

# Let's Taco 'Bout Modularity

Investigating the potential fit of modularization in a service context

## Abstract

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Modularization has been shown to be a way for manufacturing firms to escape the dichotomy between efficiency and effectiveness and achieve a dual competitive advantage. The purpose of this thesis is to investigate to what extent modularization can help service firms achieve the same, by looking at contextual factors affecting the fit of a modular system. To understand this contextual relationship, we have used an adapted version of the theoretical model developed by Schilling (2000) as a tool for analysing our empirics. The empirics have been gathered using a multiple case study of the high-end restaurant industry. In-depth interviews have been conducted with renowned restaurateurs in Sweden, in order to understand the context of the high-end restaurant industry. The findings have been interpreted and analysed to address the entire service industry. The analysis culminates in five theoretical proposals which describe the relationship between observed factors and the fit of a modular system in a service context. Our findings indicate, among other things, that service firms characterized by a differentiation strategy is less receptive to modularization.

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*“A recipe is just a historical description  
of the process I used at a specific point in time,  
it will never be possible to recreate that dish identically”*

Mathias Dahlgren

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Balkongligan for an exuberant spring and extraordinary playmaking abilities.

# Glossary

<b>Effectiveness:</b>	In this thesis, effectiveness regards the level of “doing the right things”. Concerns the ability to meet specific customer demands.
<b>Efficiency:</b>	In this thesis, efficiency regards the level of “doing things the right way”. Concerns processes, capital intensity, and cost minimizing.
<b>High-end restaurants:</b>	Restaurants characterized by striving for perfection in terms of food quality and originality of the menu. Operates in a higher price segment.
<b>Service firm:</b>	A firm whose value offering consists of some degree of intangible content.
<b>System:</b>	A number of entities acting within a common context, with the same external factors affecting them.
<b>Service package system:</b>	A number of service offerings within a firm.

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# 1 Introduction

*This chapter will serve as an introduction to the thesis. The problem area and research gap are presented and explored, followed by a motivation of our research question. A description of the structure of the thesis is also included, to serve as a pedagogical roadmap to guide the reader and facilitate understanding of the thesis.*

## 1.1 Background and Research gap

The academic field of service management is well established and mature, with a vast body of literature produced in the last 30 years since it started gaining traction as a separate field from manufacturing operations (Johnston, 1999). The nature of the research has been trending from a descriptive and conceptual state, to an empirical state, and subsequently arrived in a state of application and prescription, where scholars try to link operational characteristics of service firms to performance outcomes (ibid.). The specific performance outcomes vary, but what they have in common is that they are tools for firms to achieve competitive advantage, and as such the interesting things to study are methods that lead to a competitive advantage. This thesis takes place in this domain, more specifically we will look at the trade-off that service firms face when they develop their strategy. We will investigate one specific strategy, modularization, for achieving superior competitiveness for service firms, taking a perspective of efficiency and effectiveness.

Research on the service industry have developed a number of service positioning matrices to plot out how service firms position themselves strategically (Silvestro et al, 1992; Tinnilä & Vepsäläinen, 1995; Kellogg & Nie, 1995). Service firms have traditionally been found to position themselves as either efficiency-focused, serving many customers with a standardized offering, or effectiveness-focused, serving a relatively small number of customers with a more tailored offering (Schmenner, 1986). Researchers have labelled these matrices in different ways throughout the years, but the main categories have been a customer involvement dimension, i.e. degree of customization, and service system design dimensions, i.e. degree of standardization (Collier & Meyer, 1998). Schmenner (2004) further refined a matrix to illustrate relative throughput time and degree of variation, which can be interpreted as doing things the right way and doing the right things, i.e. efficiency and effectiveness. Furthermore, it is being assumed that there is superior performance if a service takes a specific position which is described to be along a diagonal across the quadrants, either by being very standardized or by offering a very customized solution (Schmenner, 2004). Firms adhere to this, it is argued, and gravitate towards the diagonal. This dynamic lead to service firms often taking a position characterized by either efficiency or effectiveness.

Regardless of what labels are on the axes in such positioning matrices, a common denominator-argument is that there is a trade-off to be made regarding level of customer-specific customization (effectiveness) and process standardization (efficiency). How service firms choose to do this trade-off is a vital strategic decision and relates to classic strategic literature such as the generic strategies of Porter (1985), which state that firms need to decide on a strategy; either cost leadership (efficiency), or differentiation (effectiveness). There are those that claim that firms can pursue both strategies at once under certain conditions (Wright, 1987; Hill, 1988), yielding a dual competitive advantage. However, methods for achieving such a dual competitive advantage are not addressed as much in academic literature.



One strategy which has proven effective for manufacturing firms to achieve a low-cost structure while maintaining a high level of customization is modularization (Sköld, 2017). It has been shown to be a way of achieving a dual competitive advantage and escaping the trade-off of efficiency versus customization (effectiveness). Modularization, or modularity, is a manufacturing paradigm that focuses on component combinability (Sanchez & Mahoney, 1996; Schilling, 2000), meaning that firms should strive for the ability to create a large number of unique products from a low number of unique inputs by combining the inputs in various constellations. Research has shown that a modular strategy can be a way to decrease the internal variation, increasing efficiency, while maintaining a high degree of external variation in the offering to customers, increasing effectiveness (Ulrich, 1994; Baldwin & Clark, 1997; Langlois, 1992). Thus, a move towards decreasing costs while maintaining a high degree of variation in the customer offering could potentially be achieved by applying a modular strategy.

However, existing research have still put limited focus on investigating context and industry specific factors that affect how well a modularization strategy could be implemented to achieve such a dual competitive advantage. Previous research has suggested this to be a research area that needs to be examined more in detail to find out if and which factors that accelerate or hinder the implementation of a modular strategy (Campagnolo & Camuffo, 2010). The service sector is also underrepresented in modularity research, as previous case studies have almost exclusively focused on the manufacturing sector (Ostrom et al., 2015).

As such, a research gap takes shape. Research show that service firms take a strategic position that is grounded in either superior efficiency (low costs) or effectiveness (high customer value). We assume that, for service firms, a combined strategy would yield a dual competitive advantage and better performance. Methods for succeeding with this is an area in need of further research. One method that has been proposed as a way of increasing performance in the manufacturing industry is modularization. Our research gap thus exists in the intersection between the promise of a dual competitive advantage for service firms through a strategic position of combined efficiency and effectiveness, and to what extent modularization could be a potential method for achieving that, specifically in terms of how contextual factors affect the suitability of such a strategy.

## 1.2 Purpose and Research Question

With this thesis, we aim to fill the research gap identified above. Research say that modularization is a way for manufacturing companies to increase competitiveness through low costs and customized products. Further, our work is based on the premise that service firms should strive for being efficient and effective to maximize profitability, and that this is difficult to achieve since most firms take a strategic position of one or the other. The purpose of the thesis is thus to investigate to what extent modularization can be a way for service firms to escape the dichotomy of the trade-off of efficiency and effectiveness and achieve a dual competitive advantage.

In order to fill the research gap, our research question will address the issue of applying a modularization strategy to service firms. We want to focus on the contextual factors, that make the service industry more or less suitable for application, in contrast to the manufacturing industry.

At the broadest level, we want to know whether modularization would be a useful tool for the service industry, and in order to answer that we need more specific research question to maintain coherence and clarity throughout the thesis. Our research question reads as follows:

*What contextual factors speak for or against modularization as a way for service firms to achieve a dual competitive advantage?*

### 1.3 Thesis Roadmap

Chapter 1 serves as an introduction to the thesis, and here we have presented the research question, research gap, and purpose of the thesis. In chapter 2, previous literature is presented as a foundation for our analysis. Three literature streams (strategy, service operations management, and modularization) are combined into a framework and concludes chapter 2. Chapter 3 consists of a motivation and presentation of the analytical tool we will use to answer our research question. Chapter 4 explains our method for answering the research question, and chapter 5 subsequently presents and analyses our findings. The thesis ends with chapter 6, which relates our findings to the research question, and discusses the implications of the findings as well as limitations on the study.

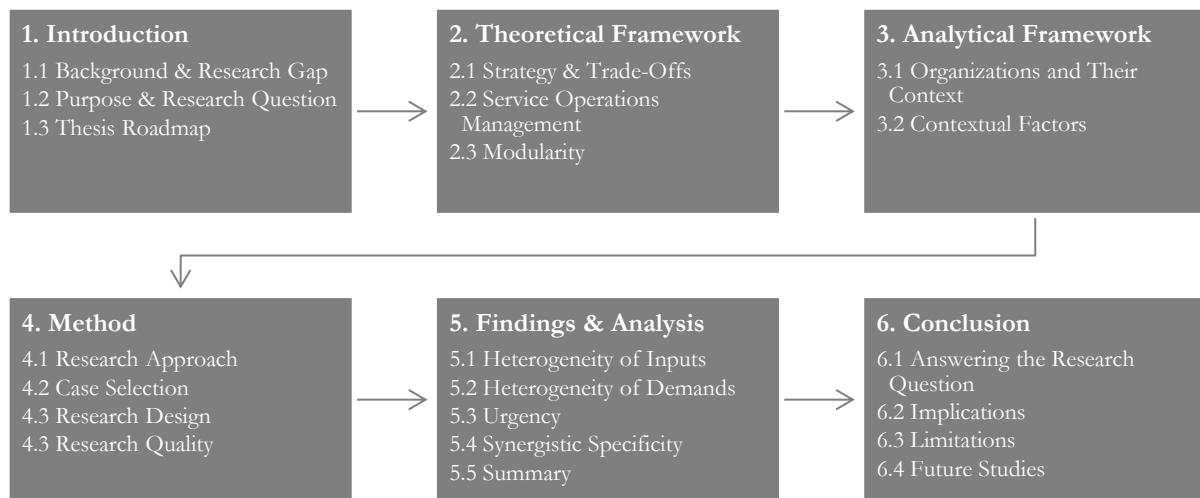


Figure 1 - Thesis Roadmap

## 2 Theoretical Framework

*In this chapter, we review previous literature and lay the foundation for our analysis with building blocks of previous research. The chapter is structured around the research gap, which was introduced in chapter 1. We will show that firms are faced with strategic trade-off decisions regarding what level of efficiency and effectiveness they possess. We then explain how service firms specifically have traditionally been found to do this trade-off. In the last part we explain how modularity is proposed as a way for firms to escape this trade-off and become simultaneously efficient and effective. Finally, we show how modularity in services have been overlooked and that the context a firm operates in is in need of more research to fill the identified research gap. An illustration of the research gap is seen below in figure 2.*

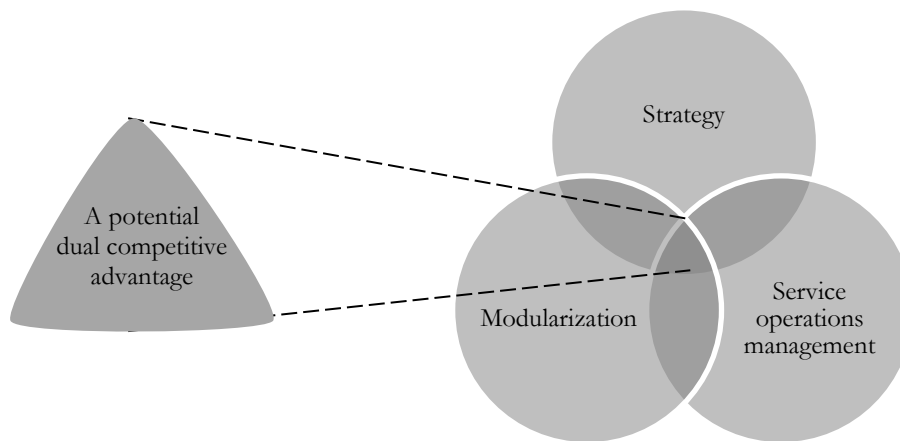


Figure 2 - Research Gap

### 2.1 Strategy and Trade-Offs

This part will present some of the most fundamental work within the field of business strategy. The prevalent problem of the dichotomy between efficiency and effectiveness, and the trade-offs between these firms have to make, is then presented. The chapter ends with an illustration of said trade-off dilemma.

Arguably the most influential work in business research when it comes to strategy is Porter (1980, 1985), and his proposed framework of generic strategies is generally considered an effective simplification of the complex issue of strategic positioning (Kotha & Orne, 1989). In short, Porter proposes three archetypical strategies firms can adopt; cost leadership, differentiation, or focus (which can be based on either cost or differentiation). Firms must adhere to one strategy only, and commit to that strategy wholeheartedly, in order to avoid becoming “stuck in the middle” (Porter, 1985). This yields the concept of trade-offs. For every firm, there is a trade-off to be made regarding cost-performance, in order to position themselves in the market. The trade-offs occur because of a need for a consistent company image, and to keep internal activities streamlined and productive (Porter, 1996).

Critics of Porter often state that his view on strategies are simplified, and that it is possible to pursue combinations of the generic strategies. Wright (1987) suggests that large firms should simultaneously pursue a combination of cost or differentiation and focus, to utilize the firm's resources maximally. Hill (1988) go even further and claim that firms regardless of size can pursue combined cost and differentiation strategies under certain conditions, such as when the firm have the ability to differentiate, there are considerable learning effects occurring, and the firm can achieve cost reductions through economies of scale or scope. Hill (1988) simultaneously proposes that differentiation can be a method through which firms achieve a low-cost position.

Another view on strategies is the resource-based view (Wernerfelt, 1984; Peteraf, 1993). This view proposes that rather than being free to pursue any strategy of choice, firms are constrained to pursue the strategy which their key resources allow them to (Grant, 1999). Wernerfelt (1984) proposes that competitive advantage stem from the heterogeneity of resources among firms, and firms' ability to capitalize on them determine profitability. In addition to heterogeneity, the relative immobility of key resources is identified as important factors influencing competitive advantage (Peteraf, 1993). Resource based competitive advantage is further divided into cost advantage and differentiation advantage, in an attempt to harmonize the resource-based view of strategy with Porter's generic strategies (Grant, 1999). One take-away is that there is a trade-off between efficiency and flexibility, with regard to resource allocation (ibid.).

Similar trade-off thinking is applied to the service industry by Kellogg & Nie (1995). The authors propose a framework for strategic positioning for service firms, based on customer involvement. The two axes in the framework correspond to the degree of customer discretion on the content of the service, and customer involvement in the process of carrying out the service. Porter's generic strategies are plotted in the framework to enhance the practical usefulness, where a differentiation strategy would entail a high degree of content discretion and process involvement, and vice versa for the cost leadership strategy. Thus, a trade-off needs to be made regarding degree of satisfying customers' needs and process efficiency. It is however possible to achieve competitive positioning off the primary trade-off diagonal, if technology allows for it (Kellogg & Nie, 1995). Critique brought forward claim that the framework is unnecessarily convoluted and hard to understand, since it includes customer involvement on both axes (Collier & Meyer, 1998).

As such, we can discern a basic trade-off dilemma. Firms strive for effectiveness and efficiency, i.e. satisfying customer needs to a high degree and using as little resources as possible while doing so. However, research states that you can often only do one or the other, and that increasing your effectiveness often decreases your efficiency (Porter, 1985; Grant, 1999; Kellogg & Nie, 1995). An illustration of the trade-off is seen below:

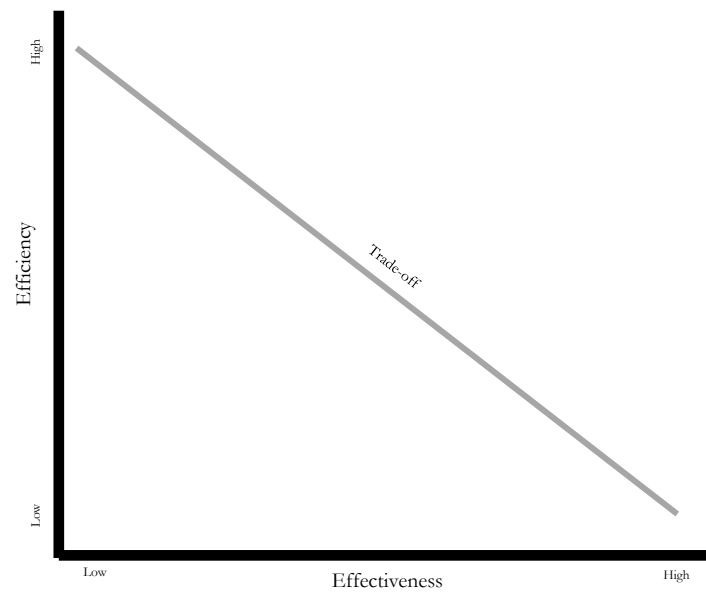


Figure 3 - Efficiency/Effectiveness trade-off

## 2.2 Service Operations Management

This part will present relevant research within the field of service operations management and synthesize it with the strategy literature previously presented. In order to answer the research question, we will present how service firms have traditionally been found to reason regarding the efficiency-effectiveness trade-off. This part ends with an evolved illustration of the trade-off dilemma, with the addition of service firms' positioning.

Measuring volume, profitability, and efficiency in service firms is not a straightforward task, as there is some ambiguity in what constitutes a unit of service (Collier & Meyer, 1998). It could e.g. mean one customer served, or one transaction processed (ibid.). Collier (1994) describes a service unit as a “set of tangible (goods-content) and intangible (service-content) attributes the customer recognizes, pays for, uses, or experiences”, and labels the service unit a “consumer benefit package”. Another label with a near identical definition is “service package” (Kellogg & Nie, 1995), and this is the term we will use in this thesis.

Schmenner (1986) develop a matrix to categorize services which plots out businesses in terms of customization and labour intensity in a two-by-two matrix. He presents that it is possible to be profitable anywhere in the matrix, but productivity is higher in the top left corner when degree of interaction and customization is low, and the degree of labour intensity is also low. In the service matrix a diagonal can be drawn from the bottom right corner to the top left corner, and it is shown that companies move towards diagonal this because it is found that there is superior profitability in these areas.

Furthermore, when companies reach the diagonal many of them start to move up the diagonal to the top left corner to increase their productivity (Schmenner, 1986). With that said there will still be companies everywhere in the matrix that are successful in their business. Some researchers

mean that describing services with these two dimensions is not sufficient and state that customization and interaction is not similar enough (Haywood-Farmer, 1988).

Critique has also been aimed at the model for not being able to theoretically explain why development in the matrix gravitates towards the diagonal. However, it is still considered useful to analyse service strategies since it provides robust empirical support for the proposal (Tinnilä & Vepsäläinen, 1995).

From this critique Schmenner (2004) modified the matrix and tied it to the Theory of Swift, Even Flow (Schmenner & Swink, 1998; Schmenner, 2001). He finds that a key success factor for service companies in terms of productivity is the flow of materials or information through the process. “The more swift and even the flow of material (or information) through a process, the more productive is that process” (ibid.). This theory states that capital intensity does not have a direct effect on productivity but rather how the investment in capital allows for an increased speed and lower internal variation.

One improvement that can be done by managers is to focus on evenness. To enhance the evenness Schmenner (2004) suggests that managers should among other things group together products and tasks into modules or families, this can reduce waste and enhance productivity. However, this model does not take profitability into account, the model focuses on the link between Swift, Even Flow and productivity, and can only explain profitability to the extent to which productivity is linked to profitability.

In this updated model, the x-axis is relabelled to degree of variation, in terms of variation of the supply of the service so that the offering is customizable to customers wishes, which can be seen as the effectiveness of the operations. On the y-axis, labour intensity is replaced with relative throughput time. The y-axis can thus be interpreted as an inverted measure of efficiency (low throughput time = high efficiency). Schmenner still maintains that firms migrate towards the “productive diagonal”, in accordance with his original article, in search for better performance. An adapted illustration of the updated model from Schmenner (2004) is seen below in figure 4.

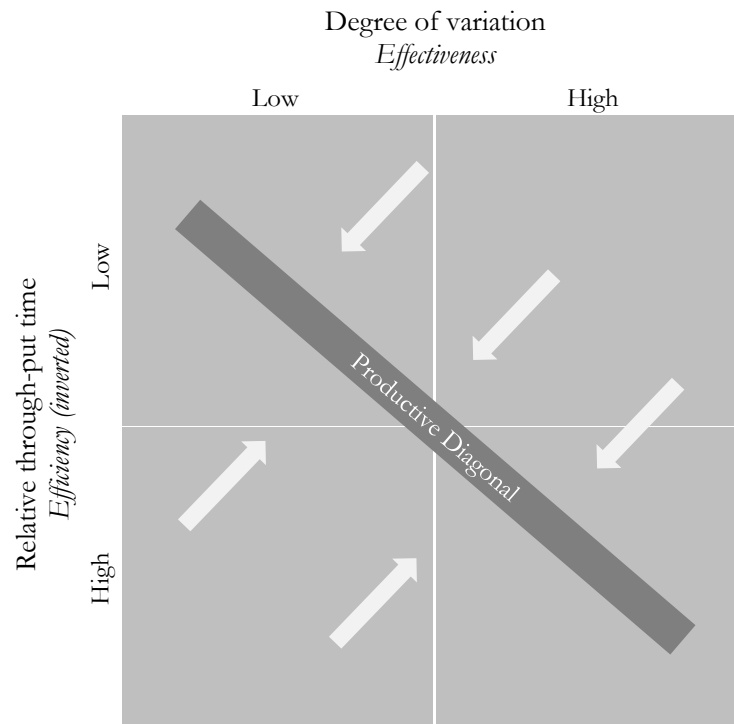


Figure 4 - Schmenner (2004)

Thus, we observe that the previously explained trade-off thinking also applies to service firms specifically. In accordance with Schmenner (2004) we assume that the most productive strategies for service firms are, traditionally, those characterized by either high effectiveness or high efficiency, and that a position in between is not as attractive. Using Porter's (1985) vocabulary, the position of high effectiveness is characterized by meeting specific customer demands to a high degree and can thus be considered a differentiation strategy. Conversely, a position of high efficiency focuses on meeting the demands of as many customers as possible and can therefore be considered a cost leadership strategy. The conventional positioning of service firms is added to the trade-off diagram and is illustrated below in figure 5.

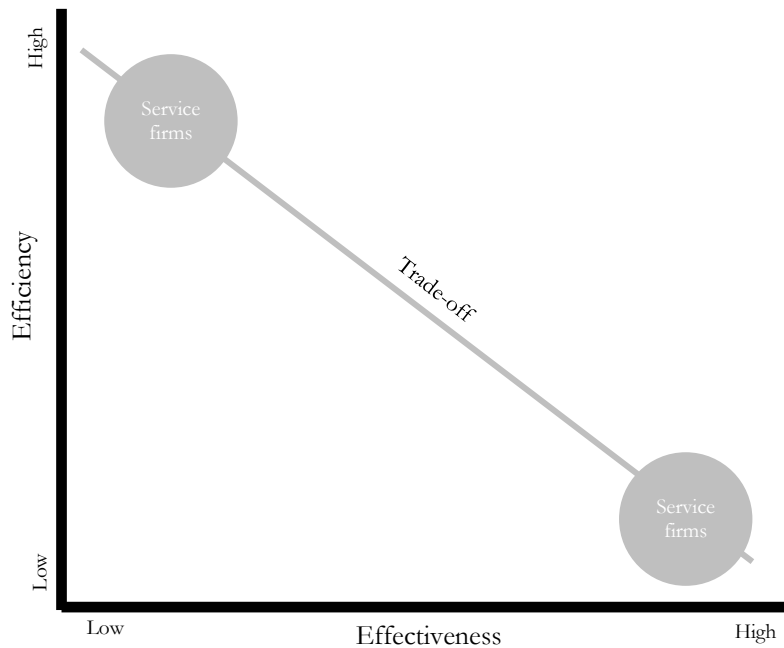


Figure 5 - Service firms positioning

## 2.3 Modularity

This part will give an exhaustive presentation of the current state of research within the field of modularity. The presentation will lay the foundation for the subsequent analysis later in the thesis. We will also show that research on modularity in a service context has historically been overlooked. In the last part, the chapter culminates in a final illustration of the strategic trade-off dilemma for service firms and shows how modularization can potentially help with solving it.

### 2.3.1 Introduction to Modularity

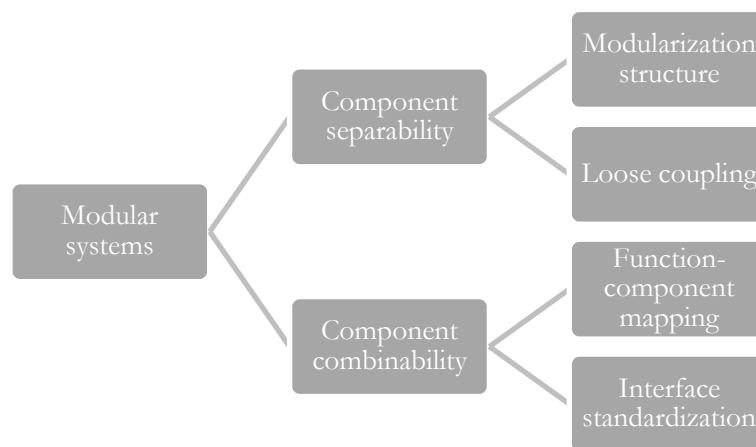
Modularity is proposed to be an effective tool for escaping the dichotomy of efficiency and effectiveness (Ulrich, 1994; Sköld, 2017). In order to understand why that is the case, we must first define what modularity is in the context of this study. Although there is a vast body of academic research in the field of modularity, no universally agreed on definition exists (Salvador, 2007). Little research has also been focused on investigating market specific factors that could influence modularization (Bask et. al, 2010; Campagnolo & Camuffo, 2010). Thus, for the purposes of this thesis, we synthesize concepts and findings from earlier studies to create a basic definition of modularity. Through this definition, it is possible to get an overview of what modularity actually means in the specific context, and what the different “parts” of a modularized system consist of.

Modularity is about combining components of different products into new and unique constellations. As such, it is not useful to look at modularity in the case of a single product or service, but rather as the interplay between many products or services within a firm’s offering. In common with Schilling (2000) and others, in this thesis we call this a system, and more specifically, in the context of the service industry, a service package system.



The concept of modularity is derived from earlier concepts such as “near-decomposability” (Simon, 1962). Other concepts have also been related to modularity such as platforms, architectures, loose coupling, utilizing a standardized interface, and matching functions and modules one-to-one (Jacobs et al, 2007; Arnheiter & Harren, 2005; Asan et al, 2004; Jose & Tollenaere, 2005). These concepts together create the concept of modularity.

For our synthesized definition of modularity, the two primary characteristics of a modular system are component separability and component combinability (Salvador, 2007). This is the very essence of modularity; components should be separable from their architecture and should be able to provide flexibility through combination with other components in new constellations, without having to re-design the architecture (Sanchez & Mahoney, 1996). These two categories are however conceptual and abstract, and to facilitate understanding of what constitutes modularity in a practical sense they need to be broken down further. Component separability is broken down into two concepts, modularization structure and loose coupling. Component combinability is broken down into two concepts, function-component mapping, and interface standardization.



*Figure 6 - Synthesized definition of modularity*

For modularization structure, the key issue to consider is where in the production line the modularization takes place. In order to understand how and where to modularize, a mapping of all the different components is useful. Gershenson et. al (1999) proposes this to be the starting point for modularization analysis. Once the mapping is done, analysis and subsequent decision of where to modularize can happen. It can happen at the raw material level, or after some degree of sub-assembly and refinement. As a basic example, a PC consists of many different parts such as a hard-drive, graphic card, and CPU. These parts are modules and the different modules can be combined into many different unique models of computers. The hard drive, in turn, consists of components such as platters and actuators. These components can also have different shapes and functionalities and be combined into many different constellations. As such the different modules of the finished PC consists of modules themselves, and the modularization concept can often be taken all the way down to raw materials. The appropriate structure of modularization is depending on the specific context of the firm and choosing which step in the production to modularize is an important decision firms face (Salvador, 2007).

A very central idea in modularity is loose coupling (Salvador, 2007; Thompson, 1967). The idea is that if a product system, or service package system, is loosely coupled, it is possible to break down the system into modules and combine them into new constellations. A loosely coupled system is one that allows for unique combinations of components with minimal loss of efficiency in the production of the products/service packages. A tightly coupled system on the other hand does not allow for this, but rather requires the production of a product to be specified in detail from start to finish in a fixed architecture. Some scholars label loose coupling as component combinability, which in essence summarizes what modularity is all about (Sanchez & Mahoney, 1996; Schilling, 2000). All systems are more or less tightly coupled on a sliding scale, and the level of tightness can be translated as the level of modularization.

Function-component mapping is similar to the mapping of physical components, but with a focus on the functionality of the components. There can either be a one-to-one relationship between the component and the function it fills, or many-to-one i.e. one component that fills many functions (Ulrich, 1995). What this means is that every component fills a specific purpose, and even though the components might be interchangeable, the function it fills must remain identical for the modularization to be effective. The finished product must have the same functions in place regardless of what components it consists of. When the function-component relationships are mapped, it is possible to identify which functions need to be present in a system, and how they need to be combined in order to maximize performance. Firms then need to make sure that all the required functions are present and can design the components to achieve it.

Interfaces are the functions through which components can be combined with each other. It describes and prescribes how the components will fit together, connect, and communicate (Baldwin & Clark, 1997). Having a standardized interface throughout the system allows for combinability of all modules within the system (Ulrich, 1995). Continuing with the example of the PC, the interface in that case is the sockets on a motherboard. With standardized sockets on the motherboard, it is possible to create a unique PC with different components such as RAM and hard drives, since all of the components fit with the motherboard. Important considerations firms face here relates to questions of what the interfaces consist of in the specific context, as well as how it allows for separating and combining modules in different constellations.

The concept of modularization can be applied in many different fields. Bask et al. (2010) identifies four key themes within modularity research; product modularity, production/process modularity, organization modularity and service modularity. Out of the four themes, Bask et al. states that service modularity is the least exhaustive field. Campagnolo and Camuffo (2009) on the other hand argues for three key themes within modularity research: product design modularity, production system modularity and organizational design modularity, choosing to omit service modularity. This points to the fact that service modularity is an area where insufficient research has been conducted up until today, which is also something that is emphasized by Bask et al. (2010).

Previous literature has mostly focused on manufacturing industries such as the electronics industry (Gawer & Cusamano, 2014; Rantala & Hilmola, 2005), automotive industry (Doran, 2004, 2005; Fredriksson, 2006), bicycle industry (Galvin & Morkel, 2001). As mentioned above, Bask et al.

(2010) finds modularity in services is an area that has been overlooked in previous research which is something that Ostrom et al. (2015) also present in their research.

Our study will take place in the service industry domain. However, the analysis in this thesis will focus solely on the tangible attributes of the service package. This delimitation is done because the academic field of modularity is primarily focused on physical products, and as such the relevant frameworks are appropriate for analysing only the tangible attributes. There are a few frameworks related to service modularity and organizational modularity (Bask et al., 2010; Campagnolo & Camuffo, 2009), which would correspond to both tangible and intangible attributes, but for the purpose of this thesis they lack clarity and coherence.

### 2.3.2 Benefits and Costs of Modularity

Ulrich (1994) presents in his research the potential benefits that the industrial process of modularity brings to its practitioners. He proposes ten potential benefits; (1) component economies of scale, (2) product change, (3) product variety, (4) flexibility in use, (5) order lead-time, (6) decoupling of tasks, (7) design and production focus, (8) component verification and testing, (9) differential consumption and (10) ease of product diagnosis and repair.

The nature of modularity allows for the same component to be used in different products or different versions of a product. It is made possible because the functions of the components are clearly defined which allows manufacturers to create this kind of standardisation and when components are being shared between products the volume of that component increases. Not only does this lower the costs, it also increases reliability and technical performance of the component. It also makes it easier to make changes to a product when new technical solutions are developed or customer preferences change without having to redesign the entire product (Rothwell & Gardiner, 1990). An increased variety in potential products offered also means that specific customer demands can be met to a higher degree. As such, a successful implementation of modularity will simultaneously increase both efficiency and effectiveness.

Ulrich (1994) also presents some of the downsides and costs that are related to the implementation of modularization. In his research he describes five costs of modularity; (1) Static product architecture, (2) Performance optimization, (3) Ease of reverse engineering, (4) Increased unit variable cost and (5) Excessive product similarity.

For modularity to be successful it has to have a particular product architecture in place. Henderson and Clark (1990) find in their study of the photolithography industry that this can be counterproductive for the innovation of products, Ulrich (1994) emphasizes that this problem can be present in other industries as well. Having a shared interface within a product often implies adding unnecessary elements to the components that do not add functionality to the product. These physical elements that do not exploit enough shared functions can be removed by reducing the level of modularity, and assuming that a firm has unlimited resources products can be optimized through minimizing modularity and focusing on perfecting the individual product (Ulrich & Seering, 1990).

The nature of modularity and its simplicity in terms of well-defined components and connections will make it easier for competitors to copy the design. It can also lead to having to use components with excess capacity because the components need to be developed to meet the demands of a more complex product. This will in turn lead to unnecessary increased variable costs that are not utilized by the components. But there is still a possibility that it lowers the overall cost of the product line lower than a non-standardized component (Tung, 1991).

Lastly criticism has been aimed at modularity for the use of standardized components to create products and that it can be difficult to meet specific customer demands. This has been found among car manufacturers where customers have experienced the different models to share too many components and design elements. A solution to this problem is to focus modularity on components that are “hidden” (Pahl & Beitz, 1984).

<b>Benefit</b>	<b>Definition</b>	<b>Cost</b>	<b>Definition</b>
1. Component economies of scale	Fewer unique components allow for higher volumes of specific components	1. Static product architecture	Make the innovation process inert
2. Product change	Easier to renew a product when not all components need to be developed again	2. Performance optimization	Better performance is possible without modularization
3. Product variety	Allows for large variety in output	3. Ease of reverse engineering	Easy for competitors to copy
4. Flexibility in use	User has the ability to use the product in a variety of ways	4. Increased unit variable cost	Unnecessary performance of components can increase variable cost
5. Order lead-time	Shorter lead time	5. Excessive product similarity	If products share too many components customers will not experience a variety
6. Decoupling of tasks	Lower complexity in tasks and possible to complete tasks in parallel		
7. Design and production focus	Easier to optimize production and design		
8. Component verification and testing	Simple to conduct simulations of specific components		
9. Differential consumption	Different parts are consumed at different paces. It is favourable to modularize components that are worn out fast		
10. Ease of product diagnosis and repair	Replace component instead of trying to locate a specific problem.		

Figure 7 - Table of Benefits and Costs

### 2.3.3 Achieving a Dual Competitive Advantage

So far in chapter 2, we have shown that traditionally there is a trade-off to be made regarding cost-performance for firms in order to position themselves strategically (Porter, 1985). We have also shown that service firms in particular have been found to apply a strategy characterized by either a low throughput time, i.e. high efficiency, or a high degree of variation, i.e. high effectiveness (Schmenner, 2004). As such, they seem to adhere to the trade-off thinking, and have realized that it is very difficult to be both efficient and effective at the same time.

We have also shown that modularization is a way to increase efficiency and effectiveness simultaneously in manufacturing firms (Sköld 2017). The efficiency can be increased through e.g. limiting the number of performed actions, i.e. decoupling of tasks (Ulrich, 1994), making it possible to accelerate the learning curve for those actions since they will receive more attention. At the same time, by allowing for combining the performed service actions in a flexible way, it is possible

to achieve a high degree of customization, i.e. product variety (ibid.). This corresponds to effectiveness in the context of our theoretical model.

As an illustrative example, consider a salad bar. This type of service firm can be operating in a few different ways. Typically, it will either have a set menu of high quality salads, or make the customers create their own from large number of ingredients. A modular approach for the salad bar would be to e.g. let customers pick freely from a limited number of ingredients, but to make sure that all ingredients can be combined with each other with great flavour results, i.e. being loosely coupled (Sanchez & Mahoney, 1996). The limited number of ingredients will increase the efficiency of the salad bar, since the staff will have fewer preparations to make and can learn to do them faster. If the bar also manages to create a way to have all ingredients potentially mix successfully together by utilizing a standardized interface (Baldwin & Clark, 1997), they will have a very large number of unique salads to offer to customers. This increases the effectiveness of the salad bar, i.e. higher customer satisfaction and increased willingness to pay, since the customer can tailor the offering to their liking.

With the above stated reasoning in mind, we propose that modularization is a way for service firms to achieve a dual competitive advantage of efficiency and effectiveness. The potency of modularization as a strategy for service firms is, of course, dependent on whether it can be successfully implemented. The proposal is as such assuming a successful implementation of a modular approach. The likelihood of successful implementation will be dependent on the specific context of each firm, which is where our research gap exists. The final dynamics of the proposal is illustrated below in Figure 8. An analytical framework will be presented in chapter three for how to analyse the contextual fit of modularity, and how it affects the applicability of modularization.

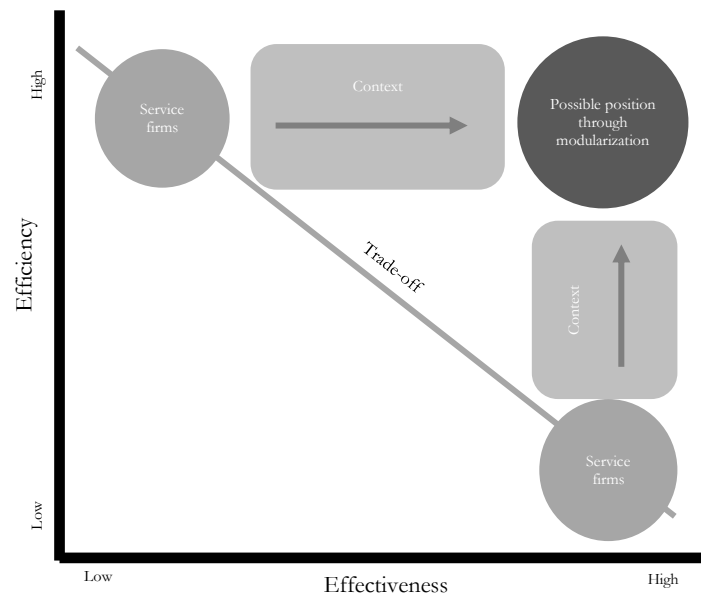


Figure 8 - Theoretical Framework

### 3 Analytical Framework

*In the previous chapter we have shown that previous research within modularity, strategic positioning, and service operations management is exhaustive within each field. Our literature review presents that modularization is proposed as a way of solving the strategic trade-offs that firms must tackle. However, there is still little knowledge about the effects of modularization in specific contexts and every context needs to be evaluated to examine how likely it is that a modularization strategy would be successful. This part of the thesis will present the theoretical model of Schilling (2000), which is a useful tool for assessing factors determining the suitability of modularity in a specific context. The model will be adapted to the context of service firms and used to answer our research question and fill the research gap. An illustration of the relationship between Schilling's model and the research gap is seen below in figure 9.*

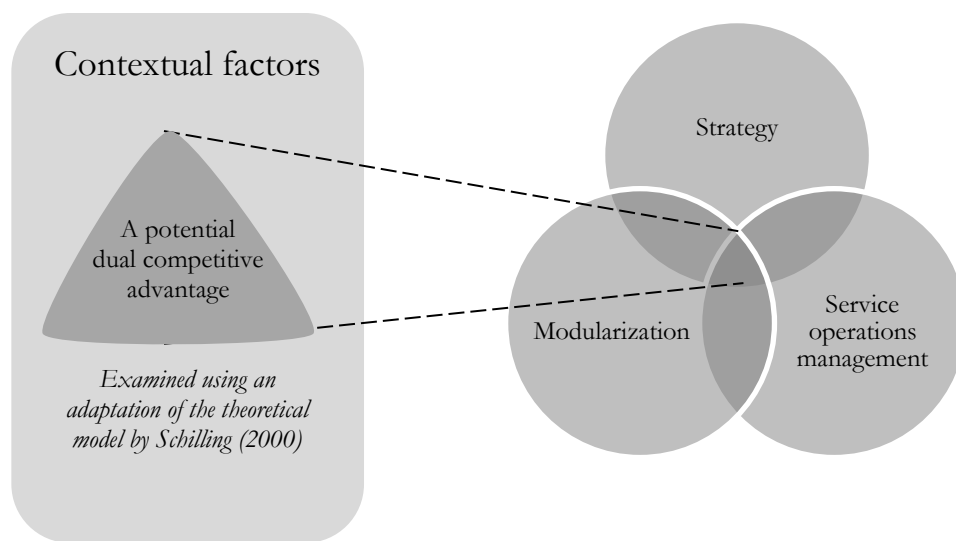


Figure 9 - Relationship between research gap and analytical framework

#### 3.1 Organizations and Their Context

Every system exists within a context, and this context is defined by factors that puts pressure on the system (Alexander, 1964). The fit between the system and the context that the system operates in is very important and is not to be treated as definite or fixed. Complex systems respond to changes in the context that they are in, or changes in the components that makes up the system in a strive towards a better fit (Holland, 1992, 1995, 2000).

However, it is very rare that a system manages to reach a “perfect fit” with the context. One of the reasons for this is that change is a process that often is very slow, resulting in a need for a new better solution once the change is implemented. Furthermore, systems might not be able to reach a “perfect fit” even though they have unlimited resources, the reason being that the systems are too complex which creates “conflicting compromises” that hinders the system to reach an optimal fit with the context (Kauffman, 1993; 1995). Lastly a system that responds to its context and changes will also change the context that it operates within. This change can be both unintentional or purposeful, but the context and the system are continuously co-evolving (Gell-Mann, 1994).

With this in mind, in order to study modularity in the context of service firms, we must thus utilize a theoretical model that examines how a specific system responds to an attempt to modularize it, which leads us to the theoretical model of Schilling (2000).

### 3.2 Contextual Factors Towards Increased or Decreased Modularity

Schilling (2000) develops a theoretical model that tries to explain the process of how systems migrate toward an increased or decreased degree of modularization and the relationship between the context and the modular system. The study uses previous literature within modular systems to define four forces that makes modularity a more or less fitting system in a specified context: *Heterogeneity of inputs, heterogeneity of demands, synergistic specificity and urgency*. The model is a generic one, meaning that the specific content of each force must be developed for the context the model is applied to. The generic model is applied in the context of inter-firm product modularity in the article (Schilling, 2000), meaning the degree to which firms in an industry develops standardized interfaces between them to facilitate synergies between products of all firms. The article proposes 11 specific drivers towards increased or decreased modularity in the inter-firm context. Our context will be that of intra-firm system modularity in service firms, i.e. how internally modular firms are, and similarly to Schilling (2000) we aim to propose drivers for or against increased modularity.

#### Synergistic specificity

Systems are defined as modular when the components that makes up the system can be separated and put together in new combination without having to make compensations in terms of functionality (Langlois, 1992; Sanchez, 1995). Knowing this there are sometimes components in systems that have better functions than others when combined. Synergistic specificity defines the degree to which systems achieve a higher performance thanks to the specificity of the components. The degree of synergistic specificity is high if a combination of different components cannot obtain a similar or better performance. The synergistic specificity is a force that draws systems away from adapting modularization which sacrifices the level of recombability within the system. This factor thus put pressure on the system to become less modular.

#### Heterogeneous Inputs and Demands

The aim with modularization is, as mentioned, to allow heterogeneous inputs to be recombined into many different heterogeneous outputs. For this to be successful the ability to reconfigure components into many different outputs also has to increase the fit of the system to its context. If the system contains a lot of heterogeneous inputs it will make recombability through modularity easier to conduct. If demands are simultaneously heterogeneous it will make the recombability more valuable for the system.

These two forces of demand and inputs reinforces each other's pressure that they put on the system. However, if there is a heterogeneous demand but the system and its components are homogenous, modularity will have limited effects. It would increase flexibility in scale, but it would not be able to deliver an increased variation in the configuration of components. Similarly, if customer demands are homogenous there is little to be gained from modularization, instead trying

to find the best combination and develop a non-modular system will be more suitable (Langlois, 1992). It is the combination of heterogeneous inputs *and* demands that together create strong driving forces for increasingly modular systems.

### Urgency

The last force of the framework is the indirect effect of urgency. Systems are generally slow in their response to external changes that occur. This means that a system can be out of balance between the degree of modularity and what the synergistic specificity and heterogeneity of demands and inputs designates. The speed of the response of a system towards increased or decreased modularity is determined by different forces that create urgency. Urgency is thus indirectly positively correlated with increased modularity. Factors that creates urgency are for example competitiveness, time pressure, technological changes and short product life cycles.

As an example, firms must often innovate and update their product offering, in order to be able to capture the entrepreneurial rents, i.e. the price premiums firms can enjoy by developing creative solutions to customers, potentially provided by new products (Schumpeter, 1947). This creates urgency for the firm, in terms of requiring a fast product development lead time if they want to maximize profits. A modular system for production allows for faster development of products, and this is one way urgency positively influences the fit of a modular system.

### Dynamics

The forces can be divided into two different categories, forces that puts pressure on the system to become more modular and forces that puts pressure on the system to become less modular. Heterogeneity of inputs, heterogeneity of demands, and urgency all put pressure on the system to become more modular. Degree of synergistic specificity put pressure on the system to be less modular. These two sides of positive and negative forces and their proportions relative to each other will put pressure the system to migrate towards an equilibrium in terms of the degree of modularization. This equilibrium will take place when the improved functionality of increased modularization is equivalent to the decreased functionality from a lower level of specificity in the system.

We make one minor adjustment to the model, based on our review of existing literature on modularity. Schilling (2000) argues that the number of possible unique outputs created by a modular system is directly correlated to the number of unique inputs. We argue that while this notion is not necessarily false, a much more important factor in order to create numerous outputs is component combinability (Ulrich, 1995; Salvador, 2007). Thus, we argue that in the context of intrafirm modularity in service firms, heterogeneous inputs are not necessarily positively correlated with pressure towards increased modularity. The concept of modularity is, in our opinion, based on the idea of creating a large number of unique products from a small number of unique inputs. We therefore consider the “Heterogeneity of Inputs” category of Schilling’s model to be of less importance than the other categories.

To summarize, the model of Schilling (2000) aims to explain how a system would respond to an attempt to modularize it. The model is used to identify factors that speak in favour of or against the systems readiness to become modular. Since the purpose of this thesis is to examine to what



extent modularization can be a way for service firms to escape the dichotomy of efficiency and effectiveness, we must understand how the context of service firms allows for modularization to be implemented. This makes Schilling's model a good fit for our analysis, which is why we have chosen it as our analytical framework.

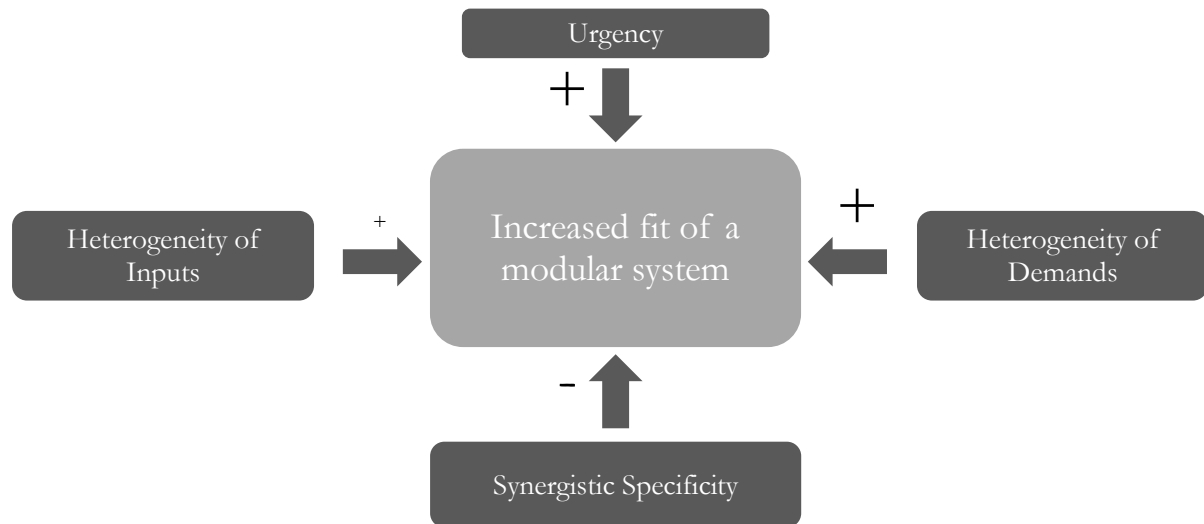


Figure 10 - Analytical Framework

## 4 Method

*This chapter will present the methodology of our empirical study. Our methodological choices are motivated, as well as the choice of case industry and firms. We then present the practical procedures of the data collection and analysis. The chapter ends with a discussion on the quality of the research, with a focus on three different quality measures.*

### 4.1 Research Approach

Research can be inductive, deductive or abductive. The choice of research approach determines how the researchers use existing theory together with gathered empirics to answer the research question (Bryman & Bell 2015; Dubois & Gadde 2002).

An inductive approach starts with observations of reality and uses those observations to try and make generalized conclusions where the outcome of the inductive study is theory. The deductive approach is the more traditional research approach that starts from theoretical knowledge that is used to create one or several hypotheses which are then tested to be confirmed or rejected (Bryman & Bell 2015).

A combination of the inductive and deductive approach is the abductive approach. This approach focuses on a continuous iteration from empirical observations to theoretical models and the theoretical framework evolve simultaneously with empirics and analysis (Dubois & Gadde 2002). For this thesis an abductive approach has been chosen as the most appropriate given the exploratory nature of the research question and the aim to develop further knowledge about the chosen topic. The iterative procedure of conducting our research study is illustrated in figure 11 below.



Figure 11 - Overview of research procedure

In this study we embrace the interpretative paradigm of business research (Burrell & Morgan, 1979). The interpretative paradigm suggest that organizations exist only as conceptions between social actors, and as such it can only be understood through the experiences of those within them (Bryman & Bell, 2015). Throughout the thesis, we will therefore primarily collect data from actors active within the relevant industry.

Research in the intersection of modularity and the service industry, is in a nascent state and therefore an exploratory method is appropriate to answer our research question (Edmondson & McManus, 2007). Further, the nature of our research question demands that we put great emphasis on the specific context of the service industry. Because of this, we need to gather data from sources closely embedded within that context. Without going inside the context of the service industry we cannot extract relevant knowledge, since we adhere to the interpretative paradigm.

Thus, we choose the qualitative research method of a multiple case study. The reason for doing a multiple case study and not a cross-sectional study, is once again because of our emphasis on the specific context. We do not emphasize straight generalizability as much, which would have prompted a cross-sectional approach (Bryman & Bell, 2015). The cases studied were actors embedded within the chosen case industry, and the data was collected through interviews (expanded on in section 4.3).

## 4.2 Case Selection

### The Industry

The restaurant industry in Sweden has seen a rapid development, during the past 10-20 years there has been an increase in new restaurants by 25%<sup>1</sup>. There has also been a great development in who goes out to eat and the spectrum of restaurants have been widened significantly. Thirty years ago, an average person would rarely go out to a restaurant, the people who would go out during the weekdays consisted of a rather stiff banking crowd doing business. A very homogenous group of mostly men which also shaped the offering of the restaurants with large portions, greasy food and limitless amounts of alcohol. During the 90s more and more people started to go to restaurants more spontaneously (Interview with Mathias Dahlgren). This led to a rapid development in restaurants, prior to this time there was luxury or budget (mostly lunch restaurants) but nothing in between. At the same time there has also been an increase in peoples spend on eating out during lately, a 15,6% increase compared to total grocery spend which only had an increase of 3,2% between 2007 and 2015<sup>2</sup>. As the buying power of customers increased so did the plethora of restaurants and all of a sudden there were lower segments of restaurants doing the same thing as the very best did ten years ago (Interview with Mathias Dahlgren).

Furthermore, chefs are being called the rock stars of the 21st century by the media with TV-show after TV-show being released<sup>3</sup>. There are also more and more galas and events to praise chefs in the industry. Just in Stockholm alone, there are the White Guide Gala, Restauranggalan, Svenska Gastronomipriset, Gulddraken and Årets Affärskrog by Dagens Industri just to name a few.

Despite this romanticized image of the restaurant industry and the development of the restaurant industry, reality is very different. During 2017 there was an increase in bankruptcies in the restaurant industry by 19%<sup>4</sup>. The restaurant industry is burdened by tough working conditions and low margins. It is not uncommon that restaurant owners and chefs have to work 12-16 hour shifts to cope with everything that has to be done (Lundtorp, Rassing & Wanhill, 1999).

We thus observe a growth of the restaurant industry and the increased spending among people, despite this the restaurants are struggling with low margins and tough working conditions. This is the primary reason for choosing restaurants as suitable study objects for our cases. Restaurants is a relevant service industry to focus on given our research question because the competition has increased in such a rapid pace and the industry has grown dramatically during the past years, but

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<sup>1</sup> <https://sverigesradio.se/sida/artikel.aspx?programid=83&artikel=5626385>

<sup>2</sup> <https://www.scb.se/hitta-statistik/artiklar/2016/Svenskarna-ater-ute-mer/>

<sup>3</sup> <https://www.aftonbladet.se/nyheter/article14234669.ab/promo>

<sup>4</sup> <https://www.uc.se/konkursstatistik/branschstatistik/>

the profits of the restaurants have not followed the same patterns. Therefore, we see this as an interesting case to answer our research question and understand what factors that makes and adaptation of a modular strategy more or less suitable to solve the problem that we have identified above.

Previous research within the restaurant industry is limited. The conducted research on the restaurant industry is often descriptive in nature, rather than being theoretical and problematizing (Wellton, 2017). There are ambitious attempts to specify the unique features of the restaurant industries e.g. employee motivation (Fine, 2008; Skalpe, 2003), and menu engineering and profitability (Morrison, 1996). Most articles are however still retrospective and descriptive. Our thesis aims to be prescriptive and not descriptive, and as such we fill a minor research gap within the restaurant literature as well.

### The Cases

We studied seven cases in total, which is in line with Eisenhardt (1989), who states that six to eight cases is an appropriate number in a multiple case study. Ten restaurant owners/head chefs, one was interviewed twice, from the case restaurants were selected as appropriate interviewees. The restaurants are all quite small organizations with between 10 and 40 full time employees and a turnover between 10 and 45 MSEK<sup>5</sup>. At the larger restaurants we interviewed both the owners and the head chef to get a deeper understanding of the overall strategy but also the daily operations. For the smaller restaurants we were able to gather enough information from both a strategic and operative perspective by just meeting with the owner. A full list of cases studied can be found in the appendix.

All of the restaurants were classified as high-end restaurants in terms of their aspirations to create something unique and of high quality. Two of the restaurants had been awarded with one star in the Guide Michelin<sup>6</sup>. One of the restaurants have been awarded “Restaurant of the year 2017” at the Swedish restaurant awards<sup>7</sup> and Gulddraken by DN 2014<sup>8</sup>. Three of them were placed in the top 20 of “Best restaurant according to the chefs 2017”<sup>9</sup>. The reason for picking only high-end cases is that they are more likely to exhibit similar characteristics and struggle with the challenges described above. They can also be considered a homogeneous sample, which is preferable for our study (Guest, Bunce et al., 2006).

Their concepts were varied where some of them offered a fixed tasting menu and some of them a traditional á la carte menu with either smaller dishes or traditional starter, main course and dessert. This allowed us to get a broad picture of how slightly different restaurant contexts affect the suitability of a modular strategy.

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<sup>5</sup> According to [www.allabolag.se](http://www.allabolag.se)

<sup>6</sup> <https://guide.michelin.com/is/news-and-views/nordic-michelin-guide-2018-results-full-list/news>

<sup>7</sup> <http://www.restaurangalan.se/previous.xhtml?previousId=20>

<sup>8</sup> <https://www.dn.se/pa-stan/gladje-nar-drakar-gick-till-krog-bar-och-kafe/>

<sup>9</sup> [http://www.restaurangvarlden.se/wp-content/uploads/2016/04/SGP\\_VINNARE\\_2017.pdf](http://www.restaurangvarlden.se/wp-content/uploads/2016/04/SGP_VINNARE_2017.pdf)

## 4.3 Research Design

### 4.3.1 Pre-study

Our abductive approach prompted us to iterate between theory and data, and we therefore conducted a pre-study in addition to the main study. In the pre-study, the goal was to acquire enough knowledge of the subject to formulate a research question and design our study. Hence, we went in to the pre-study with only an idea of what field we wanted to relate our study to and performed unstructured interviews in an inductive manner. This allowed us to absorb the knowledge without preconceived notions or biases, and after the interviews we had a better understanding of the challenges in the industry and could formulate more specific and relevant research question (Bryman & Bell, 2015).

The pre-study was conducted together with four experts from various restaurant-related fields. The pre-study sample included people with different expertise from an outsider perspective. This was to cover as many aspects of the industry as possible, and the interviewees were selected based on the knowledge they possess. As such the pre-study sample was characterized as a “judgement sample” (Marshall, 1996). A full list of interviewees can be found in the appendix.

### 4.3.2 Data Collection

The data of the main study was primarily collected through interviews. Since we in the pre-study already explored the topic through unstructured interviews, the main study interviews were semi-structured. Semi-structured interviews are suitable when there is a rather clear focus of the investigation, while still needing flexibility to capture what the interviewees find most important (Bryman & Bell, 2015). Since we conducted a multiple case study, there was also need for some structure between interviews in terms of coherent questions, in order to be able to compare answers between the cases to identify common themes (*ibid.*). Further, we embraced the style of responsive interviewing (Rubin & Rubin, 2011). The style is very similar to that of semi-structured interviews, with one addition being that it puts emphasis on building relationships and trust with the interviewees. This leads to a more collaborative process, and allows for more honest answers, and deeper acquired knowledge.

The empirical results are based on 15 interviews, of which four was conducted as a pre-study. This is deemed satisfactory, since saturation in the answers is often reached at around twelve interviews if the interviewees are a homogeneous group (Guest, Bunce et al., 2006). Out of the eleven main study interviews, all of them were males employed within the restaurant industry and can thus be considered a homogeneous group. We had scheduled two interviews with female restaurant owners as well, a depressingly rare phenomenon at the top level fine dining scene in Sweden, but they both unfortunately cancelled with short notice.

In accordance with the method of semi-structured interview, we created an interview guide (Bryman & Bell, 2015). The guide served as a starting point for discussions during the interviews and were not seen as a list of questions to adhere strictly to. The questions were rather seen as a

list of topics, to remember the interviewer of what to steer the discussion towards. A full list of the questions in the interview guide can be found in the appendix.

All interviews were discussed and summarized shortly after completion, in order to gain deeper understanding of the insights provided by the data (Bazeley, 2013). Since all interviews were conducted in Swedish, all quotations in the thesis has been translated. Considerable effort was put in to make sure we did not miss any vital information through misinterpretation, but there is always risk of some losses in translation (Flick, 2014). Furthermore, additional documents have been evaluated before and during the interviews to get a broader understanding of the context of the cases such as websites, annual reports and menus.

#### 4.3.3 Data Sampling

With our method, the multiple case study, a critical step was the sampling of cases to be studied. Dubois & Araujo (2007) argue it is the single most important decision for the quality of the research, and as such much consideration was put into the decision.

After our pre-study, where the interviewees were selected based on their industry knowledge from an outsider perspective, another sampling decision was made. To answer the research question, access to people embedded in the context of the restaurant industry was needed. Answering the research question would only be possible if we acquired the inside knowledge of these individuals, in accordance with the interpretative paradigm. We therefore made a sample of people we wanted to interview and observe and reached out to them through contacts we made during the pre-study in a snowball sampling effort (Goodman, 1961).

Thus, our sampling process for the main study consisted of two parts; first a judgement sample (Marshall, 1996) where we carefully selected desired cases to study, and then from that a convenience sample (ibid.) where we met for interviews with those from the first “wish list” who accepted our invitation.

#### 4.3.4 Data Coding and Analysis

The way we analyse our data is inspired by grounded theory (Glaser et. al, 1968), most evident by the way we structure, code, and process the empirical data into categories based on converging themes. The categorized coded data was then interpreted in order to produce theoretical implications and insight. We further borrow from grounded theory by constantly comparing our findings with our theoretical framework, in order to iterate our theory based on the level of support by the data.

The coding of our data is done in consecutive steps. The first step is known as open coding (Strauss & Corbin, 1990), and prescribes discovery of similarities in the data, which can be coded into concepts and categories relevant to the research question. In our study such concepts are related to the characteristics of modularization in a restaurant context, as well as hints of the potential implications from adopting modularization in the specific context. The next step is axial coding (ibid.), where we combined the discovered concepts in new constellations, allowing for the emergence of patterns and theoretical insights. The theoretical insights are then synthesized and

analysed, and subsequently used as a base for answering the research question. An overview of the analytical process can be seen below in figure 12.

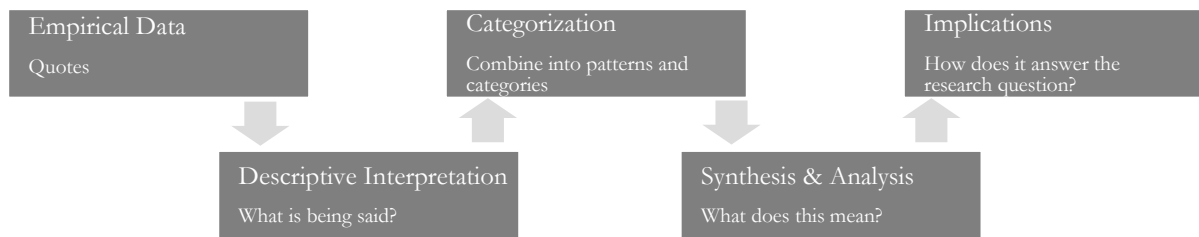


Figure 12 - Data coding process

## 4.4 Research Quality

### 4.4.1 Reliability

Internal reliability is related to whether or not two or more people on a research team agree on what they observe (Bryman & Bell, 2015). The internal reliability issue was addressed by making sure we were always two researchers present at the interviews and discuss our notes after each interview in order to discover any discrepancies. If found, we discussed further what was actually being said and what it meant. External reliability concerns the degree to which the study can be replicated (ibid.). This is difficult to achieve in qualitative research since it emphasizes the specific context in the cases (ibid.). We aim to increase the external reliability by presenting a thorough method chapter and interview guide to help future researchers in replicating the study.

### 4.4.2 Validity

Validity, specifically internal validity, in a qualitative context concerns whether the researchers observe what they think they observe (Mason, 2017; Bryman & Bell, 2015). Internal validity is generally considered a strength of qualitative research, as extensive exposure of the topic ensures a high level of congruence between observations and theory (LeCompte & Goetz, 1982; Bryman & Bell, 2015). As such, since we spend substantial time with the topic and actors within the context, the internal validity is deemed to be satisfactory for this thesis. External validity, also called transferability (Lincoln & Guba, 1985), which is the degree to which findings can be generalized across contexts, is elaborated on in section 4.4.3.

### 4.4.3 Transferability

The nature of case studies provide knowledge that is highly dependent on the unique context of the cases. Findings can therefore seldom be transferred directly to other contexts without modification (Bryman & Bell, 2015). However, if the research is of high enough quality, transferability is possible through translation efforts. A prominent viewpoint is that qualitative research should produce rich enough content, “thick descriptions”, to enable others to make judgement of the applicability of the findings in their specific contexts (Lincoln & Guba, 1985; Geertz, 1973). We designed this study to provide identifiable contextual factors, from which readers can draw conclusions on the applicability of the findings in the relevant context. This was an important consideration throughout the research, since we want to address problems faced by a broad number of stakeholders.

## 5 Findings and Analysis

*This chapter will present our empirical findings and analysis. First, relevant data from the conducted interviews will be presented as quotes, with a short text to accomplish it. Since we have many cases, to increase readability, the results will be categorized according to the model of Schilling (2000) instead of a case by case basis. Each category is then followed by an analysis to make it easier to understand the link between empirics and analysis. The categorized findings are subsequently interpreted and synthesized in order to answer the research question. The chapter culminates in 5 proposals which describe the relationships between the observed phenomena and level of fit of a modularized system, in similar to the original article by Schilling (2000). The proposals are grounded in the empirical findings but aim to be applicable to every service firm. As such they are not specific to the restaurant industry but formulated to address the entire service industry.*

### 5.1 Heterogeneity of Inputs

In the model, heterogeneity of inputs is positively influencing the fit of a modular system. Heterogeneity of inputs is in the context of our cases of fine dining restaurants relates to what raw ingredients or produce that is available for the restaurant to use, given their business idea and season of the year.

#### 5.1.1 Empirical Findings

*“You do not want to have a situation when a guest has ordered five different dishes that the components in the different dishes are too similar. It was easier before, then it was potatoes to everything and a steamed broccoli bouquet as garnish”*

Henrik Norström, Lux Day-by-Day

*“It is super difficult to develop new things, that is why chefs steal from each other. I think that it is a great value to have things that people know are mine”*

Stefan Ekengren, Restaurang Hantverket

Regarding narrowing down inputs Henrik Norström explains that it is a very big challenge to do because it is difficult to create variation between the dishes when you are working at such a high level. He says that it would demand a lot more from the development side of the chefs both in terms of time but also creativity. Even though the chefs would want to do that, it is a limitation in how much time they have to focus on development. Stefan also emphasizes the challenges of development and the difficulties in creating something new and unique in this industry.



*“We have a fixed condiments menu depending on the season. But we cook the fishes the same way; BBQ. It gives the fishes a certain flavour and it is a lot more effective than pan frying because then you have to add some kind of fat”*

Henrik Norström, Lux Day-by-Day.



*We always have comfortable cooking methods, we bake our turbot at a certain temperature because we have optimized the way we work around that. Then we add the components around that foundation of the fish depending on the season and what is available.*

Kalle Nilsson, Punk Royale.

Kalle and Henrik talk about how they become more efficient by reducing the different types of cooking methods of the main component of a dish. Optimizing the cooking method of a specific ingredient gives them control over the output. Having that level of comfort and efficiency makes it easy for them to become flexible in terms of the dishes that they are able to create with that component. Having a standardized cooking process means that they will always have the same result from it and this helps them to be more accurate in the way that they come up with new variations of the dish but also easy to handle special requests since they will not have to change the cooking method because of allergies or diets.



*“There is absolutely some value to be gained from a low number of unique ingredients, but the most important thing is always to create good flavour combinations and that the guests appreciate it. This is a very difficult trade-off.”*

Henrik Norström

*“It is difficult to lower the amount of unique ingredients, but what we try to do is to make sure that we take care of everything and do not throw away things that we can do something with. We can use one raw ingredient and make two or even three servings. But food is vivid, everything cannot be combined with everything.”*

Kalle Nilsson, Punk Royale.

Kalle and Henrik also mention the complexity of flavour and how it makes their industry differ from many other industries. Both of them are positive to lower the number of inputs that they are utilizing today but they find it very difficult because of the intangible and tacit characteristics of flavour combinations. There are many ingredients with unique characteristics which are difficult to change with others. They try to solve it instead by making more out of one ingredients and avoid throwing anything away that can be used for something which puts a lot of pressure on their creativity.

### 5.1.2 Analysis

According to Ulrich (1995) and Salvador (2007) component combinability is very important when a company develops a modular system. To allow for component combinability to be high in a modular system it will make things easier if there is a larger variation in the available inputs that a firm is able to use to create their products and services. As Joel Åhlin, owner at Agrikultur, explains, throughout the winter especially there is much less variation in what ingredients they have available. There are only a few ingredients that they can replace with that have the right functionality and at certain times of the year the variation of inputs are very low. Joel also explained that they were limited by their concept of using locally sourced produce in their menus and said

that if they were to buy produce from all over the world they would be able to keep the variation of inputs throughout the year. However, that would have too much of a negative effect on their brand as well as lower the quality of the product.

As Joel mentioned they were struggling to find enough produce with the right functions at times. Ulrich (1995) discusses the issue of component and function mapping and suggests that every component has a specific function in a product and even if the components are interchangeable, the specific function it fills has to remain the same to be able to utilize modularization effectively. When the product is finished it needs to have the same functions regardless of the components it consists of. This becomes an obvious issue when there is a lack of availability in input for the producer, as they will find it difficult to make sure that all functions that are required are present when they are combined in different ways.

Salvador (2007) and Thompson (1967) also discusses the decomposition of the inputs of components. They suggest that products should be loosely coupled to be suitable for a modular system. As both Henrik at Lux Day by Day and Joel at Agrikultur explained they find it difficult to develop dishes that are too loosely coupled and menus that share too many of these loosely coupled components between different dishes. This since there is a risk that this will make the guests experience the different dishes as too similar. This is also further emphasized by Ulrich (1991) as one of the negative sides of modularization, that it can result in the consequence of having products that shares too many components which makes them too similar for customers.

Kalle at Punk Royale and Henrik at Lux also explain how they deal with this in one way to have their dishes loosely coupled without being too similar to the other dishes. By using one cooking technique for a specific produce on the menu they are then able to easily map up what other functions that are needed for that dish to contain all necessary functions and then vary the components throughout the year. Both of them also discusses how they want to keep the number of unique inputs down but that it becomes very difficult to make everything fit with each other. This is also in line with Ulrich (1991) analysis where he states that often when modules are developed they can have excess functions that are not being used to make sure that they can fit into different configurations. This becomes very difficult to translate into the context of food since it is hard to add features in the same way as to a car engine. Produce has much more specific features since it has flavours that are hard to emulate.

Based on the above analysis of the relationship between heterogeneity of inputs and suitability for a modular system in a service firm we find that restaurants are struggling to reduce their input without reducing the output. The issue with seasonality affects what produce restaurants will have available. This limits them to few ingredients that can be swapped with each other without interfering with the function of the final product. This is something that modularity would be able to rectify, by making the ingredients loosely coupled (Sanchez & Mahoney, 1996). Therefore, our observations indicate that the larger the variation of inputs that are available for a service firm, the more suitable would it be to apply a modular system for their offering.

**Proposal 1 - Variation in the availability of inputs will be positively related to an increased fit of a modular system for service firms**

## 5.2 Heterogeneity of Demands

In the model, heterogeneity of demands is positively influencing the fit of a modular system. Heterogeneity of demands is in the context of our cases of fine dining restaurants related to special dietary requests like ordering a specific dish but without the meat if you are vegetarian, or allergic requirements such as lactose intolerance.

### 5.2.1 Empirical Findings

*“The challenge is not so much that people are allergic to something, it used to be fine when it was only a few things like lactose or gluten. Today people are allergic to everything, and you do not know if they are allergic or just that they do not like something. It is very challenging for the kitchen staff, they can’t operate at full speed”*

Mathias Dahlgren, Matbaren.

*“Problems arise when you have a menu that is very thought through, and there is a special order because of allergy. In that case you need to have prepared a parallel menu in addition to the primary one, in order to handle the request. Most often that menu consists of entirely new dishes, which of course means a lot of extra work”*

Mathias Dahlgren, Matbaren

*“People go to restaurants and expect them to be able to provide everything, because they believe that is how it works. No other industry has the same requirements on service level. Nobody goes to Filippa K and asks them to sew a pair of pants that they do not have in their collection, but in restaurants that happens every day.”*

Mathias Dahlgren, Matbaren

Mathias explains that they encounter difficulties when there is too much fluctuation in the demand from their guests. His style is working with fixed dishes that are not intended to be tailored to variations in demand. He creates dishes that are optimized to taste as good as possible which makes them difficult to adapt to different customer preferences. He further expresses a frustration towards the excessive demands on service level by customers.



*“When you make adjustments to dishes to accommodate allergies, you need to make sure that the thing you add is as good as the original ingredient you removed”*

Kalle Nilsson, Punk Royale

*“If there would be a diet-friendly alternative that is of equivalent quality the original ingredient I can switch it, but otherwise there is no chance”*

Stefan Ekengren, Restaurang Hantverket

The difficulties with special requests is further accentuated by Kalle Nilsson at Punk Royale and Stefan Ekengren at Hantverket. They state that they would like to be able to switch out components to accommodate everyone, but that it is difficult since the original ingredient is so carefully thought out and selected to perfect the dish.



*“There is a point in having dishes on the menu that are not profitable, if the result is that the menu is ‘complete’”*

Henrik Norström, Lux Day-by-Day

*“The easiest thing to do would be to not care about special requests at all, but that would not be smart. If a group of people, where one person is a vegan, want to eat at your restaurant, you risk losing all of them if you can’t serve a vegan alternative.”*

Henrik Norström, Lux Day-by-Day

Henrik Norström talks about the importance of including alternatives for those with special requests. Even though it might be cumbersome or even unprofitable to include those alternatives, you need to include them in order to not lose out on substantial business.



*“We work with simpler components and work hard with refinement and enhancing with everything surrounding it. We base our dishes on vegetables and we can easily switch out the animal protein to vegetables. It is too much work to create unique dishes that are vegetarian for us. “*

Tom Sjöstedt, Lilla Ego

*“The general idea is that the vegetables are the main event, and what we serve in addition to them is less important”*

Tom Sjöstedt, Lilla Ego

*Our dishes are built up from vegetables, the meat in our dishes are “vegetables” in the old school style of cooking. That makes it easy for us to change the meat or even just remove it completely. Some guests say that ‘this was even better without meat’, then you wonder what you are actually doing”*

Joel Åhlin, Agrikultur & Bar Agrikultur

Tom Sjöstedt at Lilla Ego and Joel Åhlin at Agrikultur talks about how they work with vegetables and give them a bigger role in the dish this allows them to be more flexible in how they develop and present their dishes. Lilla Ego and Agrikultur have changed the way they look at the composition of a dish and make sure that the components around the animal protein creates a complete spectrum of flavours and texture. This means that they can easily create a vegetarian dish if that is requested, and this is something that they have been striving for from the beginning.

### 5.2.2 Analysis

Some of the topics that got most attention during the interviews were those that related to customer preferences and dietary requirements. Virtually every interviewee expressed some level of discontent with the difficulties that special requests from customers entailed. The most problematic issues arising from this seems to be those relating to the extra work and stress that burdens the staff when they have to improvise to quickly create a new dish that meet a special request. This is in line with previous research, which has found that handling a fluctuating work pace is one of the biggest challenges in the restaurant industry (Fine, 2008). The additional time pressure that occurs is thus an obstacle that firms need to overcome in order to be productive. It has been suggested that modularity is a way of both creating a wide variety of products (Sköld, 2017; Ulrich, 1994), as well as shortening order lead time (Ulrich, 1994). This is closely related to the issues with special requests, since the difficulties of creating a wide variety of products with a short lead time is basically what the problem of special requests boils down to for the studied cases.

Another point being made is that it is difficult to accommodate the heterogeneous demands, since the ingredient that the customer wants to replace was there for a reason. As stated by Kalle at Punk Royale and Stefan at Hantverket, it is very important that the new component is of as high quality as the one it replaces, otherwise the finished product will suffer. This is one of the key aspects of modularity, according to Sanchez & Mahoney (1996). They speak about loose coupling, and how a loosely coupled product architecture allows for components to be switched out for another one, with minimal loss of functionality. As such, a completely modular approach to cooking, with dishes characterized as loosely coupled, would help with handling the special requests in this regard.

Further, even though the problems with special requests are evident and recognized by everyone, the general consensus seems to be that even though it means a lot of extra work it needs to be handled. Henrik at Lux talks about how they include items on the menu which are not profitable, in order to provide alternatives for those with special requirements. This is also in line with existing research, which has shown that fine dining restaurants often include unprofitable items on the menu, based on other grounds (Morrison, 1996). The logic behind this is that if a group of people wants to eat at a restaurant, and one person in that group has a dietary requirement which cannot be met, the whole group are likely to skip that restaurant. It is therefore very important that special requests can be met by the restaurants, even though it means lots of extra work. In other words, restaurants need to be flexible and agile in order to meet demands and be successful, which is one of the most prominent features of a modular approach (Sanchez & Mahoney, 1996).

With the findings presented above in mind, there are some things that can be inferred about the relationship with between the heterogeneity of demands in customers for service firms, and the potential fit of a modular system. We observe that restaurants encounter some difficulties when it comes to meeting special requests, i.e. heterogeneous demands, from customers. We also observe that they choose to meet the varied demand to a as large extent as possible, despite the difficulties. Thus, it seems very important to them. We know from previous literature that modularization would be a useful tool to mitigate some of the difficulties firms face in these

matters. Therefore, a modular system appears to be a good fit for firms that face very heterogeneous customer demands, and for whom it is important to meet those demands. As an illustrative example on the opposite case, consider an airline. Their customers have very specific demands on where they want to travel. However, airlines choose to offer a number of standard flights that they operate, even if it does not exactly match the heterogeneous demands of their customers. As such, it does not seem very important to the airlines to meet the heterogeneous demands, and therefore a modular strategy, which would allow customers to choose freely which airport to fly to, does not seem to be a good fit. Based on this analysis, we arrive at a second proposal for factors that influence the relationship between service firms and the potential fit of a modular system:

**Proposal 2 - The relative importance of meeting heterogeneous customer demands will be positively related to an increased fit of a modular system for service firms**

### 5.3 Urgency

Urgency, in the context of the model we use (Schilling, 2000), concerns factors that accelerate or slow down the migration towards an increasingly modular system. In other words, by themselves the factors does not put pressure on the system to move in one direction or the other, but the presence of urgency factors will strengthen the pressure from other factors. The applicable urgency factors in the studied cases are related to the competitive intensity of the industry, and the need for frequently updating the product offering.

#### 5.3.1 Empirical Findings

*“You can go to a generic restaurant and eat a five servings tasting menu with wine pairing. This segment has started to do the same thing as the best restaurants did 10-20 years ago, now you can go out and eat very good food in five servings for 495 SEK”*

Mathias Dahlgren, Matbaren.

*“We are part of the last manufacturing industry that is still operating at premium locations”*

Mathias Dahlgren, Matbaren.

Mathias explain that the industry has developed a lot over the years. When he began to work in the industry there were only two types of restaurants, fine dining restaurants and lunch restaurants. Today there are many solutions for customers to choose from. At the same time the level of gastronomy has increased dramatically. Small neighbourhood restaurants are delivering food that you could only get at the best restaurants 10-20 years ago which has in turn put a massive pressure on the traditional fine dining restaurants to deliver an even more refined and unique product. He further comments on the fact that restaurants have a lot of overhead costs, which puts immense pressure on delivering value to stay competitive, to get revenues that cover those costs.



*“We need to increase our revenue, have a more even customer flow throughout the weeks. There is no room to charge higher prices, so we need to increase the number of guests”*

Stefan Ekengren, Restaurang Hantverket.

Stefan continues to expand on their challenges about the flow of customers. The fact that they work with fresh produce makes fluctuations in demand devastating for economic performance. Even though they have a slower day, they need to have everything prepared for a higher capacity. Consequently, they need to be serving a full house every night to stay profitable.



*“The customers don’t really know what they want. The fact that we keep changing makes people come back here”*

Kalle Nilsson, Punk Royale

*“In the beginning we sometimes changed dishes every day. Now we do it every quarter and try to keep a higher more consistent quality, to get more guests to return here”*

Joel Åhlin, Agrikultur

*“Sometimes a dish is made up of a specific ingredient for example fresh carrots from a local farm that have a specific size and specific flavour, which you can only buy for two weeks a year. After that it is not possible to switch to a regular carrot for that dish.”*

Henrik Norström, Lux Day by Day

Kalle and Joel explains that frequently changing the menu is a method of keeping customers coming. The new dishes are not necessarily better than the old, but the fact that they are new makes customers return. It is explained that novelty is a way to provide value and is a necessity for staying competitive. Henrik further states that dishes are changed because of a lack of availability of certain ingredients. Very seasonal ingredients need to be taken advantage of, and the menu will be tailored in order to incorporate them and provide a versatile value offering.



*“It’s both about keeping customers coming, but also about keeping our staff motivated. It’s not motivating to do the same things every day forever, like at McDonald’s”*

Kalle Nilsson, Punk Royale

*“We don’t change dishes for the sake of changing. But you also need to kill your darlings, sometimes we must replace the best dishes in order to keep developing”*

Tom Sjöstedt, Lilla Ego

*“It takes time to develop new things and get people to accept it, and once you are there you feel it is time to move on”*

Tom Sjöstedt, Lilla Ego

It is further explained that the frequent change of product offering is done to attract customers, as well as to keep the work fun, interesting, and developing. In order to keep staff and management motivated, it seems to be important to continuously keep innovating new dishes, so that tasks and procedures are not too monotonous and repetitive.



*“It’s a challenge that we change as many dishes as often as we do. If you always have the same dishes you can work more like an assembly line”*

Andreas Simonsson, Lux Day-by-Day

*“We used to change every dish on the menu at once. This was very tough, to calculate the right amounts, predict how much a dish will sell, how to get all wheels turning in the kitchen”*

Oskar Mendelin, Restaurang Hantverket

Andreas and Oskar talk about the challenges with changing dishes so frequently. Both Andreas and Oskar are operative kitchen staff and are as such very familiar with the necessary procedures when the kitchen staff need to learn new dishes in terms of training and learning curves.

### 5.3.2 Analysis

As mentioned, urgency is an indirect effect on the pressure towards increased or decreased modularity. Schilling (2000) proposes that competitive intensity and speed of technological change are urgency factors that enhances the pressure on a system to be increasingly modularized. In our studied cases, we want to make the same argument regarding competitive intensity. Mathias talks about the recent emergence of numerous restaurants with very high quality of the cooking. This means that upscale fine dining is no longer a privileged industry characterized by high margins, but rather that the barriers to entry (Porter, 1979) are surmountable which creates increased competitive intensity and drives profits down.

In order to handle the increasingly intensive competition, one strategy employed by restaurants is to frequently replace dishes on the menu. The logic behind it is, as stated by Kalle at Punk Royale and Tom Sjöstedt at Lilla Ego among others, that continuously changing the menu is one of the reasons customers keep coming to the restaurant. We interpret this as a sign of very short product life cycles, and that the frequent change of menu is a way to capture the additional entrepreneurial rent (Schumpeter, 1947) that an innovative product entails. Since the cycles are so short, the offering needs to be updated shortly after the menu is perfected in order to maintain a unique offering to customers. As such, the changing of dishes is seen as a method for creating competitive advantage based on differentiation (Porter, 1985), i.e. effectiveness, and of great importance for restaurants.

As a side note, another reason for changing dishes is in order to keep motivation high. In many instances in the studied cases, the importance of doing things that are new and exciting is emphasized. This is considered important both as a creative outlet for the restaurant owners, and



to keep tasks varied and interesting for the operative staff. This emphasis on intrinsic motivation can be considered a good fit for the restaurant industry, since studies have found that people choose to enter the restaurant industry for a variety of reasons other than money (Skalpe, 2003).

The frequent changing of dishes has some drawbacks. It is explained that there is a learning curve for the staff to learn how to cook the new dishes, and it also puts pressure on management to be creative and invent new products. Changing of dishes can therefore have a negative effect on both the efficiency and effectiveness of a firm if it is not handled properly. This makes the frequency of changing dishes an urgency factor in itself, as well as a method to handle the urgency factor of competitive intensity. As explained by Schilling (2000), urgency factors work by reinforcing the other factors, and this relationship can be observed in this case as well. The need for frequent changing of dishes reinforces the heterogeneity of inputs factor, since the pressure for finding the best inputs gets stronger. It reinforces heterogeneity of demands as well, since every new dish needs to satisfy the various demands that exists. This puts extra requirements on the creative process for the new dishes.

The observed challenges with frequent changes to the menu can be mitigated by applying some degree of modularization to the operations. Modularization has been found to shorten lead time (Ulrich, 1995), which naturally would help with developing new dishes. Another major benefit of modularity is the ability to develop new offerings without changing the entire previous offering (Ulrich, 1994; Rothwell & Gardiner, 1990). An implementation of modularity would thus be a way to replace some parts of a dish without having to build a new one from scratch, which would save both time and energy.

An example from another service industry, that is already operating modularly, is a cinema complex. A cinema needs to update their offering whenever a new film comes out, to cater to the audiences' demands, and has designed their business model modularly to be able to do so as smoothly as possible. The interfaces (e.g. screen and audio format) are standardized (Baldwin & Clark, 1997), and it is very easy to update the offered films. As such there is a good fit between the cinema and a modular system, much due to a need for frequent updating of the service package offering. With these observations and analysis in mind, our third proposal reads as follows:

**Proposal 3 - A need for frequent updates of the service package offering will be positively related to an increased fit of a modular system for service firms**

## 5.4 Synergistic Specificity

The force of synergistic specificity focuses on the degree to which a system benefits from the specific functions and combinations of components that cannot be obtained from other combinations or components. The synergistic specificity of a firm's offering draws it away from modularization and puts pressure on the system to become less modular in order to perform better.

### 5.4.1 Empirical Findings

*“You eat something with your hand, something with a spoon, something with a knife and fork”*

Stefan Ekengren, Restaurang Hantverket

Head chef Stefan Ekengren at Hantverket and Henrik Norström at Lux, cited in section 5.3.1, explained that it is common that dishes are created with specific purpose both in their presentation and also in the components that makes up the dish. Furthermore, they explained that when the component that is the most essential to the dish has a unique function, flavour or texture, that component cannot be replaced by another component and the entire dish needs to be redeveloped to be successful. As Henrik explained in 5.3.1, some produce has such specific features and they only exist during such a short time period that it is impossible to replace them when their season is over.



*“It has to be the right feeling, often a dish is built up by flavour combinations and a texture. If you find the same flavour combination and the same texture it is of course possible to switch out these components”*

Henrik Norström, Lux Day-by-Day

When Henrik talks about the specificity of components in dishes he explains that there are intangible aspects of a dish, he calls it “a feeling” that consists of a detailed and very specific feature that is held by the components when they are combined with each other in a specific way. To find these synergies that are created from the uniqueness of the combination of the components is very difficult but if they are found the replacement can be done.



*“Fixed menus are easier to plan, cook and serve. They also have the advantage that you are able to create a more complete product for the guest.”*

Mathias Dahlgren, Matbaren

Mathias explains that when you lock yourself up to a fixed menu for your customers and they do not get to choose dishes themselves you gain a lot in terms of control over the demand and processes for how to deliver the product. But when the dishes themselves are being optimized to be as good as they can be it creates difficulties when demand is varied. The fixed menu concept as it is developed today is too optimized, in terms of having components that cannot easily be switched, which forces the restaurant to create entirely new dishes to cope with allergies and diets.



*“You try to find your fundamentals in a dish, then you can be interchangeable and creative with the specific components”*

Mathias Dahlgren, Matbaren

*You cannot just switch crispy celery for crispy carrot in a dish with other components of celery. Then there is no longer an idea behind the dish. The guest will see through this and the experience will be ruined.*

Stefan Ekengren, Restaurang Hantverket

Mathias and Stefan discussed how components can be changed but also what prevent such a change. Mathias talked about how some dishes can be developed to have a foundation built up by a few ingredients that work well together, after that you can switch out one component based on what is available for example cauliflower with langoustine and shellfish sauce can be switched out for cauliflower, squid and shellfish sauce. Stefan however explains that this switch cannot be made just for something with a similar function. If a dish is made up of three types of celery root, where one component is crispy celery root, it cannot be switched out for crispy carrot even though they have the same functionality because there is a specificity in the celery root for that dish that creates a complete experience for the guest because of that specificity from the celery root in this case.



*“We base our dishes primarily on vegetables, and then it becomes pretty easy for us to remove the animalistic components and create an entirely vegetarian dish by adding some more green to it”*

Tom Sjöstedt, Lilla Ego

*“We procure 20 kilograms of jerusalem artichoke for one dish and use it all at once. 5kg is turned to sauce, 5kg of pickles, 5kg served raw, and 5kg is deep-fried. We enjoy working this way, really making sure that every part of the raw ingredient is taken care of...”*

*“...We build all our dishes in similar ways with variations of raw ingredients, purees, fried-, pickled- and raw components. This also allows us to bring back components from previous dishes into new dishes.”*

Tom Sjöstedt, Lilla Ego

Tom Sjöstedt at Lilla ego explain how they deal with the difficulties of switching ingredients by building their dishes around more generic vegetables to create a dish that contains all necessary functions and then add animal protein or take away animal protein to make the dish entirely vegetarian.

This way of working also help them to work more efficient, most of their dishes are made up from similar techniques and it is not uncommon that they make a dish with one raw ingredient that comes in 3-5 variations on the plate together with a sauce and animal protein. This allows them to increase their productivity since they are able to prepare all variations of a raw ingredient at the same time without having to change too much in the preparatory work



*“In other industries you try to create products that are identical every time. We can’t do that; raw ingredients change over time and no dish turns out identically two times in a row. A recipe is just a historical description of the process I used at a specific point in time, it will never be possible to recreate that dish identically. You have to let the ingredients steer your dish unless you work 100% industrially, and most guests don’t want industrially cooked food”*

Mathias Dahlgren, Matbaren

*“I want to do what I want to do and that can sometimes mean that some dishes are not profitable, and some are more profitable”*

Stefan Ekengren, Restaurang Hantverket

*“To switch menu often is difficult and creates issues but at the same time, it is also what makes it fun, to be able to be creative”*

Andreas Simonsson, Lux Day-by-Day

*“We would never avoid components when we develop dishes to adapt to allergies etc. When you do that, you block the creative creation completely”*

Tom Sjöstedt, Lilla Ego

*“When you work in a creative industry it is important to always create new things. Compare that with for example McDonalds, that is dependent on that you as a customer know exactly what you want.”*

Kalle Nilsson, Punk Royale

Many of the chefs we interviewed talked a lot about the importance of creativity in their work. Mathias, Stefan, Andreas, Tom and Kalle specifically talked about how the nature of cooking and how they want to create something that is continually developing. The raw ingredients change throughout the year which makes it difficult to do the same thing over and over again. But they also emphasize how important it is for themselves to be able to be creative in their work and not be locked in to structured processes and being like an assembly line in a factory.

#### 5.4.2 Analysis

Synergistic specificity is the degree to which value is added to products or services by matching components who have a uniquely beneficial relationship. A system with a high degree of synergistic specificity will create unique outputs that derive their value from having an architecture designed from start to finish with specific components in mind. As such, the goal is to create a very unique product that excels in performance compared to its alternatives. Relating this to Porter (1985), we can infer that a high degree of synergistic specificity is similar to a differentiation strategy, which emphasises to achieve superior product or service performance. As Stefan said in 5.2.1, that dietary requests are only adhered to if it does not negatively impact the quality of the dish, it is very important to him that the product performance is impeccable. As such he displays a high degree of synergistic specificity and can be considered to take a strategic position characterized by differentiation.

Salvador (2007) and Thompson (1967) present the importance of loose coupling in a successful modular system. They find that working with loosely coupled products makes it easier to break them apart and put them together into new combinations without the loss of efficiency in production or performance. When Stefan and Henrik explain how dishes are created it is evident that many dishes are developed as very tightly coupled dishes. It is not uncommon that a dish is dependent on a raw ingredient that has very specific features and that cannot be removed or replaced by anything else without having to redesign the other components as well which leads to creating an entirely new dish.

Function-component mapping is described by Ulrich (1995) as another important part of modularity and it plays an important role in regard to component combinability. However, we have found in our research that even though a component has the same function as another component it still is not enough to make them interchangeable. Stefan explains that when creating dishes there are intangible parts of a dish in terms of the idea and purpose behind it, which makes it impossible to change some components for others with the same functions, since the purpose of the dish can get lost. Henrik further emphasizes this when he explains that there is a “feeling” in a dish which develops through the synergies of combinations of specific ingredients that is hard to achieve if an ingredient would be exchanged for another.

Tom and Mathias further discuss how they are able to switch components for another component and it becomes clear that they are successful in how they are able to switch out components thanks to a combination of tight and loose coupling. They develop a foundation of the dish with a tight coupling which gives them a near complete product in terms of flavours and textures. Thanks to this they are able to keep parts of the product that they benefit from changing loosely coupled. The loosely coupled parts of the dishes are assigned to components that need to be changed either for dietary requirements or for variations in availability this way of working makes the features that can be changed less specific since they have a smaller role for the flavour combinations but a large role for the customer in terms of preference.

As an example where synergistic specificity is much less present in the service industry we can consider a hairdresser. When you get a haircut, the result is the normally the sole focus for the customer, while the way of achieving that result becomes much less important for the customer. Hence the “ingredients” of getting a haircut that the customer is satisfied with is not as important as long as the result is good. A hairdresser can therefore be very interchangeable, i.e. modular, with methods and products used to arrive at the best result. Compare that to our cases of high end restaurants, where the value of the individual ingredients in the complete dishes are evidently considered very important to the finalized dish.

As per the findings presented above, there are indications on how the synergistic specificity of components in service firms in general and restaurant firms in particular affect the suitability of adapting a modular system. We observe that there is a higher degree of synergistic specificity when components that have specific functions are given a larger, more important role in the dish. When restaurants are able to develop dishes that are more “complete” and the component(s) that they want to be interchangeable, due to e.g. diets and supply of raw ingredients, become more loosely

coupled to the dish, they are able to be more modular. With this as a foundation we suggest the following proposal on how synergistic specificity draws systems away from a modular strategy.

**Proposal 4 - The relative importance of component value to the perceived value of the finished product will be negatively related to an increased fit of a modular system for service firms.**

Continuing with synergistic specificity we observe the presence of creativity as an important factor. As Ulrich (1991) finds in his research there are limitations to modularity and one of them is static product architecture as a consequence of a modular strategy. This is also something we find to be an issue in the restaurant industry since it is, at least for higher level restaurants, very important for chefs to continuously develop their menus to get an outlet for their creativity. A modular architecture would impose a limitation on the creative freedom of the chef, and decrease the motivation of him or her, subsequently leading to inferior performance. Also from a customer perspective, this becomes an issue when chefs are not allowed to be as creative as they want to be, since it will lead to a stagnation in the development of the menu and therefore be less attractive for the customers.

Henderson and Clark (1990) also discusses the issues with a static product architecture within modularity and they further emphasizes the importance of a set product architecture to be successful in the development of a modular strategy, but that it also hinders innovation. In this context the innovation is based around the development of new dishes and a modular strategy will make it more difficult to be creative within the modules.

Based on the observations above, we find that there are indications of a second force regarding how synergistic specificity of components in service firms affect the suitability of adapting a modular system. We find that chefs, at this level, have a strong drive to be creative and innovate their product continuously both to stimulate themselves but also to remain attractive to guests. This is something that seems to have a negative effect on the suitability on adapting a modular system and based on this we suggest the following proposal on how synergistic specificity draws systems away from a modular strategy.

**Proposal 5 - The relative importance of creative uniqueness will be negatively related to an increased fit of a modular system for service firms**

## 5.5 Summary and Discussion

This part will summarize the analysis above about the factors drawing a system towards or away from modularization. We find indications that within the four forces that Schillings (2000) model contains, when applied to a service context in general and a high-end restaurant context in particular, there are five proposed effects of how these forces steer a system towards and away from modularization. These five proposals vary in their importance and effect on a system's fit to become modularized.

Proposal	Definition	Factor	Impact on restaurants
Proposal 1	Variation in the supply of inputs will be positively related to an increased fit of a modular system for service firms	Heterogeneity of inputs	Weak positive
Proposal 2	The relative importance of variation in customer demand will be positively related to an increased fit of a modular system for service firms	Heterogeneity of demand	Positive
Proposal 3	A need for frequent updates of the service package offering will be positively related to an increased fit of a modular system for service firms	Urgency	Positive
Proposal 4	The relative importance of component value to the perceived value of the finished product will be negatively related to an increased fit of a modular system for service firms	Synergistic specificity	Strong negative
Proposal 5	The relative importance of creative uniqueness will be negatively related to an increased fit of a modular system for service firms	Synergistic specificity	Strong negative

In our study we have observed that the force of synergistic specificity tends to have the biggest impact on a system, a larger negative impact than the positive impact of the heterogeneity of inputs and demands and urgency factors. Synergistic specificity is throughout the cases found to be the decisive factor for whether it would be possible to implement a modular strategy or not. Even if the restaurants has a high variety in the availability of produce on the input side, customers that find it is very important to get a dish that is adapted to their specific request, and the dish is updated frequently, i.e. the presence of urgency and heterogeneous inputs and demands, it will still be difficult to implement modularity if the level of synergistic specificity is high. This since the synergistic specificity will make the components of the products inseparable which in turn will make recombination impossible, the two major parts of modularization (Salvador, 2007).

The reason we arrive at this insight is due to the fact that few of the studied cases are operating with a high degree of modularity today, and when we inquired as to why that is the case, the answers mostly revolved around topics related to synergistic specificity. Thus, we infer that synergistic specificity is the strongest determinant of the fit between a modular system and the high-end restaurant industry. However, if one would apply the framework to another service industry, it is not given that the same factors have the most impact.

In a situation where the restaurant operates in a context where the unique features of specific ingredient in the dish plays a smaller role and the creative uniqueness is of less importance for the chef and the guests, i.e. the synergistic specificity is lower, the system will be more suited for a modular strategy. In this case when we look at the other forces they will only affect to what extent the system can be modularized. Many restaurants are limited to what produce is available, especially in Sweden where everything is not available all year around. Assuming a low level of synergistic specificity, the availability of produce is what will allow them to be more modular. Should demand however be homogeneous it would infer an advantage of a less modular strategy, with more focus on maximizing the performance of the products tailored to that homogenous demand.

Let us analyse our empirics from a more strategic perspective, by looking back at where we began our thesis in the strategic positioning of service firms and how this is affected by our proposals. We find that the strategic positioning that restaurants have taken is affected by these forces, most strongly by synergistic specificity, which influences their ability to move towards the top right corner of the matrix presented in chapter 2.3.3. Restaurants that put a lot of focus on creativity of the chefs and that are using ingredients with very unique features i.e. have a high level of synergistic specificity will according to Porter's (1980) definition have a differentiation strategy. As the analysis above indicates, such positioning will be less suitable for a modular strategy and a move upwards in the matrix. A strategy more likely to be successful for these firms would be to keep developing their non-modular system to achieve perfection in their specific offerings (Langlois, 1992).

Instead, more cost focused strategies might be more suitable to implement modularization and achieve a strategic position in the top right corner. This indicates that many service firms can implement some degree of modularity, since according to Schmenner's (1986, 2004) theories service firms often migrate towards a position of efficiency in their strive for productivity. Firms that do this will as such be more likely to successfully implement modularity.

An illustration of these dynamics is seen below in figure 13. While these results and the analysis that has been made is specifically regarding the high-end restaurant industry, every industry has its own unique challenges and context that affect the fit of a modular system. As mentioned in the introduction of this chapter, we have aimed to take the analysis to a broader perspective and the proposals we present are aimed to address a more general service firm level.

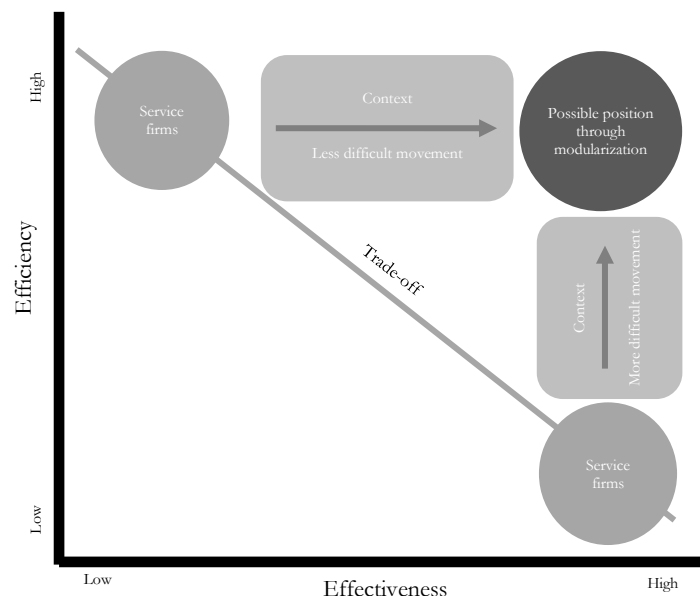


Figure 13 - Illustrated findings



## 6 Conclusion

*In this final chapter, we first establish to what extent the research question has been answered. Secondly, we present some implications of our findings, managerial and academical. Thirdly, limitations to our study is presented, and in what way they might have affected the findings. Finally, some suggestions for related future research is presented.*

### 6.1 Answering the Research Question

To answer the research question, we have used the framework by Schilling (2000) which has been adopted and adjusted from an inter-firm focus to intra-firm focus, and specifically in the service industry context. Using this framework our analysis of the gathered empirical data resulted in five proposals, compiled in chapter 5.5, that describe the relationship between observed factors derived from our interviews and the potential fit of a modular system in service firms.

The factor found to be the strongest determinant for the restaurant industry is synergistic specificity, which we observed to have a strong negative impact on the potential fit of a modular system. Firms that gave components with specific features a bigger role in the products seem to be less suitable for implementing a modular system because of a low level of component separability and combinability. Looking at these firms from a strategic perspective, they seem to be focusing more on a differentiation strategy (Porter, 1985) and thus our research indicates that service firms with a differentiation strategy tend to be less suitable for modularization. All proposed factors are however equally applicable if the framework is used in another service industry, and the relative strength of the respective factors will be dependent on the specific context.

To conclude, our empirical findings suggest that modularization might be a useful tool for service firms, if the factors found to positively impact the fit are strongly present, and the ones negatively impacting the fit are not as present. This is illustrated as a contextualized model of Schilling's (2000) original generic model and presented below in figure 14. Ergo, if the relevant contextual factors allow for it, modularization can indeed be a way for service firms to achieve a dual competitive advantage by escaping the trade-off of efficiency and effectiveness.

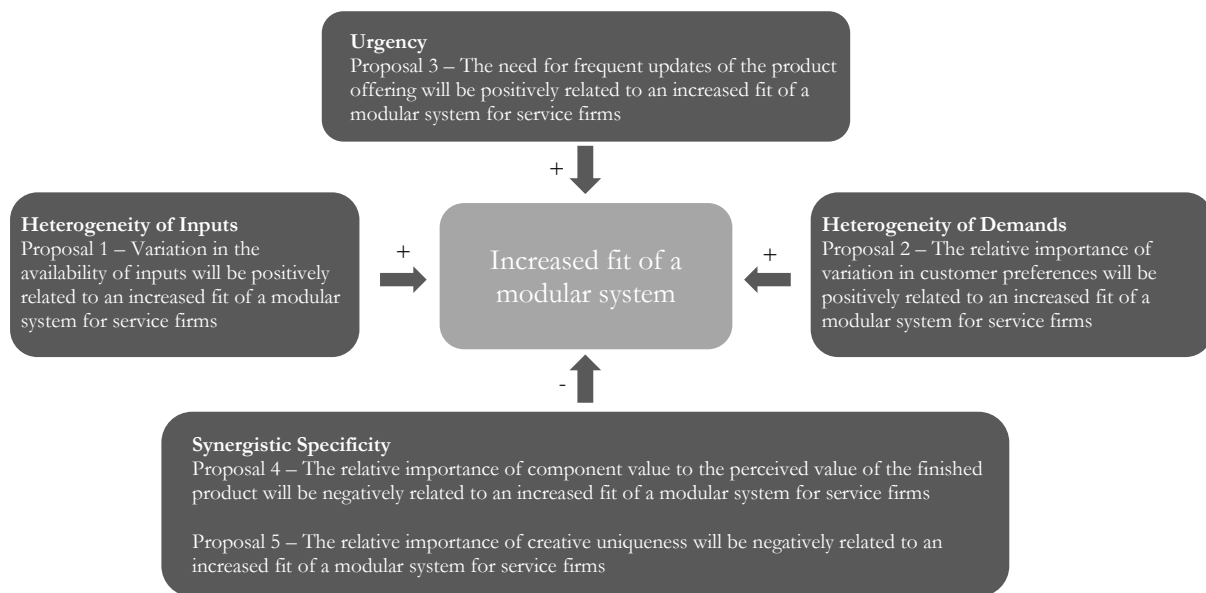


Figure 14 - Overview of proposals

## 6.2 Implications

### 6.2.1 Management Implications

Managers in service firms can and should take the findings of this study into account before deciding whether to implement a modular strategy to their service offering. In our specific context of high end restaurants, managers should be aware of how their environment affects the ability to implement modularization. High end restaurants that want to try to achieve the dual competitive advantage of modularization should aim to develop dishes that contain a complete flavour combination where the interchangeable parts of the dish are not adding much value by themselves in relation to the finished dish. They also need to consider the level of heterogeneity of demands and create dishes that are not limited by the availability of inputs. Managers that focus on developing concepts that put a lot of effort into giving raw ingredients with very specific functions a big role in a dish should perhaps not try to implement a modular strategy, since it will be difficult to reach the appropriate level of separability and combinability for it to be useful.

For managers on a broader service firm level the implications are that they should, given their context, if they want to implement a modular strategy, look into these five proposals of the model that we have presented. Based on this they can then decide to what extent they might be able to modularize their operations.

### 6.2.2 Theoretical Implications

The way we have addressed our research question through a multiple case study has given us the possibility to observe the cases in great detail. This have provided us with thorough information on how high-end restaurants work and in what context they operate. We have through gathering

of previous theories been able to further explain how modularization can be a tool to reach a dual competitive advantage. Secondly, by analysing specifically how high-end restaurant contexts are suited for a modular strategy, we have added more legitimacy to Schilling's (2000) model by adapting it to another specific context. Our conducted research has also provided important insights for future research within modularization since it continues to scratch the surface of service modularity. Finally, our research has contributed to the academic field of restaurant management by performing a prescriptive study in a field characterized to a large extent by description.

## 6.3 Limitations

There are some limitations to our study, which might have affected our findings negatively. Perhaps the most unconventional thing with our study, is that we have utilized frameworks developed for product modularity when studying service firms. Our reason for doing this is that the academic field of product modularity is much more mature than that of service modularity and has more robust support for its models and frameworks. In order to make the frameworks and theories applicable to our context as well, we have analysed only the tangible part of the service package, which corresponds reasonably well to a physical product. However, there is a minor risk that service firms are so distinctly different from manufacturing firms that the existing modularization theories are not applicable, which of course would render our analysis of little use.

Further, we have performed a multiple case study on one specific industry. Hence, one might question the transferability of our findings. We have designed our analysis to be applicable to every service firm, by providing thick descriptions (Lincoln & Guba, 1985) to enable our general findings to be contextualized when applied to other situations. Despite this, the transferability might be hampered by the fact that the restaurant industry is a very unique industry with lots of unique characteristics. During our pre-study, it was even referred to as "the last unprofessionalised industry" by industry expert Ingela Stenson, a description which points in the direction that our findings can perhaps not be translated directly to other industries.

The last limitation of our study regards the fact that some of the studied cases are not applying any degree of modular thinking in their operations today. As such, some of the interviews were purely hypothetical when we discussed modularization and the potential adoption of it. There is always a risk that there are some minor discrepancies in what people say is possible and what is possible in reality. Therefore, one should take a somewhat critical stance to the findings in this study, and make sure to carefully review the context in which the findings are applied.

## 6.4 Future studies

For future studies we suggest that a study on this topic should be done for a longer period of time. This study was limited to a short period of time and a future study should be made longitudinally. Secondly future researchers should try and deductively test our proposals on how the different forces affect a system in practice to understand more on how they influence firms. Lastly, our

research has been focused on one specific industry, the high-end restaurant industry and eight cases. Future researchers should look deeper into more cases within the restaurant industry and compare how lower end restaurant companies differ from high end in their context, and also try to investigate other service industries to see if our findings are applicable for those industries as well.

## 7 References

- Alexander, C. 1964, *Notes on the Synthesis of Form*, Harvard University Press.
- Arnheiter, E.D. & Harren, H. 2005, "A typology to unleash the potential of modularity", *Journal of Manufacturing Technology Management*, vol. 16, no. 7, pp. 699-711.
- Asan, U., Polat, S. & Serdar, S. 2004, "An integrated method for designing modular products", *Journal of Manufacturing Technology Management*, vol. 15, no. 1, pp. 29-49.
- Baldwin, C.Y. & Clark, K.B. 1997, "Managing in an age of modularity", *Harvard business review*, vol. 75, no. 5, pp. 84-93.
- Bask, A., Lipponen, M., Rajahonka, M. & Tinnilä, M. 2010, "The concept of modularity: diffusion from manufacturing to service production", *Journal of Manufacturing Technology Management*, vol. 21, no. 3, pp. 355-375.
- Bazeley, P. 2013, *Qualitative data analysis: Practical strategies*, Sage.
- Bryman, A. & Bell, E. 2015, *Business research methods*, Oxford University Press, USA.
- Burrell, G. & Morgan, G. 1979, "Sociology paradigm and organisational analysis: Elements of the Sociology of Corporate Life", Routledge.
- Campagnolo, D. & Camuffo, A. 2010, "The concept of modularity in management studies: a literature review", *International Journal of Management Reviews*, vol. 12, no. 3, pp. 259-283.
- Campagnolo, D. & Camuffo, A. 2009, "What really drives the adoption of modular organizational forms? An institutional perspective from Italian industry-level data", *Industry and Innovation*, vol. 16, no. 3, pp. 291-314.
- Collier, D.A. 1994, *The service/quality solution: Using service management to gain competitive advantage*, Irwin Professional Publishing.
- Collier, D.A. & Meyer, S.M. 1998, "A service positioning matrix", *International Journal of Operations & Production Management*, vol. 18, no. 12, pp. 1223-1244.
- Doran, D. 2005, "Supplying on a modular basis: an examination of strategic issues", *International Journal of Physical Distribution & Logistics Management*, vol. 35, no. 9, pp. 654-663.
- Doran, D. 2004, "Rethinking the supply chain: an automotive perspective", *Supply Chain Management: An International Journal*, vol. 9, no. 1, pp. 102-109.
- Dubois, A. & Araujo, L. 2007, "Case research in purchasing and supply management: Opportunities and challenges", *Journal of Purchasing and Supply Management*, vol. 13, no. 3, pp. 170-181.
- Dubois, A. & Gadde, L. 2002, "Systematic combining: an abductive approach to case research", *Journal of business research*, vol. 55, no. 7, pp. 553-560.
- Edmondson, A.C. & McManus, S.E. 2007, "Methodological fit in management field research", *Academy of management review*, vol. 32, no. 4, pp. 1246-1264.
- Eisenhardt, K.M. 1989, "Building theories from case study research", *Academy of management review*, vol. 14, no. 4, pp. 532-550.
- Fine, G.A. 2008, *Kitchens: The culture of restaurant work*, University of California Press.
- Flick, U. 2014, *An introduction to qualitative research*, Sage.
- Fredriksson, P. 2006, "Operations and logistics issues in modular assembly processes: cases from the automotive sector", *Journal of Manufacturing Technology Management*, vol. 17, no. 2, pp. 168-186.

- Galvin, P. & Morkel, A. 2001, "The effect of product modularity on industry structure: the case of the world bicycle industry", *Industry and Innovation*, vol. 8, no. 1, pp. 31.
- Gawer, A. & Cusumano, M.A. 2014, "Industry platforms and ecosystem innovation", *Journal of Product Innovation Management*, vol. 31, no. 3, pp. 417-433.
- Geertz, C. 1973, "Thick description: Toward an interpretive theory of culture", *Turning points in qualitative research: Tying knots in a handkerchief*, vol. 3, pp. 143-168.
- Gell-Mann, M. 1994, "Complex adaptive systems", *Santa Fe Institute Studies in the Sciences of Complexity*
- Gershenson, J.K., Prasad, G.J. & Allamneni, S. 1999, "Modular product design: a life-cycle view", *Journal of Integrated Design and Process Science*, vol. 3, no. 4, pp. 13-26.
- Glaser, B.G., Strauss, A.L. & Strutzel, E. 1968, "The discovery of grounded theory; strategies for qualitative research.", *Nursing research*, vol. 17, no. 4, pp. 364.
- Goodman, L.A. 1961, "Snowball sampling", *The annals of mathematical statistics*, pp. 148-170.
- Grant, R.M. 1999, "The resource-based theory of competitive advantage: implications for strategy formulation" in *Knowledge and strategy* Elsevier, pp. 3-23.
- Guest, G., Bunce, A. & Johnson, L. 2006, "How many interviews are enough? An experiment with data saturation and variability", *Field methods*, vol. 18, no. 1, pp. 59-82.
- Haywood-Farmer, J. 1988, "A conceptual model of service quality", *International journal of operations & production management*, vol. 8, no. 6, pp. 19-29.
- Henderson, R.M. & Clark, K.B. 1990, "Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms", *Administrative Science Quarterly*, pp. 9-30.
- Hill, C.W. 1988, "Differentiation versus low cost or differentiation and low cost: a contingency framework", *Academy of management Review*, vol. 13, no. 3, pp. 401-412.
- Holland, J.H. 2000, *Emergence: From chaos to order*, OUP Oxford.
- Holland, J.H. 1995, *Hidden order - How adaptation builds complexity*, Helix books
- Holland, J.H. 1992, *Adaptation in natural and artificial systems: an introductory analysis with applications to biology, control, and artificial intelligence*, MIT press.
- Jacobs, M., Vickery, S.K. & Droge, C. 2007, "The effects of product modularity on competitive performance: do integration strategies mediate the relationship?", *International Journal of Operations & Production Management*, vol. 27, no. 10, pp. 1046-1068.
- Johnston, R. 1999, "Service operations management: return to roots", *International Journal of Operations & Production Management*, vol. 19, no. 2, pp. 104-124.
- Jose, A. & Tollenaere, M. 2005, "Modular and platform methods for product family design: literature analysis", *Journal of Intelligent Manufacturing*, vol. 16, no. 3, pp. 371-390.
- Kauffman, S. 1996, *At home in the universe: The search for the laws of self-organization and complexity*, Oxford university press.
- Kauffman, S.A. 1992, "The origins of order: Self-organization and selection in evolution" in *Spin glasses and biology* World Scientific, pp. 61-100.
- Kellogg, D.L. & Nie, W. 1995, "A framework for strategic service management", *Journal of Operations Management*, vol. 13, no. 4, pp. 323-337.

- Kotha, S. & Orne, D. 1989, "Generic manufacturing strategies: a conceptual synthesis", *Strategic Management Journal*, vol. 10, no. 3, pp. 211-231.
- Langlois, R.N. 1992, "External economies and economic progress: The case of the microcomputer industry", *Business history review*, vol. 66, no. 1, pp. 1-50.
- LeCompte, M.D. & Goetz, J.P. 1982, "Problems of reliability and validity in ethnographic research", *Review of educational research*, vol. 52, no. 1, pp. 31-60.
- Lincoln, Y.S. & Guba, E.G. 1985, *Naturalistic inquiry*, Sage.
- Lundtorp, S., Rassing, C.R. & Wanhill, S. 1999, "The off-season is 'no season': the case of the Danish island of Bornholm", *Tourism Economics*, vol. 5, no. 1, pp. 49-68.
- Marshall, M.N. 1996, "Sampling for qualitative research", *Family practice*, vol. 13, no. 6, pp. 522-526.
- Mason, J. 2017, *Qualitative researching*, Sage.
- Morrison, P. 1996, "Menu engineering in upscale restaurants", *International Journal of Contemporary Hospitality Management*, vol. 8, no. 4, pp. 17-24.
- Ostrom, A.L., Parasuraman, A., Bowen, D.E., Patricio, L. & Voss, C.A. 2015, "Service research priorities in a rapidly changing context", *Journal of Service Research*, vol. 18, no. 2, pp. 127-159.
- Pahl, G. & Beitz, W. 1984, "Engineering design, The design council", *London, Springer*, vol. 12, pp. 221-226.
- Peteraf, M.A. 1993, "The cornerstones of competitive advantage: A resource-based view", *Strategic Management Journal*, vol. 14, no. 3, pp. 179-191.
- Porter, M. 1996, "What is strategy", *Harvard Business Review*, vol. 74, no. 6, pp. 61-78.
- Porter, M.E. 1985, "Competitive advantage: creating and sustaining superior performance", *New York*.
- Porter, M.E. 1980, "Competitive strategy: Techniques for analyzing industries and competition", *New York*, vol. 300, pp. 28.
- Porter, M.E. 1979, "How competitive forces shape strategy", *Harvard Business Review*.
- Rantala, L. & Hilmola, O. 2005, "From manual to automated purchasing: case: middle-sized telecom electronics manufacturing unit", *Industrial Management & Data Systems*, vol. 105, no. 8, pp. 1053-1069.
- Rothwell, R. & Gardiner, P. 1990, "Robustness and product design families", *Design management: A handbook of issues and methods*, vol. 3, pp. 279-292.
- Rubin, H.J. & Rubin, I.S. 2011, *Qualitative interviewing: The art of hearing data*, Sage.
- Salvador, F. 2007, "Toward a product system modularity construct: literature review and reconceptualization", *IEEE Transactions on Engineering Management*, vol. 54, no. 2, pp. 219-240.
- Sanchez, R. 1995, "Strategic flexibility in product competition", *Strategic Management Journal*, vol. 16, no. S1, pp. 135-159.
- Sanchez, R. & Mahoney, J.T. 1996, "Modularity, flexibility, and knowledge management in product and organization design", *Strategic Management Journal*, vol. 17, no. S2, pp. 63-76.
- Schilling, M.A. 2000, "Toward a general modular systems theory and its application to interfirm product modularity", *Academy of management review*, vol. 25, no. 2, pp. 312-334.
- Schmenner, R.W. 2004, "Service businesses and productivity", *Decision Sciences*, vol. 35, no. 3, pp. 333-347.
- Schmenner, R.W. 2001, "Looking ahead by looking back: Swift, even flow in the history of manufacturing", *Production and Operations Management*, vol. 10, no. 1, pp. 87-96.

- Schmenner, R.W. 1986, "How can service businesses survive and prosper?", *Sloan Management Review (1986-1998)*, vol. 27, no. 3, pp. 21.
- Schmenner, R.W. & Swink, M.L. 1998, "On theory in operations management", *Journal of Operations Management*, vol. 17, no. 1, pp. 97-113.
- Schumpeter, J.A. 1947, "The creative response in economic history", *The journal of economic history*, vol. 7, no. 2, pp. 149-159.
- Silvestro, R., Fitzgerald, L., Johnston, R. & Voss, C. 1992, "Towards a classification of service processes", *International journal of service industry management*, vol. 3, no. 3, pp. 62-75.
- Skalpe, O. 2003, "Hotels and restaurants—are the risks rewarded? Evidence from Norway", *Tourism Management*, vol. 24, no. 6, pp. 623-634.
- Sköld, M. 2017, *Modularization - The Art of Making More by Using Less*, Rheologica Publishing.
- Strauss, A. & Corbin, J.M. 1990, *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications, Inc.
- Thompson, J.D. 1967, *Organizations in action: Social science bases of administrative theory*, Transaction publishers.
- Tinnilä, M. & Vepsäläinen, A.P. 1995, "A model for strategic repositioning of service processes", *International Journal of Service Industry Management*, vol. 6, no. 4, pp. 57-80.
- Tung, K. 1991, *Modularity and component sharing as a product design and manufacturing strategy*, (Doctoral dissertation, Massachusetts Institute of Technology).
- Ulrich, K. 1995, "The role of product architecture in the manufacturing firm", *Research policy*, vol. 24, no. 3, pp. 419-440.
- Ulrich, K. 1994, "Fundamentals of product modularity" in *Management of Design* Springer, pp. 219-231.
- Ulrich, K.T. & Seering, W.P. 1990, "Function sharing in mechanical design", *Design Studies*, vol. 11, no. 4, pp. 223-234.
- Wellton, L. 2017, *Making Meals in Restaurants: Daily Practices and Professional Ideals*, (Doctoral dissertation, Örebro University).
- Wernerfelt, B. 1984, "A resource-based view of the firm", *Strategic Management Journal*, vol. 5, no. 2, pp. 171-180.
- Wright, P. 1987, "A refinement of Porter's strategies", *Strategic Management Journal*, vol. 8, no. 1, pp. 93-101.



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# Appendix

## Interview script

### Intro

- Presentation of ourselves and the thesis
- Presentation of the interview procedure (recorded, confidential, duration)

### Opening questions

- How long has this restaurant existed?
- How many employees do you have?
- What is your role here?

### Business strategy

- Why do guests come to eat here?
- What is your concept?
- What is your position in the market?
- What are your thoughts on the competitive landscape?
- Are you profitable?

### Menu engineering

- What is the most important thing to consider when establishing a menu?
- How often do you change dishes on the menu?
- How often do you change ingredients within dishes?
- How do you select raw ingredients?
- What are your thoughts on special dietary requests?
- What are your thoughts on pricing?
- What is the deciding factors for whether ingredients mix well together?
- What components always need to be present in a great dish?
- Is there a value in keeping the number of unique ingredients low?
- Are there ingredients in dishes that are easily replaceable by other ingredients?

### Operations

- What are your biggest operational challenges?
- How is the work up until service structured in terms of preparations?
- How are you working with effectiveness improvements?
- Are you struggling with bottlenecks? Where?
- Are there strict instructions for the work in the kitchen?
- How is the refinement process of produce structured?
- How do you handle special requests?
- How do you experience the availability of staff?

## Interviews

Name	Role	Perspective	Organization	Date	Time	Interview type
<i><b>Pre-study</b></i>						
Ingela Stenson	Strategist and Gastronomy Specialist	Industry expert	United Minds	24/1 2018	60min	Face-to-face
Hanna Halpern	CEO	Industry expert	Restaurangakademien	29/1 2018	60min	Face-to-face
Fredrik Önrup	CEO	Industry expert	Pingvinen Restaurant Revenue Management	2/2 2018	60min	Face-to-face
Stina Algotsson	CEO	Industry expert	Besöksnäringens forsknings- och utbildningsråd	8/2 2018	60min	Face-to-face
<i><b>Main Study</b></i>						
Henrik Norström	Owner	Strategic	Lux Day-by-Day	7/3 2018	70min	Face-to-face
Fredrik Eriksson	Owner	Strategic/Operative	Långbro Vårdshus	7/3 2018	75min	Face-to-face
Stefan Ekengren	Head Chef	Strategic	Restaurang Hantverket	9/3 2018	60min	Face-to-face
Mathias Dahlgren	Owner	Strategic	Matbaren	21/3 2018	75min	Face-to-face
Andreas Simonsson	Kitchen Manager	Operative	Lux Day-by-Day	21/3 2018	45min	Face-to-face
Tom Sjöstedt	Owner	Strategic/Operative	Lilla Ego	22/3 2018	50min	Face-to-face
Oskar Mendelin	Sous Chef	Operative	Restaurang Hantverket	6/4 2018	40min	Face-to-face
Kalle Nilsson	Owner	Strategic/Operative	Punk Royale	9/4 2018	75 min	Face-to-face
Mathias Dahlgren	Owner	Strategic	Matbaren	20/4 2018	90min	Face-to-face
Jonas Hedenqvist	Head Chef	Operative	Matbaren	20/4 2018	90min	Face-to-face
Joel Åhlin	Owner	Strategic/Operative	Agrikultur	12/4 2018	40 min	Face-to-face