinguished: core service (essential benefit or service), perceptible service (personnel, quality, service time, waiting time, supporting equipment, packing and labelling) and augmented service (follow-up services, warranties, credits) (Kotler&Bloom 1984: 153).

2.2.5 Strategy execution and performance

Managing strategy differs from managing operations. However, both are vital and need to be integrated and linked. Operational excellence may lower costs, improve quality and reduce process and lead times; however, without the vision and guidance of a strategy, a company is unlikely to enjoy sustainable success from its operational improvements alone (Kaplan and Norton, 2008: 1). Gaps often exist between strategic high-level plans and operational execution despite the use of many available tools, such as mission, vision, values, and external and internal operative analysis tools (e.g. SWOT, Porter's five forces, resource-based views, Blue Ocean and disruptive strategy). This described execution gap is very much a reality in the studied service industry.

Kaplan and Norton (2008: 8) formulated a management system for integrating strategy planning and operational execution using six major stages (see Figure 17). This system is a basic tool and framework for a strategy plan and includes execution processes, updates and adaptations. Their book presents practical ideas for implementing these six stages (Kaplan&Norton 2008: 9-18).

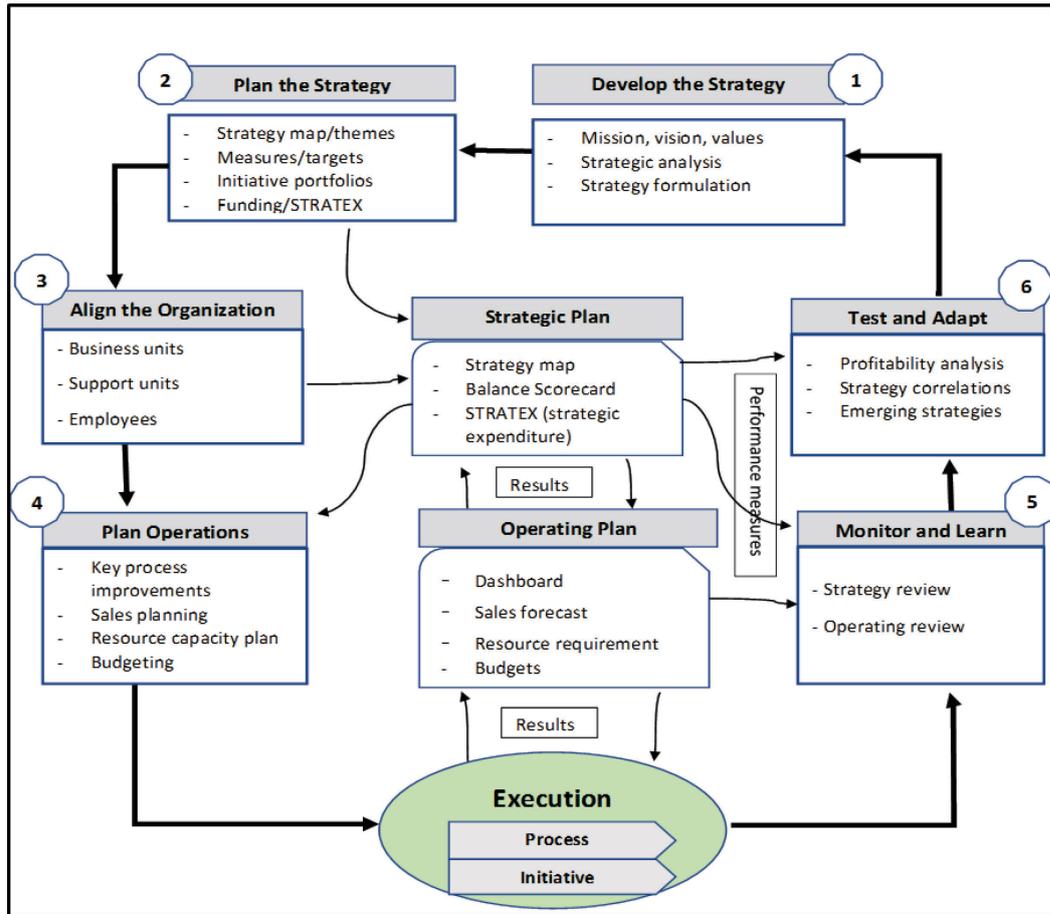


Figure 17. The management system: linking strategy to operations (Kaplan & Norton 2008: 8)

The Blue Ocean strategy defines three Es, which depict mutually reinforcing elements and principles for a fair strategy process: (1) engagement – involving individuals in strategic decisions by asking for their inputs and refuting ideas and assumptions, (2) explanation – everyone involved understands the basics of the strategic decisions and (3) expectation clarity – after a strategy is set, managers state clearly the rules of the game. These three E principles and criteria collectively lead to a fair judgement of the process (Kim & Mauborgne 2005: 175-176).

Nilson, Martin and Powers (2011: 147-156) summarized five traits to effective strategy execution:

- Everyone has a good idea about the decisions and actions for which he or she is responsible.
- Important information about the competitive environment reaches headquarters quickly.

- Once made, decisions are rarely second-guessed; clarified decisions, rights and responsibilities.
- Information flows freely across organizational boundaries.
- Field and line employees usually have the information they need to understand the bottom-line impact of their day-to-day choices.

10 issues to tackle are introduced when improving performance, profit and accelerating growth to making the company a vibrant and joyful place to work (Connors, Smith and Hickman 2004: 199). These most threatening unresolved organizational issues are poor communication, people development, empowerment, misalignment, entitlement, work and personal life imbalance, poor performance, senior management development, cross-functional strife and 'programitis'.

Sinek (2009: 6) claimed that great leaders are able to inspire people to act. Those who are able to inspire give people a sense of purpose or belonging that has little to do with any external incentive or benefit to be gained. The role of the leader is to create an environment in which great ideas happen and great companies give their people a purpose or challenge around which to develop ideas (Sinek 2009: 99-100). Passion comes from feeling that you are a part of something you believe in, something bigger than yourself. Vision is the public statement about *why* the company exists; it is the vision of a future that does not yet exist. The mission statement is a description of the route, the guiding principles of *how* the company intends to create that future. In the organization, *why* types are focused on the things most people cannot see, such as the future. *How* types are focused on things most people can see and they tend to be better at building structures and processes and getting things done. Those who know *why* need those who know *how* (Sinek 2009: 140). *Why* and *how* actions are followed by *what*, which has to align with them. *What* actions can be changed with time when needed, but never *why* (Sinek 2009: 155). When people know *why* you know *what*, they are willing to give you credit to execute targets (Sinek 2009: 201). Leadership requires two things: a vision of the world that does not yet exist and the ability to communicate it (Sinek 2009: 228).

The future of business is largely formed by the present management's performance in four areas: appropriating capital, people decisions, innovations, and strategies versus performance (Drucker 1980: 68-71). Drucker (1992) summarized five simple measurements for business performance to control its execution: firstly, measure whether the market is going up or down and whether the improvement is in the right markets. Secondly, measurement of innovative performance, which

refers to whether the company's achievement as a successful innovator in its markets is equal to its market standing. Thirdly, productivity measurement, which relates the input of all major factors of production – money, materials, people – to the added value they produce. Each factor has to be measured separately. Fourthly, measurement of liquidity and cash flow – a business can run without profits for many years provided it has adequate cash flow; however, the opposite is not true. Finally, a business's profitability, which shows the capacity of a company's resources to produce profit, excluding profits and losses from non-recurring transactions and overhead-cost allocations (Drucker 1992: 264-266).

Several academics have explored quality and profitability, customer satisfaction and production reliability in service businesses and their relationships (Kostama&Toivonen 2011: 350). The financial limitations imposed on quality improvement have been measured (Kano et al. 1984). Porter (1985) argued that achieving cost leadership and product differentiation simultaneously is not possible since differentiation is normally costly.

The basic economics of service production comprise the concepts of productivity, profitability, efficiency and effectiveness (Djellal & Gallouj, 2008, Sundbo & Toivonen 2011: 352). In service industries, the produced output may be difficult to measure in quantitative terms. Therefore, they suggested that profitability is the perspective best suited to the economic analysis of services and that applying a managerial accounting methodology would be effective. Kaplan and Cooper (1998, Sundbo & Toivonen 2011: 352) developed a sophisticated accounting procedure called the 'Activity-Based Costing' (ABC) model (Figure 18). This model is the sum of the costs of all traceable activities/business processes related to services, which include capital investment, variable costs, variable labour costs, overhead costs and revenue (including costs relating to new service innovations and development).

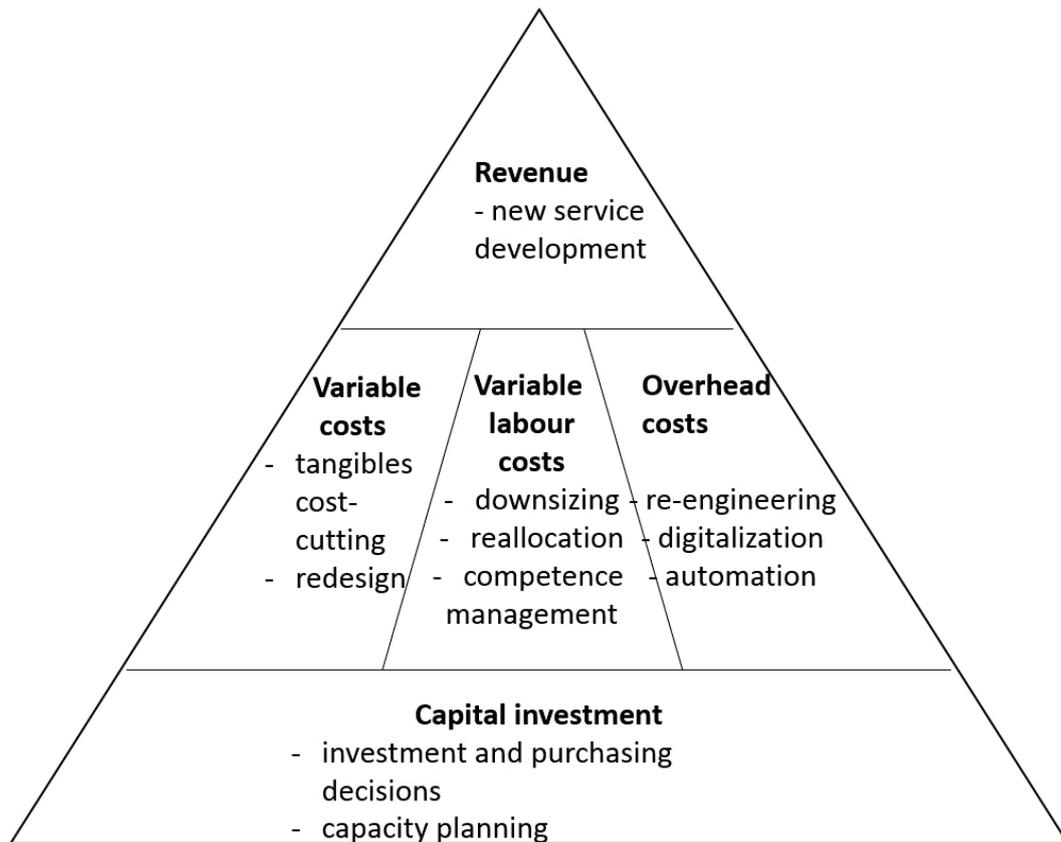


Figure 18. The Active-Based Costing (ABC) model (Sundbo & Toivonen 2011: 352).

Connors et al. (2008) discussed getting results through individual and organizational accountability. They introduced the 10 most threatening unresolved organizational issues: poor communication, people development, empowerment, misalignment, entitlement, work and personal life imbalance, poor performance, senior management development, cross-functional strife and 'programitis'. They briefly explained the meaning of each issue and offered solutions. As an example, they advised confronting poor performance in a precise, constructive and supporting way and accepting constructive feedback daily. Regarding 'programitis', they stated that there are too many managerial 'isms', which are proposed to solve 'all' problems easily without hard evidence and accountability (Connors et al. 2008: 197-198).

Kotter (1996:21) introduces an eight-stage process to carry out successful organizational transformation and implement a strategy and necessary changes: (1) establish a sense of urgency, (2) create a guiding coalition, (3) develop a vision and strategy, (4) communicate the change vision, (5) empower broad-based action, (6) create short-term wins, (7) consolidate gains and produce more change and (8) anchor new approaches in the culture.

2.2.6 Outsourcing models

Organizations worldwide are looking for new approaches to maintain or develop CA. Outsourcing can be such an approach (Campbell 1995: 18-24). Two strategic ways to develop CA are (1) concentrate the organization's resources and investments on what it can do best – its core competences; and (2) outsource all other activities for which the company has neither a strategic need nor a special capability. Considerable research has given reasons for business outsourcing, such as cost efficiency, relieving the balance sheet, better quality, removing fixed costs, more flexible and available resources, better competences and workforce motivation (Lehikoinen & Töyrylä 2013: 21-26).

There are two main alternatives for outsourcing: (1) Business Process Outsourcing (BPO), such as financial management, cleaning, safety and security and (2) outsourcing assets, such as IT services and catering.

Recently, a typical business transformation has involved separating the service business from the production business. By building a well-functioning service organization and developing the metrics needed by the service organization, the need to measure customer satisfaction, employee satisfaction and business success were applied. A strong initiative to improve the efficiency, quality and delivery time of the services provided and the creation of additional services has resulted in supplementing the service offering and transferring a customer service offering to a single organizational unit. The first difficulty in this transition is the cultural change for a product-centred organization to become service-oriented. The economics of the service business are different from the economics of the product market and the business focuses the value proposition on the end user instead of on product efficiency (Oliva & Kallenberg 2003). By being less visible, services are more labour-dependent and much more difficult to imitate, thus becoming a sustainable source of CA (Heskett, Sasser & Schlesinger 1997).

Kumar and Kumar (2004) gave typical examples of outsourcing concepts which included partial outsourcing or contracting specialized maintenance tasks, full-service contracts and purchasing of functions rather than products. These alternatives require different strategies and organizational actions on the customer side (2004: 310-319).

The firm must have a clear service strategy and purpose for enhancing its service offering. The firm has to decide whether it is a strategic repositioning to support increased product and spare part sales, or whether it is a part of the change in the firm's business model from manufacturing to a service provider. Although the service organization is most likely the key entity, it forms only a part of the service

function; other organizational entities are seen as part-time service functions (Kowalkowski 2011: 484-492). Figure 19 presents the outsourcing process (Lehikoinen & Töyrylä 2013: 43).

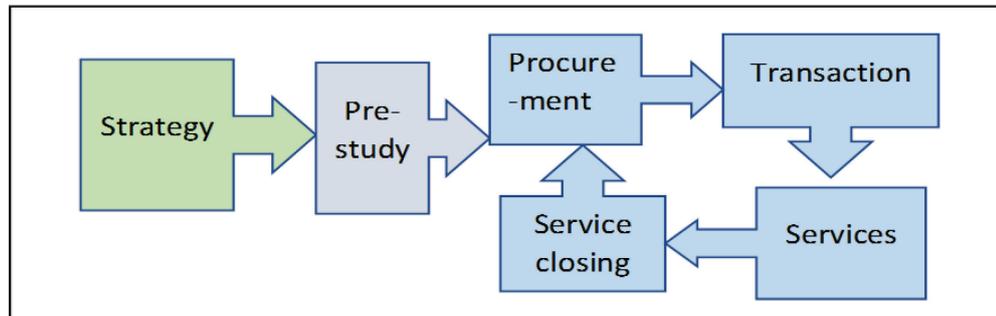


Figure 19. Outsourcing process (Lehikoinen & Töyrylä 2013: 43).

Keränen and Lehtiö examined the practical challenges involved in maintenance outsourcing and found that, compared to a totally internal maintenance service model, the outsourced model comprises three different business units: (1) the customer's own business, (2) a common service contract-based business and (3) the service provider's own business. This presented set-up creates more complexity and requires joint alignments in operations and new contract structures. There are also many slow-moving intangible, organizational structures, which slow down the change processes. Additionally, considerable communication is needed within and across partners (Keränen & Lehtiö 2010: 24-31). Outsourcing also increases operational complexity and service company internationalization trends have increased multiculturality. Outsourcing also emphasizes the need for increased communication and co-operation capabilities (Keränen 2009).

2.2.7 Digitalization/Internet of Things

Digitalization has three impacts on the economy: firstly, physical products are converted to digital services to reduce costs; secondly, digital platforms increase efficiency and can transform local businesses into international businesses and thirdly, digitalisation improves the efficiency of traditional production (Koistinen-Jokiniemi et al. 2017: 2).

Digitalization and its resulting opportunities are a hot topic in industry as a whole and in the industrial service business. The digital transformation occurs in four levels: digital data, automation, connectivity and digital customer access. Digital

data can be used for predictive maintenance, demand forecasting and data-based routing. Examples of automation include robotics, additive manufacturing, autonomous vehicles and reduced production costs. Connectivity refers to synchronising logistic chains, shortening process delivery times, and implementing cloud computing and remote maintenance. Digital customer access supports transparency and co-operation (Helaakoski 2015). Helaakoski explained that to prepare for digitalisation, a firm should analyse the digitalization trends in its industry, analyse its digital capability and competences, and make a digital transformation action plan.

The information that can be accumulated and collected through digitalization (including big data) will enable completely new services and business concepts to be placed on the market. In such a situation, it is important to prepare for structural changes in service business that may be much more dramatic than those in the manufacturing industry (TEM 2015: 21). Many service markets are changing from local to global. This change will affect service producer's value chains; however, its impact and timing are hard to predict (TEM 2015: 45).

Martinsuo and Kärri (2017: 10-12) gave a comprehensive presentation of industrial examples of digitalization and Internet of Things (IoT) solutions in the maintenance of power plants and the process industry utilizing modern sensors, big data analysis and communication technology in Finnish industry. Many activities are ongoing widely in industry.

2.2.8 Service ecosystems - platform economy

Many manufacturing companies have responded to global competition and commoditization by servitizing, which refers to changing the business focus from manufacturing to service provision. The strategic role of technological resources is decreasing and moving towards a systemic perspective in economic actors interacting through institutions, technology and language to co-produce service offerings, engage in mutual service provision and co-create value (Vargo and Lush 2010: 181-187). Academics have recently given more attention to service ecosystems, as defined above; however, industrial experiences are limited, especially in the industry service business surveyed herein. Eloranta (2016) concluded that in the manufacturing business servitization and digitalization are now facilitating rapid changes. Service-driven manufacturing is moving towards a systemic perspective in the service business. The strategic role of technological resources in solutions is decreasing and complex socio-technical relationships are preferred. Service networks are seen to hold strategic potential. Furthermore,

platforms are identified as potential offerings and organizational structures for addressing the new strategic requirements (Eloranta 2016: 53).

The platform economy has emerged as the winning productivity solution in the present decade. The key idea is that value added and, most importantly, the competence and knowledge accumulated will accrue to the owner of a platform. Platforms compete in a global market, crossing national and international borders. Work, management and business logic will all change in one way or another (TEM 2015: 15-16). The starting point of a platform economy is that a techno-economic service platform is connected to a set of ecosystems, the most important of which are the ecosystems of users and application developers. This entity functions based on SDL and accumulates value for the owner of the platform, interacting with the ecosystems. In an ecosystem, no one operates alone. The end result is a service that is more than the sum of its parts (TEM 2015: 115).

The value chain business model and/or strategy, herein called a pipeline business, create value by controlling a linear series of activities. Inputs at one end of the chain (materials from suppliers) undergo a series of steps that transform them into an output that is worth more – the finished product. The move from a pipeline business model to a platform business model involves three key shifts: from resource control to resource orchestration, from internal optimization to external interaction and from a focus on customer value to a focus on ecosystem value. These three shifts make it clear that competition is more complicated and dynamic in a platform world. Porter's five competitive forces are still applicable, but these forces behave differently, and new factors come into play to manage them. Executives must pay close attention to the interactions on the platform, participants' access and new performance metrics (Van Alstyne et al., 2016:3).

The driving force behind the Internet economy is the demand-side economies of scale – the network effects. New technologies create efficiencies in social networking, demand aggregation, app. development and other phenomena that help networks expand. In pipeline businesses, the five forces are relatively well defined and stable, but in platform businesses, these boundaries can shift rapidly. For example, consumers and producers can swap roles (e.g. Airbnb, Uber). Because platforms require new approaches to their strategy, they also demand new leadership styles, and new competences are needed to design, govern and expand the platforms (Van Alstyne et al. 2016: 7-8).

Although pipeline firms have long outsourced their internal functions, such as their customer services, companies today are taking further steps to move towards orchestrating external networks that can complement or entirely replace internal functions.

Drucker (1999) introduced the phrase ‘the New Information Revolution’, which is not a revolution in technology, machinery, techniques, software or speed, but rather a revolution in concepts. It is not happening in IT or in Management Information Systems (MIS) and is not being led by Chief Information Officers (CIOs). Instead, this revolution is being led by people on whom the information industry tends to look down: accountants. This revolution started in business enterprises and with business information, but it will surely engulf all institutions of society (Drucker 1999: 97).

A platform is a business based on enabling value-creating interactions between external producers and consumers. The platform provides an open, participative infrastructure for these interactions and sets governance conditions for them. The platform’s overarching purpose is to consummate matches among users and facilitate the exchange of goods, services or social currency, thereby enabling value creation for all participants (Parker et al. 2016: 5). Platforms beat pipelines because platforms scale more efficiently by eliminating gatekeepers and unlocking new sources of value creation and supply by using a data-based tool to create community feedback loops (Parker et al. 2016: 7-12). Supply economies of scale are transforming to become demand economies of scale (Parker et al. 2016: 19). Incumbent companies can fight back against platform-driven disruption by studying their industries through a platform lens and by building their own value-creating ecosystems; pipelines are becoming platforms (Parker et al. 2016: 78).

2.2.9 Strategic agility and flexibility

Strategic agility is needed now more than ever because of the complex forces of change buffeting companies that are facing increasing demand for charting and following a steady course of growth and renewal (Doz & Kosonen 2008: 28). Authors have defined the following three key dimensions of strategic agility: (1) strategic sensitivity – both the sharpness of perception and the intensity of awareness and attention, (2) collective commitment – the ability of the top team to make bold decisions fast without being bogged down in ‘win-lose’ politics at the top and (3) resource fluidity – the internal capability to reconfigure business systems and redeploy resources rapidly.

In cases where a company has been in stagnation, regaining strategic agility requires action on four fronts: emotional, organizational, cognitive and political. It is not easy to regain; it requires systemic capability. Such strategic agility calls for more difficult top management skills and more demanding behaviours. A simple, single recommendation for rebuilding strategy agility does not exist (Doz & Kosonen 2008: 184-185).

Grantham, Ware and Williamson (2007) discussed corporate agility questions, which they summarized as more corporate agility, and less corporate real estate. The authors reviewed methods to reduce fixed operational costs by reducing the real estate footprint, reconfiguring corporate space and green building/sustainable design, choosing a location, outsourcing labour and reducing turnover costs. The authors identified eight issues a firm should address to devote its resources to the next wave of change: (1) meta forces of change, (2) public policy issues, (3) demographics dynamics, (4) geography of talent pools, (5) work process and collaboration styles, (6) social and intellectual capital metrics, (7) challenges and difficulties of managing a distributed workforce and (8) deeper understanding of barriers and sources of resistance to the new models (Grantham, Ware & Williamson 2007: 247). The industry customers studied here are operating in a natural monopoly business environment, reflecting corporate types of businesses.

Gobillot (2007) introduced the connected leader model to create agile organizations for people, performance and profit. To ensure that their organizations are resilient to context change, leaders must make them agile. Agility requires all members of an organization to be fully engaged to respond to the changes. However, a formal organization is always slow to respond to an unplanned context change. The real organization is made up of the networks of relationships people have within and outside the formal organization. Utilizing and leading the real organization towards 'formal' organization objectives demands a great leader, an ability called connected leadership. Gobillot (2007: 95) explained that the tools needed to create this agile connected leadership need to be connected through trust, aligned through meaning and sustained through dialogue, and he introduced steps to achieve the targeted 'formal' organization (Gobillot 2007: 171).

Many businesses continuously face uncertainty and meet unexpected and unplanned outcomes. In these circumstances, the strategy has to display flexibility features and be able to change direction quickly and at a low cost. Business risk analysis has to be applied. Barney (2007: 243-271) introduced many examples of how to implement business risk and flexibility analysis utilizing the VRIO model for sustaining CAs.

2.2.10 Guidance from conceptual frameworks for the studied industrial service business

The above section introduced conceptual frameworks for the service industry, which emphasized the following:

- customer proximity – a win-win approach in services and service development, and value co-creation jointly with customers
- technology and innovations have the power to influence industry structure and its CA
- empowering employees for service development
- strategy execution needs better performance – many tools were presented
- outsourcing is one tool for strategy implementation
- through FMA, an agile organization with short-term CA can be achieved, but how can it be sustained?
- IoT/digitalization modernizes service processes and creates options for new service models
- platform business value creates interactions between external producers and consumers; orchestrating an external network will be a great opportunity for service businesses in the future
- sensitivity, and capable and flexible competences to react to industry changes and opportunities – business agility

These conceptual frameworks and views have been applied to the analysis in order to answer research questions RQ1 and RQ2, such as authority/regulation requirement, customer proximity, service innovation impacts, differentiation advantages, strategy execution improvement and simple accounting method (see sections 4.7.1 and 4.7.2).

2.3 Sustainable competitive advantage (SCA) analysis methods

In the existing literature, a substantial number of business models and methods have been published that discuss the CA and SCA of companies and businesses. This section introduces the main analysis tools comprising the external and internal environment models and company performance measurements used in this study.

2.3.1 PESTEL analysis

PESTEL analysis (political, economic, socio-cultural, technological, environmental and legal) is a framework of macro-environmental factors used in the environmental scanning component of strategic management. It is a strategic tool for understanding market growth or decline, business position and potential, and the direction for operations (Wikipedia).

2.3.2 Porter's five competitive forces

Porter (1980) claimed that industry structure has a strong influence in determining not only the competitive rules of the game but also the potential strategies available to the firm. The state of competition in an industry depends on five basic competitive forces: bargaining power of suppliers, threat of new entrants, bargaining power of buyers, threat of substitute products and rivalry among existing competitors (Porter 1980: 4). Figure 20 lists some examples of items and factors in the five forces. In his book, Porter (1980) presented tools for meeting these five forces in the competition. The five forces framework explains the industry's average prices and costs and the average industry profitability that a company is attempting to beat.

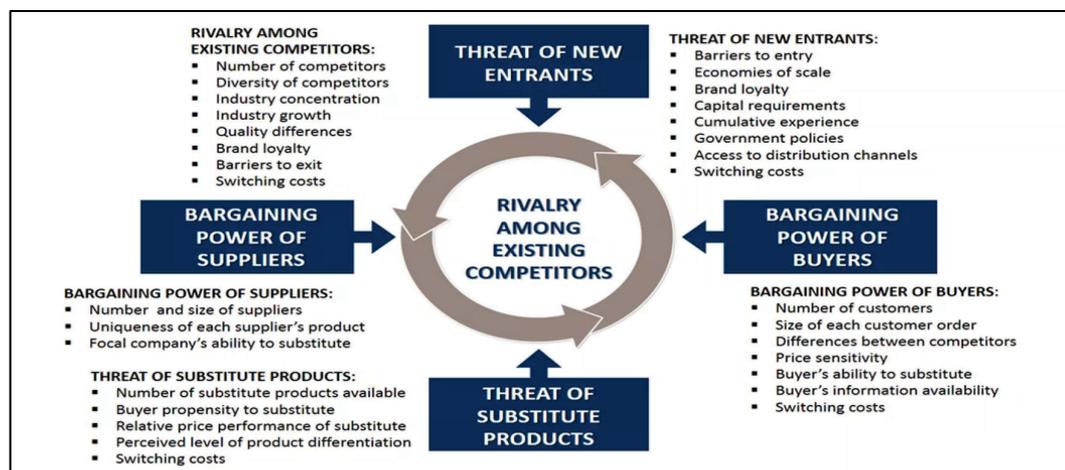


Figure 20. Porter's five competitive forces (Porter 1980:4).

2.3.3 Value Chain analysis

One way to identify resources and capabilities that have the potential for creating CA for a firm is to engage in value chain analysis (Barney 2007: 135). A firm's value chain may differ in competitive scope from its competitors, representing a potential source of CA. The relevant level for constructing a value chain is a firm's

– primary and support – activities in a particular industry (the business unit). The value chain is the basic tool for diagnosing CA and for finding ways to create and sustain it, and it has a valuable role in designing a firm's organizational structure. Identifying value activities requires isolating activities that are technologically and strategically distinct; see Figure 21 (Porter 1985: 37). Value activities and accounting classifications are rarely the same (Porter 1985: 36-39).

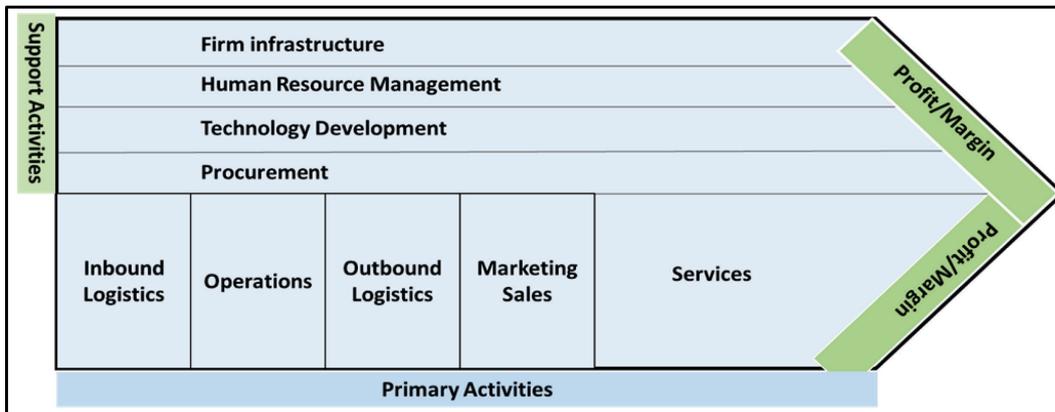


Figure 21. The generic value chain chart (Porter 1985: 37).

Value chain analysis can be applied to total systems, where many connected business partners are involved in targeting improvement of the total value. Careful attention should be paid to linkages between activities within each value chain, as well as to the activities of suppliers, distributors and customers (see Figure 22; Day 1990: 151).

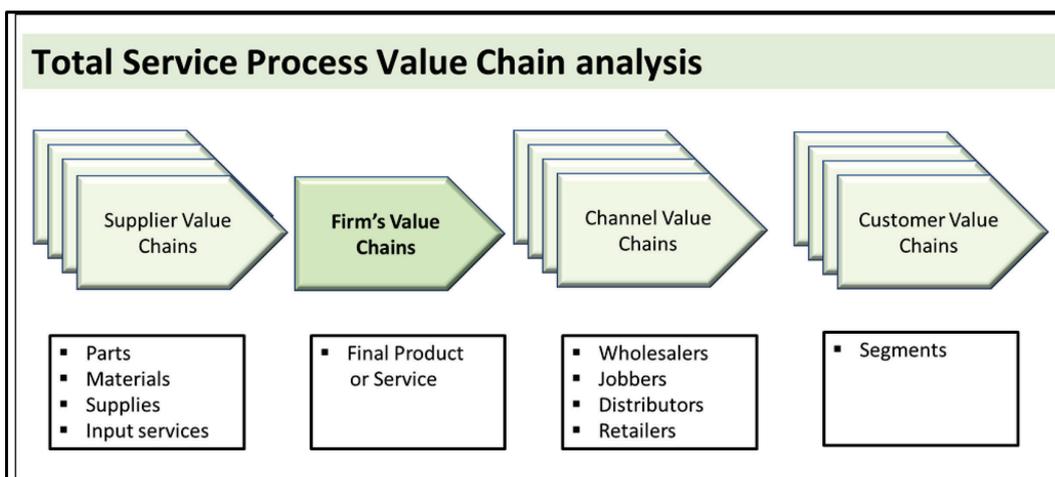


Figure 22. A system of value chains (Day 1990: 151).

Through this vertical integration process, utilizing a total value chain tool has the potential to create CAs for partners. However, many governance and

compensation policy challenges may be encountered in vertical integration processes (Barney 2007: 334; Martek, Chen 2015: 518-519).

2.3.4 VRIO resources

The relationship between resource heterogeneity and immobility and sustained CA via the VRIO model are summarized in Figure 23 (Barney & Clark 2007: 69; Knot 2014: 1808):

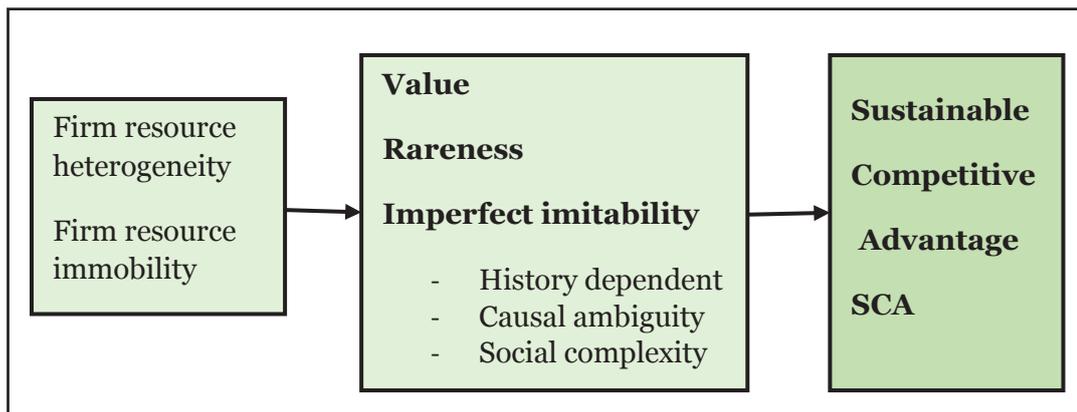


Figure 23. The relationship between resource heterogeneity and immobility (Barney & Clark 2007: 69).

The VRIO model is applied to analyse the potential of a broad range of firm resources as sources of sustained CA. Researchers also use valuable, rare, inimitable and non-substitutable (VRIN) attributes to achieve SCA by implementing value-creating strategies that cannot be easily duplicated by competing firms (Eisenhardt et al. 2000: 1105).

The VRIO framework is part of a firm's larger strategic scheme. The basic strategic process begins with a vision statement and continues with internal and external analysis, strategic choices in business and at the corporate level, and strategic implementation targeting CA in the market. VRIO is an internal analysis framework that evaluates all the resources and capabilities of a firm. VRIO is an acronym for four questions asked about a resource or capability to determine its competitive potential:

1. The question of **Value**: Is the firm able to exploit an opportunity or neutralize an external threat with the resource/capability?
2. The question of **Rarity**: Is control of the resource/capability in the hands of a relative few?

3. The question of **I**mitability: Is it difficult to imitate and will there be significant cost disadvantage to obtain, develop or duplicate the resource/capability?
4. Question of **O**rganization: Is the firm organized, ready and able to exploit the resource/capability?

A firm has two types of resources: tangible (e.g. land, buildings, machinery) and intangible (e.g. brand, reputation, culture, trademark, intellectual property, unique training system). Tangible assets are rarely a source of CA. Thus, the VRIO resources should first look at a company’s intangible assets (Barney&Clark 2007: 138-150; Grant 2008: 143-144). The VRIO process consists of four steps, as shown in Table 7.

Table 7. How to identify VRIO Resources (Grant 2008:143, Barney & Clark 2007: 70, adapted by Kontu)

Step 1	Identify VRIO resources	Cost and differentiation advantages VRIO questions, Value chain, SWOT
Step 2	Find out if your company is organized to exploit these resources	Do you have an effective strategy, an effective motivation and a reward system, do you have the excellent management and control systems
Step 3	Protect your resources	By all possible means, top mgmt has to be aware of such VRIO resources, which can lower the costs and/or differentiate products or services. Ideas how to make it more costly to imitate?
Step 4	Constantly review VRIO resources and capabilities	The value of resources changes over time – review is needed constantly

When the valuable resources have been identified, the VRIO test can be applied as shown in Figure 24 (Rothaermel 2013: 91). After all the selected valuable resources have been analysed, the firm can make conclusions about which resources and/or capabilities create SCA.

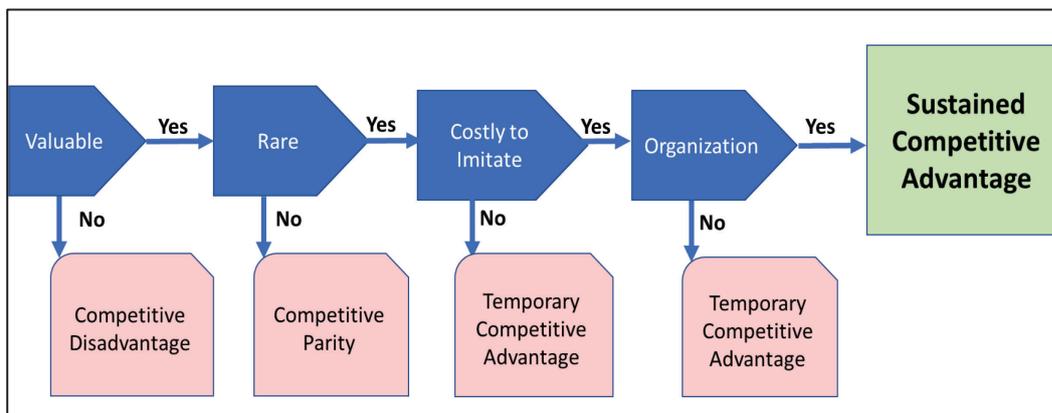


Figure 24. The VRIO framework (Rothaermel 2013: 91).

2.3.5 SWOT analysis

A SWOT analysis is a strategic planning technique used to help identify strengths, weaknesses, opportunities and threats related to business competition or project planning. SWOT identifies both internal and external factors that are favourable and unfavourable for achieving the given objectives; see Figure 25.

Strengths and weaknesses relate to internal aspects, while opportunities and threats commonly focus on the external environment (Andrews 1971; Hofer & Schendel 1978).

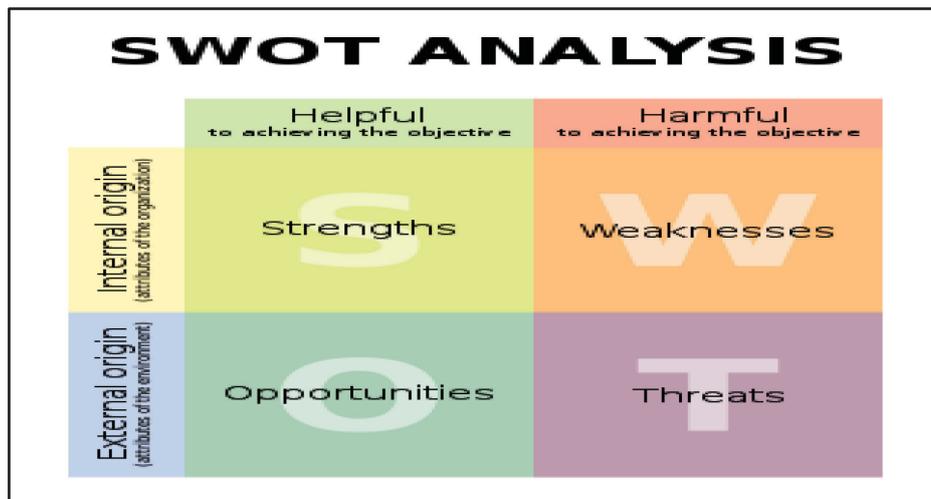
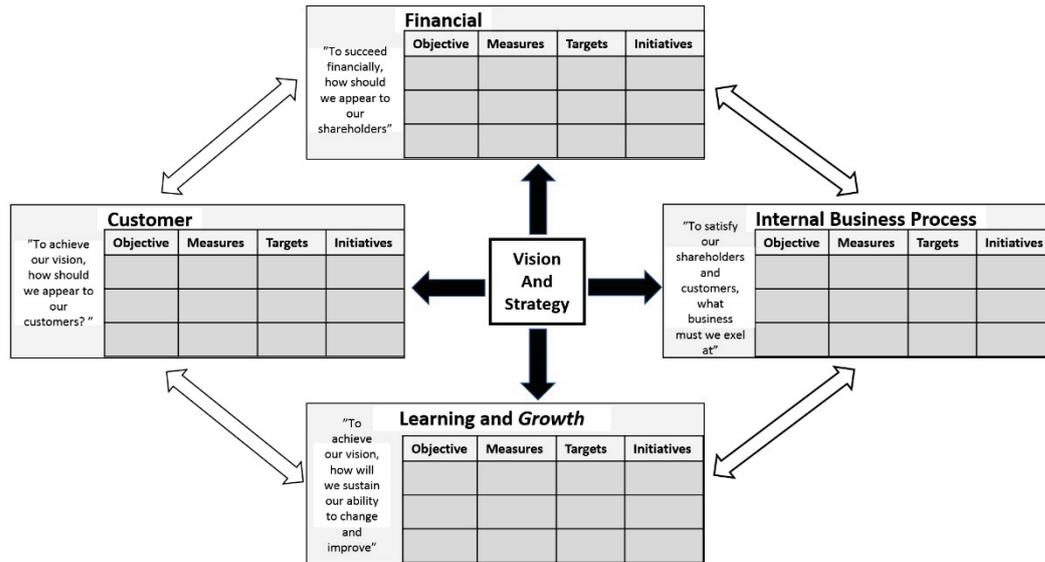


Figure 25. The SWOT analysis matrix (Andrews 1971).

2.3.6 Balanced Scorecard (BSC) framework

The BSC complements financial indicators of past performance with indicators of drivers of future performance. The objectives and indicators of the BSC derive from an organization's vision and strategy. The BSC measures organizational performance from four perspectives: financial, customer, internal business process, and learning and growth. Each one has four dimensions: objectives, indicators, target and incentives. The BSC provides a framework with which to translate a strategy into operational terms; see Figure 26 (Kaplan & Norton 1996: 9).



Adapted from The Balance Scorecard by Kaplan&Norton

Figure 26. The Balanced Scorecard framework (Kaplan & Norton 1996: 9).

The BSC accomplishes critical management processes by, firstly, clarifying and translating the vision and strategy; secondly, communicating and linking strategic objectives and indicators; thirdly, planning and setting targets, and aligning strategic initiatives; and fourthly, enhancing strategic feedback and learning (Kaplan & Norton 1996: 10). The identified generic BSC indicators are as follows: financial, return on investment and economic value added; customer, satisfaction, retention, market and account share; internal, quality, response time, cost and new product introductions; learning and growth, employee satisfaction and information system availability (Kaplan & Norton 1996: 44). The authors (1996: 193) identified the following barriers between strategy formulation and its implementation: (1) vision and strategy that are not actionable; (2) strategies that are not linked to departmental, team and individual goals; (3) strategies that are not linked to long- and short-term resource allocation and (4) feedback that is tactical, not strategic.

2.3.7 Growth-share matrix

The growth-share (GS) matrix (Hamermesh 1986: 13; Ansoff 1965: 176), also known as the BCG (Boston Consulting Group) matrix, is a chart to help corporations analyse their business units by ranking the business units (or products) based on their relative market shares and growth rates. The business units are divided into four categories: (1) cash cows, where a company has high market share in a slow-growing industry; (2) dogs, which are units with low market share in a mature, slow-growing industry; (3) question marks, which are

businesses operating with low market share in a high-growing market and (4) stars, which are units with a high market share in a fast-growing market (see Figure 27).

According to Henderson (1980), the creator of the GS matrix, to be successful, a company should have a portfolio of products with different growth rates and different market shares. The portfolio composition is a function of the balance between cash flows. High growth products require cash inputs to grow. Low growth products should generate excess cash. Both kinds are needed simultaneously (Henderson 2013).



Figure 27. The growth-share (GS) matrix (Hamermesh 1986: 13).

2.3.8 Activity system map

An activity map is a diagnostic tool that is used to identify an organization's CA. It connects an organization's value proposition to the activities of the organization, thus enabling the company to deliver the value proposition better than its competitors. The interlinkages highlight the difficulty for competitors to copy the organization's strategy because a competitor would have to match these in multiple different areas at the same time; see the example in Figure 28 (Porter M. E. 1996:73).

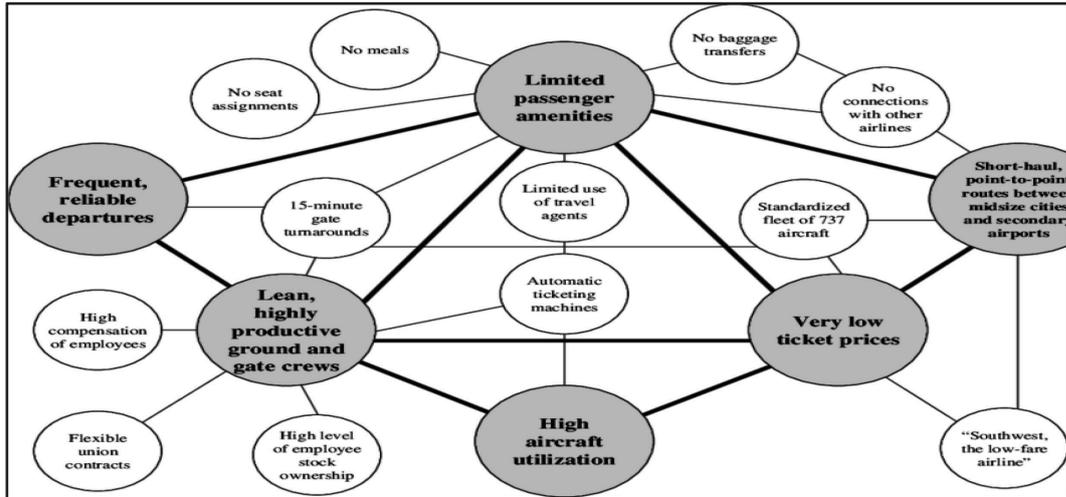


Figure 28. Example of an activity system map (Southwest Airlines, Porter M. E. 1996: 73).

2.3.9 Must-win battles

The must-win battles (MWB) concept refers to the three to five key battles that an organization absolutely must win to achieve its key objectives. MWB is a shortlist, so it is disciplined and tough. A well-chosen MWB has the following five characteristics: an MWB should (1) make a real difference; (2) be market-focused; (3) create excitement – real challenges create real energy; (4) be specific and tangible – ‘we must be innovative’, ‘get closer to customer’ or ‘reduce costs’ are not useful and (5) be winnable. An MVB journey is an ongoing process, during which two things happen simultaneously. One is that the team learns to behave as a team, with shared objectives and a common agenda. The other is that MWBs are identified, fought and hopefully won (Killing et al. 2005: 3-8). Existing research has presented many tools and processes applied during the MWB journey, such as defining battles, engaging teams, motivating organizations and creating SCA. According to previous research, it is difficult, in short, to create SCA. A better objective in today’s world is often to create renewable CA. However, Killing et al. believe that the MWB journey can be used to create a real SCA. Through the creation of a management team that truly functions as a team, SCA can be achieved (Killing et al. 2005: 24).

2.3.10 Accounting measurement

Firms have CA when they generate more economic value than their rivals (Barney 2007: 17-18). ‘Economic value is simply the difference between the perceived

benefits gained by a customer who purchases a firm's products or services and the full economic cost of these products or services. The difference between a firm's and its rivals' economic value is the size of the firm's competitive advantage' (Barney 2007: 17-18).

This definition is simple, but it is not so easy to measure the size of the competitor's CA because the perception of customer and service provider benefits are often complicated to measure as are the total production costs of the services. Barney (2007: 20) proposed two accounting measurement tools, simple accounting and adjusted accounting methods. The simple accounting method is mostly used when a firm's financial data are readily and publicly available. The adjusted accounting method is applied to more sophisticated financial data such as return on invested capital (ROIC), economic profit (EP), market value added (MVA) and Tobin's q (Barney 2007: 24-40).

Simple accounting applies various accounting ratios such as growth, profitability, cash flow, liquidity and solvency ratios (Barney 2007: 20; Ikäheimo et al. 2011: 61), which are used in the present study.

2.3.11 Guidance for applying SCA analysis methods

Table 8 summarizes how the SCA methods presented in section 2.3 can be utilized and applied in the evaluation of the research questions.

Table 8. Sustainable analysis methods applied in the Research Questions.

Methods	RQ1	RQ2	Comments
PESTEL	Environmental	Environmental	Understand industry environment
Five competitive forces	Must	Good to know	Understand industrial connections
Value Chain analysis	Must for VRIO	Must	Cost structure and connections
SWOT	Must for VRIO	No needs	Understand position
VRIO resources	Must	Must	Core awareness of competences
Balanced Scorecard	Must	No needs	For performance and execution
Growth and Share matrix	Good to know	No needs	For strategy/business selection
Activity system map	Good to know	Good to know	For business plan
Must win battles MWB	Good to know	Good to know	Interesting approach – should test
Accounting measurement	Must	Must	Basic tool (simple accounting) for knowing profit bases

RQ1: What methods and tools can be used to create sustainable competitive advantage and enablers for the industrial service business?

RQ2: Is there a conflict between service providers and customers in terms of sustainable business targets, and can a win-win position be found?

Sections 4 and 5, the empirical results, the discussion and conclusion sections discuss in greater detail how these sustainable analysis methods have been applied and utilized in the present research.

3 METHODOLOGY AND DATA SETS

3.1 Data collection methods

For this study, data were collected from industrial service businesses from three target groups: customers (electrical and telecom network customers), representatives of the service industry and industrial service companies. The data collection methods used were publicly available data (annual and financial reports etc.), three questionnaires (17 customer companies, 19 service companies, one industry union, four senior experts/consultants), and eight in-depth management interviews. All three questionnaires comprised 56 detailed questions including 330 sub-questions. In total, 60 individual questionnaire replies were collected. The collected data sets give a comprehensive picture of the industrial service business in Finland, covering about 70% of the total service industry. All questionnaires and received replies were documented and filed by the researcher.

3.2 Data sets

The data sets comprised data and information collected from selected network customers, service industry representatives and service companies, the content of which is described below.

3.2.1 Customer data sets

The customer survey covered 70% of electrical network customers (total turnover € 850 million, 800 employees) and 35% of telecom network customers (total turnover € 1,600 million, 5,400 employees) in Finland. Questionnaires (Appendix 1.1) were sent to 15 electrical and three telecom network companies and to three consultants. The questionnaire included 21 detailed questions with 110 evaluation sub-questions. The questionnaires were sent to customers in advance and discussed with 25 respondents face-to-face. Because of management changes during the survey period, two to three answers were received from three of the companies. In addition, four in-depth interviews were conducted with top managers from the network company. The aim of the interviews was to obtain detailed information about customer experiences, the future targets of this service industry transformation and development plans.

Customers' replies to four questions are presented as an example in Appendix 1.2.

3.2.2 Service industry data sets

The questionnaire for the industrial service business were collected from 18 service companies and four individuals or the industry union that specialized in this business. The questionnaire comprised 14 questions with 70 sub-questions. Examples of questionnaire questions and their replies are presented in Appendix 2.1. The survey utilized the 'Monkey Survey' software tool and the questionnaire was distributed via email. The aim was to collect information about how service companies view the service industry development during the studied period and its future developments.

3.2.3 Service company data sets

For this survey, Balance Consulting Oy/Valor Partners Oy reports and published annual reports and financial statements were utilized for financial data collection. Key financial data sets were obtained from 13 network and two industrial service companies (revenues, operational profit/EBITDA, investments), as shown in Appendix 3.1. Operational and performance data for 10 industrial network service companies were collected from public annual reports published between 2006 and 2017, see Appendix 3.3.

The questionnaire, which covered 70% of the total business sector studied (total turnover €1,500 m, 8,600 employees), was sent to 19 service companies and 18 responses were received. The questionnaire comprised 23 questions and 150 sub-questions. Examples of the questionnaire questions and replies are presented in Appendix 3.2. This survey also used the 'Monkey Survey' software and the questionnaire was distributed via email. The aim of the survey was to acquire information about the company's actions and future targets in the studied industrial service business development during the last two decades. Face-to-face in-depth interviews with management representatives from four service companies were conducted based on the questionnaire. The target of the interviews was to explore and understand more of the company's actions in this service business transformation.

3.3 Data analysis methods

Mixed qualitative and quantitative analysis methods were used in the study. Qualitative analysis was applied in the in-depth interviews and partly in the questionnaire analysis relating to opinions, transformation influences, future views and operational and performance analysis of annual reports. Quantitative

analysis was used in the financial analysis and in analysing some of the questionnaire questions related to satisfaction with outsourcing, future service models, evaluation criteria of service companies, what creates SCA in an industrial service company, the best tools and means to achieve CA and the future means of developing SCA in the company. The selected time horizon of this survey is cross-sectional, covering the service industry extensively.

Responses to all three questionnaires were collected, analysed and summarized question by question. Section 4 presents the raw database and summarized results. A similar analysis process was applied to the in-depth interviews. A summary of the replies to a few selected questions, which are essential to the research questions, is attached in the Appendices (customer survey in Appendix 1.2, industrial service business in Appendix 2.2, industrial service companies in Appendix 3.2 and in-depth interview summary in Appendix 3.5).

Financial data were collected from annual reports and published financial account statements supported by other reports (Balance/Valor). For the targets of this study, SCA analysis was selected based on the company's annual revenues/growth, operational profit/ EBITDA % and annual investment data. Some financial cash flow analysis was also applied.

Based on the results of the questionnaire summary, the financial analysis results and operational performance information were analysed and summarized to provide the research results and the answers to the research questions presented in section 4.

All results were analysed and are reported anonymously without company or respondents' names. This anonymity was promised to the respondents in the questionnaire to encourage more open and honest replies.

3.4 Applied competitive analysis methods

To evaluate the CAs and SCAs of the service industry companies, the following analysis methods, processes and techniques were selected: PESTEL analysis, Porter's five forces, SWOT analysis, value-chain analysis, VRIO resources and the simple accounting method (see Table 9). The analysis methods applied by the service companies in their business development and operative functions are described and an evaluation and consideration of their impacts on performance are given in the discussion of RQ1 and RQ2, see details in section 4.

Table 9. Applied CA analysis methods

External environment	Internal Environment
PESTEL	VRIO resources
Porter five forces	Value-chain analysis
SWOT (Opportunities, Threats)	SWOT (Strengths, Weaknesses)
	Simple Accounting method

3.5 Reasoning

Deductive reasoning constructs range from a set of general arguments to a more specific conclusion, and the consequence has to follow analytically from those grounds (Ketokivi & Mantere, 2010). In deductive reasoning, it is typical that the original truth will last (Metsämuronen 2009: 412). In this study, the hypothesis tests are based on deductive logic. For example, in this study, the analysis for RQ1 first stated strategy theories and then deduced the CA and SCA frameworks and further applicable tools from them, finally focusing on empirical concepts and measurement.

Inductive reasoning constructs move from specific arguments to generalizations. Inductive reasoning combines observation and explanation to infer rules and thus moves from the particular to the general (Ketokivi & Mantere, 2013: 71). The survey results showed that the network regulation rules in a natural monopoly business environment create a low-profit service business and limited win-win and joint co-operative business models with customers. Can an inductively theoretical model be created for this business behaviour and phenomena?

In abductive reasoning, one begins with the rule and assesses whether it accounts for the observation (Mantere & Ketokivi 2013: 71). Mantere and Ketokivi explained that we predict, confirm and disconfirm through deduction, we generalize through induction and we theorize through abduction (Mantere & Ketokivi 2013: 72). In this study, abductive reasoning is applied to service innovation. The theories strongly support service investments and innovations for business success, but the surveyed companies had limited service development investments, which could be the reason for their low margins/profits and cash flow challenges. Which of these two phenomena comes first – lack of innovations leading to low profit or the other way round?

4 EMPIRICAL RESULTS

The research results are presented and analysed in three categories based on customers, service industry business and service company questionnaires, including in-depth interviews. The list of questions in the questionnaires are presented in Appendices 1–3. The responses were collected question by question and summarized as tables. Responses of relevance to the research questions are included in the dissertation appendices.

4.1 Customer survey

The analysis of the customer survey results presented above is summarized below:

- Service outsourcing has created remarkable and immediate efficiency improvements/cost reductions over the past 5–10 years; 20–50% of companies and customers expect that price levels will continue to decrease.
- Network companies are very satisfied with outsourcing, and satisfaction clearly improved compared to the beginning of the outsourcing phase, with ratings increasing from 2.5/5 to 4/5 (see Figure 29 and Appendix 1.2). A service market has been created, and it works reasonably well. There are many competing service providers. This is the case in network engineering, construction, operation and maintenance as well as automatic metering reading (AMR) services. However, customers are not satisfied with network control room services, although there were not many responses regarding this. Customers do not show any interest in discharging the outsourced service, and they are increasingly developing their operational functions towards the roles of asset owner and manager.

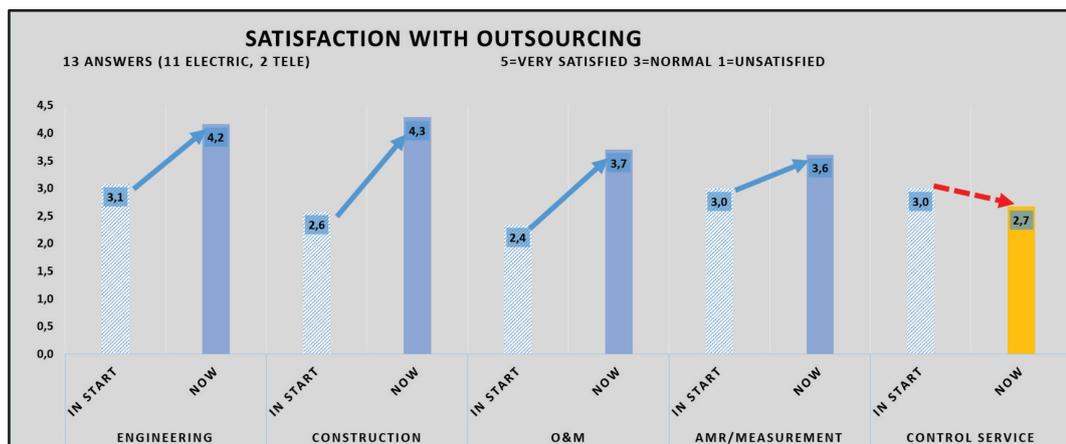


Figure 29. Satisfaction with outsourcing.

- Authorities have a key role in this transformation, and their requirements have created efficiency. Customers did not report many claims against them.
- There is a unanimous expectation of greater outsourcing and larger service packages for service providers in the future. New business models are also of interest, such as alliance (Nordström 2017) and networking business models, and digitalization is seen as a core enabler. However, customers do not see financial packages as a necessary part of the services, and consolidation development is expected (see Table 10).

Table 10. Future service models and needs.

Future service models and needs			
Question	Yes	No	Comments
Outsourced services increase (14)	15	0	
Longer service contract duration (15)	10	6	
Bigger service packages (14)	15	2	In future less unit prices, more asset management roles
More networking service models (12)	15	0	
Financial packages included (15)	8	7	Today not available, regulation model guarantees funding
Life cycle solutions/model (14)	10	4	
Alliance model (12)	8	5	
IoT/more digitalization (15)	16	0	Creates opportunities, Data hub will change grid operators
Consolidation of network companies (14)	9	4	Regulations do not support this, operative co-operation, efficiency, competence requirements, data hub can drive consolidation

- The most important evaluation criteria for service providers are price (80–90% in the majority of responses), quality, competence, safety and reliability, whereas local, Finnish, company, solvency and language were of minor importance (see Figure 30).
- Network companies do not see significant risks in service providers; they trust that the market works. Both customers and service providers feel that the service companies part of the energy group restricts service market development. This statement was almost unanimous (see Figure 31). Network companies responded that they are also responsible for service providers' wellbeing and future. Some customers are concerned that there is a risk of decreasing competence and the retirement of experts.

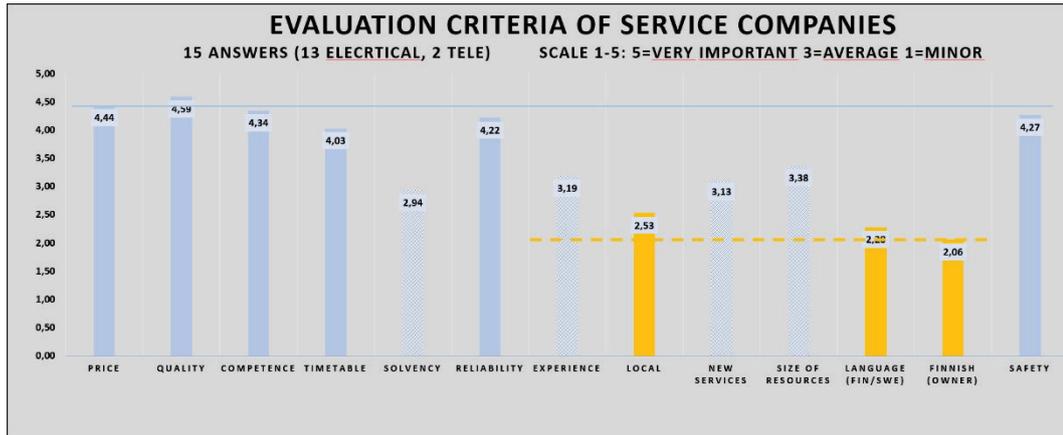


Figure 30. Evaluation criteria of service companies

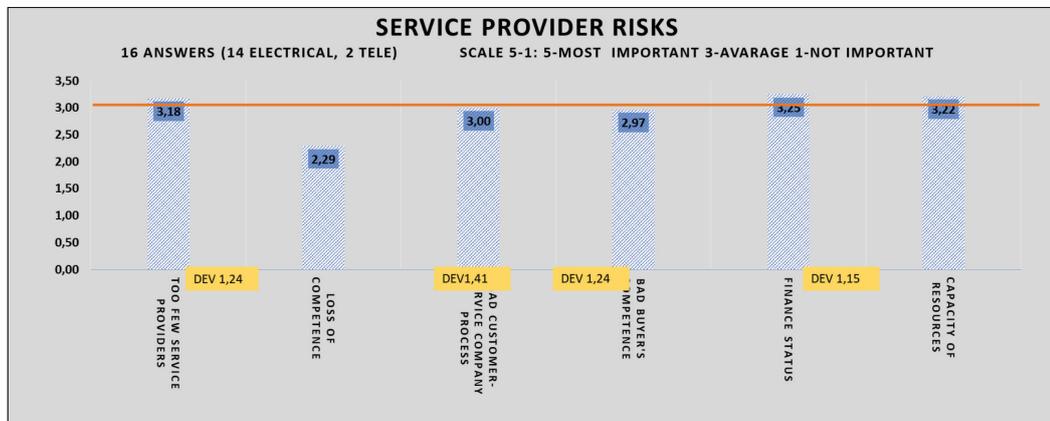


Figure 31. Service provider risks.

Customer replies indicate that they do not see any conflict between operational and quality requirements and targets against service providers. However, there are some conflicts between financial targets, which is normal in buyer–seller relationships and situations. Both parties must live in the market world and its rules (see Appendix 1.2).

4.2 Industrial service business survey

The industrial service business and market have changed and developed over the past two decades, as shown in Table 11.

Table 11. Industrial service market development during 2000 – 2017

Before 2010	2010-2014	2015-2017
Separation of networks into independent companies	Tight competition	Hard competition More new players
Outsourcings	New players	Growth services
Service market development	Profitability challenge	Growth in digitalization
Competition started	Weatherproof networks – new investments	Consolidation, internationalization
International competition	Bigger volumes – more efficiency	Bigger contract packages
Growth	Industrial outsourcings	Customers’ ownership changes
Stabile		Cash flow/profitability more important

Summaries of the replies to selected key questionnaire questions in the industrial service business are presented below. The service sector believes that the future will involve growth, larger service packages, networking, digitalization/Internet of things, consolidation, internationalization, and that the market will be open but tight, with low margins and more openness and flexibility (see Figure 32 and Appendix 2.1 question 2).

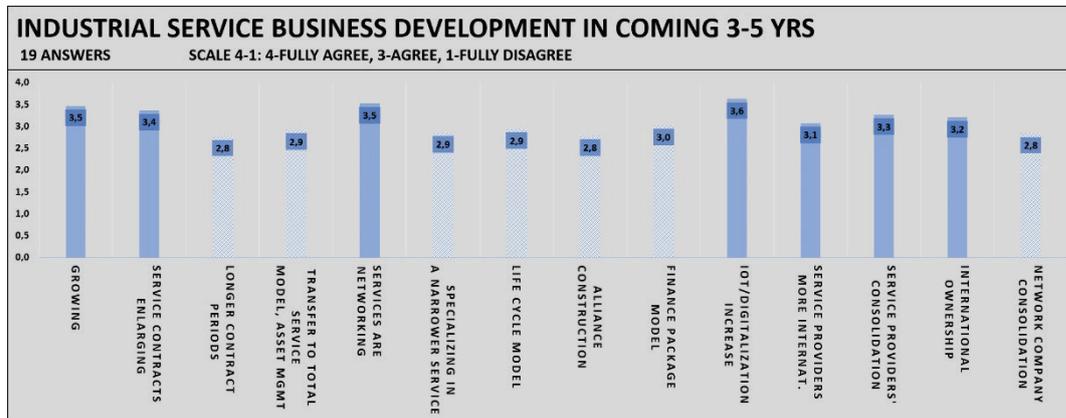


Figure 32. Industrial service business development in coming 3-5 yrs.

The service market has been created, and it works, with new players appearing, tough price competition, consolidations and new service needs; however, there are too many players, buyers’ purchasing power is too strong and more openness to the market is expected (see Figure 33 and Appendix 2.1 question 11).

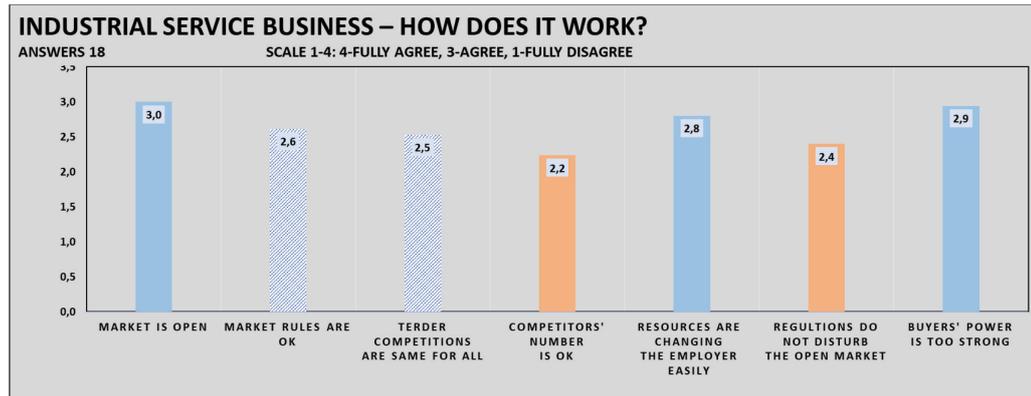


Figure 33. Industrial service business – how does it work.

Sustainable competitive advantage (SCA) can be created through differentiation, new innovative services, cost efficiency and customer proximity, (see Figure 34 and Appendix 2.1 question 7).

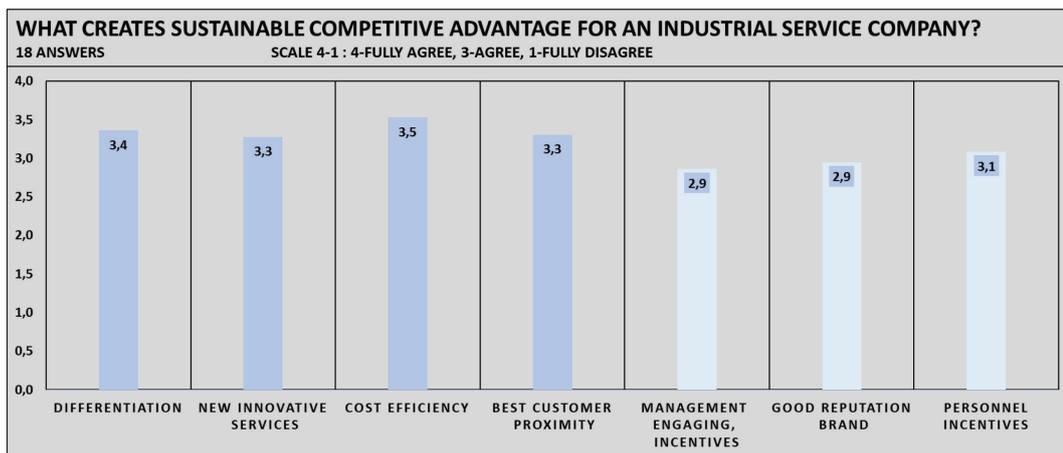


Figure 34. What creates sustainable competitive advantage (SCA) for an industrial service company.

Critical success enablers are continuous business development, engaging management/personnel and profitability, whereas growth, learning from competitors and internationalization are not. Sustainable competence will be retained by taking care of critical competences, customer surveys and work safety (see Figure 35 and Appendix 2.1 question 3).

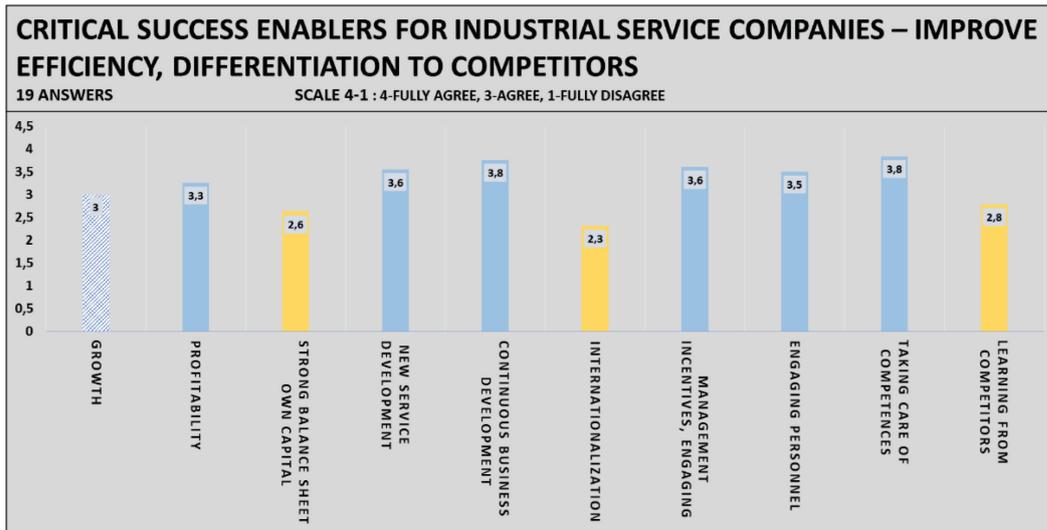


Figure 35. Critical success enablers for industrial service companies: improved efficiency and differentiation from competitors.

Other noteworthy replies are that employees quite often change employer, but this has not dramatically affected the performance of companies; it is clear that service companies which are part of the energy group negatively affect the service industry market; the most recommended service company owners are management, private equity and public – municipalities are less favoured.

4.3 Industrial service company survey

The industry service company results comprise three parts: questionnaires including in-depth interviews, financial figures and operational actions and performance.

4.3.1 Questionnaires

The service companies selected for the questionnaires (a total of 19/18 responses) comprise a very versatile and diverse constellation of the industrial service industry. The companies were founded between 1996 and 2016. Table 12 presents a breakdown of the selected service companies sorted by sales, number of personnel, services and owners.

Table 12. Constellation of surveyed service companies.

Sales/millions	Number of companies	Personnel	Number of companies	Services	Number of companies	Ownership	Number of companies
Total 1.500	Total 19	Total 8600	Total 19	Electr./tele	6	PE/mng	7
➤ >100	5	>1000	3	Electr./tele/DH	3	Public	2
➤ 50-100	3	500-1000	3	El./tele/Ind/ICT	1	2-3 EnGr	4
➤ 20-50	4	200-500	2	Electrical	5	1 EnGr	3
➤ 10-20	3	100-200	4	Industry	3	IndGr	2
➤ <10	4	<100	7	ICT	1	Mng	1
PE=private equity, EnGr=Energy Group, IndGr=Industry Group, Mng=Management DH=District heating							

The industrial service company questionnaires and in-depth interviews surveyed the respondents' experiences over the past 20 years, their views on the future of industrial service business development, and the behaviour of their customers. The findings are summarized below.

The results of the questionnaires show that service companies encountered three phases of industrial service business development over the past 20 years. The first phase was prior to 2010 and included service industry creation, rapid growth, outsourcing, internationalization, technical competences were at the core and the market opened up. The second phase was between 2010–2014 and included targets from growth to profitability and transformation to a market-oriented service company. The third phase was after 2014 and included concentration on profitable growth and the cash flow management, although there was more competition, and service companies were looking for customer proximity.

All companies applied a strategy process, and the board, as well as personnel, were committed to this. However, targets have not been achieved or have been weakly implemented and executed. All of the surveyed companies had targeted growth in Finland, as well as having growth expectations from new services and mergers and acquisitions. However, these targets have not been achieved.

SWOT analysis, unit costs, customer surveys and developing competences are the main tools for exploring critical success factors — value chain, growth-share (GS) matrix and the value, rarity, imitability and organization (VRIO) model are not used. All companies have applied a balanced scorecard system as the company's efficiency definition and performance measurement tool (see Figure 36 and Appendix 3.2 question 9).

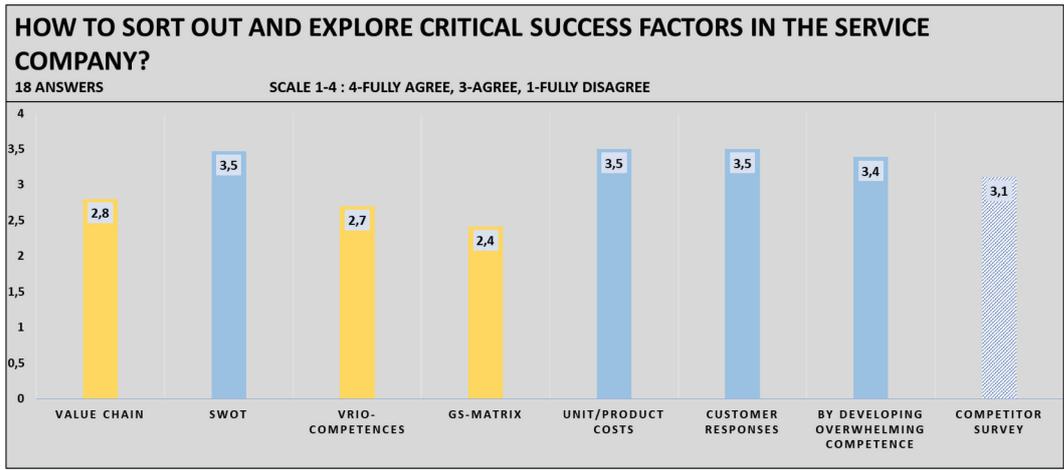


Figure 36. How to sort out and explore critical success factors.

There are very low investments in business and service development (see Appendix 3.2). Total investments per company are less than € 1 million per year in all 13 service companies, including merger and acquisition investments. According to the respondents, annual service development investments are marginal at € 0.1–1 million.

Profit reviews, contract audits with customers and internal tender audits are the most favoured tools for achieving competitive advantage, whereas new service thinking and development are not a high priority (see Figure 37 and Appendix 3.2 question 11).

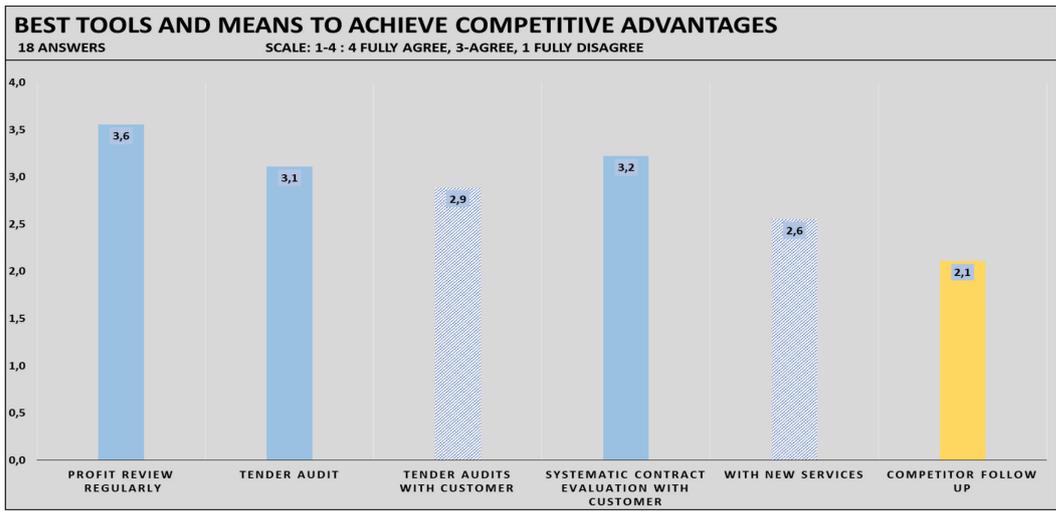


Figure 37. Best tools and means to achieve CA.

Taking care of key competences, profitability, customer proximity and new services are critical when developing competitiveness, whereas following

competitors and internationalization are not. The surveyed companies did not use any systematic tools to take care of key competences (see Figure 38 and Appendix 3.2 question 16).

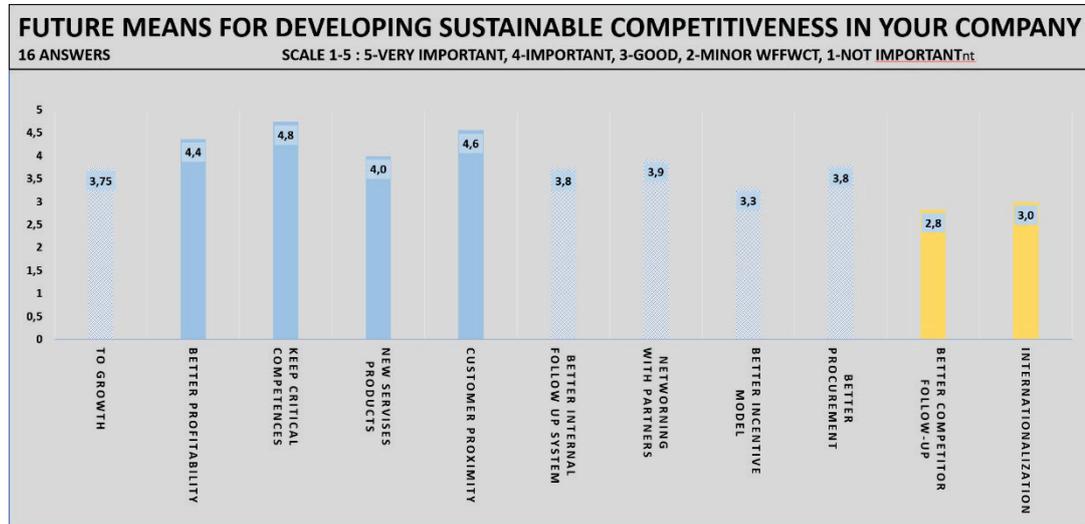


Figure 38. Future means for developing sustainable competitiveness in your company

Management is not satisfied with EBITDA development, but it is better for efficiency and competitiveness. The lay-off process works properly and is widely used, as well as the ‘work hour bank’ model. Service companies’ efficiency improvements have been 2–3%/yr., totalling 10–30% over 10 yrs.; efficiency improvements are also expected in the future (see Figure 39 and Appendix 3.2 question 17).



Figure 39. Has the company achieved the targets?

It was unanimously agreed that project management, resource, subcontractor and workforce management, and the management of systems and procurement are critical competences and resources of service companies.

It was also unanimous that the company's positive reputation/brand, incentive system, and promotion and training are the most commonly used tools for retaining key resources in the company, whereas 'more engaged work contracts' were not considered important. Competitive advantage and taking care of critical resources are not a high priority; few resources are given to new service development and service differentiation plans regarding competitors.

4.3.2 Financial figures

On the basis of the available financial and annual reports and other public data and information (see section 3.2.3), the following findings were identified concerning 11 service companies.

In 2007-2010, the industrial service business grew due to increased outsourcing of services, mergers and acquisition and larger customers' investments (Figure 1) as well as wider offerings and service packages. However, the studied service companies' growth rates have been decreasing or flat during the last 5-8 yrs. The average annual revenue growth rate in 2007-2011/2012-2017 was international service companies (3) 9.6%/4.8% and municipality-owned service companies (5) 2.8%/1.4%. The growth rate decreased due to fierce price competition, divestments and fewer mergers and acquisitions (see Figure 40 and Appendix 3.1). During 2007-2017, total electrical network construction volumes enjoyed strong growth because of the weatherproof network investment requirement (see Figure 1).

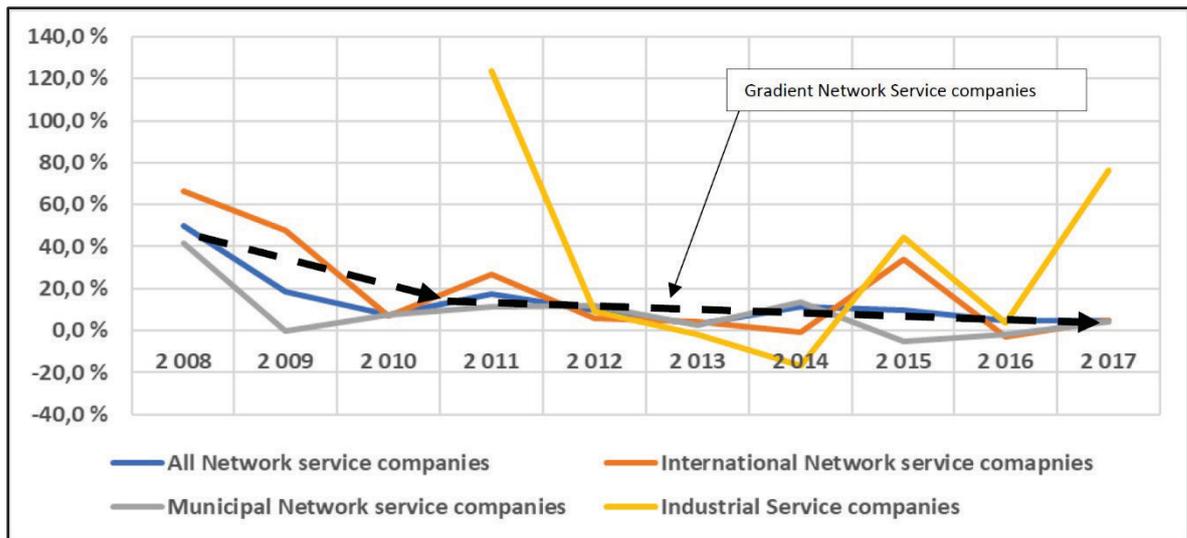


Figure 40. Service companies' revenue growth 2007-2017.

The industrial service business has been reasonably profitable, although fluctuating. The average annual EBITDA percentage in network service companies is 5.4% (7.5% for international and 5.1% for municipal). However, last years' figures for profitable international companies were uncertain because they had discontinued some services almost every year, while only continued businesses are included in the reported continuous profit figures; in one case, this included high-profit information and communications technology services. Profitability had decreased dramatically during the past three years, dropping to a level of 2% (see Figure 41 and Appendix 3.1). Profitability (EBITDA) and earnings before interest and taxes (EBIT) had often turned negative. In industrial services, the EBITDA levels are at the same low level, although figures from only two service companies were included.

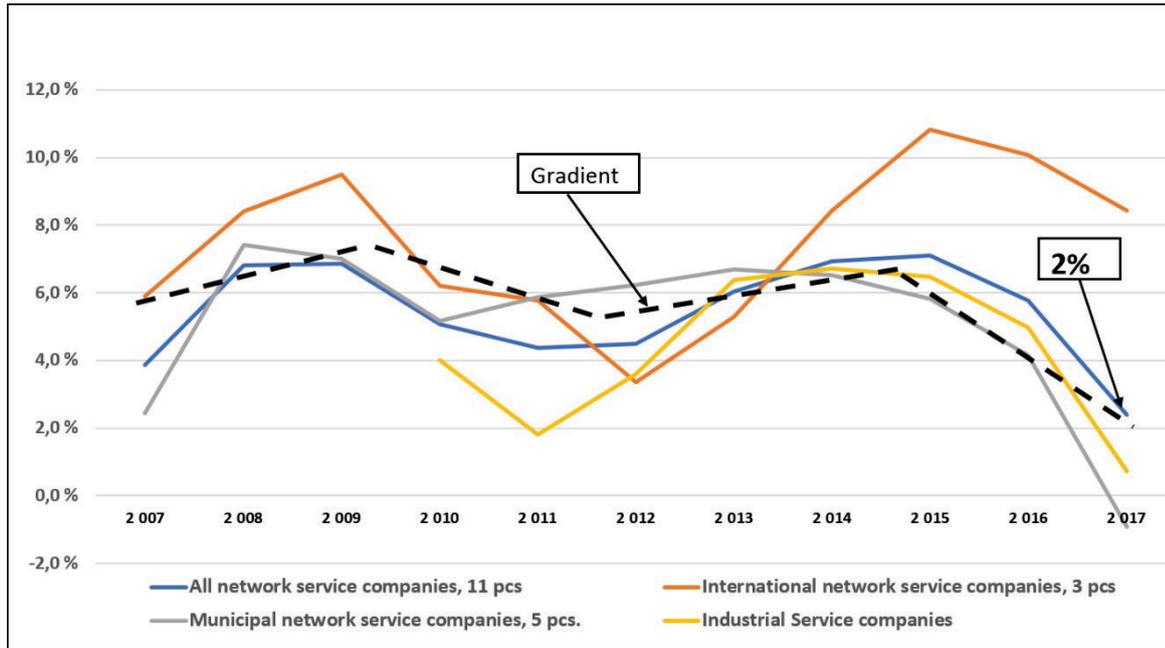


Figure 41. Service companies' profit rate (EBITDA %)

4.3.3 Operational actions and performance

Annual reports and other public sources of service companies' operational actions and performance do not contain deep operational information, and they generally provide more positive than negative news. This is understandable from a company point of view. Nevertheless, they give some reflection of real performance. There are very few comments on macroenvironmental issues, such as European Union directives, economic shocks and technological development. There are also few comments on weatherproof network investment requirements. However, there are a few comments on fierce price competition, new entrants, buyers' strong bargaining power, poor project management and raw material prices (see Appendix 3.3).

At the beginning of the surveyed period, many companies (a total of 10) reported the growth (internal, domestic and organic), but later this volume decreased. Meanwhile, many companies reported low profit/ financial challenges more often during recent years (see Figure 42). The years 2011 (7/9) and 2017 (5/10) were the most challenging. Financial figures support this remark. Service companies' business portfolios changed continuously, with many divestments, restructuring and some new services, etc. No complaints were reported on challenges in service insourcing processes and how they are managed through consolidation. Companies targeted increased profitability.

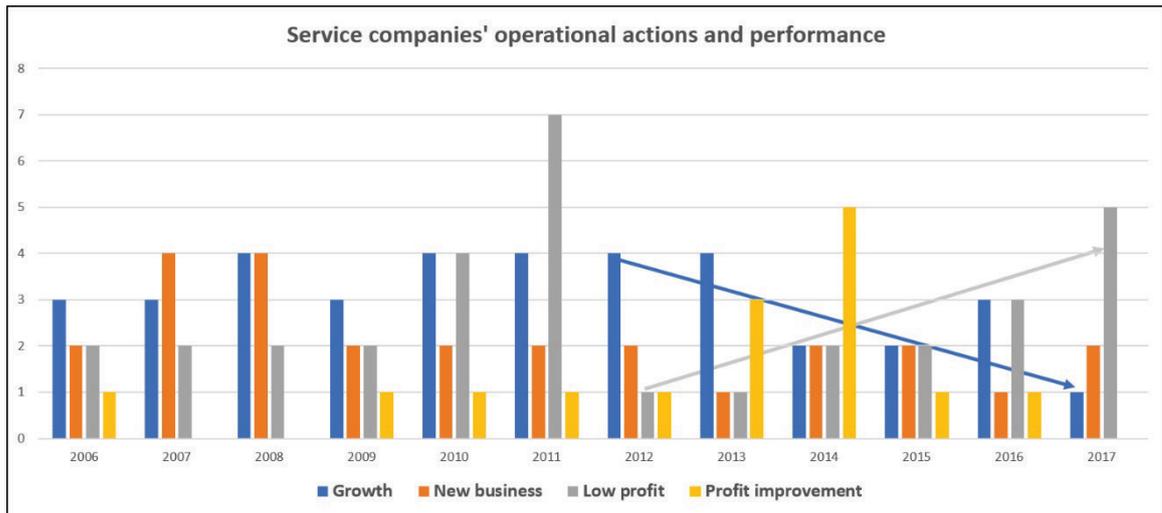


Figure 42. Service companies' operational actions and performance.

4.4 Quantitative analysis

From the empirical results, the following overall quantitative analysis can be made:

- Customers are very satisfied with the industrial business transformation, with improved values from 2.5/5 to 4/5, and outsourcing. Significant cost reduction (20–50%) was achieved 5–10 years after initial outsourcing. The service market was created, and it works reasonably well, with new service providers appearing.
- After a rapid growth phase at the beginning of the transformation period of the studied service companies, the companies stopped growing (Figure 40). This was despite the remarkable growth in market volumes due to weatherproof network investments and fibre cabling (Figure 1). Recently, service companies' profits (EBITDA) have dropped from 5–6% to 2%, despite continuous efficiency improvement actions, which are estimated to be 2–3%/yr. (Figure 41). Many companies have met cash challenges in recent years; one reason for this is low profit. Service companies have very limited service development resources and investments (0.1–1.0 M€/yr.) and no differentiation service plans.
- Strategy processes are widely applied in service companies (16/17). All companies have profitable growth targets. The Balanced Score Card (BSC) is used, and it is mainly synchronized with strategy targets. However, strategy

targets are not being met, and strategy implementation and execution have mostly failed.

Quantitative analysis gives the following insight regarding RQ1 (What methods and tools can be used to create SCA and enablers for the industrial service business?):

- SCA cannot be achieved through minor continuous cost cuts and without differentiation (see service companies profit behaviour in Figure 41). Customers' service company evaluation criteria are mostly valued price, quality, competence, safety and reliability (score >4/5). Service companies apply SWOT and unit costs to sort out critical success factors, while value chain, VRIO tools are not used. In the future, outsourced services will increase, there will be larger service packages, and there will more networked and digitalized services (>12/15 respondents). Customer proposals for SCA are efficiency, low cost, confidence, competence, quality (6/15), customer proximity and new services (4/15).
- The service industry believes that new services, taking care of competences, profitability and management are critical success factors (>3/5) and reports that critical competences, customer surveys and work safety are evaluated with SCA tools (>3.5/5). Industries that introduce cost efficiency, differentiation, new innovative services and customer proximity create CA for service companies (>3.3/5).
- The best tools to achieve CA for service companies are regular profit reviews and tender audit/contract evaluations with customers (>3.1/5) rather than new services and competitor follow-up (<2.6/5). Service companies do not systematically utilize any of the presented tools to analyse critical competences. It was unanimous that the critical resources and competences in service companies are project management, flexible resources and subcontracting networks (>4/5).

The results of the quantitative analysis give the following guidance regarding RQ2 (Is there a conflict between service providers and customers in terms of sustainable business targets, and can a win-win position be found?):

- There is some conflict in financial targets (customers 5/15, service industry 2.8/5) but not in operative and quality targets.

4.5 Qualitative analysis

The following qualitative analysis and summary were drawn from the empirical results:

- A market was created and many new competitors appeared, including international competitors. The authorities played a key role in this transformation and were the main driver and not much opposition towards their activities.

Qualitative analysis gives the following insight regarding RQ1:

- Service company management is not pleased with EBITDA development but is satisfied with efficiency and competitiveness improvements.

The qualitative analysis and requirements for RQ2 are:

According to the customer survey (see Appendix 1.2) building long-term partnerships (4 answers from 12 replied network companies); creating targets together (customer–service provider development plan) (5/12); understanding the total value chain regarding customer–service company; and taking care of service provider profitability are proposed. Honesty towards a party's (customers and service companies) own targets have also been recommended. Trust, openness and transparency are the industry's response (5/15). In addition, the valuation of the total value chain and the parties' roles within it, incentives and profit share (4/15) are recommended in response to this question. More openness to the service market is needed, and there are still captive markets and network owners which can use supporting/sponsoring tools and advantages for their own service companies.

4.6 Summary of analysis methods

A summary of the quantitative and qualitative analysis of the collected data sets related to the research questions are presented in Table 13.

Table 13. Summary of quantitative and qualitative analysis

Data set	Quantitative analysis	Qualitative analysis	Responses to RQs
Customer	Volumes grow New services in future	Value chains unknown	RQ1, RQ2
Service Industry	Growth in future Authority roles positive		RQ1 RQ1/RQ2
Service Industry Companies	No growth, low profit Strategy execution bad Customer/service firm conflicts	No service differentiation No service development Customer value chain Customer proximity Critical competences Digitalization/platforms	RQ1 RQ1 RQ2 RQ1, RQ2 RQ1 RQ1 RQ1/RQ2

4.7 Answers to research questions

The research analysis results and answers described above to the selected two research questions are summarized below:

4.7.1 RQ1: What methods and tools can be used to create sustainable competitive advantage and enablers for the industrial service business?

Based on the findings and conclusions of this survey, an SCA process chart has been constructed for how to create SCA competences, see Figure 43. The SCA process is called the **Smart Service** – toolbox, including four sub-processes: (A) Profitable Growth plan, (B) Market analysis, Customer Proximity plan, (C) Critical Competence Resource plan and (D) Service Business Development plan. These sub-processes are presented in Figure 44 and the contents and action proposals are described below.

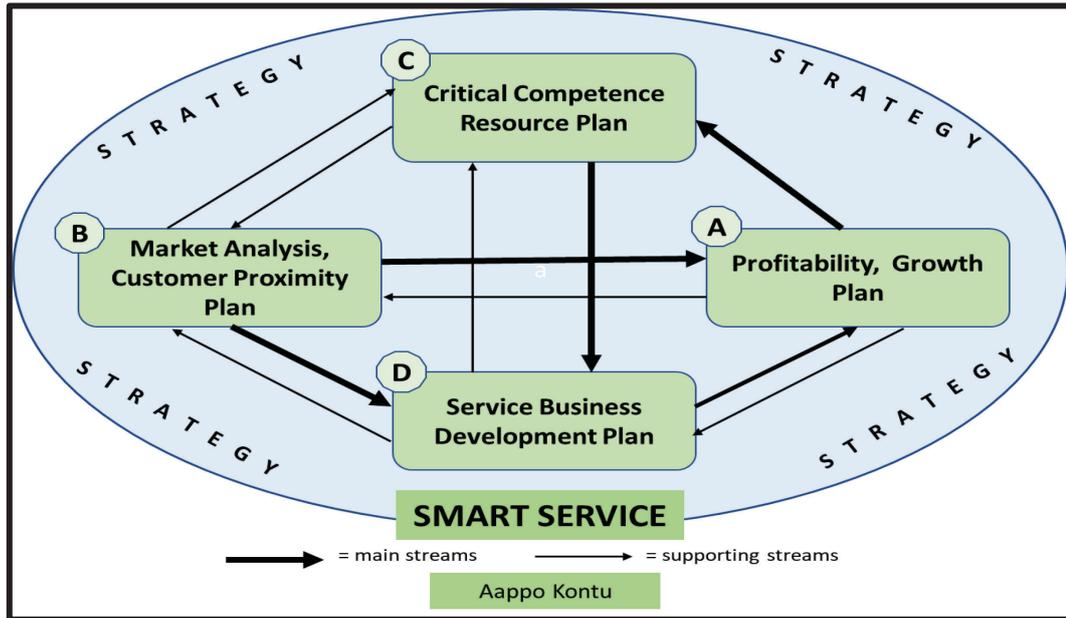


Figure 43. The new sustainable competitive advantage (SCA) process chart for an industrial service company – **Smart Service** - toolbox (created by Aappo Kontu).



Figure 44. Contents of **Smart Service** – toolbox SCA sub-processes (created by Aappo Kontu).

A. Profitable Growth plan

All service companies apply strategy processes (two-five-year framework); financial/operational monthly follow-up reporting is used, as well as the BSC.

However, over the past five to ten years, strategy implementation and execution has been very weak, and strategy targets have generally not been achieved – profit targets in particular have not been met. Moreover, business plans have generally been unrealistic. Have the companies made deep business environment and market analyses connected to their business capabilities and resources? Strategy shaping and adaptation are needed (e.g. Ritakallio & Vuori 2016, Sivusuo 2019, Day 1990). Does the management place effective pressure and requirements on the organization, including incentives? Section 2.2.5 presented tools for strategy execution. Drucker introduced advice for better business execution: deeply analyse the market that the company is operating in, measure innovative performance, measure productivity, and increase liquidity and cash flow (Drucker 1992:264–266). Wider business execution programmes connected to strategies and operating plans have been introduced by Kaplan and Norton (2008:8), which are clear and informative when implemented. If the profitability is below target, a sense of urgency for recovery has to be established – a fast reaction (Kotter 1996:21).

B. Market analysis, Customer Proximity plan

Porter recommended analysing business and industry environment changes actively and keeping close contacts with key customers and co-creating joint processes utilizing win-win analysis (Porter 1980). The business environment analysis tools that are used today are rather limited and simple – mainly SWOT. More advanced tools are recommended, such as PESTEL, the five competitive forces, and value chain (see section 2.3). Shifts in the role of the customer from isolation to connection, from unaware to informed and from passive to active have been introduced (Prahalad & Ramaswamy 2004:2). Value must be co-created with customers and assessed according to ‘value in use’ (Vargo & Lusch 2004:1–17). To co-create unique value with the customer, what constitutes a personalized co-creation experience must be appreciated (Prahalad & Ramaswamy 2004:115–116, Reeves, Haanaes&Sinha 2015:6-15)). Service companies do not know their customers’ value chain processes and vice versa (see RQ2 comments in section 4.7.2).

C. Critical competence resource plan

None of the surveyed service companies conduct systematic critical resource analysis. Service company success is very much based on available competences, which companies must develop, create and sustain (Grant 1991:115). A critical competence plan can be constructed using SWOT and value chain analyses, defining company VRIO resources, and following and protecting them. Using VRIO analysis, deeper information regarding resource heterogeneity and resource immobility can be gained compared to competitors (Barney 2007:138). Appendix

5 describes a reference process and provides an example of a critical competence analysis that applies value chain and VRIO tests and plans in one surveyed service company.

SCA is created when companies assemble difficult-to-imitate combinations of capabilities into bundles, controlling critical capabilities and bundling capabilities for enduring advantage. The capability can walk out of the door with employees (Baghai, Coley&White 1999:100). This is a big risk in the surveyed industry. SCA is sustained as long as the resources and capabilities are durable and not imitable (Grant 2008:140). Companies must build structures and mechanisms to engage employees with the company (Heyman and Barrera: 2010). As a basis for CA, it is recommended that greater focus is placed on intangible assets than on tangible assets (Prahalad&Hamel: 1990:82). Empowering employees has also been recommended (Grönroos 2007:402). These are also essential in this type of service business.

D. Service Business Development plan

If a service company wants to get out of the cost leadership (Porter 1985)/Red Ocean (Kim & Marrborgne 2017) strategies – more recently jointly termed ‘**cost battle**’ – environment, transforming towards a ‘**smart service**’ environment, it should invest in service development and build a differentiation business model, in co-creation with customers. Service companies must prepare a service development plan and program for differentiation. The required resources, both human and financial, must be allocated. Extended value chain innovations are proposed, whereby more actors, such as customers, subcontractors and even competitors, are connected to the process (Sundbo & Toivonen 2001:87–88). User experience should be integrated into innovation practices, as well as employee experience (through listening, understanding and dialogue) (Sundbo&Toivonen 2011:350). Technology and innovation have the power to influence industry structure and CA. Companies must evaluate whether they want to be technological leaders and utilize the first mover’s advantages (Porter 1985:176). Market boundaries can be reconstructed with new service innovations (Chan&Mauborgne 2005:49–77).

Service companies, as well as customers, have many digitalization plans and on-going projects. Most of these are replacing detailed manual processes, such as power line route surveys, AMR, detail engineering, some procurement and billing processes, work process monitoring and managing systems.

Thus far, the surveyed service businesses have not created new service platforms and ecosystems that challenge the existing service market. The researcher

proposes that there is a new business potential to jump into ‘**smart service**’ by reshaping and networking processes and partners in the total service value chain, from material vendors, subcontractors and service providers to the end customer, including new earning models. Some examples have been developed as a reference in the building industry. The first mover can create profitable CA, and it can be SCA if development work continues.

4.7.2 RQ2: Is there a conflict between service providers and customers in terms of sustainable business targets, and can a win-win position be found?

According to the survey results, there are minor conflicts in sustainable business targets but not in quality and operational targets. There are also some conflicts in financial targets, which the parties saw as normal market business positions. Some comments were given regarding the importance of profitability on both sides, but the parties have not analysed this jointly. All surveyed customers were very satisfied with service outsourcing and cost savings.

The service providers were not unsatisfied with insourcing, which created growth at the beginning of the transformation. However, profit growth later declined. They have not investigated the root cause for this or a means of removing themselves from continuous fierce competition. Total service process value chain analysis has not been applied (see section 2.3.3, Figure 22). There is great potential to create added value for all involved partners — in this case, network companies and service providers, as well as subcontractors. This is recommended, and parties are interested in this approach.

Currently, wider networking activities and cooperation with connected partners are not ready, as well as constructing business platforms in the service industry, and there are competence deficiencies (see the description in section 2.2.9). This requires more references and risk takers to become forerunners. Neither the service industry nor the customers are ready for this. However, the researcher considers that there is great potential to reshape this business and move from ‘cost battles’ to ‘smart service’.

5 DISCUSSION AND CONCLUSIONS

The discussion and conclusions are based on literature and theoretical studies, the quantitative and qualitative research results obtained and the analysis introduced in sections 2, 3, 4 and 5.

5.1 Theoretical contributions

In the strategy theory frameworks presented, scientists have noted that the firms that have selected cost leadership (Porter 1985)/Red Ocean (Kim & Marrborgne 2017) strategies, later jointly termed the '**cost battle**' strategy without differentiation/focusing (later called the '**smart service**' strategy), operate in a business environment characterized by harsh competition and low margins. In addition, such firms require continuous cost-cutting processes and overhead minimization as well as a very lean organizational structure to achieve CA. These business development profiles fit very well with the current performance of the studied industrial service businesses. All the companies studied have applied the '**cost battle**' model and lost growth capabilities, and profitability has dropped. One reason for this is that purchasers' power (see section 2.3.2) is very strong and mainly the tender price is generally used to select the winner. There is also a low entrance barrier to this industry. However, buyers argue that alternative service solutions are acceptable, although these are very seldom presented, tendered and applied.

One theoretical question arose during the research – can a customer's natural monopoly business position, including a strongly regulated business and earning model, create a buyer's position that is so strong that there is no room for business alternatives to the '**cost battle**' model for service providers, and '**smart service**' models cannot develop? A natural monopoly is a business strongly regulated by the authorities, and strategy theories in these circumstances have not been studied. Nor has the researcher identified respective business concepts and solutions in other infrastructure businesses or examined new theoretical models for the studied industrial network services.

5.2 Practical contributions

The industrial service market has been created during the last two decades in the industrial network construction and maintenance service business as well as in process industry services in Finland. Many service providers have taken a place in the market. New service companies have been born, and international players are

also present. Legislation requirements and the authorities have been the key drivers in this transformation of the service business and opening up of the market, and their influence on cost reductions is also evident. Overall, the role of the authorities has been experienced positively by both network and service companies.

Quantitative analysis showed a strong satisfaction among customers regarding implemented outsourcing and the separation of service functions from asset-based network businesses. No customers plan to insource or discharge service functions themselves. More business activity outsourcing is planned. Customers are concentrating more on the roles of landlord and asset owner. Customers have gained remarkable cost cuts and efficiency improvements, with a 40% to 60% reduction in cost per network unit over the past two decades. When electrical network companies operate as a natural monopoly without competition, their bargaining power is extremely strong.

After the service companies' initial phase of rapid growth, their growth stopped despite rapid market growth. New competitors have appeared. The barriers to entry to the market are low. Service companies' margins have dropped to very low levels, and companies have often met limitations and challenges regarding cash flow. Tendering process practices have resulted in very limited service differentiation. Service companies' investments in service development and new services are limited – overall, this is less than 1% of annual turnover. Companies do not own any patents and own only a few trademarks. Service companies proposed in the questionnaire that competitive advantage could be created with new service development, but this has not been developed or executed. Without investment in development, a company does not have the capability to differentiate itself from competitors, and companies are operating in the 'cost battle' model. Regarding their service development, all surveyed service companies have some ideas and development actions for utilizing digitalization and the IoT. However, new digitalized service solutions are still limited today and platform concepts have not been developed (section 4.7.1)

Companies do not have systematic CA tools, such as the value chain, VRIO model, in their business processes to analyse, develop and protect their key competences and capabilities. Therefore, key resources have found it easy to resign and move to competitors.

Quality assessments are summarized as follows. Strategy processes are widely used, but established targets have not generally been achieved, and implementation and execution capabilities are weak. Old service producers have

little agility and they react slowly to market changes — for example, when newcomers take a share of the growing market.

The growth of municipality-owned service companies has also been very limited, and their main customer is the parent company. It is estimated that this will retain some captive market position and limit fair and open market development. The owners should carefully consider the role of their service company in the group strategy and ask whether it creates real added value for the owners and end customers.

5.3 Reliability and validity evaluations and other remarks

The terms reliability and validity describe issues involved in evaluating the quality of measurements.

5.3.1 Reliability

Reliability is concerned with questions of stability and consistency or the extent to which a measurement does not contain random error — is the measurement measuring ‘something’ consistently and dependably? Is the measurement repeatable? (Ketokivi 2015:97; Metsämuronen 2009:74). Empirically, reliability can be analysed using various methods, such as test-retest reliability or the internal consistency method, where the same argument is tested by many indicators.

This research applies the internal consistency method. The reliability of the research results has been analysed and tested by questionnaires and supported by in-depth interviews and financial analyses, as well as service companies’ operational actions and performance analysis. All these results are in alignment and support the summarized results.

5.3.2 Validity

Measurement validity refers to the congruence or ‘goodness of fit’ between an operational definition of measurement and the concept it is purported to measure (Singleton & Straits 2005:131). There are two methods of validity assessment based on the subjective evaluation of an operational definition: face validity and content validity. Face validity refers simply to a personal judgement that an operational definition appears, on the face of it, to measure the concept that it is intended to measure (Singleton & Straits 2005:138). In this survey, the

researcher's long business experience of the service business constructs the validity of the research scope and content. Also, during the research, representatives of both customer and service companies have been interviewed face to face. These documented discussions have given strong support to the conclusions of the research results.

Content validity concerns the extent to which a measure adequately represents all facets of a concept (Singleton & Straits 2005:139). Content validity can be subdivided into construct validity, criterion or criterion-oriented validity and concurrent validity (Metsämuuronen 2009:2009–2010). The survey applied the concurrent validity method — for example, many questions were asked and evaluated among different target groups (customers, service industry and service companies). The evaluation measurements were the same. The following questions are given as examples:

- Are there conflicts between customers' and service providers' targets?
- How can win-win positions between service providers and customers be created?
- What is the role of the authorities?
- What are the future service models and needs?
- What are the critical success enablers for industrial service companies?
- How can service company SCA be created?
- Is the service company part of an energy group — what are the influences?

The strong validity of the research measurements is created by the above-described concurrent content method and supported by the face validity method.

In addition, during the research project a sub-project for the Electricity Research Pool was carried out related to the topics of this study (Kontu et al. 2018). The steering committee of this project was nominated by six service company managers responsible for their service function either in customer or service provider companies. They actively controlled the validity of the project related to empirical experiences and gave advice and remarks to ensure the validity of this sub-project.

5.4.3 Other remarks

The three research hypotheses were presented in the section 1.5. The research resulted following comments on these as follows:

H1: The surveyed service companies have no differentiation strategy; their businesses are low-profit and compete on price, and SCA has not been achieved.

This hypothesis was the fact as has reported in the results (see section 4.4 and 4.7.1 D), investments on service development is very limited in the industry and so very limited differentiation activities have not developed and executed.

H2: Customers and service providers have different CA targets, giving rise to conflict.

This is just a partly truth, operational and quality targets are the same both by customers and service providers, but some conflicts in financial target, which is natural in an open market position (see section 4.7.2).

H3: A sustainable win-win situation can be co-created by service providers and customers.

This is also the fact, but partners (customer – service provider) do not know each other's value chains and there is great efficiency potential to achieve through total service process value chain (see the section 2.3.3). Partners have interested in this approach.

The research made the following other findings and observations through interviews, questionnaires, data collection and their analysis of the studied industrial service business: adequate liquidity/solvency resources from owners is required for project guarantees and better cash management; changes in ownership have had little effect on businesses; more market-based thinking is required: service companies connected to energy groups restrict the development of the total service market, which is still partly captive; innovation incentives in the regulation model do not create the motivation for new service development; the surveyed businesses anticipate that digitalization/IoT will improve processes and services, but there are currently limited resources/investments; both customers and service companies expect more business consolidations. Moreover, disturbance resource reservation systems/contracts need to be discussed and customer service companies' co-operation improved. Project and service businesses have different business models and drivers. Some service companies have selected which to concentrate on. Can both be selected?

5.4 Limitations and suggestions for future research

The following limitations are associated with this research. A detailed management and cost analysis of the studied service companies is not included, and thus it is difficult to gain a deep understanding of the origin of the very low profit margins, such as high overheads, procurement efficiency, resource/management/flexibility capabilities, capital resources and customer/tendering processes.

Network customers' processes have not been analysed in adequate detail to develop an understanding of the impact of service providers on their efficiency. International service industries have not been analysed, and new ideas and business solutions may be found there, for example in Sweden or Germany.

The proposed Smart Service SCA business model has not been widely piloted, and the planned software has not yet been produced.

The following future research programmes are suggested: to build up the work tool/model/system for Smart Service, SCA in the service businesses introduced in section 4.7.1; to estimate the impact of the electrical network regulation model in a natural monopoly business on the service business earning model, such as its effect on unit price-based network valuation, innovation and quality incentives; personnel participation and activation in critical competence development should be researched in greater depth as well as promotion of digitalization in industrial service business development; a lot of development and research potential can be gained through total value chain construction (service provider – network customer) and win-win targets, including the building of ecosystem service platforms.

Limited research has been made on service innovation development in industrial service businesses regarding motivation, barriers and promotion. In-depth analysis of project and service business drivers and differences have to be explored more to achieve better service execution. Strategic targets for various owner groups in the industrial service business and the invested company (municipal, private equity, public and management) is an interesting target for study; are there differences?

References

The Act on Public Procurement and Concession Contract (1397/2016), Finland

Alam, I. & Perry, C. 2002 – A customer-oriented new service development process-
Journal of Service Marketing, 16(6), 515-34

Van Alstyne, M. W, Parker, G.G & Choudary, S.P 2016 - Pipelines, platforms, and new rules of strategy – *Harvard Business Review*, 001780. April 2016, Vol. 94, Issue 4

Aminoff, A., Lappveteläinen, I., Partanen, J., Viljanen, S., Tahvanainen, K., Järventausta, P. & Trygg, P. 2009. Ostopalvelujen käyttö verkkoliiketoiminnoissa – *VTT Research Notes* 2462

Ansoff, H. I. 1965 – *Corporate strategy: an analytic approach to business policy for growth and expansion* – McGraw-Hill Higher Education

Argyris, C. 2000 – *Flawed advice and the management trap – How Managers Can Know When They're Getting Good Advice and When They're Not* - Oxford University Press, New York, USA

Baghai M., Coley, S. & White, D. 1999 – *The Alchemy of Growth. Kickstarting and sustaining growth in your company* - Orion Business, Great Britain

Bailey, J.R.E. 2002 -Retracting reflection; Views from the Inside – *Academic of Management Executive*, 1(1):77

Bain, J.S. 1956 – *Barriers to new Competition* – Harvard University Press 1956

Barney, J.B 1988. Returns to Bidding Firms in mergers and Acquisitions – *Reconsidering the Relatedness Hypothesis*, *Strategic Management Journal*, 9:

Barney, J.B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17:99-120

Barney, J, Wright, M & Ketchen, D.J. Jr, 2001 – The resource-based view of the firm: ten years after 1991 – *Journal of Management* 27 (2001) 625-641

Barney, J. B. 2001. Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view - *Journal of Management*, 27 (2001) 643-650

Barney, J. B., Clark & D.N. 2007 – *Resource-Based Theory – Creating and Sustaining Competitive Advantage* – Oxford University Press Inc., NY

Barney, J. B. 2007 - *Gaining and sustaining competitive advantage* – the Ohio State University, Pearson Education International, Inc, New Jersey

Barney, J. B. 2010. VRIO framework in strategic management and competitive advantage?

Bettencourt, L.A. 2010. *Service Innovation – How to go from Customer Needs to Breakthrough Services* – McGraw-Hill Companies Inc USA

Bitner, M., J. Ostrom, A.L. & Morgan, F.N. 2007 – *Service Blueprinting_ A Practical Technique for Service Innovation* – Center for Services Leadership, Arizona State University

Beyer, J. M. & Trice, H. M. 1982 – *The Utilization Process -A conceptual – framework and synthesis of empirical – findings* – *Administrative Science Quarterly* 27 (4):591-622

Buckley, P. J. & C, I., Prescott, K. 1992/1988 - *Interrelationship of dimensions of firm's competitiveness?*

Campbell, J.D. 1995 – *Outsourcing in maintenance management, A valid alternative to self-provision* – *Journal of Quality in Maintenance Engineering*, Vol. 1, No. 3, pp. 18-24

Chatzoglou, P., Chatzoudes, D., Sarigiannidis, L. & Theriou, G. 2016 -*The role of firm-specific factors in the strategy-performance relationship, Revisiting the resource-based view of the firm and the VRIO framework-Management Research Review* Vol. 41 No. 1, 2018, pp.46-73

Chesborough, H. W. 2006 – *Open Innovation, the New Imperative for Creating and Profiting from Technology* – Harvard Business School Publishing Co

Cohen, M. A., Agrawal, N. & Agrawal, V. 2006 – *Achieving Breakthrough Service Delivery through Dynamic Asset Deployment Strategies* – *Interfaces* Vol 36, No. 3, May-June 2006, pp. 259-271

Collins, J. C. & Porras, J. I 2002/2004 – *Built to Last/Pysy parhaana* – Curtis Brown Ltd, New York and Ia Atterholm Agency/Tallentum Media Oy

Collins, J. 2001. *Good to Great – Why Some Companies Make the Leap and Others Don't* - Random House Business Books

Collins, J. & Hanssen, M. T. 2011. *Great by Choice* – Harper Collins Publisher New York, USA, translation Mauri Laukkanen, Tietoisesti paras, epävarmuus, kaaos, sattuma-menestyy niistä huolimatta, Talentum Media Oy

Connors, R., Smith, T. & Hickman, C 2004 -*The OZ Principle, Getting results Through Individual and Organizational Accountability* - Penguin Books, New York, USA

Christensen, C.M. 1997 – *The Innovators Dilemma: When New Technologies Cause Great Firms to Fall* – Harvard Business School Press

Christensen, C.M. 1999 – *Innovation and General Manager* – MacGraw-Hill Companies

Christensen, C.M. & Raynor, M. E. 2003 – *The Innovator's Solution, Creating and Sustaining Success Growth* – Harvard Business School Publishing Co

Creswell, J.W. 2009 – Research design – qualitative, quantitative and mixed methods approach- 3rd edition Sage publication. Los Angeles, USA

Day, G.S. 1990 – Market Driven Strategy, Processes for Creating Value – The free Press, Collier Macmillan Canada

Djellal, F., Gallouj, F. 2008 – Measuring and Improving Productivity in Services – Issues, Strategies and Challenges, Cheltenham, UK and Northampton, MA, USA: Edvar Elgar

Djellal, F., Gallouj, F. 2015 – Service Innovation for Sustainability: Paths for Greening through Service Innovation – HAL archives-ouvertes Id: halsha-01188530, 31 Aug

<https://halshs.archives-ouvertes.fr/halshs-01188530>

Doz, Y. & Kosonen, M. 2008. Fast Strategy/ Nopea Strategia- How Strategy Agility Will Help You to Stay Ahead of the Game/Miten strateginen ketteryys auttaa pysymään kilpailun kärjessä – Talentum Media Oy/ Wharton School Publishing

Drucker, P. F. 1992 – Managing for the Future, the 1990s and Beyond – Truman Talley Books, Dutton, New York, USA

Drucker, P.F. 1994 -The theory of the business - Harvard Business Review, Sep-Oct, Vol. 72, 95-104

Drucker, P. F. 1999 - Management Challenges for the 21st Century – HarperCollins Publisher

Drucker, P. F. 1980 – Managing in Turbulent Times – Harper&Row, Publisher, New York, USA

Drucker, P. F. 2006 – Classic Drucker – Harvard Business School Publishing Corporation

Edmonds, T. 2000. Regional competitiveness & the Role of the Knowledge Economy - House of Commons Library. Research paper. London: Research Publications Office, 73–55.

Edvarsson, B, Gustafsson, A & Roos, I. 2005 – Service portraits in service research: a critical review – International Journal of Service Industry Management, Vol. 16, No. 1, 107-121

Edvardsson, B, Enquist, B & Johnston, R. 2003 – Cocreating customer value through hyperreality in prepurchase service experience – Journal of Service Research, Vol 8, No 2, 149-161

Edvardsson, B & Enquist, B. 2009 – Value-based Service for Sustainable Business, Lessons from IKEA – Rotledge, Taylor&Francis Group, London and New York

Eisenhardt, K. M. & Martin, J.A 2000– Dynamic Capabilities: what are they? – Strategic Management Journal 21:1105-1121

Electricity market act 386/1995, Finland

Eloranta, V & Turunen, T. 2015 - Seeking competitive advantage with service infusion: a systematic literature review - *Journal of Service Management*, Vol. 26 Issue: 3, pp.394-425,

<https://doi.org/10.1108/JOSM-12-2013-0359>

Eloranta, V. 2016 – Servitization, strategy and platforms – Doctoral Dissertation 74/2016

Energiavirasto 2015 – Valvontamenetelmät, 30.11.2015

Energiavirasto 2019 – Sähköverkkoliiketoiminnan kehitys, sähköverkon toimintavarmuus ja valvonnan vaikuttavuus 2018 - 443/402/2019, 12.3.2019, Helsinki, Finland

Feuer, R. & Chaharbaghi, K. 1994. Defining Competitiveness: a Holistic Approach - *Management Decision*. [Referred 02.04.2018]. Available: <https://www.emeraldinsight.com/doi/abs/10.1108/00251749410054819>

Filippini & Massimo 1998 - Are Municipal Electricity Distribution Utilities Natural Monopolies – *Annals of Public and Cooperative Economics* 69(2):157

Fingrid Oy 2016: Kantaverkon kehittämissuunnitelma 2017-20237 – Fingrid Oy, Helsinki Finland

Finnish market for digital business development 2019 – Strategy industry report – Alma Talent, Valor Partners Oy

Fullan, M. 2001. *Leading in a Culture of Change* - John Wiley & Sons Ltd

Gallouj, F. & Toivonen, M. 2011 – Elaborating the characteristics-based approach to service innovation_ making the service process visible – *Journal of Innovation Economics and Management* 2011, Vol. 2, no 8

Gallouj, F. 2002 – *Innovation in the Service Economy, the New Wealth of Nations*- Edwardd Elgar Publishing Limited, Cheltenham, UK

Gallouj, F & Weinstein, O. 1997 – *Innovation in Services* – Research Policy, Elsevier Vol. 26 (4-5) pp. 537-556

Gobillot, E. 2007. *The Connected Leader. Creating agile organizations for people, performance and profit* – Kogan Page Limited

Grantham C. E., Ware, J. P. & Williamson, C. 2007. *Corporate Agility. A Revolutionary New Model for Competing in a Flat World* – American Management Association

Grant, R. 1991. The resource-based Theory of Competitive Advantage, Implication for Strategy Formulation, *California Management review*, Spring: 114-135

- Grant, R. 1996. Towards a Knowledge-based Theory of a Firm, *Strategic Management Journal*, Vol. 17 109-122
- Grant, R. 2008. *Contemporary strategy analysis – 3rd Edition*. Blackwell Business, Malden, MA, USA
- Grant, R. 2010. *Contemporary strategy analysis - United Kingdom*: John Wiley & Sons. ISBN 978-1-119-12651-5
- Grönroos, C. 1990 – *Service Management, Ledning, Strategi och Marknadsföring I Servicekonkurrens – ISL Förslag*, Göteborg
- Grönroos, C. 2000 – *Service Management and Marketing, A customer Relationship management Approach – John Wiley& Sons Ltd*, England
- Grönroos, C. 2007. *Service Management and Marketing, Customer Management in Service Competition – John Wiley&Sons Ltd*, England
- Hamel, G. 2000. *Leading the Revolution/Vallankumouksen kärjessä– Harvard Business School Press*
- Hamel, G. 2007. *The Future of Management/Johtamisen tulevaisuus – original The Future of Management – Talentum Media Oy*, Finland
- Hamel, G. & Prahalad, C. K. 1994 – *Competing for the Future – Harvard Business School Press*, Boston, Massachusetts, USA
- Hamel, G. & Prahalad, C. K. 1994 – *Competing for the Future – Harvard Business Review*, Vol. 72 (4) pp. 122-128, Boston, Massachusetts, USA
- Hamermesh, R.G 1986 – *Making Strategy Work, How Senior Managers Produce Results – Harvard Business School, John Wiley&Sons, Inc., Massachusetts, USA*
- Humphrey, A. 1960. *SWOT analysis – Strengths, weaknesses, opportunities, threats*
- 10 must reads, 2011 – *On Strategy, definitive articles from Harvard Business review- Harvard Business School Publishing Corporation*, Massachusetts, USA
- Helakoski, H. 2015 – *Digitalisaation hyödyt teollisuudessa – Teollisuus ja digitalisaatio seminaari*, Tampere, VTT
- Henderson, B. 1970 – *The Growth-Share Matrix, The product Portfolio – Boston Consulting Group analysis, portfolio diagram*, USA
- Heiskanen, E & Repo, P 2007 – *User Involvement and entrepreneurial action – Human technology*, Vol. 3(2), May 2007, pp. 167-87
- Helkkula, A. 2011 – *Characterizing the concept of service experience – Journal of Service Management*, 22(3), 367-389
- Helkkula, A & Holopainen, M, 2011 – *Service Innovation as an experience: Differences between employees and user narratives – User-based Innovation in*

Services, edited by Sunbo, J., Toivonen, M. published Edvard ELGAR Publishing Limited, Cheltenham, UK

<http://jsr.sagepub.com/content/15/1/59>

Helkkula, A, Kelleher, C & Pihlström, M. 2012 – Characterizing Value as Experience: Implications for Service Researchers and Managers – *Journal of Service Research* 2012, Vol. 15 (1): 59-75

Helkkula, A & Kelleher, C. 2010 – Circularity the concept of service experience and customer perceived value - *Journal of Customer Behaviour*, Vol. 9(1), pp. 37-53

<https://doi.org/10.1362/147539210X497611>

Helkkula, A & Pihlström, M. 2010 – Narratives and metaphors in service development – *Qualitative Market Research*, 13(4), 354-71

Heskett, J.L., Sasser, W.E. & Schlesinger, L.A. 1997 – *The Service Profit Chain* – Free Press, New York

Heymann, J & Barrera, M. 2010. *Profit at the Bottom of the Ladder. Creating Value by Investing in Your Workforce* – Harvard Business Press

Humphrey, A. 2005 – SWOT Analysis for Managenet Consulting (<http://www.sri.com/sites/default/files/brochures/dec-05.pdf> SRI Alumni Newsletter

Ikäheimo, S., Laitinen, E., Laitinen, T. & Puttonen, V. 2011. *Laskentatoimi ja rahoitus - Sundom: Vaasan yritysinformaation*. ISBN: 978-951-96324-3-8.

Immonen, M., Tahvanainen, K. & Viljanen, S. 2011 – Supplier relationships in regulated Industries: longitudinal study on energy distribution – *International Journal of Procurement Management*, Volume 4, Issue 6, 2011, pp 589-609

Immonen, M 2011 – *Public Private Partnerships: Managing organizational change for acquiring value creative capabilities* – Dissertation Lappenranta University of Technology 10.6.2011

Jonker, J. & Pennink, B.J.W. 2010 – *The Essence of Research Methodology – A Concise Guide for Master and PhD Students in Management Science* – Springer-Verlag Berlin Heidelberg

Juuti, P. & Luoma, M. 2009. *Strateginen Johtaminen. Miten vastata kompleksisen ja postmodernin ajan haasteisiin?* - Kustannusyhtiö Otava

Kano, N., Seraku, N., Takahashi, F. & Tsuji, S. 1984 – Attractive quality and must-be quality – *The Journal of the Japanese Society for Quality*, April, pp. 39-48

Kantola, J. 2005. *Ingenious Management*. - Tampere University of Technology, Doctoral Thesis -Publication 568.

Kantola, J., Vanharanta, H. & Karwowski, W. 2005 – The evolute System: A Co-evolutionary Human Resource Development Methodology – International Encyclopedia of Human Factors and Erconomics

Kaplan, R. S., Norton, D. S. 1996 -The Balanced Scorecard – Harvard Business School Press, Boston, Massachusetts, USA

Kaplan, R. S. & Norton, D. S. 2008 – The Execution Premium, Linking Strategy to Operations for Competitive Advantage- Harvard Business School Publishing Corporation, Massachusetts, USA

Kaplan, R. S. & Cooper, R. 1998 – Cost and Effect: Using Integrated Cost Systems to Drive Profitability and Performance – Boston, MA: Harvard University Press

Kasanen, E., Lukka, K. & Siitonen, A. 1991 - Konstruktiivinen tutkimusote liiketaloustieteessä (Constructive research approach in business studies). In Finnish. - Liiketaloudellinen aikakauskirja, 40(3), 301-329.

Kaulio, M. 1988 – Customer, consumer and user involvement in product development: a framework and a review of selected methods - Total Quality Management, 9 (1), 141-149

Keränen, T. 2009 – Change in organization – emerging situations, character and praxis – Doctoral dissertation 1797-2515, School of science and technology, Aalto university, Finland

Keränen, T & Lehtiö, T 2010 – Ulkoistettu kunnossapito – käytännön toteutuksen haasteet – Promaint 7.2010 Helsinki Finland

Ketokivi, M 2009 – Tilastollinen päättely tieteellisenä argumenttina– Gaudeamus Helsinki University Press, Finland

Ketokivi, M 2015 – Tilastollinen päättely ja tieteellinen argumentointi – Gaudeamus Helsinki University Press, Finland

Ketokivi, M. & Mantere, S. 2010 – Two strategies for inductive reasoning in organizational research - Reasoning by analogy and the progress of theory – Academy of Management Review 2010, Vol. 35, No. 2, 315-333

Ketokivi, M., Mantere, S. & Cornelissen, J 2017 – Reasoning by analogy and the progress of theory – Academy of Management Review 2017, Vol. 42 No. 4, 637-658

Killing, J.P, Malnight, T. & Kays, T. 2005 – Must-win battles: creating the focus you need to achieve your key business goals – Financial Times Prentice Hall

Kim, W. C. & Marrborgne, R. 2005 – Blue Ocean Strategy – How to Create Uncontested Market Space and Make the Competition Irrelevant – Harvard Business School press, Boston, USA

Kim, W. C. & Marrborgne, R. 2017 – Blue Ocean Shift beyond Competing – Proven Steps to Inspire Confidence and Seize New Growth – Hachette Books, NY, Unites States of America

- Kingman-Brundage, J., George, W. R. & Bowen, D.E. 1995 – “Service logic”: achieving service system integration – *International Journal of Service Industry Management*, Vol 6, no 4, pp. 20-30
- Knot, P.,J 2015 – Does VRIO help managers evaluate a firm’s resources – *Management Decision*, Vol 53, No. 8, 2015 pp. 1806-1822
- Koistinen-Jokiniemi, P., Koskiniemi, T., Lehtinen, I., Lindtoos, V., Martikainen, J., Montonen, S, Savela, O & Tuomaala, E. 2017 – *Digitalisaatio ja BKT - Tilastokeskus*
- Kontu, A. 2012 – *Palvelumarkkinoiden kipupisteet – Verkosto 2012 seminaari 30-31.10.2012*
- Kontu, A, Ryttilahti, M., Passi, P. & Kontu, K. 2015 - *The potential of Service business development in District Heating business in Finland - Finnish Energy*
- Kontu, A., Seppälä, R, Kantola, J & Vanharanta, H. 2018 - *Sustainable Competitive Advantages in the Industrial Service Business – Electricity Research Pool, research program, Detail results, summary reports (Fin., Eng.) published by Finnish Energy 14.8.2018*
- Kontu, A., R, Kantola, J, Vanharanta, H. & Kontu, K. 2019 – *Sustainable Competitive Advantages in the Industrial Service Business – 2nd International Conference on Intelligent Human Systems Integration*
- Korhonen, H. M. E. 2016 – *Customer Orientation in Industrial Service Innovation – Doctoral Dissertation 124/2016, Aalto University, Finland*
- Kostama, Toivonen, M 2011 – *Co-Innovation for profitability- User-based Innovation in Services*, Edited by Sunbo, J., Toivonen, M. published by Edvard Elgar Publishing Limited, Cheltenham, UK
- Kotler, P., Bloom, P. 1984 – *Marketing Professional Services – Prentice-Hall, Inc., Englewood Cliffs, New Jersey*
- Kotter, J., P. 1996 – *Leading Change-Harvard Business School Press, Boston, Massachusetts, USA*
- Kowalkowski, K. 2011 – *The service function as holistic management concept – Journal of Business and Industrial Marketing 26/7*
- Kumar, R., Kumar, U. 2004 – *A conceptual framework for the development of a service delivery strategy for industrial systems and products – Journal of Business and Industrial Marketing Volume 19-number 5)*
- Lainema, M. 1988. *Hallituksen Strateginen Rooli – Werner Söderström Oy*
- Lammi, A. 2012. *Intellectual Capital Strategy – Integrating Strategic Management and Intellectual Capital Ontology – PhD Thesis Tampere University of Technology*
- Lehikoinen, R., Töyrylä, I. 2013. *Ulkoistamisen käsikirja – Talentum Media Oy*

Leonard-Barton, D. 1992 – Core capabilities and core rigidities: A paradox in management new product development – *Strategic Management journal*, Summer Special issue, 13:111-125

Makkonen, H, Olkkonen R., Partanen, J. & Tahvanainen, K. 2012 – Palvelusuhteiden ja verkostojen johtaminen jakeluverkkoliiketoiminnassa – PAVE-hankkeen loppuraportti LTY

Mantere, S, Ketokivi, M. 2013 – Reasoning in organization science – *Academy of management Review*, 38(1).70-89

Margaretta, J. 2012. *Understanding Michael Porter. The essential Guide to Competition and Strategy* – Harvard Business review Press

Martek, I. & Chen, C. 2015 – Value chain supply procurement strategies in international construction, Cases of foreign constructors in China- *Management Decision* Vol 54 No. 2, 2016 pp. 501-521

Martinsuo, M & Kärri, T. 2017 – Teollinen internet uudistaa palveluliiketoimintaa ja kunnossapitoa- Kunnossapitoyhdistys Promaint ry, Helsinki, Finland

Metsämuronen, J, 2009 -Tutkimuksen tekemisen perusteet ihmistieteissä – *International Methelp Ky*, Helsinki, Finland

Mintzberg, H. 1987 – The strategy concept II: another look at why organizations need strategies – *California Management Review*, 30:1, 25.32

Mintzberg, H. 1994 – *The Rise and Fall of Strategic Planning* – Prentice Hall Europe, Harlow, England

Mintzberg, H., Quinn, J. B & Ghoshal, S. 1995 – *The Strategy Process* – Prentice Hall Europe, Harlow, England

Mitronen, L. & Raikaslehto, T. 2019 -Voittajan strategia, lyhytjännitteisyydestä kestävään menestykseen – *Alma Talent Oy*, Helsinki, Finland

Montonen, S., Savela,O. & Tuomaala, E. 2017 – *Digitalisaatio ja BKT-Tilastokeskus*

Nordström, A. 2017 – Allianssimallin menestyksen avaimet infrarakentamisessa- *Energiateollisuuden kevätseminaari 19.5.2017*, Pori, Finland

Nahapiet, J.& Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23 (2)

Namibian, S. 2002 – Designing virtual customer environments for new product development: toward a theory – *The Academy of Management Review*, 27 (3), 392-413

Neilimo, K. & Näsi, J. 1980. Nomoteettinen tutkimusote ja suomalaisen yrityksen taloustiede - Tutkimus positivismiin soveltamisesta (Nomothetic research approach and economics in Finland—a study of applications of positivism). in

Finnish. – Yrityksen taloustieteen ja yksityisoikeuden laitoksen julkaisuja. (p. 82)
Tampere, University of Tampere. Sarja A, 2.

Nordlund, H. 2009 – Constructing customer understanding in front end of innovation – publication no. 1478, Dissertation, University of Tampere

Nordström, A 2017 – Allianssimallin menestyksen avaimet infrarakentamisessa-
Visio Oy, Energiategollisuuden kevätseminaari, Pori 19.5.2017

Norman, R.1993 -Service Management, Strategy and Leadership in Service
Business – John Wiley& Sons Ltd, England

Oliva, R. & Kallenberg, R. 2003 - Managing the transition from products to
services -International Journal of Service Industry Management, Vol 14, No. 2, pp.
160-172

Olkkonen, T. 1994. Johdatus teollisuustalouden tutkimustyöhön (An Introduction
to Research on Industrial Management) in Finnish. (Second Ed., p. 143) -
Teknillinen korkeakoulu, Tuotantotalouden osasto, Teollisuustalouden
laboratorio.

Osterwalder, A. 2004 – Business Model ontology – A Proposition in a Design
Science Approach University of Lausanne

Osterwalder, A. & Pigneur, Y. 2010 – Business model Generation: A handbook for
Visionaries, Game Changers and Challengers – John Wiley&Sons

Parker, G.G., Van Alstyne, M.W & Choudary, S.P. 2016 – Platform Revolution, how
networked markets are transforming the economy and how to make them work for
you – W.W. Norton & Company, Inc New York, USA

Penrose, E.T. 1959/1995. Theory of the Growth of the Firm. New York: Oxford
University Press

Porter, M.E. 1980 - Competitive Strategy, Techniques for Analyzing Industries and
Competitors. New York: The Free Press

Porter, M.E. 1985. Competitive Advantage – Creating and Sustaining Superior
Performance,

Porter, M.E. 1996. What is strategy? – Harvard Business Review 74 (6)

Prahalad, C.K. & Hammel, G 1990 – The Core Competence of the Corporation –
Harvard Business Review, May-Jun, 79-91

Prahalad, C.K. & Ramaswamy, V. 2000 – Co-opting Customer Competence -
Harvard Business Review. Jan-Feb, 79-97

Prahalad, C.K. & Ramaswamy, V. 2004. The Future of Competition: Co-Creating
Unique Value with Customers - Harvard Business School Publishing, Boston,
Massachusetts, USA

Prahalad, C.K. & Krishnan, M.S. 2008 – The New Age of Innovation: Driving Co-created Value through Global Networks – McGraw-Hill

Puusa, A . 2008. Käsiteanalyysi tutkimusmenetelmänä (Concept analysis as a research method). - *Premissi*, 4(2008), 36-43, in Finnish.

Reeves, M., Haanaes, K & Sinha, J. 2015. Your Strategy need a Strategy. How to Choose and Execute the Right Approach – Harvard Business Review Press

Reillier, L. C. & Reillier, B. 2017 – Platform Strategy: How to Unlock the Power of Communities and Networks to Grow Your Business – eBook, Routledge, New York, USA

Ritakallio, T & Vuori, T.O 2018 -Elävä strategia, Kyky nähdä, taito tarttua tilaisuuteen- Alma Talent Oy, Helsinki

Ritakallio, Timo 2016 – Shaping Elements While Maintaining Fit – Doctoral Dissertation, Industrial Engineering and Management, Aalto University, Espoo, Finland

Rynes, S. L, Bartunek, J.M. & Daft, R. L. 2001 – Across the great divide: Knowledge creation and transfer between practitioners and academics – *Academy of Management journal*, 44(2): 340-355,

Rönkkö, M 2018: T4-LOOOO Research Methods in Industrial Engineering and Management 18.9.-4.12.2018 - Aalto University, Espoo, Finland

Saunders, M.N. 2009. Research Methods for Business Students (Fifth Ed.). - Pearson Education India.

Sauders, M., Lewis, P. & Thornhill, A 2016 – Research Methods for Business Students, Seventh edition – Pearson Education Limited, Edinburgh Gate, Harlow, Essex, England

SCEMM (Scandinavian Center for Maintenance Management) 1998- Keep It Running, Industrial Asset Management– Painoyhtymä Oy, Loviisa, Finland

Schmenner, R.W. 1995. Service operations management. Simon & Schuster Books for Young readers

Shostack, G.L. 1982 – How to design a service – *European Journal of Marketing*, 16(1), 49-63

Schumpeter, J. A. 1934 – The theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle – Harvard Economic Studies 46, Transaction Publisher, New Brunswick, NJ, USA

Seppälä, R. 2018. - The Performance Analysis of an Infrastructure Service Industry – Pro gradu thesis, Vaasa university

Siilasmaa, R., Fredman, C. 2018 – Paranoidi Optimisti, Näin johdin Nokiaa murroksessa – Kustannusosakeyhtiö Tammi

- Sipilä, J. 2003 - Palvelujen hinnoittelu – WSOY/ Suomen Ekonomiliitto
- Sipilä, J. 1995 – Asiantuntijapalvelu tuotteistaminen – WSOY/ Suomen Ekonomiliitto
- Singleton, R. A.J. & Straits, B.C 2005 – Approaches to Social Research 4th ed., chapter 5, Measurement –Oxford University Press, New York, USA
- Sinek, S 2009 – Start with Why. How Great Leaders Inspire everyone to Take Action – the Penguin Group, Toronto Canada
- Sivusuo, J. 2019 – Dynaamiset kyvykkyydet – Myytti vai todellinen jatkuva kilpailukyvyyn rakentaja – Väitöskirja 0355-2667
- Strebel, P. 2003. Trajectory Management. Leading a Business Over Time – John Wiley & Sons Ltd
- Suomen energiatoimiala 2019 – Strateginen toimialakatsaus – Alma Talent Tietopalvelu, Valor Partners Oy
- Suomen teletoimiala 2018 – Strateginen toimialakatsaus – Balance Consulting Oy, Valor Partners Oy
- Sundbo, J. & Toivonen, M. 2011. User based Innovation in Services – Edwar Elgar Publishing Ltd, UK
- Sveiby, K. E. 1997. The New Organizational Wealth. Managing & Measuring Knowledge-Based Assets – Berrett-Koehler Publishers, Inc.
- Syrjälä, J. 2006. Valoon piirrettyjä kuvia. Tarinoita ja tulkintoja sähköalan murroksesta hyvinvoinnin ja henkilöstöstrategian näkökulmasta – Thesis Jyväskylä university
- Takala, J., Shylina, D. & Tilabi, S. 2014 How to apply sustainable competitive advantage for regional developments – Case: Ostrabothnia Region of Finland – Management and production Engineering Review Volume 5, Nr 2, June 2014 pp 66-77
- TEM - Ministry of employment and the Economy, 2015 – Service Economy Revolution and Digitalization, Finland's growth Potential – Publication Innovation 41/2015
- Traficom 12.3.2019 – Viestintämarkkinat, teletoimialan investoinnit 2017-2009
- Turkia, V. 2016 - Managing Customer Value: A Study of Mobile Applications – Master's Thesis, Aalto University, TU3001
- Walsh, P., R. 2005. Dealing with the uncertainties of environmental change by
- Van de Ven, A .H & Johnson, P. E. 2008 – Knowledge for theory and practice – Academy of Management Review, 31(4): 802-821

Vargo, S.L., Lush, R.F. 2004 – Evolving to a new dominant logic of marketing – Journal of Marketing, Vol. 68, January, pp 1-17

Vargo, S.L. & Lush, R.F. 2006 - Service dominant logic: continuing the evolution – Journal of the Academy of Marketing Science (online version)

Vargo, S.L. & Lush, R.F. 2010 -It's all B2B ... and beyond: Toward a systems perspective of the market – Industrial Marketing Management 40 (2011) 181-187

Wenger, E. 1998 - Communities of Practice, Learning, Meaning and Identity – Cambridge University Press

Viljanen, S., Tahvanainen, K., Amoniff, A., Trygg, P., Lappeteläinen, I., Järventausta, P. & Partanen, J. 2009 – Service Purchasing in Electricity Distribution Network Sector -CIRED 20th International Conference on Electricity Distribution, paper 0488, pp 8-11

Williamson, O.E.1975 – Markets and Hierarchies: Analysis and Antitrust Implications – New York, Free Press

Williamson, O.E.1989 – The Economic Institutions of Capitalism – New York, Free Press

Yli-Renko, H, Autio, E & Sapienza, H. J, 2001 -Social Capital, Knowledge Acquisition, and Knowledge Exploitation in young technology-based firms – Strategic Management Journal 22: 587-613

Appendices

Appendix 1 Customer survey

Appendix 1.1 Questionnaire 18.11.2017

Appendix 1.2 Customers' replies on selected questions

- Satisfaction to outsourcings?
- Is there a conflict between network owner and service provider?
- How to create Customer – Service Provider sustainable win-win position – key actions, enabler?
- How and whence creates sustainable service company competitiveness

Appendix 2 Industrial service business

Selected questions and replies on Industrial Service Business Questionnaire 9.1.2018 (examples)

- Industrial Service business development in coming 3-5 years?
- Critical success enablers to Industrial Service companies – Improve efficiency, differentiation to competitors?
- What creates sustainable competitive advantage for Industrial Service company – how do you make it?
- Industrial Service Business – How does it work?

Appendix 3 Industrial service companies

Appendix 3.1 Financial data sets (revenues, profit/EBITDA, investments), summary

Appendix 3.2 Selected questions and replies of Industrial Service company Questionnaire 9.1.2018:

- How to sort out and explore critical success factors?
- Best tool and means to achieve Competitive Advantage?

- What are the future means to develop a sustainable competitiveness in your company?
- Have the company achieved the targets?

Appendix 3.3 Summary of service companies' operational actions and performance

Appendix 3.4 Service companies' in-depth interviews, summary

Appendix 4 Summary of electrical distribution network regulation methods

Appendix 5 Critical competence analysis by the VRIO method in an example service company

Appendix 1. Customer survey

- Appendix 1.1 Questionnaire 18.11.2017
- Appendix 1.2 Customers' replies on selected questions

Appendix 1.1 Questionnaire 18.11.2017

Total number of questions was 20 included 110 sub-questions.

c) have target change, how, when, why?					
c) onko tavoiteasetanta muuttunut, miksi, miten milloin?					
aa) customer - service provider model					
aa) tilaja-toimittaja -malli					
bb) cost targets					
bb) kustannustavoite					
cc) other factors?					
cc) muut tekijät?					
d) satisfaction to outsourcings					
d) tyytyväisyys ulkoitukseen					
(5 very satisfied/tyytyväinen - 3 normal/ normaali - 1 unsatisfied in start/alussa	now/nyt		Kommentti		
aa) engineering/suunnittelu					
bb) construction/verkostorakentaminen					
cc) O&M/ käyttö- ja kunnossapito					
dd) AMR/energia- ja tekniset mittaukset					
ee) control room operations/valvomotoiminnot					
ff) other /muuta, mitä?					
Have your own processes developed as planned?					
4 Onko oma toiminta kehittynyt suunnitellusti? - sanallinen kommentti					
a) customer competences, how, what/tilaajan osaaminen, miten, mitä tehty?					
b) customer-service provider model/ tilaaja - toimittaja - mallin toimivuus?					
c) biggest changes/suurimmat muutokset toimintamallissa, oman toiminnan kehittyminen?					
Evaluation of service companies, criterias, what is important?					
5 Palvelutoimittajien arviointi tilaajan kannalta, mikä tärkeää 1-5					
price/hinta		5 most important/ tärkein		3-average/keskinkertainen	1-minor/vähäinen
quality/laatu					
competence/osaaminen					
timetable/aikataulu					
solvency/vakavarainen					
reliable/luotettavuus					
experience/kokemus					
local/paikallinen					
new service ideas/uudet palveluideat					
size of resources/resurssien koko					
speaking language/kielitaito (suomi/ruotsi)					
finnish/suomalainen (omistus)					
safety/turvallisuus					
other, what/ muu, mikä?					
Have customer's role changed during years?		written			
6 Onko tilaajan rooli muuttunut vuosien aikana - miten?		Sanallinen selvitys			

Ownership change	When?	How?
7 Omistusmuutos	Milloin?	Miten?
How has it influenced on service functions?	Written	
Onko omistuksen muutos vaikuttanut palveluliiketoimintojen hankintaan?	Sanallinen selvitys	
Authority control		
8 Viranomaisten ohjaukset		
a) Have Energy authority actions influenced how, have they changed? How?		
a) Onko Energiamarkkinaviranomaisen toimet ja määräykset muuttaneet tilaajan ja/tai palvelujen toimittajan rooleja ja tehtäviä? Miten?		
b) Have other authority actions and rules changed business models and roles? How? Which authority?		
b) Ovatko muiden viranomaisten toimet ja määräykset muuttaneet tilaajan ja/tai palvelujen toimittajan rooleja ja tehtäviä? Miten? Mikä viranomainen?		
Have service providers roles change, tasks and roles? How?		
9 Onko palvelutoimittajien roolit, tehtävät ja toimintatavat muuttuneet? Miten		
a) wider, how, why/laajentunut, miten, miksi?	Written/Sanallinen selvitys	
b) decreased, how, why/pienentynyt, miten, miksi?		
c) other changes/ muut muutokset? IoT/digitaalisuus?	Written/Sanallinen selvitys	
Service providers tendering process?		
10 Palvelutoimittajien kilpailutus		
a)How, what/ Mitä kilpautetaan - kohteet, kohteiden koko, kuinka usein	Written/Sanallinen selvitys	
b) tendering criterias/ Kilpailutuksen kriteerit	Written/Sanallinen selvitys	
Service contracts/Palvelusopimukset	Written/Sanallinen selvitys	
12 a) Content, how long/ Minkälaisia ja kuinka pitkiä palvelusopimuksia on tehty palvelutoimittajien kanssa	Sanallinen selvitys	
b) Onko sopimusrakenteet muuttuneet? Mite ja miksi?	Written/Sanallinen selvitys	
Service providers' change and new entrants		
13 Palvelutoimittajien vaihtuvuus ja uudet toimijat	Written/Sanallinen selvitys	
a) How often, why/ Kuinka usein ja miksi?		
b) Have new service concepts appeared with new service providers, what?/Onko tullut uusia palvelumuotoja uuden toimijan kautta? Mitä?		

Appendix 1.2

1(3)

Customers' detailed replies on selected questions

Satisfaction to outsourcing											
5=satisfied		3=normal		1=unsatisfied							
		engineering		construction		O&M		AMR/measurement		control service	
		in start	now	in start	now	in start	now	in start	now	in start	now
Elecrtric NWC	1	3	4	1	4	3	4	3	4		
Elecrtric NWC	2	3,5	5	3	5	2,5	4	2	3		
Elecrtric NWC	3	3	4	1,5	4	2	3	2	4,5	2	2
Elecrtric NWC	4			4	5	2	4	3	5		
Elecrtric NWC	5			1	5	1	5	3	1		
Elecrtric NWC	6				4		4				
Elecrtric NWC	7			4	5						
Elecrtric NWC	8			2	4	2	3				
Elecrtric NWC	9	4	4	3	4						
Elecrtric NWC	10	2	4	2	3	2	2	4	3		
Elecrtric NWC	11			3	5	3	5	3	3		
Elecrtric NWC	12				4				5		3
Elecrtric NWC	13	3	4	2	4	3	3	4	4	3	3
Elecrtric NWC	14										
Telco	1			3	4						
Telco	2										
Telco	3			4		3				4	
Average		3,1	4,2	2,6	4,3	2,4	3,7	3,0	3,6	3,0	2,7
Deviation		0,6	0,4	1,0	0,6	0,6	0,9	0,7	1,2	0,8	0,5
Organisation	1										
Organisation	2										
Other comments:											
- no alternatives any more - no discharge outsourcing											
- in AMR service provider did not have capability to develop services											
- in O&M motivation challenges and in AMR service technology challenges in the begining											
- service market works, many service providers											
- improved from 1 to 4											
- mixed model partly own and partly service provider's services in engineering											
- target ascieved, challenges in AMR											
- more remarks than with own service company											
- in control room service not enough resorces, co-operation needed, management challenges											
- competences are critical in both parties - service provider and customer											

Replies:

2(3)

Is there a conflict between network owner and service provider				
		Economical	Operational	Quality
Electric NWC	1	Ei, molempien tulee elää markkinaehtoisesti	No	no
Electric NWC	1	No, both have to work market based	Cannot be	no
Electric NWC	2	Both parties profitability chances	no	no, by quality work, once in shape
Electric NWC	3	No, but used business model there is conflict	no	no
Electric NWC	4	No	no	no
Electric NWC	5	Always little conflict	no	No, continuous quality control
Electric NWC	6			
Electric NWC	7	yes, normal market based situation	no	no
Electric NWC	8	Annual contract no	Balanced workload	no
Electric NWC	9	Yes	Unified	Sometimes bad work, not provider's target
Electric NWC	10	Yes, customer cost cut, service company profit	no	Provider's views restricts over quality.
Electric NWC	11	Project services yes, longer contracts no	Project services yes, longer contracts	Project services yes, longer contracts no
Electric NWC	12	Yes, normal buyer/seller position	no	no
Electric NWC	13	No, both targeting to profitable business.	same target	
Electric NWC	14	Targets no, both have to live, but small conflict	no	no
Telco	1	Ei, kirjattu yksiselitteisesti tilaajan tavoitteet	no, involved targets	no, jointly agreed
Telco	2			
Telco	3	Yes, natural	Service provider challenge, different customers. Projects prioritized.	not challenge
Other comments:				
- New industry, in the beginning learning time				
- Both parties target to develop operations jointly, add partnerships				

How to create Customer-Service provider sustainable win-win position - key actions, enablers			
Electric NWC	1		
Electric NWC	1		
Electric NWC	2	Long lasting partnership contracts	
Electric NWC	3	Define jointly target levels and incentives as bonuses.	
Electric NWC	3	Procurement model supporting this idea, Customer advantage to service provider benefit too.	
Electric NWC	4	Strategic partnership, admit benefits/disadvantages. Joint development plan, in co-operation.	
Electric NWC	5	Market takes care.	
Electric NWC	6		
Electric NWC	7	Longer contracts, jointly constructed and developed (japanese model)	
Electric NWC	8		
Electric NWC	9	Efficiency, volume advantages	
Electric NWC	10	Success in contracts is deepening co-operation, needs maintenance, upkeep of both parties.	
Electric NWC	11	The size of the organization. Have to understand the meaning, importance of service providers and take care of their profitability.	
Electric NWC	12	Work quality determines, competences, flexibility, quality services. The price not most important (40 yrs. operative time), but in the deal a high weight.	
Electric NWC	13	Partnership, open discussion, target jointly.	
Electric NWC	14	Earning model/value chain knowledge in both parties, openness.	
Telco	1	Onest to own internal targets.	
Telco	2		
Telco	3	May be possible	

How and whence creates sustainable service company competitiveness		
Electric NWC	1	Internal efficiency, must. Advanced services, ahead of competitors. Better knowledge of customer process. Small work business processes best developed.
Electric NWC	2	Think differently, new brave business models for future permanently
Electric NWC	3	Ability to be more efficient, service develop.
Electric NWC	3	By own service model can create more added value to customer and so that a service is profitable.
Electric NWC	4	Good service attitude, co-operation capability, quality, reasonable price. Capability to joint-development. In future wider service packages, not unit prices.
Electric NWC	5	Cost efficiency, quality, competences.
Electric NWC	6	
Electric NWC	7	Not easy to find, network owner as driver. You have to create added value for the customer. from which they are ready to pay.
Electric NWC	8	Efficient operation, small overheads
Electric NWC	9	Service provider lives from services - interests on efficiency, if not, you are disappearing from the market
Electric NWC	10	You cannot find sustainable competitive advantage, market functions eat it.
Electric NWC	11	Operative efficiency and evidence of permanent quality
Electric NWC	12	Competence, flexibility, quality services. Price not most important (40 yrs. Operative age), but in the deal a high weight.
Electric NWC	13	Project management
Electric NWC	14	Good own equity, secure competences, development, customer proximity.
Telco	1	Keep promises (contract measurements - sanctions). Ability to learn and listen.
Telco	2	
Telco	3	Competences and wide competences.

Appendix 2. Industrial Service Business

Selected questions and replies of Industrial Service Business questionnaire 9.1.2018 (examples)

Total number of questions was 13 included 70 sub-questions

2. Industrial service development in coming 3-5 yrs.?

Questions	Fully disagree	Disagree	Agree	Fully agree	Cannot answer
	1	2	3	4	empty
Growing					
Service contracts enlarging					
Longer contract periods					
Transfer to total service model					
Service s are networking					
Specializing to narrow service					
Life cycle model					
Alliance construction					
Finance package model					
IoT/digitalization increases					
Service providers more internationalization					
Service providers' consolidation					
International ownership					
Network companies' consolidation					
Other					

Replies:

Industrial service business development in coming 3-5 yrs																
Scale: 4-fully agree, 3-agree, 1-fully disagree, empty-no opinion																
		Growing	Service contracts enlarging	Longer contract periods	Transfer to total service model, asset mng	Services are networking	Specializing to narrow service	Life cycle model	Alliance construction	Finance package model	IoT/digitalisation increase	Service providers more internat.	Service providers' consolidation	International ownership	Network company consolidation	Other
1	Network Service C	4	4	2	3	4	3	3	3	3	4	3	3	4	4	
2	Network Service C	3	3	3	3	4	3	3	4	3	4	3	2	2	3	
3	Network Service C	4	4		3	3	2	3	2	3	4	2	4	4	4	
4	Network Service C	3	3	2	3	4	3	3	2	1	3	2	3	2	2	
5	Network Service C	3	3	2	4	3	3	4	3	3	4	3	4	3	2	
6	Network Service C	3	3	2	2	3	2	1	2	4	2	4	4	4	1	
7	Network Service C	3	3	2	2	3	2	1	2	4	2	4	4	4	1	
8	Network Service C	4	4	2	2	4	4	2	3	3	4	4	3	3	3	
9	Network Service C	4	4	4	4	4	2	4	3	4	4	3	4	4	4	
10	Network Service C	3	2	3	3	2	3	3	3	2	3	2	3	3	3	
11	Network Service C	3	3	2	2	3	3	3	3	3	3	2	3	3	3	
12	Network Service C	4	4	3	3	4	3	2	3	4	4	3	3	2	3	
13	Network Service C	3	3	3	3	3	2	3	1	2	4	3	3	3	3	
14	Network Service C	4	4	4	4	4	4	4	4	4	4	4	4	4	3	
15	Engineering Co	4	4	3	3	4	3		2	2	4	3	3	3	3	
16	Industrial Service C	3	3	3	3	3		4	3	3	4	3	3	3	3	
17	Industrial Service C	4	4	4	3	4	3	3	4	4	4	4	3	4	3	
18	Industrial Service C	3	2	3	2	4	4	4	3	2	4	3	3	3	3	
19	Union	4	4	3	3,5	4	2,5	3	3	3,5	4	3,5	3	3	3	
	Average	3,5	3,4	2,8	2,9	3,5	2,9	2,9	2,8	3,0	3,6	3,1	3,3	3,2	2,8	
	Deviation	0,50	0,67	0,71	0,65	0,60	0,66	0,91	0,77	0,87	0,67	0,69	0,55	0,69	0,81	

3. Critical success enablers to Industrial Service companies – improve efficiency, differentiation to competitors?

Questions	Fully disagree	Disagree	Agree	Fully agree	Cannot answer
	1	2	3	4	empty
Growth					
Profitability					
Strong balance sheet, own capital					
New service development					
Continuous business development					
Internationalization					
Management incentives, engagement					
Engaging personnel					
Taking care of competences					
Learning from competitors					
Other					

Replies:

Critical success enablers to Industrial Service companies - improve efficiency, differentiation to competitors												
Scale: 4-fully agree, 3-agree, 1-fully disagree, empty-no opinion												
		Growth	Profitability	Strong balance sheet, own capital	New service development	Continuous business development	Internationalization	Management incentives, engaging	Engaging personnel	Taking care of competences	Learning from competitors	Other
1	Network Service Co	3	4	3	4	4	3	4	4	4	4	
2	Network Service Co	3	3	2	4	4	3	4	4	4	3	
3	Network Service Co		3	3	4	4	2	3	3	4	2	
4	Network Service Co	2	4	2	3	4	1	4	4	4	4	
5	Network Service Co	2	3	3	4	3	2	4	4	4	3	
6	Network Service Co	3	3	2	3	4	2	4	4	4	2	
7	Network Service Co	3	3	2	3	4	2	4	4	4	2	
8	Network Service Co	4	4	3	4	4	2	4	4	4	4	
9	Network Service Co	3	4	3	3	4	2	4	4	4	3	
10	Network Service Co		3	3	3	4	2	3	3	4	3	
11	Network Service Co	3	3	3	4	4	2	3	2	4	3	
12	Network Service Co	2	3	3	4	3	2	4	4	3	2	
13	Network Service Co	3	3	3	3	4	3	3	3	4	3	
14	Network Service Co	4	4	4	4	4	3	3	3	4	3	
15	Engineering Co	3	3	3	3	4	2	3	3	4	3	***)
16	Industrial Service Co	3	3	2	3	3	2	3	3	3	3	
17	Industrial Service Co	3	3	1	4	4	3	4	3	4	1	
18	Industrial Service Co	4	3	3	4	3	3	4	4	3	2	
19	Union	3	3	2	3,5	3,5	3	3,5	3,5	4	3	**)
	Average	3	3,3	2,6	3,6	3,8	2,3	3,6	3,5	3,8	2,8	
	Deviation	0,59	0,44	0,67	0,48	0,41	0,57	0,48	0,58	0,36	0,77	
	*) Have know customer need and what creat added value to customer, co-creation with customers, how to researh competitive and motivated personnel, critical to success?											
	**) Local can be meaningful and critical success tool, networking, *)											
	***) Local can be meaningful											

7. What creates Sustainable Competitive Advantage for Industrial Service Company – How do you make it?

Questions	Fully disagree	Disagree	Agree	Fully agree	Cannot answer empty
	1	2	3	4	
Differentiation					
New Innovative services					
Cost efficiency					
Best customer proximity					
Management engagement, incentives					
Company good reputation, brand					
Personnel incentives					
Other					

Replies:

What creates sustainable competitive advantage for Industrial Service company - How do you make it?									
Scale: 4-fully agree, 3-agree, 1-fully disagree, empty-no opinion									
		Differentiation	New innovative services	Cost efficiency	Best customer proximity	Management engagement, incentives	Good reputation brand	Personnel incentives	Other
1	Network Service Co	4	3	4	4	3	4	3	
2	Network Service Co	3	4	4	3	4	3	4	*)
3	Network Service Co	3	3	4	3	2	4	3	
4	Network Service Co	2	1	4	1	3	1	3	
5	Network Service Co	4	3	3	4	3	3	3	
6	Network Service Co	4	4	4	3	2	2	3	
7	Network Service Co								
8	Network Service Co	4	4	3	4	3	3	3	
9	Network Service Co	4	3	3	3	3	3	3	
10	Network Service Co	3	2	3	4	2	3	2	
11	Network Service Co	4	4	4	4	3	3	3	
12	Network Service Co	3	4	4	3	2	3	4	
13	Network Service Co	3	3	4	3	3	3	3	
14	Network Service Co	3	3	4	4	4	3	3	
15	Engineering Co	3	3	3	3	3	3	3	**)
16	Industrial Service Co	3	4	4	4	2	3	3	
17	Industrial Service Co	4	4	2	2	3	3	3	
18	Industrial Service Co	3	3	3	4	4	3	4	
19	Union	3,5	4	3,5	3,5	2,5	3	2,5	***)
	Average	3,4	3,3	3,5	3,3	2,9	2,9	3,1	
	Deviation	0,57	0,80	0,59	0,80	0,66	0,62	0,48	
*)	Good, clear concept, process and execution. Motivated personnel and resource model.								
**)	All important, not sustainable, to develop all								
***)	In the market has to find space for innovations								

11. Industrial Service business – How does it works?

Questions	Fully disagree	Disagree	Agree	Fully agree	Cannot answer
	1	2	3	4	empty
Market is open?					
Market rules are ok?					
Tender competitions are same to all?					
Competitors number is ok?					
Resources are changing employers easily?					
Regulations do not disturb the open market?					
Bayer's' power is too strong?					
Other					

Replies:

Industrial Service business - How does it work?									
Scale: 4-fully agree, 3-agree, 1-fully disagree, empty-no opinion									
		Market is open	Market rules are ok	Tender competitions are same to all	Competitors number is ok	Resources are changing employers easily	Regulations do not disturb the open market	Buyers' power is too strong	Other
1	Network Service Co	2	2	2	3	2	3	3	Customer owner influences
2	Network Service Co	3	3	3	2	3	3	2	
3	Network Service Co	3	2	2	2	2	2	3	
4	Network Service Co	4	4	4	1	4		4	Competitio rools same to all
5	Network Service Co								
6	Network Service Co	3	2	1	1	3	1	4	
7	Network Service Co	3	2	1	1	3	1	4	
8	Network Service Co	3	3	3	2	2	1	4	
9	Network Service Co	3	3	3	2	3	2	3	
10	Network Service Co	3	3	3	2	2	3	2	
11	Network Service Co	3	3	3	3	3	3	4	
12	Network Service Co	3	3	2	3				
13	Network Service Co	2	2	2	3	3	3	2	
14	Network Service Co	3	3	3	2		2	4	
15	Engineering Co	3	2	2	3	2	1	4	Depends on services and targets and need of special com
16	Industrial Service Co	3	3	3	2	3		3	
17	Industrial Service Co	3	2	3	3	4	4	1	
18	Industrial Service Co	4	3	3	3	3	4	2	
19	Union	3	2				3	1	Customer in key role
	Average	3,0	2,6	2,5	2,2	2,8	2,4	2,9	
	Deviation	0,47	0,59	0,78	0,73	0,65	1,02	1,06	

Appendix 3. Industrial Service Companies

Appendix 3.1 Financial data sets (revenues, profit/EBITDA, investments), summary

Appendix 3.2 Selected questions and replies of Industrial Service company Questionnaire 9.1.2018:

Appendix 3.3 Summary of service companies' operational actions and performance

Profitability, EBITDA, M€/%

Profitability EBITDA, M€/%														
	2 007	2 008	2 009	2 010	2 011	2 012	2 013	2 014	2 015	2 016	2 017		Average	CAGR
Company													2007-201	
COM1	8 747	4 925	6 359	9 760	7 683	14 584	16 733	11 342	17 229	18 979	14 912			5,48 %
	6,00 %	2,90 %	3,50 %	5,70 %	3,60 %	5,60 %	6,60 %	4,60 %	6,10 %	6,80 %	5,30 %		5,15 %	
COM2	11 100	15 800	17 600	6 200	400	-16 882	10 106	4 340	15 747	17 283	16 360			3,96 %
	6,60 %	5,90 %	5,50 %	2,00 %	0,10 %	-4,60 %	3,10 %	2,00 %	6,10 %	7,10 %	6,70 %		3,68 %	
COM3	1 472	2 369	2 117	3 541	-1 650	2 757	5 171	2 956	3 593	1 836	3 419			8,79 %
	4,80 %	5,90 %	5,00 %	6,30 %	-2,90 %	3,70 %	6,50 %	3,90 %	4,40 %	2,10 %	3,20 %		3,90 %	
COM4	- 534	- 159	127	526	251	756	1 350	1 892	732	993	- 1 278			9,12 %
	-9,50 %	-1,50 %	1,20 %	4,60 %	1,90 %	4,90 %	6,50 %	6,00 %	4,00 %	5,30 %	-7,00 %		1,49 %	
COM5	2 567	3 005	2 821	1 318	- 1 886	- 63	861	1 212	1 430	1 328	542			-14,40 %
	6,80 %	7,50 %	7,30 %	3,60 %	-5,60 %	-0,20 %	2,40 %	3,30 %	4,20 %	4,30 %	1,80 %		3,22 %	
COM6	1 252	1 128	1 520	1 050	1 455	1 077	1 213	1 158	1 272	889	1 028			-1,95 %
	20,30 %	18,50 %	22,60 %	16,80 %	19,50 %	13,30 %	14,50 %	13,40 %	13,70 %	9,80 %	9,80 %		15,65 %	
COM7	- 325	863	1 024	749	861	540	551	893	751	- 138	- 1 163			13,60 %
	-8,10 %	9,40 %	11,70 %	6,80 %	6,90 %	4,40 %	5,50 %	7,00 %	5,90 %	-1,20 %	-12,60 %		3,25 %	
COM8		1 101	2 236	1 211	1 825	1 290	561	3 395	3 582	4 036	2 557			9,81 %
		9,80 %	9,20 %	5,30 %	7,90 %	6,20 %	2,30 %	11,90 %	11,70 %	11,20 %	7,20 %		8,27 %	
COM8	82	236	537	420	642	392	589	1 217	2 993	1 356	1 950			37,28 %
	5,10 %	6,60 %	10,30 %	5,60 %	5,70 %	2,90 %	3,90 %	6,80 %	8,60 %	5,10 %	6,10 %		6,06 %	
COM9	391	491	- 1 001	- 703	966	1 422	668	414	196	373	582			4,06 %
	2,70 %	3,20 %	-7,70 %	-6,00 %	6,70 %	8,80 %	4,60 %	2,90 %	1,30 %	2,60 %	3,40 %		2,05 %	
COM10							2 380	4 873	4 260	6 447				39,40 %
							10,50 %	14,40 %	12,20 %	10,40 %			11,88 %	
All network co, 11pcs	3,9 %	6,8 %	6,9 %	5,1 %	4,4 %	4,5 %	6,0 %	6,9 %	7,1 %	5,8 %	2,4 %	Average	5,4 %	
ernat. network co. 31	5,9 %	8,4 %	9,5 %	6,2 %	5,8 %	3,4 %	5,3 %	8,4 %	10,8 %	10,1 %	8,4 %	Average	7,5 %	
municipal network co,61	2,8 %	7,2 %	6,7 %	5,4 %	4,4 %	5,8 %	6,7 %	6,1 %	5,6 %	3,8 %	-0,2 %	Average	4,9 %	
Average/yr				4,00 %	1,80 %	3,60 %	6,35 %	6,51 %	6,35 %	4,79 %	1,08 %	Average	4,3 %	
IND1							1 203	964	- 152	608	2 689	3 281		22,3 %
							11,40 %	14,10 %	-1,20 %	4,20 %	7,60 %	8,20 %	7,4 %	
IND2				2 647	2 706	5 693	2 978	3 862	5 273	4 065	4 055			6,3 %
				4,00 %	1,80 %	3,60 %	1,90 %	2,40 %	3,20 %	2,60 %	2,40 %		2,7 %	
Industrial service co, 2pcs.			average	4,00 %	1,80 %	3,60 %	6,65 %	8,25 %	1,00 %	3,40 %	5,00 %		4,2 %	

Investments

3(3)

Investments		1 000 €											Total	Inv./yr	
Company		2 007	2 008	2 009	2 010	2 011	2 012	2 013	2 014	2 015	2 016	2 017			
COM1	Revenues	146 191	169 014	184 363	170 778	211 696	259 837	253 606	246 275	283 471	281 096	280 420			
	Inv.	2 011	1 931	1 021	3 129	2 041	2 128	2 618	2 589	1 648	4 673	4 329	28 118	2 556	
	Inv/TO %	1,4 %	1,1 %	0,6 %	1,8 %	1,0 %	0,8 %	1,0 %	1,1 %	0,6 %	1,7 %	1,5 %	1,1 %		
COM2		168 000	267 000	318 000	307 000	404 000	367 000	326 000	217 000	259 213	243 104	245 322			
COM3	Revenues	30 735	39 974	42 440	56 252	57 692	74 546	79 381	75 943	81 892	89 013	107 560			
	Inv.	344	552	653	1 846	1 130	809	660	692	1 021	5 759	3 365	16 831	1 530	
	Inv/TO %	1,1 %	1,4 %	1,5 %	3,3 %	2,0 %	1,1 %	0,8 %	0,9 %	1,2 %	6,5 %	3,1 %	2,1 %		
COM4	Revenues	5 592	10 250	10 466	11 432	13 414	15 473	20 687	31 415	18 465	18 619	18 281			
	Inv.	154	482	273	103	1 093	331	130	330	166	279	116	3 457	314	
	Inv/TO %	2,8 %	4,7 %	2,6 %	0,9 %	8,1 %	2,1 %	0,6 %	1,1 %	0,9 %	1,5 %	0,6 %	2,4 %		
COM5	Revenues	38 014	39 873	38 701	37 034	33 359	36 388	36 022	36 703	34 204	30 841	30 086			
	Inv.	41	226	187	300	111	41	41	16	89	27	51	1 130	103	
	Inv/TO %	0,1 %	0,6 %	0,5 %	0,8 %	0,3 %	0,1 %	0,1 %	0,0 %	0,3 %	0,1 %	0,2 %	0,3 %		
COM6	Revenues	6 167	6 092	6 737	6 256	7 467	8 089	8 370	8 676	9 258	9 058	10 459			
	Inv.	13	6	- 1	2	101	22	3	0	0	- 1	13	158	14	
	Inv/TO %	0,2 %	0,1 %	0,0 %	0,0 %	1,4 %	0,3 %	0,0 %	0,0 %	0,0 %	0,0 %	0,1 %	0,2 %		
COM7	Revenues	4 030	9 203	8 780	10 970	12 493	12 181	9 967	12 735	12 768	11 938	9 198			
	Inv.	262	118	253	208	213	37	163	179	272	60	134	1 899	173	
	Inv/TO %	6,5 %	1,3 %	2,9 %	1,9 %	1,7 %	0,3 %	1,6 %	1,4 %	2,1 %	0,5 %	1,5 %	2,0 %		
COM8	Revenues		11 239	24 224	22 953	23 160	20 658	24 600	28 540	30 609	36 128	35 742			
	Inv.		115	268	218	150	821	385	399	155	5 032	1 117	8 660	787	
	Inv/TO %		1,0 %	1,1 %	0,9 %	0,6 %	4,0 %	1,6 %	1,4 %	0,5 %	13,9 %	3,1 %	2,6 %		
COM9	Revenues	1 600	3 585	5 239	7 555	11 359	13 749	15 263	18 029	34 866	26 760	31 934			
	Inv.	84	115	174	534	729	1	891	908	324	- 369	- 1	3 390	308	
	Inv/TO %	5,3 %	3,2 %	3,3 %	7,1 %	6,4 %	0,0 %	5,8 %	5,0 %	0,9 %	-1,4 %	0,0 %	3,2 %		
COM10	Revenues	14 494	15 168	13 009	11 740	14 485	16 260	14 681	14 515	14 995	14 400	16 904			
	Inv.	1 321	1 507	- 1	0	241	118	42	0	11	36	164	3 439	313	
	Inv/TO %	9,1 %	9,9 %	0,0 %	0,0 %	1,7 %	0,7 %	0,3 %	0,0 %	0,1 %	0,3 %	1,0 %	2,1 %		
Network companies investments average %/revenues	Revenues							22 762	33 855	35 001	62 204	66 000			
	Inv.							1 685	1 505	3 256	949		7 395	1 849	
	Inv/TO %							7,4 %	4,4 %	9,3 %	1,5 %	0,0 %	2,1 %		
IND1	Revenues							10 559	6 856	12 633	14 422	35 432			
Inv.								415	359	251	70	358	1 453	291	
Inv/TO %								3,9 %	5,2 %	2,0 %	0,5 %	1,0 %	2,5 %		
IND2	Revenues				65 624	146 792	160 456	157 314	159 793	167 368	155 890	166 504			
	Inv.				34 452	947	888	3 597	2 023	1 914	2 135	1 575	47 531	5 941	
	Inv/TO %				52,5 %	0,6 %	0,6 %	2,3 %	1,3 %	1,1 %	1,4 %	0,9 %	7,6 %		
Total investments 2007-2017 (1000€)															
All network companies (excl. COM2, comment 1)						74 477	total	7 947	per company						
								722	per company/yr						
International network companies, 2 pcs. (excl.COM2)						40 168	total	20 084	per company						
									per company/yr						
Municipal network companies, 6 pcs.						26 914	total	4 486	per company						
								408	per company/yr						
Industrial service companies, 2 pcs.						48 984	total	24 492	per company						
								1 884	per company/yr						
Comment 1: COM2 company investments not divided to network/industrial services from total investments															
Commet 2: Investments include also acquisitions, these are not separated from normal annual investments, by yellow colour marked estimated to include acquisitions															

Appendix 3.2

1(4)

Selected questions and replies of the Industrial Service Company questionnaire 9.1.2018 (examples)

Total number of questions was 23 including 150 sub-questions.

9. How to sort out and explore critical success factors?

Questions	Fully disagree	Disagree	Agree	Fully agree	Cannot answer
	1	2	3	4	empty
Value chain (Porter)					
SWOT					
VRIO - competences					
GS/BCG - matrix					
Unit/product costs					
Customer responses					
By developing overwhelming competences					
Competitor survey					
Other					

Replies:

How to sort out and explore critical success factors										
Scale: Fully disagree=1; disagree=2; agree=3; fully agree=4; no answer=empty										
Company no		Value chain	SWOT	VRO-competences	BCG-matrix	Unit/product costs	Customer responses	By developing overwhelming competence	Competitor survey	Other
1	Network Service Co	3	3		3	3	4	4	4	
2	Network Service Co	2	3		3	4	4	4	2	
3	Network Service Co	4	4			4	4	3	3	
4	Network Service Co	3	4	4	3	4	4	4	4	
5	Network Service Co									No answer
6	Network Service Co	3	4	3	3	3	3	4	4	
7	Network Service Co	3	4	4	3	3	3	3	3	
8	Network Service Co		3			4	3	3	3	
9	Network Service Co	3	4	3	1	3	3	3	3	
10	Network Service Co	3	4	3	1	3	3	3	3	
11	Network Service Co		3			4	4	3	4	
12	Network Service Co	2	3	2	1	4	4	3	3	
13	Network Service Co	3	4			4	4	3	4	Meetings with key customers, new service concepts under
14	Network Service Co					4	3	3	3	
15	Network Service Co	3	4	1	3	4	4	3	3	
16	Engineering Co	2	3	3	3	3	3	4	2	Many means, depends; GS-matrix&profitability/growth, service controllable portfolio
17	Industrial Service Co	4	3	1	3	4	3	4	3	
18	Industrial Service Co	1	3	3	2	2	3	4	3	
19	Industrial Service Co	3	3			3	4	3	2	
	Average	2,8	3,5	2,7	2,4	3,5	3,5	3,4	3,1	
	Deviation	0,75	0,50	1,00	0,86	0,60	0,50	0,49	0,66	

2(4)

11. Best tools and means to achieve Competitive Advantage?

Questions	Fully disagree	Disagree	Agree	Fully agree	Cannot answer
	1	2	3	4	empty
Profit review regularly					
Tender audit					
Tender audits with customers					
Systematic contract evaluation with customers					
With new services?					
Competitor follow up?					
Other					

Replies:

Best tools and means to achieve Competitive Advantage		Scale: Most important=4; Important=4; Good=3; Reasonable=2; No influence==						
Company nro		Profit review regularly	Tender audit	Tender audits with customer	Systematic contract evaluation with customer	With new services	Competitor follow up	Other
1	Network Service Co	3	3	3	3	3	3	
2	Network Service Co	4	3	2	3	3	1	Consentrating and responsibility for, customer intrested servoces and service portfolio
3	Network Service Co	3	3	4	4	2	1	
4	Network Service Co	4	3	3	4	3	2	
5	Network Service Co							No answer
6	Network Service Co	4	4	3	3	4	3	
7	Network Service Co	4	4	3	3	2	2	
8	Network Service Co	4	2	3	3	2	1	
9	Network Service Co	4	3	3	4	2	3	
10	Network Service Co	4	3	3	4	2	3	
11	Network Service Co	3	3	2	3	2	3	
12	Network Service Co	4	4	3	3	2	2	
13	Network Service Co	4	3	3	3	3	3	Follow up reference service indutries, how to differentiate, ref. Fira Oy
14	Network Service Co	4	3	3	3	3	3	
15	Network Service Co	3	3	2	2	2	2	
16	Engineering Co	1	2	3	2	4	2	Profit control 1 month is too short, for projects it can be too long.
17	Industrial Service Co	4	4	2	4	2	1	
18	Industrial Service Co	3	3	4	4	2	1	
19	Industrial Service Co	4	3	3	3	3	2	
	Average	3,6	3,1	2,9	3,2	2,6	2,1	
	Deviation	0,76	0,57	0,57	0,63	0,68	0,81	

3(4)

16. What are future means to develop a Sustainable Competitiveness in your company?

Questions	Very important	Important	Good	Minor meaning	No important
To grow	5	4	3	2	1
Better profitability					
Keep critical competences					
New service products					
Customer proximity					
Better internal follow up system					
Networking with partners					
Better incentive model					
Better procurement					
Better competitor survey					
Internationalization					
Other					

Replies:

What are the future means to develop a sustainable competitiveness in your company (16 answers)												
Very important=5; Important=4; Good=3; Minor meaning=2; No important=1												
Company nro		TO growth	Better profitability	Keep critical competences	New services products	Customer proximity	Better internal follow up system	Networking with partners	Better incentive model	Better procurement	Better competitor survey	Internalization
1	Network Service Co	4	4	5	5	5	3	3	3	3	3	3
2	Network Service Co	3	4	4	4	5	4	4	4	5	2	2
3	Network Service Co	4	5	4	3	4	3	4	3	5	2	2
4	Network Service Co	3	4	5	4	5	4	4	3	4	3	3
5	Network Service Co	No answer										
6	Network Service Co	4	5	5	4	5	4	4	5	4	4	3
7	Network Service Co	3	4	5	4	4	5	5	3	4	2	2
8	Network Service Co	5	5	5	3	4	5	4	3	5	2	1
9	Network Service Co	5	4	5	4	5	3	3	3	3	3	2
10	Network Service Co											
11	Network Service Co	3	4	5	3	3	5	4	3	3	3	2
12	Network Service Co	4	5	5	4	5	4	5	3	4	3	3
13	Network Service Co	4	5	3	5	5	3	4	3	3	3	5
14	Network Service Co	4	4	5	4	4	5	4	4	4	4	4
15	Network Service Co											
16	Engineering Co	3	3	5	5	5	2	4	2	2	2	4
17	Industrial Service Co	4	5	5	4	4	3	3	3	3	2	4
18	Industrial Service Co	4	5	5	4	5	3	4	4	4	3	4
19	Industrial Service Co	3	4	5	4	5	4	4	4	5	3	4
	Average	3,75	4,4	4,8	4,0	4,6	3,8	3,9	3,3	3,8	2,8	3,0
	Deviation	0,66	0,60	0,56	0,61	0,61	0,90	0,56	0,68	0,88	0,66	1,06

4(4)

17. Have the company achieved the targets?

Questions	Very well	Good	Reasonable	Not good	Badly
	5	4	3	2	1
EBITDA 2005-2012					
EBITDA 2013-2017					
Efficiency 2005-2012					
Efficiency 2013-2017					
Competitiveness 2005-2012					
Competitiveness 2013-2017					
Other comments					

Replies:

Have the company achieved the targets								
Very well=5; good=4; reasonable=3; not good=2; badly=1								
Company nro		EBITDA 2005-2012	EBITDA 2013-2017	Efficiency improvement 2005-2012	Efficiency improvement 2013-2017	Competitiveness 2005-2012	Competitiveness 2013-2017	Other comments
1	Network Service Co	2	2	2	3	3	3	There are better and worse years during long journey
2	Network Service Co	4	3	5	4	5	3	
3	Network Service Co	3	3	3	4	4	3	
4	Network Service Co	3	3	2	3	2	3	
5	Network Service Co							No answer
6	Network Service Co							No answer
7	Network Service Co	1	3	2	4	1	4	
8	Network Service Co	4	2	2	3	2	3	Before 20017 hour-based works, after unit prices and lately projects.
9	Network Service Co	4	4	4	4	4	4	
10	Network Service Co	4	4	4	4	4	4	
11	Network Service Co	5	4	3	3	4	3	
12	Network Service Co	5	3	3	4	3	4	
13	Network Service Co		3		3		4	
14	Network Service Co	3	3	3	3	3	3	
	Network Service Co	4	4					
15	Engineering Co	4	4	3	4	3	3	
16	Industrial Service Co							No answer
17	Industrial Service Co							No answer
18	Industrial Service Co	3	4	4	4	4	4	
	Average	3,5	3,3	3,1	3,6	3,2	3,4	
	Deviation	1,05	0,68	0,92	0,49	1,05	0,49	

Service companies' operational actions and performances 2006-2017

1. Company COM1

The Company COM1 is a multinational service company that offers a wide range of services ranging from design, construction and maintenance services to comprehensive project deliveries electrical and telecommunication business.

Remarks on performance of the case company COM1 in 2011 – 2016.

2011	The company made new market entries and won new customer contracts, and improved operational efficiency and cash position. The company's growth in revenue was achieved organically with positive contributions from most areas and geographies. The operating result stayed at a stable level as the company has made important structural improvements in recent years and this has helped us to perform practically in all market conditions.
2012	The company's revenue increased due to organic growth coupled with new market openings in the UK and Ukraine. Steady improvement of operating result and liquidity were achieved by means of systematic development of company's operational model. The operating result included costs of closing down of unprofitable business operations.
2013	The company continued its positive improvement focusing on operating result, rather than growth of revenue. The company's capability to offer major turnkey projects is well supported by its specialized engineering company with 200 employees. A new power transmission and distribution unit was opened in Germany. A new joint venture company with telecom operator will start operations in the beginning of 2015. The company sold part of its business and 39 employees shifted company.
2014	The company's revenue increased purely due to organic growth. The company's operating result slightly decreased due to changes in mix of maintenance and projects of a business line.
2015	The company's revenue growth was driven by the successful completion of acquisitions in Germany and Norway, as well as healthy organic growth. The company's operating result also continued to improve. The company signed new framework agreements with all of the largest telecom operators to construct fibre and mobile networks. The company conducted the second largest acquisition, consolidating a joint venture with Norwegian telecom operator. The company made another strategic acquisition within rail business in Norway. The company acquired a power transmission business in Germany.
2016	The company recruited a new president and CEO. The company's revenue increased due to previous business transactions and organic growth within the power and communication segments. The company's operating result damaged due to the deficiencies of project business as some projects had too aggressive historical revenue recognition in certain projects. The company will concentrate its operations on the healthy core business equivalent to 85% of revenue and with stable profitability. The core businesses are within power and communication in the Nordics, Poland and Germany. The company discontinues its unprofitable operations in the UK and will continue to divest other businesses on next year. The negative operating result lead to danger company's long-term financing needs.
2017	Focusing on profit improvement in the new strategy. Divesting businesses outside Europe as well as rail operation and power distribution in Baltic countries. Revenues dropped 4,5% and EBITA margin turned to slightly negative (+3%). Number of employees reduced by 15%. Strategic priorities on AMR projects, market leader.

2. Company COM2

The Company COM2 is a multinational service company that builds, installs, maintains and repairs electrical and telecommunication networks, maintains power plants and factories and provides ICT solutions.

Remarks on performance of the case company COM2 in 2006 – 2016.

2006	The company's competitiveness is based on motivated employees, wide customer group and versatile expertise. The company increased its revenue by merging new companies and businesses. The mergers strengthened the construction and maintenance of tele communication networks as well as industrial plant maintenance. The revenue of the company increased due to acquisitions and large project deliveries in Baltics. The operating result of the company increased due to acquisitions of new companies and a business.
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	Seasonal fluctuations play a major role in the company's liquidity, and as business grows, the importance of working capital optimization is emphasized. The company made seven company and business acquisitions, bringing 250 new employees and a turnover of EUR 13 million.
2007	The revenue of the company increased due to new acquisitions and increased demand in electrical network and industrial services. The operating results increased due to increased volume and improvements in procurement. The two thirds of investments were invested in acquiring new businesses. The company expanded its telecommunication services by acquiring six companies and businesses, which doubled the revenue of telecommunication business. The ownership of the company changed, as there is now a new capital investor and still part of the ownership is in the management team.
2008	The finance crisis decreased the company's order books and resulted unprecedented personnel adjustments. The growth of revenue was due to seven company and business acquisitions as well as organic growth in industrial and telecommunication network services. The growth of operating results was due to increased volume of operations as well as administrative costs decreased in comparison to growth of revenue. Company divested two partially owned subsidiaries from Russia as the failed to launch as intended. Company's group structure and operating model has been renewed.
2009	The revenue grew due to new acquisitions, in some areas the revenue grew and in some areas the revenue declined due to economic recession. The operating results was on satisfactory level due to economic recession. The company acquired two new companies and expanded its operations into new customer segments.
2010	The company's revenue declined due to decrease in transmission network project volumes, rest of the businesses increased their revenue. The declined in project volumes and tightening price competition among competitors resulted the negative operating result.
2011	The company's revenue grew significantly as all businesses increased their sales due to customers' investments increased. The company did not achieve the desired operating results because of its revenue grew strongly and there were unprofitable service contracts as well as industry's tight price competition. The company has a development program to boost profitability, and therefore the company has decreased number of employees in the businesses that have lost contracts or the profitability level is not acceptable.
2012	The company's revenue declined significantly due to decreases in sales of almost each business as well as divestments of some operations. The company focused to improve its operating result and cash flow during the year and managed to balance the company's cash flow and liquidity in second half of the year by the efficiency improvements and capital loan from the owner. The company's return on investment was negative for 2012-2010, also the equity ratio was negative for 2012-2011.
2013	The key to the company's operations was restoring profitability and stabilizing business and this was achieved. During the year, company managed to attain new construction and service contracts as well as continue existing contracts.
2014	The company's revenue decrease caused by the discontinuation of unprofitable business. The revenue of continuous operations remained on same level as in previous year. The company expanded its operations and customer base through two business transaction. The 47 employees were laid off temporarily.
2015	Service sales in the energy business continued to grow strongly as well as in the telecommunication business in both Finland and Sweden. In the industrial business, company's revenue decreased due to previous year's divestments. The company restructured the Group's legal structure.
2016	The company's revenue decreased and operating result increased due to focusing on businesses where it has demonstrated a solid history of profitable operations. The company exited loss-making businesses and the operations in the telecom network and industry sectors in Sweden were run down. Company also decreased its position in the highly competitive power distribution construction market. The company did not target to defend its market share at the expense of profitability and resulted to a slight decrease of revenue.
2017	Revenues increased slightly as well as profit. Digital solution was developed in industry and energy segments. Wind farm projects in Sweden. Work safety improved. Swedish business was discontinued as well as some Latvia operations. Liquidity and cash challenges.

3. Company COM 3

The Company COM3 is a Finnish-owned provider of life cycle services and solutions for electrical and telecommunication networks and systems. The company's customers include The Baltic and Central European telecom operators, Finland's most important transmission and distribution network companies, global equipment manufacturers and a large number of industrial companies, cities and municipalities.

Remarks on performance of the case company COM3 in 2006 – 2016.

2006	The company acquired ownership of telecommunication network business and 16 employees. Strong price rises in materials weakened profitability, the company mitigated it by purchasing material in advance to the storage for the coming months.
2007	Ownership of the company was sold to another Finnish company. The key feature was the increase in demand in the electricity and telecommunications business and, at the same time, the tightening of competition in the market. Operating result was further weakened by a very strong rise in material prices.
2008	Ownership of the company was partially sold to another Finnish company. Industrial maintenance service provider business merged to the company. Unit price agreements were signed with Finnish energy companies. Networking with the equipment and design offices has enabled business growth.
2009	The growth in demand for construction and maintenance of electricity and telecommunications networks declined with the global economic recession. The construction business on electricity networks was expanded to a new area. The company made a service contract with telecom operator for the construction and maintenance of telecommunications networks. Additionally, a transfer of business was made and 16 employees moved to the company's payroll. The company acquired telecom network design and installation business from another telecom operator 10 employees moved to the company's payroll. Additionally, a service contract was made for the installation and maintenance of telecommunications networks. As a result of the deterioration of profitability, the co-operation negotiations were held in the company and 29 employees were dismissed.
2010	A number of target-specific electrification projects were won that significantly increased revenue. The company's business expanded significantly and revenue almost doubled due to new service contracts and acquisitions. The company acquired a business that has special expertise in the installation and maintenance of mobile networks. The installation business on electricity grids expanded through a new customer to a new area. The market is still open to extensive deliveries. Competition in the market is fierce. The fastest and most cost effective companies are successful on the market.
2011	Ownership of the company was sold to another Finnish company. The company expanded to new areas and gained significant new customers. The company's profitability was weakened by increased personnel, material and subcontracting costs as well as the creation of new units increased costs. Due to the weakened profitability, the company launched a streamlining program, which reduces fixed costs and operations are being developed.
2012	The company's business expanded significantly, especially due to growth in telecommunication and electricity service businesses. The task of Development and Human Resources was set up in the company's management team.
2013	The company received new service contracts with new customers and was able to continue existing agreements with old customers. With these agreements, the company's business increased moderately.
2014	A subsidiary merged with the company.
2015	The company acquired a measurement and data management service business.
2016	The company's revenue increased due to the growth in existing customer contracts in the telecommunication business. The company acquired a new business. The company became a multi-talent of critical telecommunication networks, offering its customers wider service packages from design, construction and maintenance to network management and optimization across network life cycles. Due to acquisition, the company became a multinational company and is now one of the most advanced service provider in critical telecommunication networks.
2017	Acquiring telecom network construction and maintenance service company from one teleoperator, 125 persons. Revenues growth is 10% as well as profit increases to 3,3% (2,8%).

4. Company COM4

The Company COM4 delivers versatile services and solutions from the customer's needs in the electrical and telecommunications industry. Company is owned by two Finnish energy companies and operates only in parts of Finland.

Table 7. Remarks on performance of the case company COM4 in 2006 – 2016.

2006	The construction network business was expanded to a new area. The workload in the new area has been good, but the launch of the unit was hampered by the shortage of skilled labor. The result of the company was burdened by the costs of setting up a new unit and the shortage of skilled labor.
2007	The company started the powerline line business with a few employees. The powerline operation got a quick start by entering into a first contract with a large electricity network company and project planning began in the end of year. The result was burdened by the new business as revenue was not yet generated.
2008	The company's revenue was boosted by the powerline construction business and the additional volume gained from the launch of the new are unit. The volume of completed projects was also higher than in the previous years. The most significant event of the year was the launch of a new unit when the energy company transferred its network construction business to the company and became a partial shareholder of the company. As a result of the transaction, the number of personnel grew by 14. Another new area unit started as a new service contract with the electricity network company was agreed.
2009	No annual report
2010	The company's revenue was strongly boosted by the areas established in recent years. Also, volume development in powerline construction was achieved, although budget targets were not met and profitability was low. Partial ownership of a company in construction and maintenance of wind power plant creates new business opportunities.
2011	The company acquired a business specializing in industrial electrification and building services, bringing a significant boost to the electricity services. The company decided to abandon the construction of powerlines and continue inspection and maintenance activities and project monitoring services of powerlines. Its office was terminated and the remaining functions transferred to another branch office. The company's operating result was weakened by the weak market situation. The mobile work control system and the vehicle tracking system enables new and more efficient modes of operations.
2012	The company signed major maintenance and construction contract to change air wiring to underground cabling. The company reorganized its area units by creating bigger service areas. The company acquired a business to strengthen the electrical and maintenance supplier role of industrial and public construction projects.
2013	The new construction contract was the most significant revenue generator during the year. The management of the new maintenance area required new investments to procurement of equipment and tools and to the recruitment of new employees.
2014	The same construction contract was the most significant revenue generator during the year. The company renewed a maintenance contract to an existing area for a period of two years. During the contract period, the customer terminated the new maintenance contracts with all of his contractors. A tele operator outsourced its construction business to the company.
2015	The large decrease in the company's revenue was due to the exceptionally high number of projects earned in 2014. Expectations for revenue growth are moderate, due to two major customers. In the future, the material will be procured by buyer, which will impact on the revenue.
2016	The revenue was impacted due to the fact that the customer is making the procurement of materials. The company signed significant construction contract with an electrical network company to improve network reliability. The electrical network company will emphasize quality and customer satisfaction more in the future.
2017	Revenues dropped a little but profit turned strongly negative -9% (+2%). Project management competencies were delopped.

5. Company COM5

The Company COM5 offers its customers a comprehensive range of services related to the design, construction and maintenance of electronic infrastructure networks and systems as well as data networks. The Company has been established when two electric companies outsourced the construction and maintenance of electrical networks to it.

Table 5. Remarks on performance of the case company COM5 in 2006 – 2016.

2006	The scope of operations was at the previous year's level as expected. Profitability was weakened by the price development of raw materials.
2007	The scope of operations was at the previous year's level as expected. Profitability was weakened by the price development of raw materials. As a new product area, the company started designing street lighting, with its operating volume and human resources being transferred from an energy company. The company's goal is to increase profitability by focusing on the best areas of expertise. A focused product portfolio and focused operation areas support the development of quality of service and competitiveness, which can be expected to continue to be successful in the future.
2008	The scope of operations was at the previous year's level as expected. Profitability was supported by the declining cost of raw materials and productivity improvements. The focus of business development has been to continuously improve cost efficiency and quality management. Particular attention has been paid to the management of human resources and the enhancement of customer quality.
2009	Demand for company services has remained fairly stable. Raw material prices have been significantly lower than in the previous year. Due to the strong price competition in the industry, this positive cost development has a minor impact on company's operating result. Customers take advantage of market offerings and distribute procurement to multiple suppliers. This combined with the increasing number of service providers and high competition puts challenges on the company's sales, delivery methods and competitiveness.
2010	No annual report
2011	Revenue decreased due to decline in the contract portfolio and the tightening of pricing. As a result of the tightening of pricing and the rise in costs, operating result declined steeply. In particular, the cost of tools and subcontracting services has increased significantly. The markets are in a strong transition phase, where electricity network companies seek to improve cost efficiency and service providers actively market shares. In the tighter competitive environment of the industry, the price factor is emphasized. At the same time, production costs are upward. These together generate a challenge for maintaining profitability. The company suffers from seasonal fluctuations resulting in layoffs for employees. There was significant turnover in the middle management, which affected the implementation of construction projects and the development of new services.
2012	The company's revenue grew due to the stable orders and contract portfolio and previous year's unfinished project were invoiced. The demand has risen due to recent storm damages that have triggered investments aimed at improving operational reliability of the electrical network. Due to the significant loss in 2011 and the weak performance in the first half of the year, the company's liquidity weakened and the owners granted the company a capital loan to improve the financial position.
2013	Revenue fell slightly, although operations in one area ended. Revenue was boosted by big projects. Keeping the level of revenue at the previous year's level, improving the profitability of the contract portfolio and improving productivity boosted the operating result positive. The company's billing cycle was further improved and the financial position and liquidity were better than in the previous year. The development of revenue depends to a large extent on the realization of project sales.
2014	Most of the company's revenue consisted of longer-term seasonal contracts, in addition to which the sales of the project had a significant share. The company's operating result increased due to the growth in revenue and productivity improvements. In service procurement, the price is still the most significant, unless the only selection criterion, which is a challenging situation for the development of the business.
2015	The company's revenue decreased due to changes in the contract portfolio. Operating result was better than anticipated due to improved efficiency. In the construction of underground cable networks, ground construction companies have increasingly taken on a foothold as a main contractor besides the traditional subcontractor.

2016	Revenue decreased due to changes in the contract portfolio. Due to operational development actions, the operational result was in line with the budget. In addition to the traditional construction work, service demand has increased the overall construction contracting and the use of project management contracting. Ground construction contractors coming from outside the electricity sector are a major contributor to the construction of electricity network, both as subcontractors and as main contractors.
2017	Revenues dropped slightly but profit by was 1/3 of previous year.

6. Company COM 6

The Company COM6 is responsible for the construction, maintenance and servicing of infrastructure, such as electricity, heat and data transmission networks. In addition to these, the company also constructs and maintains street lighting. The Company COM6 is a subsidiary for a Finnish energy company but serves private and corporate customers all over Finland.

Table 9. Remarks on performance of the case company COM6 in 2006 – 2016.

2006	35 % of the revenue was generated outside the group.
2007	34 % of the revenue was generated outside the group.
2008	35 % of the revenue was generated outside the group. The owner of the company sold its operation and maintenance of hydropower, no major impact to the operating result. The company made a material logistics agreement with the supplier to jointly develop cost-effectiveness, quality and security of supply.
2009	35 % of the revenue was generated outside the group. The growing economic difficulties of municipalities are also reflected in the network construction industry. There are uncertainties about the start-up decisions of new projects. Maintenance generates around 50% of the revenue.
2010	34 % of the revenue was generated outside the group. The group's construction, operation and maintenance services of heating were centralized and installation staff was moved to under the company. As a result, the company's expertise expanded to construction, maintenance and control of heat and gas networks.
2011	No annual report available
2012	29 % of the revenue was generated outside the group. The growing economic difficulties of municipalities are also reflected in the network construction industry. There are uncertainties about the start-up decisions of new projects.
2013	28 % of the revenue was generated outside the group. Network companies are expected to increase their investments in their networks. On the other hand, the financial difficulties of municipalities are reflected in network construction, creating uncertainty.
2014	30 % of the revenue was generated outside the group. Network companies are expected to increase their underground cable investment in their networks. Underground cabling employs considerably less network construction companies than air wiring, which creates uncertainty in the field. On the other hand, the transformation of municipal street lighting networks gives the opportunity to grow business.
2015	35 % of the revenue was generated outside the group. Network companies increase their underground cable investment and the construction of weatherproof networks.
2016	38,6 % of the revenue was generated outside the group. The operating result was burdened by the abundant amount of unfinished work.
2017	Revenues increased by 15,5% because of increased ground cablings, weatherproof networks. In the autumn big storm repair works. Most of given service to group companies.

7. Company COM 7

The Company COM7, established in 2006, specializing in the construction, operation and maintenance of electricity, street lighting and other cable

networks. The Company COM7 is a subsidiary for a Finnish energy company and operates only in parts of Finland.

Table 10. Remarks on performance of the case company COM7 in 2006 – 2016.

2006	Company's operations expanded significantly. The company signed a partner agreement with an electricity network company.
2007	The company expanded to a new area due to new contract. In the spring, the company purchased its material business from its sister company. This change in practice meant that the previously conducted sales of the work developed towards a more holistic contracting. A tendering round for material suppliers were performed and the company made a three-year framework agreement, containing all network building materials, with the selected supplier. The company implemented an electronic location and logbook system for vehicles as well as an ERP system that enhances the company's business processes, customer service and operating result.
2008	Part of the substantial growth in revenue is explained by organic growth and some of the better workflow and cash flow management allowed by the ERP system. The company continued and completed the development projects initiated in the previous year, the most important of which was the introduction of an ERP system. The system now manages and reports all project activities, including outsourced subcontracting. Enhancing processes has been reflected in lead times, billing and cash flow. The group's internal network construction work is now under competition. The importance of continuous development of operations as a basis for competitiveness. In the spring, the company lost the maintenance of governments' road lighting contract.
2009	During the two bidding rounds, the company won annual contracts extending the territorial coverage of network construction. As a result of the agreements, it was decided to establish a new area unit. The replacement of lighting to reach energy saving targets set by the EU's energy service directive were implemented in several areas during the year. The lighting business was integrated into a new ERP system that brings new efficiency and contributes to the monitoring of quality indicators and customer-specific reporting. Significant contracts will increase the company's business and expand its scope.
2010	Significant change occurred in orders received outside the Group as they doubled. The company acquired a new contracting business of the distribution network. The company's operating result was lower than in the previous year, due to increased cost related to the establishment of a new area unit and the business transaction. The bidding of material agreement was performed.
2011	The sister company outsourced its maintenance business to the company which approximately caused half of the revenue growth, the other half of the growth was due to increased orders mainly from contract customers. The level of operating result decreased slightly from the previous year, mainly due to higher material prices. Remote terminals were introduced to effectively extend work control to the installation staff. New material stores maintained by the supplier were established next to the local units and enhances and speeds up operations especially with regard to maintenance work. Following the bidding, a part of the sister company's operations was transferred to another contractor for a three-year contract.
2012	The revenue decreased due to losing the maintenance of sister company's operations. New business transaction included industrial electrification solutions and district heating remote control installation works. The design of the electricity network increased significantly as network customers increased the amount of overall construction contracting. Co-operation with the subcontractors works efficiently through established partnerships and practices After the bidding, the road and street lighting maintenance contract of a city was transferred to another contractor by a five-year contract. CEO has announced that he will be employed by another company.
2013	Successful adjustment of the costs enabled the operating profit to remain at the same level as in 2012. The company made the first major contract with the telecom operator to implement the fiber network. A new company was merged to the Group and four employees started to work for the company and six people were put on retirement. The design of the electricity network increased significantly as network customers increased the amount of overall construction contracting further. A subcontracting network for terrain planning was developed, which contributes to improving ability to implement overall construction contracting. The project management of telecommunications contracting tried to utilize new IT solutions that achieved significant benefits both in project management and customer satisfaction.

	A major customer has reduced the volume of its network construction as it is preparing the sale of its network business.
2014	Successful overall construction contracting increased the company's revenue. The company made the first major contract for the construction of a wind power cable and fiber network. The movement from air wiring to underground cabling decreases the amount of work.
2015	The revenue decreased due to increased price competition for overall construction contracting.
2016	The profitability of the contracting business is in the crisis as the air wiring construction has changed to underground cabling and the major network operators have changed the rules of competition in the industry to favor large contractors. Operating result decreased due to the loss of a significant customer and the resulting adjustment costs.
2017	Revenues dropped by 23% and profit was more negative. Network construction works reduced. Personnel reductions. Tendering processes and project management were developed.

8. Company COM 8

The Company COM8 is a multinational service company that offers for electricity and lighting network, substations, transformers, railway system and electricity safety construction, operation and maintenance services.

Table 4. Remarks on performance of the case company COM8 in 2008 – 2016.

2008	The company's revenue increased due to organic growth in infrastructure business, despite minor challenges in security business that were due to strategic shift in customer segments. Services to group companies increased. Personnel reductions. Tendering processes and project management were developed. The company made staffing reductions in security business due to weak performance and the company is identifying next improvement actions. The company acquired the electrical network construction business from a large energy company.
2009	The company's revenue increased due to the acquisition and growth in security business, despite the challenges in infrastructure business. Infrastructure business struggled due to stable weather conditions and customers' investment decreases. The profitability was weakened due to focus on integration, financial crisis and weaker performance of infrastructure business. The company's integration processes were completed throughout the business. The most important measures are the implementation of a shared ERP system, the establishment of a group-wide IT platform and the creation of separate accounting and payroll departments in all countries. The company sold part of its security business to focus on its core businesses.
2010	The company's revenue increased due to good performance in infrastructure business despite challenges in security business due to low investment rates. The company made partial acquisition to a technical security business and established operations in Sweden and Finland. The company discontinued its traditional installation business as it was not core business for the company.
2011	The company's revenue increased due to organic growth in infrastructure business. The company's operating result decreased due lower activity levels and losses on some projects within the regional grid segment and lead to staffing reductions. The company's business areas are experiencing significant competition.
2012	The company's revenue declined slightly primarily due to the discontinuation of operations in an area. The company's operating result stayed on the same level due to efficiency improvements, still the company made project losses in medium-sized projects in the regional grid segment. Staffing adjustments were made due to the changed market and discontinuation of operations in an area.
2013	A capital investor acquired the company from the two energy companies. The company's revenue increased slightly due to rise in activity within central grid projects and the railway business. The company's operating results declined due to implemented accounting assessments of assets and liabilities, and restructuring expenses. Staffing adjustments were made due to the changed market and discontinuation of a contract.
2014	The company's revenue declined due to divesting a part of security business and losses on fibre projects. The company's operating result increased due to success in Norway and Finland despite the losses on fibre project in Sweden. The fiber business in Sweden will be closed in 2015.
2015	The company's revenue declined slightly and operating result improved a bit, no causes explained. The company initiated negotiations regarding the acquisition of the Finnish electricity network service company.
2016	The company's revenue increased due to new acquisition and higher volume of project. The company's operating profit increased due to changes in pension plans. The company acquired a leading service provider on the central grid market in Finland. The company initiated negotiations to acquire electrical maintenance business that employs 30 people.
2017	Revenues decreased slightly and profit dropped to 5% (9%), substation projects received

9. Company COM9

The Company COM9 is a long-term company specializing in the construction and maintenance of electricity networks, substations, street lighting, traffic lights and portals. The Company COOM9 is a subsidiary for a Finnish municipal energy company and operates only in parts of Finland.

Table 8. Remarks on performance of the case company COM9 in 2006 – 2016.

2006	The capacity utilization rate in 2006 was high. The development projects in the company were slightly decreasing the positive impact of high capacity utilization.
2007	A major change in the industry was the reform of the collective bargaining system that slightly impacted on the operating result.
2008	No annual report available
2009	The economic recession reduced some of the construction and maintenance work of electrical and street lighting networks and increased competition among the industry. During the year, new business was sought for expert services, specializing in electricity quality measurements and magnetic field measurements, was further developed and the opportunities for outdoor lighting provided by LED technology were actively monitored. The company's operations are labor-intensive, which leads to a significant impact on the company's result by varying demand and capacity management. Increasing productivity and competitiveness are ways to respond to tightening competition. The company's business is also supported by new product and customer segments and partnership agreements.
2010	In the last autumn, bidding competition was lost and it significantly reduced revenue in the construction of electricity networks. Temporary layoffs had to be performed due to the low capacity utilization. To reduce the cost structure and improve competitiveness, a number of actions are in progress relating to company's and partners' operations and will continue throughout the year. In the industry, price competition is tightening and, on the other hand, performance and security of supply are further emphasized as a result of the storms experienced.
2011	The company's revenue grew and profitability improved significantly due to the improved market situation, the realized business transaction and the winning new projects. The co-operation negotiations resulted to reduce the number of employees by nine due to weak business performance in the company. The business transaction carried out shifted the traffic light business to the company. The labor productivity is further enhanced by harmonizing and streamlining project management and operations in accordance with the processes. Preliminary project planning and utilization of information systems will be improved and availability of resources will be ensured during holiday periods. Flexibility and rapid responsiveness to changes in workload will be sought by utilizing subcontractors.
2012	No annual report available
2013	No annual report available
2014	Due to the fierce price competition in the industry, the company's profitability in the electricity grid business decreased considerably.
2015	Due to bankruptcy of the contractor, a loss was recognized in the financial statements and it directly impacted on the operating results. Competition of contracts is mainly based on price, and the prices continue to pressure downward, especially in the basic business.
2016	The restructuring of the organization during the current and previous operating period and other development work improved the operating result of the business, despite the losses in revenue.
2017	Some growth (17%) achieved and new services for 110kV and 400kV substation project and first projects in Sweden and Denmark. New CEO appointed, previous retired.

10. Company COM10

The company COM10 is modern network solution service provider including telecom, electrical and district heating and cooling networks. Services mostly in the southern part of Finland. Original the company was owned by the management.

2014	Main daughter company stabile development profitable growth, profit 10%.
2015	The company acquire distribution network service company in the middle of Finland. Revenues increased 10%, profit still 15%
2016	The company acquire district heating, cooling and steam network service company, majority of shares. Group structure formed. High topline growth.
2017	Private equity fund purchases the majority of the company from management owners. Revenues growth strongly near 100%, profit dropped to 1% (10%)

Appendix 3.4

Service companies' in-depth interviews, summary

Sustainable Competitive Advantages for Industrial Service Business

Detail and deep interviews of Industrial Service Companies

Industrial service companies

Company 1 International multi services

Company 2 Local electrical network services

Company 3 Multi network services

Company 4 Electrical network services

Sustainable Competitive Advantages for Industrial Service Business

3. Research questions

Question 1: What are means and tools to create sustainable competitive advantages and enablers in Industrial Service Business?

Question 2: Is there a conflict in sustainable business targets between service providers and customers (service users)?

Sustainable Competitive Advantages for Industrial Service Business

4. Research hypothesis

Hypothesis:

- Customer and service provider has different targets in competitive advantages - **conflict**
- Owners, management and personnel has different targets in competitive advantage, growth and their development targets both on service providers and customer companies
- **Sustainable win-win situation** can mutually create and develop to both service providers and their customers – what are key success enablers
- **Ownership change** (from customer owned to private equity or industrial owner) has dramatically influenced to both service companies and customers strategy and business targets
- Co-operation in decision process has to be aligned in all levels, management-BoD-owners
- **Internet of things (IoT)** will create **new business models** in industrial services

Sustainable Competitive Advantages for Industrial Service Business

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Sustainable Competitive Advantages for Industrial Service Business

5. Research propositions

- **No clear strategy and business model and no theoretical framework** has not systematically used when transforming to the customer – service provider business model
- Competitive advantage has been **short term target** not sustainable process
- Sustainable competitive advantage could not be created – **no systematic and sustainable business model**
- Competitive view was not in high managerial priority
- **No new business models** were developed during outsourcing services
- **Private equity owner has short term competitive advantage targets** not long term and sustainable

Detail and deep interviews of Industrial Service Companies

7. Yhtiön strategiset tavoitteet/Strategy process

Company 1	Company 2	Company 3	Company 4
Company 1 Main Processes, see appendix	Top level targets given, management follows and controls – now behind	Main owner gave economical targets TO/EBITDA/cashflow, EV -the built economical model regulates and controls	Done, part of group strategy
Annual clock is the tool	No differentiation means compared to competitors <ul style="list-style-type: none"> - Growth - Efficiency improvements 	Tbusiness area managers follow/month	
Cash management in a key role lately		One big customer sets Caruna asettaa interactively targets	
Now growth and renewal/trade sales processa			
Digitalization in very high priority – Smart city concept - based on IM competences			

Conclusion : Strategy process is in use as well as the board and personnel is connected to this

Comments: Content of the strategy process did not asked

Detail and deep interviews of Industrial Service Companies

8. Yhtiön tulevaisuuden kehitystavoitteet, 3-5 v Future company development targets in next 3-5 yrs

Company 1	Company 2	Company 3	Company 4
Now back in growth mode – organically	Differentiation - procurement, logistics - Work processes	DH grows	Does “Big Customer” – model works efficiently in future – control/inspections outsourced
	Difficult to find trained employees – no training schools near	New products: in DH, added services to real estates	
	85% today “internal” city/energy group works	More discussion with active business partners on future service models	

Conclusion : Companies want to grow in home market organically or by new services or M&A

Comments: But in most of these companies the balance sheet is very weak

Detail and deep interviews of Industrial Service Companies

9. Miten selvität palveluyrityksen kilpailukyyn kriittiset menestystekijät How to sort out and explore critical success factors in the service company

Company 1	Company 2	Company 3	Company 4
Must win battles – work method - In strategy identify targets, action points - Define responsibilities and means	SWOT – done, not followed Projects are followed Projektikohtainen seuranta - Could be better - Customer satisfaction annually, project feedback - Projects are not measured/graduated	No evaluated critical - Profit measurement /€ - Customer satisfaction - Employees satisfaction	Service/sector/project follow up by €/month
	Not recognized CA-means, no differentiation to - 20kV lines/street lightnings good competence	Business areamangers are following	Endcustomer requirements are increasing - What is the role and tasks of contractors? - New services are needed
	No own engineering, used group company services		

Conclusion: SWOT, unit costs, customer responses and by developing competences are main tools, value chain less
Value chain, BCG-matrix and VRIO model are not known so well

Comments: Very basic tools are used in sorting out critical success factors

Detail and deep interviews of Industrial Service Companies

10. Miten yhtiössä kehitetty palveluiden ja tekemisen kilpailukykyisyyttä How companies have developed service competences

Company 1	Company 2	Company 3	Company 4
These can be also business models not only technical	Not much, electrical tools developed (mobiili work management, follow-ups, work charts etc.)	Trainings, project manager days. Internal reports alignments, mobile work force management system	Service development 150k€/yr., tools/cars 200k€/yr. Limited development resources – no power Customers difficult to take part on development projects – investment incentive do not motivate them
	No connection to customers systems	Development projects co-creation with customers, component providers/partners involved	Development opportunities: <ul style="list-style-type: none"> Managing service chains Digitalization projects Trainings/quality ensuring Customer proximity/processes/project mng./quality/subcontractors
	Now solar panel services jointly with group companies	Some customers motivate to new ideas, but they will own them?	All what customers want/mobile portal/technical info/permissions Public procurement limits alternative proposals/tenders. Customers do not know possibilities.
	In DH heatexanger changes to customers	Public procurement rules limits alternative model presentations and tenderings – have to change	TIEKE-interfaces development further. Many joint building complicated, when systems are different – not connectable
	More towards project deliveries		Subcontractors have to connect with and engaging. Foremen are key persons in efficiency improvements, not more controlling.

Conclusion : Companies have not seen motivation or resources to invest in business development

Comments: Is this the reason, why the service business has not developed – no service differentiation and bad cost efficiency. Do companies have business development capabilities and/or views?

Detail and deep interviews of Industrial Service Companies

11. Mitkä ovat onnistuneen kilpailukyvyyn saavutusten parhaat työkalut Best tools and means to achieve competitive advantages

Company 1	Company 2	Company 3	Company 4
Trough developing own processes	With new services, target 0,5M€/5% profit, follow-up/week	Lean organization.	Process developments
Customers' system are stiff and complex to join/connect	Group sells total service package.	Subcontractors are outsiders: <ul style="list-style-type: none"> -from hourly rates to unit prices -make profit, how much ref. service companies? -more responsibilities to them 	Competences are ok and in right level and positions.
Participating in customer's process development – now, quality improved		Effective control of own resources important, not works properly today.	

Conclusion: Profit review, contract audit with customer and tender audits most favourable, but not customer follow ups and not believe in the influence of new services

Comments: New service thinking is not in high priority

Detail and deep interviews of Industrial Service Companies

12. Onko YT-menettelyä käytetty tehostamisessa, paljonko? Have Lay off - process used as resource management

Company 1	Company 2	Company 3	Company 4
Today continuous lay-off process available, in good co-operation with employees/unions – works well	With long sommer holidays has justed needed low work load needs in winter period.	Works and used	No needed, possible, work time bank in use/+/- 40h.
Now positive profit in Q1 too, first time		No connected to employer union. Employees are members in different unions. – metal most stiff.	

Conclusion : Commonly obligatory tool to adjust the work force against the work load, which is very variable

Comments: Is it possible to fine more flexible tool to make this needed work force adjustment?

Detail and deep interviews of Industrial Service Companies

14. Paljonko toiminnot ovat tehostuneet 5-10v aikana? Efficiency improvement during last 3-10 yrs

Company 1	Company 2	Company 3	Company 4
At least 2-3%/yr, >30%/10yrs	Improved 2-3%/yr - Better processes - Equipment directly to work point, not in down town - In processes new services	Owners requirement in profitability	Process development create efficiency: - Service provider - Customer process alignments - Agreement structure alignment ref. building industry - 2%/yr potential, higher than inflation
	Market manages and drives to efficiency	Hintojen tulee nousta – miten?	Procurement in bigger packages/foreign countries have not competences.
		Minor efficiency potential in future.	

Conclusion : During last 10 yrs efficiency improvement has been totally 10 -30%, on average annually 2-3% in industrial service companies

Comments: Measured by unit prices; better procurement, tendering processes and resource management

Detail and deep interviews of Industrial Service Companies

15. Miten tehostettu sisäisiä toimintoja viime vuosina, työkalut, menetelmät? What has been efficiency actions and tools in service company internal processes

Company 1	Company 2	Company 3	Company 4
In BSC "group hair cut" created bad mood – used "replacing tools" in these cases	BSC in use, payment 1 per yr.	BSC in used, based on strategy targets.	BSC in use. Systematic process control system - Feedback discussion continuously - Meetings in 2months - Reporting monthly
	Efficiency realized, influences.	Not drives operations enough.	Process descriptions renewed.
	Other measurement used too than BSC.	Achieved some customer bonuses.	BSC earnings: - Mng. max 2mth salary/white color 1mth/ blue collar piece work pay - 50% company result/development projects/personal targets.
	Max 2month salary, realized 1-2vk salary.		

Conclusion : BSC based incentive programs widely used, does it reflect an efficiency/profit improvement in companies has not materialized.

Comments: The correlation between company results and BSC influence has to study more, how?

AAPPO KONTU

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Detail and deep interviews of Industrial Service Companies

16. Miten näet yhtiösi kilpailukyvyä kehittyvän jatkossa ja miten se varmistetaan? What are the future means to develop a sustainable competitiveness in your company

Company 1	Company 2	Company 3	Company 4
Automation/digitalization create new opportunities	To understand, what is critical competence in future	Competences - Not defined - Through euros	Core competences defined and to sustain them.
Process efficiency improvement continuously	New products/services	If you cannot by yourself – imitate, copy	Training programs
Replicability create an efficiency	Customer proximity – procs/cons	With new products/services create added value to the whole group appreciation.	Promotion plan done.
	Not sell resources outside, reserved to storm reserv	Procurement, subcontracting competence, knowledge of contractors.	Total training plan for whole industry have to prepare (ET?) Engineering systems alignment challenge – not works today.
	Should corporate resource pool for storm be applicable?	Market and price knowledge, technical competences (not most important)	Customers procurement are underresourced now.

Conclusion: Taking care of key competences, profitability, customer proximity and new services are critical – not following competitors and not internationalization

Comments: What are the actions and tools to materialized these?

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Detail and deep interviews of Industrial Service Companies

17. Onko yhtiösi saavuttanut asetetut tavoitteet? Have the company achieved the targets

Company 1	Company 2	Company 3	Company 4
Customers' bargaining power increased	Can you execute works under EV unit prices?		Fiercer competition now. Now bottom prices reached.

Conclusion: Management is not very satisfied on EBITDA development, but better to an efficiency and a competitiveness actions

Comments: Deviations of answers are large in 2005-2012, but later 2013-2017 more unanimous

Detail and deep interviews of Industrial Service Companies

18. Palveluyrityksen kriittiset osaamisalueet ja resurssit What are critical competences and resources

Company 1	Company 2	Company 3	Company 4
		Project management	Project managers including subcontractings
		In O&M own resources not important, but in projects yes. Co-operation tender makers, engineering, foremen and employee are important.	Financial resources are critical to get growth (quarantees), group resources.
		Financial resources – now limits to get bigger project (quarantees, cash flow). What would be new alternative business/finance model?	

Conclusion: Project management; resource, subcontractor and work force management, mng. systems and procurement are critical – unanimously

Comments: Large deviation in the need of "own installation resources"

Detail and deep interviews of Industrial Service Companies

19. Miten mitataan, että yhtiön asettamat tavoitteet saavutetaan?

How the targets and achievements are measured in the company

Company 1	Company 2	Company 3	Company 4
Customer satisfaction additional	Project follow-up system	Result	Quality/work safety are in high influences on costs.
	Sustain competences. "foreman-employee" modell	Project measurements	Systematic project management.
	Incentive system - Under EV unit prices	Safety	Budget/follow-up/forecast
		Work satisfaction, work wellness, everybody are interviewed/yr.	
		Efficiency are measured by economy.	
		Not yet measured unit works, ref. a competitor.	

Conclusion: Economical reporting system, critical resources and work safety are the most important – but following of competitors the lowest importance

Detail and deep interviews of Industrial Service Companies

20. Miten hallitus osallistuu yhtiösi pysyvän kilpailuedun kehittämiseen?

How the board participate to the sustainable competence development

Company 1	Company 2	Company 3	Company 4
Not very active and developing	CoB and board members mostly from group management, main customer.		Meetings in 2 mnts. Freedom to drive the strategy.
	Without group connections, business model would be different.		

Conclusion: Monthly reports and strategy development are mainly the board tools to contribute and monitor sustainable competence developments

Comments: Following competitors is not critical either here. Not either successors' plan.

Detail and deep surveys of Industrial Service Companies

22. Miten usein kilpailukykyä käsitellään ja arvioidaan? How often competitiveness questions are on agenda

Company 1	Company 2	Company 3	Yritys 4
	Quartal	Monthly	Quartal development discussions

Conclusion : The topic is under the consideration and monitoring in different levels regularly

Comments: Did not asked how these questions are presented and discussed in detail

Detail and deep surveys of Industrial Service Companies

23. Miten palveluyrityksen tavoitteet ovat muuttuneet? How the service company targets have changed

Company 1	Company 2	Company 3	Company 4
		Public procurement rules more driving <ul style="list-style-type: none"> - More new competitors available - Restricts renewing and getting alternative solutions to the market 	Now growth targets Bigger service packages.
		Fiercer price competition	
		Would it be time for open tendering portal? <ul style="list-style-type: none"> - Collect tenders to one point - "Face points" cancelled 	

Conclusion : Service market and industrial service companies have created, growth targets – but profitable in core

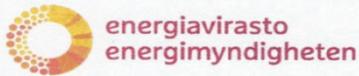
Comments: Not much new service thinking and not either sustainable competitiveness

Projektirakentamisen ja kunnossapito-/ylläpitötöiden erot Differentiation between project and O&M works

Company 1	Company 2	Company 3	Company 4
	In both unit prices	Someone given up projects and transferred to services.	
	In projects more subcontracting and material procurements.	Project management personalized, more in teams.	
		O&M multiple services, more efficiency, mobile.	

Appendix 4. Summary of electrical distribution network regulation methods

Energy authority, 30.11.2015



1.1 SUMMARY OF THE REGULATION METHODS

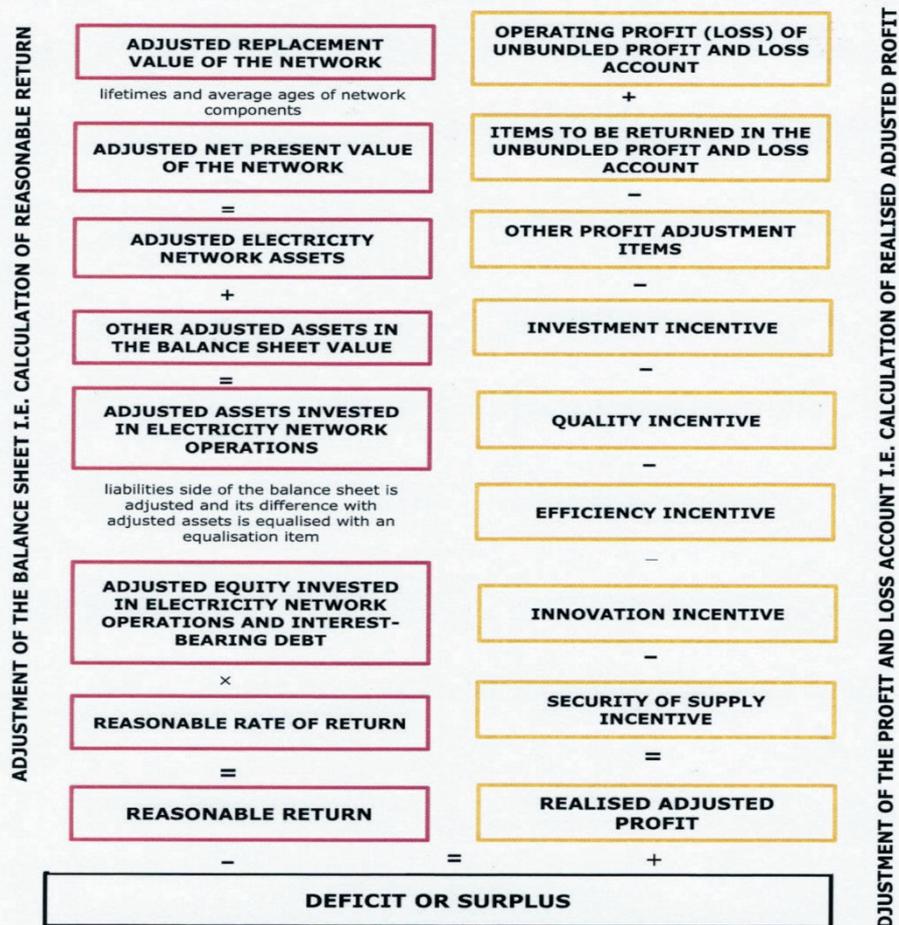


Figure 1. Regulation methods during regulatory periods 2016–2019 and 2020–2023

Appendix 5. Critical competence analysis by the VRIO method in an example service company

VRIO RESOURCE ANALYSIS					1(2)
Example Company ABC					Aappo Kontu 6.6.2018
Attribute Resurssi/osaaminen	Valuable Arvokas	Rare Harvinaisen	Imitable Jäljitettävyyys	Organsation Organisaatio	Conclusions Notes Päätelmä, kommentti
Market/business understanding Markkinoiden ymmärrys	YES	YES	NO	YES	First mover advantage Temporary Competitive advantage
Project management Projektijohtaminen	YES	YES	NO	YES	Project management, lean
Procurement Hankintatoimi	YES	NO			Competitive parity
Work force management Resurssien ohjaus	YES	No	No	Yes	Not special management tools Competitive parity
Flexibility in resources Työvoimajoustot	YES	No			
Subcontracting management Alihankkijoiden johtaminen	YES	YES	YES	YES	Sustainable competitive advantage Long term connections to subcontractors
Financial resources Taloudelliset resurssit	YES	YES Profit ++	NO	YES	Temporary Competitive advantage

VRIO Resource ANALYSIS					2(2)
Example Company ABC					Aappo Kontu 6.6.2018
Attribute Resurssi/osaaminen	Valuable Arvokas	Rare Harvinaisen	Imitable Jäljitettävyyys	Organsation Organisaatio	Conclusions Notes Päätelmä, kommentti
Management sytem/tools Johtamisjärjestelmät	YES	NO	NO	YES	Competitive parity Lean organisation
Engineering system Suunnittelujärjestelmät	YES	NO	NO	NO	Competitive disadvantage Not most important
Detail engineering competence Erikoissuunnittelu	YES	NO	NO	NO	Competitive disadvantage Not most important
Own installation resources Omat asennusresurssit	YES In project	NO	NO	NO	Competitive disadvantage
Company Brand/Reputation Yhtiön brandi/maine	YES	YES	YES	YES	Sustainable competitive advantage Take years to build up
Innovation system Innovatiojärjestelmä	YES	NO	NO	NO	Competitive disadvantage Not invested at all
Other Muuta					