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High-Tech is for Everyone:

A Case Study of Commercialization to the Restaurant Industry

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Abstract

Commercialization has been recognized as one of the most difficult phases of the innovation process. Failure rates are high, even for products with the potential to address real needs and deliver real customer value. This master's thesis explores commercialization in an even more challenging business context than the typical case. First, the innovating company is an early startup with limited resources. Second, the innovation is high-tech and radical for the potential users. Third, the prospective market is the Swedish restaurant industry, which turns out to have implications for how standard commercialization theories can be applied.

The central methodology is a business case in two parts. The first part is a review of the commercializing startup and the second part is an in-depth study of the Swedish restaurant industry focusing on operational efficiency, technology adoption, attitudes, and networks. Participant observation and documentary analysis are the main methods for data collection regarding the company, whereas the prospective market is primarily investigated through interviews and a literature review.

Several key challenges for commercialization were identified. These included certain mindsets and network dependencies that distinguished the prospective market, as well as credibility and bundling problems that distinguished the conditions of the business case startup.

In the end, a commercialization strategy is proposed for addressing the identified key challenges. This includes the identification of a target market and the formulation of a marketing mix. Lean commercialization is the core of the proposed strategy that is suggested to exercise an iterative approach based on market testing.

Keywords

Commercialization, technology adoption, restaurant industry, lean startup, lean commercialization.

Preface and Acknowledgements

This master's thesis was carried out by Benjamin Johansson during the spring of 2022. It amounted to 30 credits in total and served as a degree project to conclude the author's studies of Industrial Engineering and Management at the Faculty of Engineering at Lund University.

First and foremost, I would like to thank my supervisor Carl-Johan Asplund for his excellent feedback and guidance. His support was vital for me to navigate this ambitious project. I am particularly thankful for his initiative to go beyond his academic responsibilities by introducing me to his network within the restaurant industry, which helped me achieve a sufficient empirical basis for the market study.

Naturally, I would also like to thank all interviewees, business case company representatives, and others who have contributed to the completion of the project. Among those are also my friends and family, who have, as always, provided invaluable support, motivation, and encouragement.

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1. Introduction

This chapter provides a brief synopsis of the master's thesis, including its purpose and the relevant background. The first section introduces some key vocabulary, the company in focus for the business case study, and the challenges it aspires to overcome. The second section explains the purpose of the study, establishes the fundamental research questions, and declares the primary aims. The third section defines the scope in terms of assumptions, focus, and limitations. The fourth and final section outlines the structure of the report.

1.1 Background and Problem Statement

> *To get the bad customs of a country changed and new ones, though better, introduced, it is necessary first to remove the prejudices of the people, enlighten their ignorance, and convince them that their interests will be promoted by the proposed changes; and this is not the work of a day.*
>
> Benjamin Franklin (1787)

1.1.1 Commercialization

Few question the importance of innovation for society, companies, or individuals. On the macro level, it is a key driver of long-term development and economic growth. At the company level, it is a powerful device for competitive advantage and sustainable profits. On the individual level, we constantly adopt new inventions and sometimes build our lifestyles around them. While technological novelties are needed to enable all these benefits, the innovation process extends beyond the R&D department. To realize the potential of an invention, it has to be commercialized – sold at the marketplace or by other means made available to its prospective users. This is by no means an easy task. Many ideas or inventions with obvious benefits have gone unadopted due to failed commercialization, and some consider it

the least well-managed stage of the entire innovation process. (Chiesa & Frattini, 2011; Rogers, 1995)

While the fundamental significance of commercialization is clear, there are many ways to define the exact term. This study applies the definition provided by Gbadegeshin (2018:50): “Commercialization is a series of activities that transform an innovation to a final product or service from which economic benefit can be derived.”

1.1.2 The Case Company

The focal point of the study is the business case of a high-tech startup company. The business case is used as an illustrative example of a genuine commercialization context. In this report, the company is referred to with the fictitious name “Precognitio”. Precognitio is based in Sweden with the author personally involved as a co-founder.

Precognitio was founded in 2021 with a vision of using machine learning to reinvent how restaurants plan their operations. From the start, the rationale was that since restaurant sales fluctuate over time, optimal efficiency cannot be achieved with a fixed capacity. Instead, staff and inventory must be regulated to match the variations in demand. Precognitio's working assumption was that a machine learning model could predict future sales better than the standard industry practices. If this could be achieved, the expectation was that restaurants could improve their efficiency by implementing sales forecasts in their capacity planning.

By early 2022, Precognitio had developed a machine learning model for predicting future restaurant sales which was primarily based on transaction history, calendar, and weather forecast data. The model had performed well in pilot testing with real sales data from restaurants. Meanwhile, a pre-launch market study had validated Precognitio’s assumptions about the problems in the restaurant industry.

1.1.3 Case Company Challenge

Having reached successful results in both basic technology development and market validation, Precognitio today concludes that proof of concept has been achieved. In essence, the company recognizes that the invention can bring benefits to the prospective users and that a sustainable business model can be built around it. Naturally, commercialization is the next step ahead.

While confident in the technology and its ability to solve significant user needs, Precognitio sees risks in the next phase, in which the innovation will be brought to the market. The company has not launched any product before and the innovation is radical for the prospective market. For that reason, the company appeals for an effective commercialization strategy.

1.1.4 Research Interest

There is good reason to believe that standard commercialization theory is not entirely applicable to the context surrounding this business case. For example, Trott & Simms, (2017:605) recognized that the "traditional science and technology model of innovation" does not apply to "low-tech" markets. As a result, if the special market conditions are considered, suggestions in commercialization literature that marketing ought to "focus on the technology" might be misguided (Vincent, 2016).

Several authors have called for increased research relating to the scope of this master's thesis.

- Popovic points to a general lack of studies on how startups can commercialize high-tech products (Popovic & Fahrni, 2004).
- Strotmann, Baur, Börnert, & Gerwin (2021)suggest that the digital maturity level of the foodservice sector requires more scholarly attention, especially regarding the adoption of new technologies.
- Trott & Simms (2017) call for innovation research relating to low- and medium technology industries.
- Robertson, Smith, & von Tunzelmann (2009) ask for studies concentrating on how innovations can diffuse into the same sectors.

- Robertson et al. (2009:445) also recommends that studies “pay closer attention to the environments of the firms under consideration to show how diffusion and adaptation actually evolve in practice”. Following Robertson's recommendation, commercialization challenges have been analyzed in several context-specific studies, such as the biopharmaceutical industry in Iran and the market for quantum communications technology (Natsheh, Al Natsheh, Gbadegeshin, Rimpiläinen, & Imamovic-Tokalic, 2015). This master’s thesis adds to those by focusing on the Swedish restaurant industry.

1.2 Purpose and Research Questions

The purpose of the study is to explore the challenges facing a startup aiming to commercialize a radical innovation to the restaurant industry. In other words, a commercialization context that is characterized by three factors:

- The commercializing company is a startup rather than an established corporation.
- The innovation is radical – does not replace any predecessors on the market and requires a behavior change among adopters.
- The market is “low-tech” and atypical for high-tech products.

Based on these conditions, the case study provides opportunities for contributing to literature with findings that complement the current understanding of commercialization and technology adoption among other areas. The study also aims to refine and expand the vocabulary used in the academic domain.

A secondary purpose is to propose a robust commercialization strategy to address the challenges arising from the context.

The study concentrates on two central research questions:

RQ1) What key challenges are associated with the ambition of the business case company to commercialize its invention?

RQ2) How could a commercialization strategy be formulated to effectively address the key challenges identified in RQ1?

The study aims to answer the research questions mainly through a business case including analytical reviews of both the company and the prospective market. A literature review provides a base for and complements the business case investigation. The study should result in an academic report including an operative strategy that the case company can implement.

1.3 Scope

The main attention of the study is directed toward the commercialization phase of the innovation process. In particular, early commercialization is in focus, where the aim is essentially to acquire the first few sales of a product. Certain other phases of the innovation process are mentioned briefly to allow a thorough analysis, but the main question is how to bring a specific invention to the customers, not what should be invented. Furthermore, while the role of inter-firm relationships is discussed briefly, the study does not include an in-depth review of cooperative commercialization strategies, such as patenting, licensing, or joint ventures. For a broader introduction to innovation in the startup domain see, among others Vohora, Wright, & Lockett (2004), Blank (2013), and Bhide (2003).

With regards to the market, the study concentrates on Swedish restaurants from the start. Potential applications of the invention beyond this industry are not explored, although they could certainly exist. With regards to the market that is in focus, it is assumed that the suggested customer need is genuine and that the invention has the potential to address it if it is implemented right. The assumption is partly motivated by the objective to provide practically applicable results. *Presumed* customer need and *presumed* product/service potential is the normal starting point for a commercialization process, rather than *proven* customer need and *proven* product/service potential. Moreover, there is also a methodological reason. Proven market fit requires that the market has already accepted a product or service, so at that point, it is not possible to survey market attitudes pre-acceptance.

Covid-19 had a massive impact on the restaurant industry, which might influence the short-term conditions for commercialization. This study, however, is not an investigation into how commercialization can succeed in times of crisis. Instead, the outlook is long-term, and it is assumed that the industry will return to a normal state, even if it might be different from the one before the pandemic. Identified challenges and proposed strategies are designed with this state in mind, not the temporary turbulence of a pandemic. For that reason, the market analysis mostly aims to consider the "normal" state of the market.

Due to the nature of explorative case studies, many findings are context-dependent. This does not mean that the validity of all results is necessarily limited to the unique case, but that caution should be applied in the generalization of conclusions.

1.4 Target Groups

Naturally, anyone with an academic interest relating to the scope of the study is included in the intended audience of the report. Among those are scholars and students of commercialization and technology adoption, especially in startup or restaurant industry contexts.

In addition to those, decision makers in private enterprises are included among the target groups. Any executive evaluating how an invention ought to be commercialized in a similar context can be guided by the takeaways in the report. Finally, it might also indicate to restaurant managers how they can improve their innovativeness and absorptive capacity.

1.5 Disposition of the Report

Chapter 1. Introduction

Introduces the study as a whole. Provides some relevant background, defines the purpose, research questions, scope, and target groups.

Chapter 2. Methodology

Presents the chosen research methods. Substudies are introduced including processes for collecting and analyzing data. The chapter ends with a discussion on the quality of the study as a whole.

Chapter 3. Theoretical Frame of Reference

Lays out the theoretical framework for the master's thesis and presents some key findings from the literature review.

Chapter 4. Business Case: Company

Summarizes the business case results concerning the company.

Chapter 5. Business Case: Prospective Market

Summarizes the findings regarding the prospective market.

Chapter 6. Key Challenges of Commercialization

Based on the analysis of literature, company, and market, identifies the key challenges associated with the ambition to commercialize the technology of the business case.

Chapter 7. Proposed Commercialization Strategy

A strategy is formulated to overcome the key challenges identified in Chapter 6.

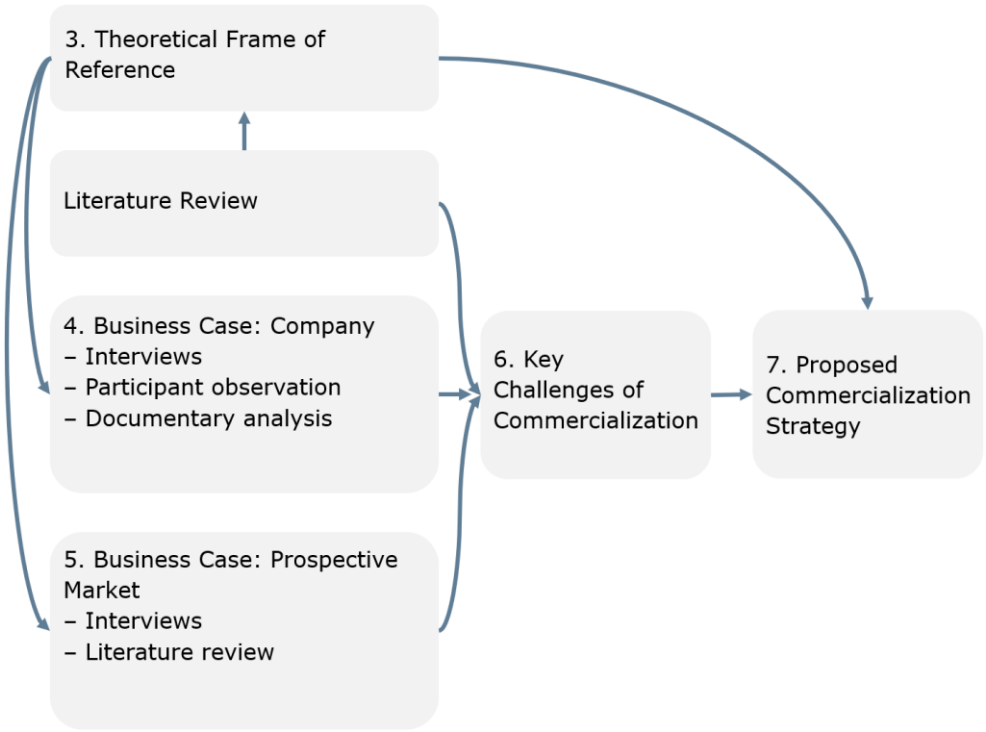
Chapter 8. Conclusion and Contribution

Reviews the conclusions with a recommendation to the company and a summary of the contributions to academic research provided by the study.

2. Methodology

This chapter describes and explains the chosen research approach. First, the main substudies are introduced including a brief description of their role in the major study. Second, the methods for data collection within the substudies are presented. Thereafter follows a general assessment of the complete study based on a number of quality factors. Figure 1 visualizes the substudies and their contribution to the master's thesis.

Figure 1. Overview of the substudies and their contribution to the master's thesis.



2.1 Research Approach and Process

The purpose of the study was to explore the commercialization challenges of a unique business context and to suggest a strategy for overcoming these. The approach generally followed three parallel tracks:

1) Understanding the concept of commercialization in theory and practice.
2) Understanding the case company.
3) Understanding the prospective market of the case company.

Conclusions from the three tracks were synthesized to identify the key challenges for commercialization. In the end, these key challenges constituted the foundation for a proposed strategy.

With limited prior research available in the relevant domain, the study took an explorative approach. As is customary in exploratory research, the aim was to lay a theoretical groundwork by identifying some general features and forming new hypotheses around the topic, rather than testing, quantifying, or explaining the findings of earlier studies (Popovic & Fahrni, 2004).

2.1.1 Literature Review

The literature review had multiple functions. First, the mapping of previous research allowed the study to focus on an area of high interest, where findings would contribute significantly to prior knowledge. Second, the review provided several frameworks for analysis, most of which are presented in chapter 3. Third, the literature review enabled the absorption of domain-specific conventions. By identifying the terminology and practices of related literature, it could be ensured that this report aligned with these. Finally, findings from the literature review were integrated to support the analysis throughout the study as a whole.

2.1.2 Business Case Study

The investigation of Precognitio served as the starting point for the business case study. By recognizing the product concept of the startup, the subsequent market analysis could effectively pinpoint the features that were relevant for the specific case. Furthermore, some commercialization challenges were directly derived from company-specific characteristics. The methods for data collection with regards to the company were interviews, participant observation, and documentary analysis.

Following the company description, the market investigation continued the case study. Commercialization is a customer-oriented activity and the challenges associated with it cannot be assessed without an understanding of the prospective market. For that reason, the industry context was central to the aims of the study and the market analysis was a major component of the business case. The methods for data collection with regards to the prospective market were interviews and literature reviews.

The case study approach is typical for exploratory research, and therefore consistent with the purpose of this study (Popovic & Fahrni, 2004). The topic was novel, unfamiliar, and consisted of multiple complex components, which made it particularly suited to be investigated through case analysis (Trott & Simms, 2017). The business case also served as an authentic illustration of the research topic, and the challenges experienced by the company proved that the problem addressed was real and substantial. This way, the case study approach bridged theory with practice and assured that the findings were relevant. Studying a phenomenon in real-life conditions also facilitates the interpretation of findings as well as replication, which further validates the choice of methodology.

For the purpose of this study, the business case concentrated on a single company. Procedural feasibility was one reason for this – multiple cases could not realistically have been investigated with the same thoroughness without a revised scope. The decision also followed an argument by Robertson et al. (2009) that there was a surplus of large-scale cross-sectional studies in the relevant domain. While no single case can represent the full landscape of any intricate topic, averages of many observations do not necessarily reflect the experiences of any individual instance. For that reason, Robertson et al. suggest that complex phenomena might be understood more clearly through the assumptions and simplifications that follow from focusing on a single case. In addition, Jorgensen (2021:8) notes that comparative studies "generally depend on previous studies of a single case". With this in mind, it was expected that this study could enable further research within the domain to take on a more comparative approach.

The outlook of the business case study was prospective. In other words, the investigation was carried out before a commercialization process had been initiated. There are several advantages to this method compared to the retrospective alternative. First, it has been acknowledged that retrospective studies are associated with a risk of bias (Trott & Simms, 2017). If company representatives are interviewed after a commercialization attempt, their perspective is likely to be shaped by the events of the process and most notably by the ultimate success or failure of the project. Retrospective case studies are also problematic concerning case selection. There is no difficulty in identifying successful commercialization attempts – any new product is an example of one – but failures might go unnoticed and undocumented. It is even harder to retroactively find examples of commercialization attempts that were never initiated even if those could be just as relevant for research. The weaknesses of retrospective studies could partly be avoided with a longitudinal approach, where the case is observed over a longer time. A company could be studied before, during, and after a commercialization attempt, but since these processes often span over many years, a longitudinal approach could entail practical difficulties for research. In a fast-changing context, such a time scale might also cause findings to be outdated before they are published. In the end, however, the main argument for a prospective approach is the business applicability. Decisions cannot be made in hindsight. If conclusions depend on factors that are unknown when a strategy is set, they are of little use for strategic decision-makers.

2.2 Data Collection and Analysis

Several challenging circumstances had to be addressed by the data collection approach.

RQ1) What key challenges are associated with the ambition of the business case company to commercialize its invention?

RQ2) How could a commercialization strategy be formulated to effectively address the key challenges identified in RQ1?

There is an ambiguous element to both research questions, as is normal for exploratory research. As a consequence, they could not be answered by the

quantification of any objective factors. For example, there is no way to measure the importance of different challenges to distinguish the “key” ones from the others. Furthermore, several central aspects of the study were hidden or hard to access, such as management attitudes within the restaurant industry. With this in mind, to ensure feasible and sufficient data collection, several methods were combined: literature review, interviews, participant observation, and documentary analysis.

Throughout the study, the principles of triangulation and iteration were applied. The risk of incorrect representation was reduced by the validation of findings through multiple modes of data collection (triangulation). To ensure that the most relevant data were collected, the process was iterative, so that next steps were repeatedly planned based on findings earlier on.

2.2.1 Literature Review

The explorative literature review started with a foundation of central works in the relevant areas, such as the academic fields of technology adoption and commercialization. Thereafter followed a focused review of niche domains, such as commercialization in the startup context or technology adoption by companies in low-tech industries. The central works served as points of reference to guide the literature review. Literature was primarily retrieved from the digital library of Lund University, LUBsearch, which is linked to the EBSCOhost platform that connects a range of databases with published literature (Lund University Libraries, 2022). In addition, the physical libraries at Lund University were used for finding printed literature. Since earlier research was limited in some areas, particularly regarding the Swedish restaurant industry, the desk study also went beyond academic literature and incorporated occasional findings from industry publications.

Results of the literature review were systematized and codified by topic area to allow comparisons and to ensure an exhaustive account. The topic areas were also used as the primary keywords in the database search for relevant literature. The topic areas are presented in Table 1 as well as the motivations for their inclusion in the literature review.

Table 1. Summary of the key topic areas in the literature review.

Literature topic area	Function in the master's thesis
Technology adoption	Explaining how and why prospective users accept new innovations.
Diffusion of innovations	Explaining how and why new innovations spread through a population.
Commercialization strategy for startups	Explaining how startups can act to facilitate profitable user adoption and diffusion of their inventions.
Commercialization strategy	Explaining how companies in general can act to facilitate profitable user adoption and diffusion of their inventions.
Commercialization to the restaurant industry	Explaining how companies in general can act to facilitate profitable user adoption and diffusion of their inventions in the restaurant industry.
Technology adoption in the restaurant industry	Explaining how and why restaurants adopt new innovations.
Innovation in the restaurant industry	Very limited literature on commercialization/technology adoption in the restaurant industry. Instead, certain findings from related areas were cautiously assimilated.
Commercialization in low-tech industries	Very limited literature on commercialization/technology adoption in the restaurant industry. Instead, certain findings from related areas were cautiously assimilated.
Innovation in low-tech industries	Very limited literature on commercialization/technology adoption in the restaurant industry. Instead, certain findings from related areas were cautiously assimilated.
Swedish restaurant industry	Part of market study. Qualitative or quantitative findings relating to the characteristics of the Swedish restaurant industry.

2.2.2 Interviews

Interviews were guided by a template (Appendix I. Template for exploratory interviews about the restaurant industry) that was standardized depending on the role of the interviewee. Following the explorative purpose, the questions were open and the interviewee was encouraged to speak freely even beyond the template topics. Follow-up questions were asked regularly to stimulate elaborate and complete answers. Each interview lasted for approximately one hour. Relevant results and quotes were noted during the interview. Before publication, all interviewees were asked to confirm or comment on the takeaways from their interviews, to ensure that their opinions were represented correctly.

The largest group of interviewees, thirteen individuals, related to the empirical investigation of the restaurant industry. Interviewees were selected iteratively throughout the study, which allowed most of them to be selected after a preliminary high-level segmentation (a detailed account can be found in chapter 7). For that reason, it could be ensured that the potential target segments *Hotel restaurants* and *Lunch and dinner restaurants* had substantial representation in the sample. Findings from these interviews were systematized and codified by topic area, with a similar methodology as in the literature review. The codification is presented in Table 2. The purpose of this process was to ensure that all areas were covered to allow the identification of contradictions. All interviews regarding the restaurant industry shared the same role: providing an empirical base for the business case market study, which indirectly led to the key commercialization challenges. An anonymized list of interviewees relating to the restaurant industry can be found in table 3.

Table 2. Codification of restaurant industry topic areas.

Restaurant industry topic area
Industry landscape
Management practices
Staffing policy and scheduling
Inventory planning and food waste
Technology and innovation
Procurement processes
Networks and competition
General operational dynamics

Table 3. Anonymized list of interviewees in the restaurant industry.

Interviewee	Organization	Role
Interviewee 1	Three restaurants in Lund	Board Member
Interviewee 2	Restaurant in Malmö	Owner/Manager
Interviewee 3	Hotel and restaurant in Uppsala	General Manager
Interviewee 4	Restaurant in Uppsala	Team Manager
Interviewee 5	High-end restaurant in Ystad	Chef
Interviewee 6	Restaurant and nightclub in Norrköping	Owner/Manager
Interviewee 7	Restaurant in Uppsala	Bar Manager
Interviewee 8	Hotel and restaurant in Uppsala	Bar Manager
Interviewee 9	Restaurant and nightclub in Norrköping	Head of Finances
Interviewee 10	Restaurant and nightclub in Norrköping	Head of Operations
Interviewee 11	Restaurant in Uppsala	Deputy General Manager
Interviewee 12	Wine distributor in Malmö	Managing Partner
Interviewee 13	Three restaurants in Los Angeles, USA	General Manager
Interviewee 14	Hotel and Restaurant Workers' Union	Head of Department

2.2.3 Participant Observation

Empirical data collection for the first part of the case study, focusing on the startup company Precognitio, was mostly carried out through participant observation. The author had been active in the company as a co-founder since its creation and remained in a semi-passive role throughout the study.

Participant observation is a form of field study where the researcher integrates with a real context for an extended period of time to observe a phenomenon in its natural environment (Silva, 2004). Participant observation is generally practiced as a form of case study. Data collection can be done in several ways, but direct observation is often, like in this case, the primary method (Jorgensen, 2021).

The rationale behind choosing participant observation followed Jorgensen's recommendations (2021), proposing that the method was especially appropriate when the domain is largely unexplored and to some extent hidden from public view. Management studies in particular are suggested as an appropriate application due to the divergent views of outsiders versus insiders. While Jorgensen highlights certain situations where the method is not appropriate – studies of large populations, causal relations between limited sets of variables, or quantitative studies in general – it could be concluded that the scope of this study was not conflicting with any of the recommendations.

There is a significant body of relevant literature where participant observation has had a central role in data collection.

- Silva (2004) participated in the work of a Spanish venture capital firm with the purpose of gaining a "real-time, holistic and dynamic view on the decision-making", to complement previous research which was mostly questionnaire, interview, or experiment-based.
- Similarly, Teague, Gorton, & Liu (2020) examined the pitching phenomenon from the inside of an American venture capital firm.
- Arshed, Carter, & Mason (2014) studied entrepreneurship by taking on a Policy Advisor role in the British public sector.
- Pöllänen (2021 chose participant observation as the primary method to analyze the culture at a Finnish startup, in order to ensure that social behavior was not influenced by the temporary presence of a researcher.

In this study, participant observation was conducted via the personal involvement of the first author in the management of the case company

Precognitio. This included interaction with both the internal team and external stakeholders, strategic discussions and workshops, development of marketing material, and contributions to sales efforts. Through these activities, the author was able to explore the genuine dynamics within the startup as well as in the external environment. While interviews with various stakeholders can investigate the opinions and attitudes of individuals at fixed points in time, the author was able to follow how interactions between individuals formed opinions and how they changed over time. The approach also ensured substantial exposure to the research topic, decreasing the risk for a misrepresentative sample.

Participant observation is naturally interpretive. A volume of observations are synthesized into a comprehensive understanding of a phenomenon. This process is prone to prejudices or hidden bias, and the results should be treated as exploratory hypotheses based on a specific context. With this in mind, the methodology of the study was designed to compensate for such weaknesses. First, the transparency with regards to roles and participation allows the reader to critically interpret the findings. Second, triangulation was used to verify findings through multiple data collection methods. While documentary analysis established the formal conditions around decisions and processes, participant observation added an interpretative layer of holistic understanding. Section 2.3.4 Objectiveness provides a more thorough discussion of how impartiality was achieved considering the combined role of the author as “researcher/entrepreneur”.

2.2.4 Documentary Analysis

Documentary analysis was used to complement and validate the data collected through participant observation. Documentary analysis is a form of qualitative research taking advantage of various documents to produce empirical results. It is often used in mixed method studies to triangulate findings from other data collection methods (Gross, 2018; Hays & McGibben, 2021).

In this study, multiple kinds of documentation relating to Precognitio was used to collect data. First, internal documents such as meeting protocols and business plans were reviewed to establish an understanding of how the case

company described itself and its strategic position at various points in time. Second, communication materials, such as e-mails, pitch decks, and social media posts were analyzed to indicate both how the business case Precognitio positioned itself towards external stakeholders and how those perceived the company.

2.3 Quality of the Study

To review the quality of the study, it is assessed in this section based on the criteria of reliability, validity, and generalizability. Reliability measures to what extent the results can be replicated, validity measures to what degree the methodology addresses the right questions, and generalizability measures to what extent the results apply to a larger population. As suggested by Kirk & Miller (1986), the union of the first two criteria is a proxy for objectivity. Still, these are complemented with a focused discussion around objectiveness at the end of this section, which briefly describes how impartiality could be achieved considering the personal involvement of the author in the business case company.

2.3.1 Reliability

Reliability refers to uncertainty due to variances. In other words, to what degree do random patterns in the sampled material under study risk causing a flawed result. If the reliability is high, a replication of the study is expected to yield a similar outcome. (Kirk & Miller, 1986)

Efforts were taken in the design of the study to ensure sufficient data collection. Participant observation allowed plentiful observation and multiple interviews were held about similar topics to ensure that findings were not randomly abnormal. Still, the case study was highly context-specific. The unique features of Precognitio and the technology cannot be excluded as causal factors of the result. Moreover, the characteristics of Swedish restaurants are constantly changing. For this reason, the study could hardly be replicated under identical conditions. Due to the methodological design, however, it is suggested that a parallel study conducted at the same time would have yielded the same outcome.

2.3.2 Validity

Validity concerns whether the study is measuring the right things (Kirk & Miller, 1986). The research questions are central to assessing this quality factor:

RQ1) What key challenges are associated with the ambition of the business case company to commercialize its invention?
RQ2) How could a commercialization strategy be formulated to effectively address the key challenges identified in RQ1?

The research questions were formulated to ensure rigorous validity. It is suggested that this was achieved, partly due to the focused approach on a unique case. If RQ1 had been formulated "What key challenges are *generally* associated with the commercialization of inventions?", rigorous validity could hardly have been achieved through the methodology in this master's thesis.

Still, there are two factors to consider that might impact the validity negatively. First, the domain is complex and elusive. Even if the main features are likely to have been identified and examined, the full realm of aspects influencing commercialization challenges in any scenario can hardly be investigated within a realistic research scope. Second, the analysis partly assumed that the management of Precognitio, the prospective customers, and the academic literature were not misinformed. The identification of commercialization challenges was to a significant extent based on what the company and the prospective customers were *experiencing*, while other factors that they were unaware of might also have played a role. Similarly, the proposed strategy was to a large degree formulated based on recommendations from commercialization literature, which might not necessarily apply to the unique context even in an adapted form.

Overall, potential validity issues primarily relate to the explorative and prospective approach of the study. Efforts were made to mitigate such problems, for example by triangulation, but the methodology of this study should also be seen in the perspective of its purpose and how that relates to the academic domain as a whole. As recommended in chapter 8, future

studies around the topic could leverage the hypotheses of this explorative master's thesis to take on a more confirmative or quantitative approach. The overall body of literature in the field is likely to benefit from a multitude of complementary methodologies.

2.3.3 Generalizability

Generalizability concerns the universality of conclusions. The essential question is the degree to which the findings can be transferred to other settings. Representativity is central to achieving this, meaning that the sample is typical of the population. (Hays & McGibben, 2021)

The purpose of the study included an exploration of a new domain within commercialization in order to suggest hypotheses that could guide further research as well as strategic decision-makers in businesses. The design was set up to stimulate findings that could be generalized with caution – leveraged to indicate the circumstances beyond the unique business or academic context. It is suggested that this was successful to some degree. For example, it is feasible that other startups will experience similar challenges and that the proposed strategy could apply to them as well. Moreover, the findings about technology adoption in and commercialization to the Swedish restaurant industry are likely to be reflected in the dynamics of some other industries too.

Still, as is typical for qualitative research and especially case studies (Hays & McGibben, 2021), full generalizability was not an ultimate aim in this study, and there is every reason to be cautious in generalizing conclusions. The case company was not selected as a representative of any group of companies in addition to itself. While certain industries share some fundamental characteristics, each is more complex than those and exists at a certain point on its own technological trajectory.

2.3.4 Objectiveness

The participant observation was carried out through the involvement of the author as a co-founder of the business case company. This method of data

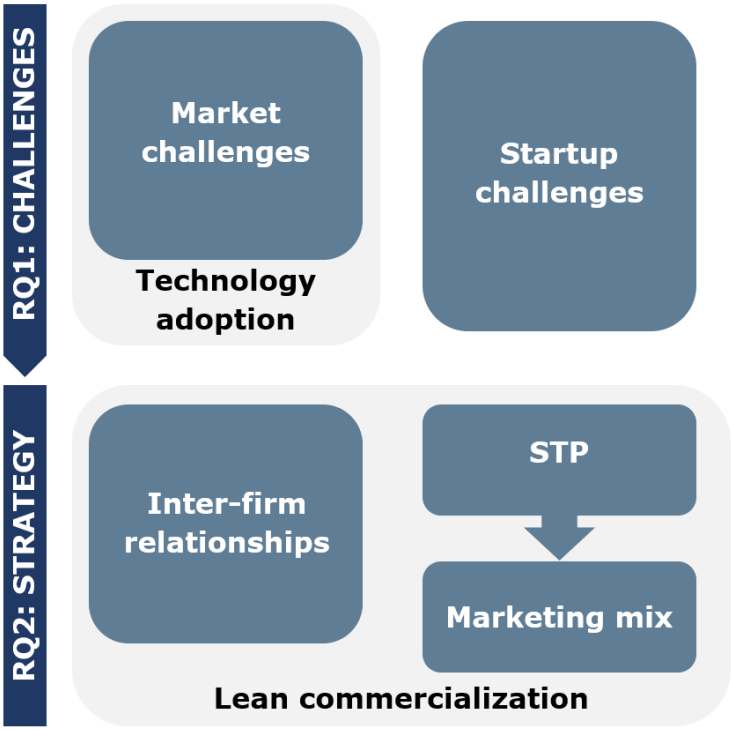
collection is always interpretative and depends on personal experiences, so the impartiality of the researcher is a natural concern. Similar considerations are relevant regarding some other methods too. For example, if a firm is investigated through interviews with company representatives, the incentives of the interviewees might not necessarily align with the impartiality of the study. A special feature of participant observation, however, is that the filter between personal experiences and results might be more subtle. With that in mind, a number of measures were implemented to ensure objectiveness in the context of this study.

First, it should be noted that impartiality could be negatively impacted by financial dependence on the success of the case company. The author was not receiving any salary, dividends, or other kinds of compensation, neither during the course of the study nor before it was initiated. Moreover, the author had a semi-passive role during the study. Two other co-founders took on the main responsibilities of managing the company. Naturally, the author participated in meetings and certain activities, since some degree of involvement is the very essence of data collection through participant observation. A third measure to ensure impartiality was that the methodology was designed to complement and validate the findings of the participant study through triangulation. Multiple sources were used to investigate similar topics, including the literature review and the interviews. With regards to the latter, results were presented with an emphasis on direct quotations, to avoid interference from a potentially subjective researcher perspective. Fourth, to avoid conflicts of interest, a fictitious business case company name was used. Since the authentic name was not used, the incentives for representing the company in a favorable way could be reduced. Fifth, the emphasis of the master's thesis was on the market rather than on the company. The business case is used as an illustrative example of a high-tech startup, but the unique strengths, weaknesses, resources, and capabilities of the company were not in focus. Naturally, a basic understanding of the business case is necessary to formulate a strategy, but it was secondary to the ultimate research interest. Finally, transparency with regards to the methodological circumstances was prioritized to allow a critical reading.

3. Theoretical Frame of Reference

This chapter summarizes some central findings from the literature review and establishes a theoretical framework. Three sets of theories within technology adoption are introduced to recognize how and why innovations are accepted or rejected by potential users. In the case study, this is used to analyze how restaurant industry characteristics might influence the expected response to a commercialization attempt. Thereafter, key frameworks for structuring commercialization decisions – Segmentation, Targeting, Positioning (STP) and the marketing mix – are presented to systematize the strategic and tactical considerations facing companies aiming to bring innovations to market. Finally, the standard literature around technology adoption and commercialization is complemented by the lean commercialization framework, which is tailored for the startup context that is central to the business case. The theoretical frame of reference is visualized in Figure 2, including its relation to the research questions.

Figure 2. Visualization of the theoretical frame of reference and its relation to the research questions.



3.1 Technology Adoption

The theory around technology adoption focuses on how and why potential users of a technology decide to adopt it or not. In this study, it is used as a theoretical base for investigating the market conditions for commercialization. By applying the lens of technology adoption theory to the investigation of the Swedish restaurant industry, the features that matter for a company aiming to launch a new technology there can be identified. Three frameworks are presented in this section. First, the technology acceptance model describes adoption from the perspective of a single individual. Second, the diffusion of innovations theory describes how technologies spread through groups of individuals in a population. Finally, the crossing the chasm theory identifies a phase of diffusion, the chasm between the early adopters and the early majority, that is theorized to be of particular importance.

3.1.1 Technology Acceptance Model

The technology acceptance model (TAM) introduced by Davis (1989) was originally designed for predicting user acceptance of computers. Since then, its application has been expanded to other applications and it has become a standard model in the technology adoption field. In essence, Davis claims that the two factors *perceived usefulness* and *perceived ease of use* are the fundamental determinants of user acceptance.

The first factor, *perceived usefulness*, is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989:320). Notably, the concept is formulated for technologies with professional applications. The second factor, *perceived ease of use*, is simply defined as “the degree to which a person believes that using a particular system would be free of effort”. Both factors are explicitly subjective.

The factors are designed to be prospective in nature. Considering the purpose of predicting technology adoption, it cannot be expected that the prospective user has first-hand experience of using the system. For that reason, it should be noted that part of Davis' study is based on an approach

where the prospective user rates the factors based exclusively on a brief demonstration.

By describing the complex technology adoption process in only two factors, TAM certainly omits some aspects which might deserve further attention. For example, the focus on productive performance might neglect the role of enjoyment and work satisfaction. Furthermore, treating the factors as constant disregards the importance of tactical decisions of the company: complementary technology and product configurations, such as user interfaces, are some examples of how a company can alter the perception of new technologies. Ultimately, the concentrated focus of TAM on how the product in itself is perceived also excludes contextual factors. Later research has emphasized the role of culture, identity, and networks as determinants of technology adoption.

3.1.2 Diffusion of Innovations

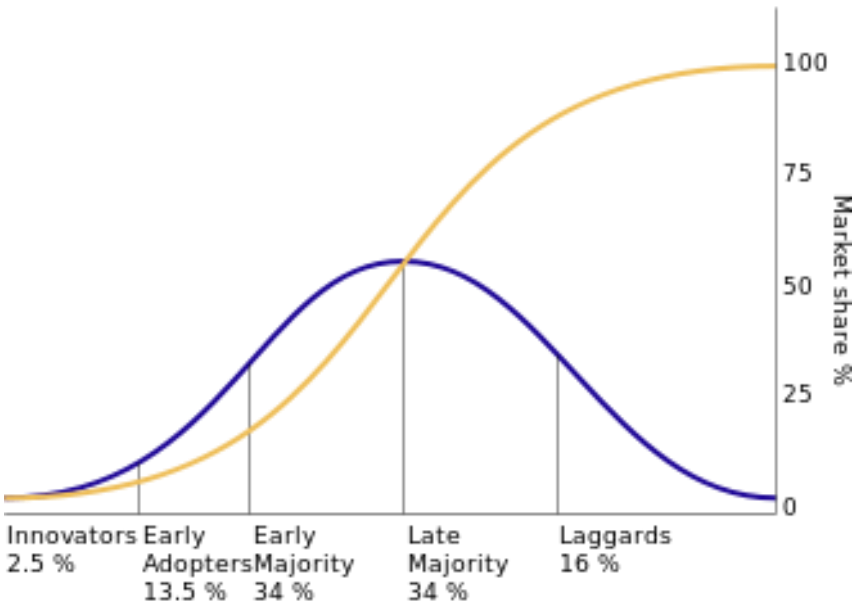
The diffusion of innovations (DOI) theory introduced by Rogers explains how an innovation spreads through a population over time. While TAM focuses on how a product is perceived by individuals, DOI highlights that not all adopters are equal and recognizes that acceptance of a technology depends on contextual factors in addition to the innate features of the invention. (Rogers, 1995)

Rogers emphasizes the importance of social systems for innovation uptake. While marketing activities may spread information about a product, it is personal relations that spread its adoption. Although TAM may predict usage based on how a potential user first experiences a product, social networks decide if the individual will even come in contact with it in the first place. Individuals in a social system are exposed to new innovations in varying degrees, depending on their status, roles, and several other factors. Moreover, given exposure, individuals are also different in terms of their openness for adoption, which Rogers refers to as differences in their "innovativeness". (Rogers, 1995)

DOI suggests that members of a social system can be grouped into five adopter categories reflecting how quickly they adopt new innovations:

innovators, *early adopters*, *early majority*, *late majority*, and *laggards*. Figure 3 shows how these are distributed through the diffusion process. While innovators are cosmopolitan, affluent, technologically skilled, and risk-seeking; laggards are traditional, local, solitary, and skeptical. Naturally, innovators will be the first to encounter and adopt new technologies, often without significant knowledge of functional benefits or social influence from the outside. Laggards, on the other hand, might resist adoption even when almost everyone in the population has realized the benefits of a new product. In DOI theory, both of these are extremes, generally comprising 2.5% and 16% of a population respectively. Depending on their order in the hierarchy, the other groups tend to lean towards either the innovators or laggards in terms of innovativeness. A central feature of the model is that the more innovative groups act as ambassadors, or lead customers, by introducing innovations to the later groups, who either accept them or reject them depending on the intensity of social influence relative to their own (lack of) innovativeness (Rogers, 1995).

Figure 3. Distribution of DOI adopter categories including the S-curve of total market share (Matinaro & Liu, 2015).



While DOI suggests that the societal system is central for the spread of an innovation, the process is not independent of product characteristics. On the contrary, Rogers (1995) presents five perceived attributes that determine the rate of adoption along with the social factors:

a) Relative advantage. How much better a potential adopter thinks the innovation is compared to the current solution (a close relative to the p*erceived usefulness* in TAM).
b) Complexity. How difficult a potential adopter thinks that the innovation is to use (a close relative to the *perceived ease of use* in TAM).
c) Compatibility. How consistent the potential adopter thinks the innovation is with previously existing values, experiences, and perceived needs.
d) Trialability. The degree to which the innovation can be experimented with on a limited basis.
e) Observability. How visible the usage and positive results of an innovation are to others in the societal system.

A key principle in DOI is that attributes of innovations are not constant over time. To successfully spread through a population, an innovation constantly has to evolve to persuade the increasingly hesitant and risk-averse adopter categories. When individuals adopt a technology, they often contribute to such reinvention by modifying the product or implementing it in new applications. Rogers highlights the “reinventability” of innovations as a determinant of successful diffusion. (Rogers, 1995)

3.1.3 Crossing the Chasm

With Roger's theory in mind, commercialization might seem like a straightforward activity. The task is simply to find the innovators and early adopters, allow them to embrace the product and its technological novelty, let them leverage their social capital to preach the greatness of the innovation and watch as the bandwagon rolls through the population as a whole. In reality, though, that is rarely how the story goes, which Moore’s crossing the chasm theory is an attempt to explain. In short, the chasm represents a gap between the second adopter category, early adopters, and

the third, early majority, as visualized in Figure 4. The chasm separates groups with fundamentally different adoption behavior and the transition between them is the major obstacle to achieving mainstream adoption. (Moore, 1998)

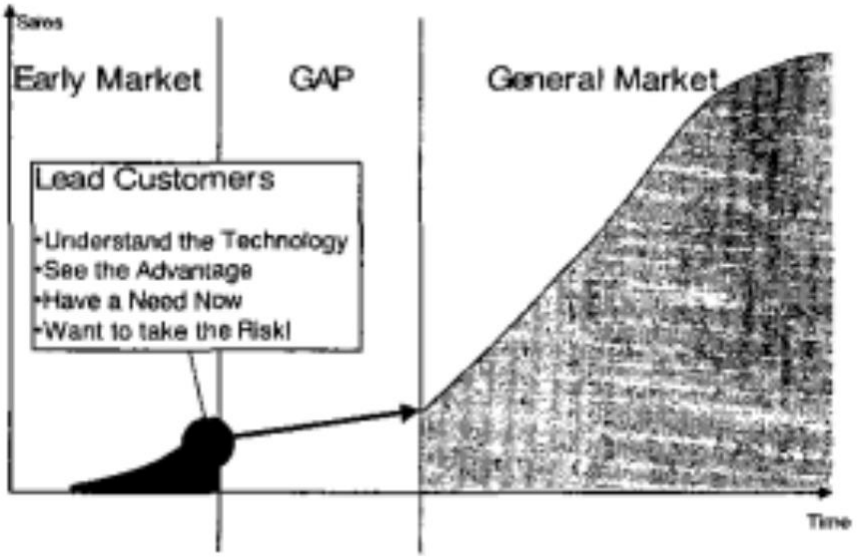
It should be noted that the crossing the chasm theory is formulated for the B2B context. The adoption behaviors focus on the commercial drivers of companies rather than identity and other factors characterizing consumer adoption. With regards to the innovation, it should be of the discontinuous or disruptive kind, meaning that adoption requires users to somehow change behavior or modify other products or services they already rely on. The business case of this study is a typical example of both these features.

Moore (1998:15) highlights that "early adopters do not make good references for the early majority". The early adopters want revolution, appreciate a chance to shake the status quo and are optimistic that it will settle in a new state that is to their advantage. In contrast, the early majority thrives within and wants to maintain the established conventions, even if they might appreciate low-risk opportunities to achieve evolution and efficiency improvements within them. In other words, there are major differences in the motivational drivers of the two groups, which is the cause of divergence in their adoption behavior. The early majority do not throw themselves into new technology ventures without consulting with suitable references, and the only suitable references to a member of the early majority "is another member of the early majority" (Moore, 1998:15).

DOI acknowledges that the attributes of innovations need to evolve as it spreads through the population. Moore suggests that this is insufficient. Due to the fundamental differences in adoption behavior across the chasm, the *entrepreneurial mindset* of any strategic decision-maker attempting to cross it must also change. This is no easy task. After all, the culture is often the most precious asset of a company early on. First, it has been vital to successfully invent a disruptive technology. Thereafter, a tough commercialization process is likely to have followed which, against all odds, has succeeded in gaining traction among the crucial group of lead

customers. It is at this point that Moore suggests that the company should pivot and remodel the very spirit of the company.

Figure 4. The chasm between early adopters and early majority (Popovic & Fahrni, 2004).



3.2 Commercialization Theory

While the frameworks above focus on the perspective of the user that accepts or rejects a new invention, commercialization theory views the phenomenon from the perspective of the company. In this study, it is understood by the definition of Gbadegeshin (2018:50), saying that it refers to the process through which an innovation is transformed to a "final product or service from which economic benefit can be derived". In other words, the purpose of the process is to realize the potential benefits of ideas by building business models around them that deliver value to customers in a profitable way for the commercializing company.

There is great variation in literature with regards to the boundaries of commercialization. Some have included processes all the way back to idea generation, while others have included marketing activities even after sustainable market acceptance has been achieved (Pellikka & Virtanen,

2009). In this study, product development and post-launch marketing are generally regarded as semantically separate from commercialization. Still, commercialization is a diverse concept related to many strategic aspects and activities. Some examples are:

- Customer selection
- Product configuration
- Strategies for market-oriented inter-firm relationships
- Marketing and sales activities

In this study, the general strategic considerations for commercialization are analyzed through the segmentation, targeting, and positioning framework (STP), while the tactical considerations are analyzed through the marketing mix. Adding to those, the lean commercialization framework, which is specifically tailored for startups, guides the overall approach.

3.2.1 Segmentation, Targeting, Positioning

Any company aiming to bring a product to the market will face two central considerations: “Who are the target customers?” and “What position should the product take within the market so that those customers want to buy it?” Those strategic questions are often systematized in a three-step process (Vincent, 2016). First, the market is segmented so that the firm can map what subgroups are present in the market as well as what needs and behaviors set them apart. Second, a target market is selected on which the marketing efforts will be focused. Third, the company chooses a positioning by defining how the product should be perceived relative to the alternatives on the market.

A good market segmentation brings about an understanding of what each customer subgroup desires and what marketing strategies can effectively deliver that value. The aim is to break down the market into homogeneous groups, which can be done based on a multitude of factors such as geography, demography, or identity. To allow an effective targeting, it is suggested that four criteria should guide the segmentation process: the size of each segment should be *measurable*, a potential target segment should be *substantial* enough to generate revenue, segments should be *stable* over time

for the strategy to be sustainable in the long-run, and for the segmentation to be useful, different segments should be expected to *respond differently* to certain commercialization approaches. (Vincent, 2016).

Successful targeting requires both accuracy in the recognition of potentially profitable segments and careful consideration with regards to how the product matches the needs present in each segment. Thereafter, there are three general strategies for approaching the targeting. The undifferentiated strategy, which is common for commodities, targets all segments. The differentiated strategy addresses multiple segments by offering adapted versions of the product, tailored to the needs of each segment. Finally, with the niche marketing approach, the marketing mix is developed with a single segment in mind. (Vincent, 2016)

With a target market defined, positioning is the next step. The aim of this phase is to present a value proposition that stands out from competing offers from the perspective of the target customers. Without an effective positioning, the customers will not have any reason to choose the product over the alternatives offered by competitors. The positioning consists of both value (essentially in terms of quality versus price) and differentiating factors, such as product attributes, brands, or sales channels. The presentation of this package to customers is referred to as the value proposition. (Vincent, 2016)

3.2.2 Marketing Mix

While the STP framework concerns the strategic level, the marketing mix focuses on tactical considerations of commercialization. The aim is to present the product to potential customers in a way that motivates them to try and eventually adopt the product. The four elements of the marketing mix are *product*, *promotion*, *price*, and *distribution* (Vincent, 2016).

At the point when a firm is actively looking to bring an invention to the market, the fundamental technology is often already decided. Still, there is more to a product than its core functionality. First, there are the appearance factors such as packaging or design. Second, there is the brand and the identity that the product is associated with. Third, added features can equal

added perceived value for certain segments. Fourth, there are the opportunities for bundling with complementary technologies or products. Finally, the service dimension including installation, training, and after-market is often essential. In other words, product configuration stretches far into the commercialization process and adds to the core technology to compose the *whole product*.

The next element in the marketing mix, promotion, focuses on communication from the company about the product. Some examples are advertising, public relations activities, social media, and personal selling. Like all components of the marketing mix, what promotion approach is the most effective depends on the context and the product being commercialized.

Naturally, the expensiveness of the product is an important part of pricing. Costs, customer expectations, competition, intermediaries, and strategic objectives all play a role in determining the optimal price level. Still, there are more aspects to pricing decisions. No matter the level, the price can be fixed or dynamic depending on, for example, the customer's contract period, size, or derived benefit.

Distribution refers to the channels through which the product is made available to customers. In some cases, an intermediary serves as the distribution channel. Besides delivering the product, the intermediary can also offer added value, for example by providing services or complementary products. Naturally, however, there can be downsides to such partnerships. With an intermediary channel, the direct point of contact with customers disappears, which can impact the opportunities for knowledge exchange. In addition, the product will be associated with the brand and identity of the intermediary, which is not necessarily positive. It should be noted that the role of distribution relates to the nature of the product. With regards to the business case, where a software product is in focus, distribution is unlikely to be the most important component of the marketing mix.

3.2.3 Lean Commercialization

The lean startup methodology was developed by Gbadegeshin (2018) as a response to high failure rates among startup ventures. It was theorized that failure often derived from poor or misguided management – startups were being run like smaller versions of mature companies. Business plans guided the strategy, prototypes were not released before they were fully functional, and "stealth" was a popular strategy to avoid competition. The lean startup methodology suggested a new approach, which recognized that searching for a business model is fundamentally different from executing it. Some key features of a lean startup are that user feedback is valued highly, activities strive to constantly test hypotheses, and minimum viable products (MVP) are launched as early on as possible.

Lean commercialization is an extension of the lean startup methodology, focusing on how startups can practice a lean approach during the commercialization process. The method can be summarized in four steps:

1. Development of MVP. An MVP should be seen as a device to gather knowledge, not as a product that is ready for the commercial market. This should also be emphasized in the relations with potential customers.
2. Market testing of MVP. The aim is to gain market information, understand the needs, wants, and preferences of customers, and explore how those can be met by the product concept. Testing often includes both technology, business model, and market aspects.
3. Collecting, analyzing, and learning from test results. Unlike the conventional lean startup methodology, test results in lean commercialization are not exclusively quantitative. Instead, a holistic approach is generally often recommended. The key criteria to look out for are if the technology works in accordance with its primary purpose, if potential customers are positive about it, and if a sustainable business model is feasible.
4. Iteration. Next steps are regularly planned depending on test outcomes. If results are positive, the company ought to preserve the approach and continue to the production and marketing stage. Having succeeded in pilot testing, the startup can be fairly confident

> that the final product is going to be well perceived by the market. If results are neutral, the company should pivot. In other words, testing should continue with a revised approach. If results are negative, the company should return to the concept stage. Most often, the results from the first round of MVP testing are incomplete, which should prompt a pivot, so that a new iteration starts (Gbadegeshin, 2018).

As a general feature, the lean commercialization methodology encourages simultaneous development of market and technology. If the technology is finalized before market activities begin, it is likely to be misaligned with the needs of potential customers and might be rejected despite significant investment. Likewise, market activities can hardly proceed far without any progress on the product side. Communication with potential customers is better if it is based on a concrete concept and technology.

4. Business Case: Company

In this chapter, the case company is presented. The product concept is presented based on a description of the customer need identified on the market as well as the solution suggested by Precognitio for addressing it. Thereafter, the team is briefly introduced. The chapter ends with a brief reflection on the competitive landscape, which is still largely unpopulated since the business case investigates a new product category.

4.1 Product Concept

4.1.1 Need

Precognitio was founded on the idea that machine learning has the potential to improve restaurant planning. The basic rationale was that the operational capacity of a restaurant must align with demand for the restaurant to be efficient. In other words, busy days require a lot of staff and abundant inventories, whereas slower days require the opposite. The case company hypothesized that data-driven forecasts could enable more accurate manager expectations of future demand, which would empower them to improve the planning of capacity.

The hypothesis was evaluated in the interview study. The restaurant industry interviews essentially confirmed the problem description with the following conclusions:

a) Future sales are central to restaurant planning.
b) Planning is a central activity for restaurants.
c) Planning often fails due to inaccurate expectations of future sales.

All interviewees agreed that demand is volatile, even if the dynamics vary between restaurants. Many experience cyclical trends of some sort. These are both short-term, over the course of a week, and long-term, throughout the seasons of the year. For some, weekends are always busy, while the summer season as a whole stands out for others. Adding to those, irregular fluctuations are also common. Some can be explained by certain events or

exceptional weather, while others appeared more random from the perspective of the interviewed restaurant managers. While demand is volatile, it also matters a lot for restaurants.

Likewise, all interviewees highlighted staffing as a central activity, impacting both quality, profitability, and in the end the success of the restaurants. Understaffing is directly linked to service quality and also impacts employee satisfaction negatively due to the intense workload it brings. Overstaffing, on the other hand, is a profitability issue, since salaries often make up around 30–50% of the total costs (Interviewee 2). Interviewee 6, a restaurant owner and manager, claimed that service quality can also suffer due to overstaffing, due to reduced "focus" among the personnel. Ultimately, scheduling is also an employee welfare issue, as highlighted by The Hotel and Restaurant Workers' Union (Patmalnieks, 2022). Most interviewees agreed that late schedule adjustments are an industry norm to cope with unexpected changes in demand: "almost every restaurant has support staff that they call in late if necessary. Sadly, it's mostly the more vulnerable people who end up in this role, such as immigrants or teenagers. Regulations and collective agreements do not seem to matter much", in the words of Interviewee 7, a bar manager. Interviewee 5, a young chef, had just terminated his contract due to this kind of scheduling culture. He was "tired of acting as a buffer for the short-sighted decision making of his employer".

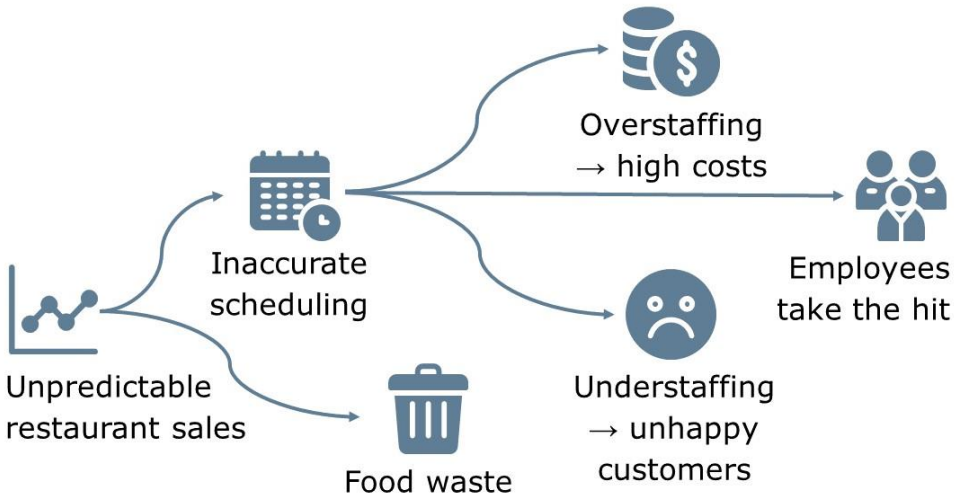
Besides the staffing, similar conclusions can be drawn about inventory. If more guests than expected turn up, inventory might run out to the disappointment of the customers. If fewer guests come, on the other hand, food waste is the natural result. The inventory issues arise through the entire supply chain, from storage waste to kitchen waste, but expected demand plays a central role in all stages.

In the end, restaurant planning matters also for the work satisfaction of managers. Interviewee 2 claimed that he could plan fairly successfully by leveraging several years' experience of owning and running his restaurant. Still, he saw an urgent need to modernize the approach. The restaurant relied

on his constant attention, which caused stress and made it difficult for him to ever take a vacation.

No doubt, a lot of restaurant activities depend on successful planning. When planning fails, the consequences take multiple forms. Figure 5 visualizes some of the most important ones.

Figure 5. Summary of the main problems caused to restaurants due to inaccurate planning.



4.1.2 Solution

This section describes the solution proposed by the case company to address the need above. As mentioned in the scope, this master's thesis does not incorporate an evaluation of the technology. In other words, it is assumed for the purpose of the study that the invention is working with the intended functionality and has the potential to create value for at least some of the prospective customers. Again, this does not mean that the market will necessarily decide to adopt the product.

Precognitio suggests that sales forecasts based on machine learning can significantly improve the decision-making of restaurant managers. Due to the element of randomness, future sales obviously cannot be predicted with complete accuracy. Still, the case company claims that a data-driven method could enable more precise planning compared to the approach practiced today, where intuition is a main component. Precognitio's prototype predicts future sales primarily based on weather, calendar, and transaction history. Depending on the granularity available in the transaction history of individual restaurants, forecasts can be split up by food and drinks, indoors and outdoors, lunch and dinner, or even individual menu items. Accuracy varies between restaurants, but Precognitio claims that the method is consistently superior to the relatively primitive approaches that are practiced by restaurants today. Machine learning enables efficient scalability of the product, with little need for manual configuration to the dynamics of new restaurants. In simple terms, the model is fed with the data of an individual restaurant and automatically recognizes the patterns that could predict future sales. With regards to the input of data, Precognitio claims that full automation can in principle be achieved through integration with point-of-sale or bookkeeping softwares.

Precognitio intends to deliver the sales forecasts through a user application. The design and the features of this application are yet to be decided at the time of the study. At a conceptual level, it is partially included in the scope to suggest how it ought to be configured.

4.2 Team

The company is managed by three co-founders, including the author of this master's thesis. Most decision-making is shared within the founding team, but there is some delegation of responsibilities through the roles of chief executive officer, chief technology officer, and chief operations officer. Before the study, the author had the chief executive officer role, but this was temporarily taken over by the chief operations officer to allow more passive participation. Two other master's thesis students were also temporarily part of the team during the study. The team has a mixed academic background including engineering, economics, and behavioral science. Professional

experiences include management consulting, financial modeling, and technology procurement. Notably, the chief technology officer has several years' experience in machine learning, both academically and professionally. All team members have at least some background in the restaurant industry.

4.3 Competition

Sales forecasting software for restaurants is essentially a new product category. Besides the business case Precognitio, a few other companies are active in the development stage or a very early commercial stage, but in terms of penetration, the market is virtually untapped. No interviewee had been using or knew of any softwares of that kind. For this reason, two perspectives are relevant concerning competition. First, an effective commercialization strategy should be based on an understanding of the solution in relation to how the prospective customers solve the problem today. This understanding follows from both *4.1.1 Need* and *5. Business Case: Prospective Market* as a whole. Second, the strategy needs to accommodate the threat from other potential entrants to the new market. If commercialization is successful, the obtained market shares will eventually have to be defended through some sort of sustainable competitive advantage. Chapter *7. Proposed Commercialization Strategy*, mainly focuses on strategies for achieving traction among early lead customers, but briefly touches upon some opportunities for competitive advantage. Most importantly, it is suggested that the entrepreneurial mindset should be transformed as the business case company prepares to cross the chasm to the mainstream market. Such a transformation can shift the focus from rapid short-term growth to establishing a more sustainable position for competitive advantage in the long term.

5. Business Case: Prospective Market

This chapter provides an analysis of the prospective market and constitutes the second part of the business case study. It begins by introducing some segmentation factors to define the diverse industry landscape. These are leveraged later to develop an effective segmentation and targeting. After the introduction of segmentation factors, the macro market is described in quantitative terms with the presentation of some key statistics. Thereafter follow four sections that outline the industry context: Management Practices, Technology and Innovation, Networks and Competition, and Norms and Attitudes. These sections present the main findings from the empirical interview study. The chapter ends with the proposal of a new industry classification, SOFA, which is suggested to recognize structural similarities between a group of sectors from a technology and innovation perspective.

5.1 Industry Landscape

There is no obvious way to distinguish the restaurant industry. A broad definition could include everything from a nightclub to a coffee shop, while a more narrow one could exclusively address à la carte restaurants with table service. Two considerations have shaped the distinctions and definitions in this master's thesis: the availability of high-quality data and the scope of the case study. Mirroring the classifications established by Statistics Sweden enables an exhaustive and reliable quantitative description of the high-level market. In some aspects, however, the case study requires a more granular approach to segmentation. For that reason, some additional factors are introduced to complement those defined by Statistics Sweden.

5.1.1 High-Level Segmentation

The restaurant index published by Statistics Sweden reports restaurant revenues in Sweden broken down into seven segments by type, as described in Table 4. (Statistics Sweden, 2022a)

Table 4. Restaurant industry segments as classified by Statistics Sweden (2019).

Segment	Description
Hotel restaurants	Restaurants operating at hotel or conference venues, or in connection with other lodging services.
Cafés	Coffee shops and similar. Limited food service.
Fast food	Characterized by fast service and high availability. Takeout is common.
Lunch and dinner restaurants	Traditional restaurants with table service, gourmet restaurants, pizza places, and neighborhood restaurants.
Restaurants in the vicinity of event venues or traffic	All kinds of restaurants close to airports, railway stations, boat terminals, or large roads. Also restaurants connected to fairs, zoos, and sports venues.
Pubs, bars, and nightclubs	Focus on beverages, but the food is also served. Meeting spots where the guests often stay until late.
Workplace restaurants	Restaurants with a distinct focus on serving people at work. Often operating with limited opening hours and in partnership with a specific employer.

5.1.2 Refined Segmentation

By exploring the market conditions for commercialization of Precognitio's technology, the industry analysis is leveraged as a base for the business case study. To achieve that purpose, a more refined segmentation than the high-level one applied by Statistics Sweden is necessary. For example, both pizza places and gourmet restaurants belong to the *Lunch and dinner restaurants* category, but it is fair to assume that there are significant differences between them in terms of culture, industry networks and management procedures. To allow appropriate depth in the market segmentation, Table 5 introduces some additional factors.

Table 5. Additional factors for segmenting the Swedish restaurant market.

Factor	Description
Big city vs. small city or rural	The type of geography that the restaurant is located in.
Restaurant size	Revenue, number of seats, number of employees, etc.
Manager age	The age of the restaurant manager or managers.

5.1.3 The Swedish Restaurant Industry in Numbers

The restaurant sector belongs to those that were hardest hit by the Covid-19 pandemic. After a period of steady growth, 2020 and 2021 brought a severe setback, as shown in Table 7. It remains to be seen whether traces of the 2020-2021 decline will persist or if the market will fully return to its pre-pandemic trajectory. This study focuses on the long-term and the aim is that the conclusions should be applicable not during a temporary crisis, but in the normality that follows after it. To allow a forward-looking market analysis, 2019 is used as the main year of reference in this study, being the most recent full year where the industry was operating under “normal” conditions.

Note that the figures in Tables 6–9 are based on public records of Swedish restaurants. While this enables a wide representation, there is also a risk that the numbers do not reflect the reality of individual restaurants with full accuracy. For example, some registered companies might not have been operating actively during the year, some might represent seasonal establishments open only part of the year, while some venues might be registered with several different companies. Such irregularities might skew average revenues and some other figures slightly. Overall, however, the numbers are believed to represent the best available quantitative overview of the industry.

Table 6. The Swedish restaurant market in numbers (Statistics Sweden, 2022a, 2022b).

Statistic	Value
Number of restaurants	26 158
Average revenue per restaurant	5.4 M SEK
Market turnover	141 B SEK
Average number of employees per restaurant	3.9
Total number of employees	101 986

Table 7. Restaurant market turnover by year. Note: market turnover for 2019 has been used as the base and converted using the restaurant index published by Statistics Sweden (2022a, 2022c).

Year	Total turnover (M SEK)
2005	104 159
2007	111 724
2009	108 714
2011	116 223
2013	124 198
2015	133 285
2017	140 116
2019	140 527
2020	105 540
2021	123 110

Table 8. Turnover by restaurant type (Statistics Sweden, 2022d).

Segment	Total turnover (M SEK)
Hotel restaurants	15 598
Cafés	9 077
Fast food	18 323
Lunch and dinner restaurants	63 194
Restaurants in the vicinity of event venues or traffic	9 056
Pubs, bars, and nightclubs	21 099
Workplace restaurants	4 180
Total market	140 527

Table 9. Number of restaurants by size class (Statistics Sweden, 2022e).

Size class	Number of restaurants
0 employees	9 624
1–4 employees	11 009
5–9 employees	4 171
10–19 employees	1 986
20–49 employees	672
50–99 employees	75
100–199 employees	32
200–499 employees	18
500+ employees	15

Several relevant conclusions can be drawn from the figures. First, the Swedish restaurant industry is substantial in scale. The total turnover of 141

billion SEK is significant in relation to other industries including GDP as a whole, which is true also for the employment numbers in the industry in relation to the total workforce. Second, the market is fragmented and dominated by small players. This is indicated by the low average revenue of 5.4 M SEK presented in Table 6, but also follows from a more thorough analysis of Table 9. If it is assumed that the number of employees is standard distributed within each interval and that the average restaurant company in the 500+ class has around 2 000 employees, it can be concluded that the vast majority of employees in the restaurant industry work for firms with less than 20 employees. A third conclusion is that the market has grown over the last 15 years, albeit at a slow pace. Finally, several high-level segments are considerable in terms of turnover, in particular *Lunch and dinner restaurants* accounting for almost half of the total market.

5.2 Management Practices

The empirical study included thirteen interviewees representing the restaurant industry. Most of these worked in management positions. The sample was selected to represent the *Lunch and dinner restaurants* and *Hotel restaurants* segments, due to their particular relevance to the product (see a more elaborate motivation in 7.3.2 Targeting). Within these segments, the interviewees represented a variety of geographies, restaurant sizes, and manager age groups. In some other perspectives, the sample was more homogenous, which presumably reflected the population as a whole. For example, a distinct majority of the restaurant managers were male, and foreign backgrounds were overrepresented. The typical manager had no advanced education, although two interviewees were exceptions to this with backgrounds in the technology sector. In all surveyed cases, the restaurant owner was actively involved in the operational management, even if decision-making was often shared with other employees to various degrees. In terms of interview responses, there was a certain diversity too, but the similarities were more striking. Being a fragmented and localized industry, it is perhaps not surprising that various attitudes and procedures coexist. In any case, all interviews essentially echoed a shared mindset and approach, which this and the next few sections aim to describe.

One unmistakable conclusion from the interviews is that restaurant managers are generally operations-focused. It is the day-to-day business that keeps them up at night, not any strategic visions or challenges far into the future. Several interviewees appeared surprised to be asked such questions and did not always seem to consider them part of their responsibilities even if they were the general manager of an enterprise. Instead, they seemed to be guided by an "ad-hoc mindset". They focused on solving problems, not on improving processes if they were not explicitly broken. Interviewee 1, having been part of the board of a company running three restaurants, claimed that the same culture stretched into the boardroom, where discussions most often concerned events or urgent problems, such as sick leave or other staff-related matters

To the extent that the managers did engage with more strategic matters, they mostly concentrated on food, beverages and customer service. With a business background from another industry, Interviewee 1 had tried to put financial efficiency and process improvements on the agenda, which had been met with opposition from the chefs and the restaurateur. Further evidence of this appeared with regards to cooperation with industry partners. Several managers mentioned that they were constantly communicating with their local networks to pick up on the latest trends for food and drinks. These networks were not used to the same extent for exchanging ideas about new management procedures or technologies.

With regards to decision-making responsibilities, a couple of different approaches appeared in the interviews. In three of the surveyed restaurants, a single individual took on the major burden of scheduling, purchasing, and other operational decisions. This person was generally a combination of owner/manager and was in at least one case able to achieve fairly successful planning based on experience and good knowledge of the venue. While consolidation of decision-making to one individual might bring benefits in certain cases, some clear drawbacks also appeared. First, there was an anxiety that the restaurant would fail without these key individuals: "without the general manager we would be screwed", as Interviewee 9 put it. Adding to that, it also seemed to cause stress to those high-importance individuals. Interviewee 2 expressed that "I'm pretty confident in my judgment, but for

me, the big problem is the constant stress caused by the fact that I'm the only one who can take the key decisions. It would be nice to be able to take a vacation some time." Other restaurants seemed to avoid these issues by delegating decision-making to lower management or experienced employees, but that came at the cost of accuracy. Interviewee 7 claimed that a lot of errors in planning were caused by the fact that unqualified staff had to make ad-hoc decisions.

5.2.1 Staffing Policy and Scheduling

Being a service-oriented sector, human capital is a fundamental resource to restaurants and competent management of staff is vital for success. Salaries regularly make up 30–50% of total costs (Interviewee 2), and all interviewees agreed that staffing-related activities were essential for their businesses. Yet, there might be good reason for questioning the standard staffing policy, especially since several managers highlighted staff shortage and high turnover as their major challenges at the moment. Literature also suggests that labor costs are the major cause of inefficiency among restaurants (Planinc & Kukanja, 2018).

All interviewees agreed that intuition or "gut feeling" was an important element of scheduling decisions. Several of them described a routine in which a preliminary schedule is set every two weeks, which only implicitly accounts for the expected circumstances ahead, such as weather, events, and holidays. In the words of Interviewee 4, it is possible to "get a good feeling for it when you've been doing it for a while, but early on there are often surprises. For that reason, the schedule is very flexible and adjusted over time." While a majority of interviewees agreed that such changes happen every week, a few different approaches were mentioned. Interviewee 10 "applied the model of always overstaffing to avoid the risk of being overwhelmed, and instead sent people home on a regular basis". During the summer, for example, at least five people were always staffed and came to work, but if the weather looked bad at 10 a.m., they were all sent home. Interviewee 6, the general manager of the same restaurant preferred understaffing as the norm. One thing that both agreed on, however, was that the late, reactive schedule adjustments were absolutely essential for staffing procedures. Even with this corrective mechanism, however, staffing

appeared to be a tricky activity for them, just as for the other surveyed restaurants. Over- and understaffing were common across all restaurants and had major impacts on both costs and quality.

All in all, several factors point to the conclusion that the current staffing situation in the industry is not sustainable. Considering the negative consequences for both the restaurants and their employees, it might seem surprising that the current system could originate and persist over time, but a closer investigation reveals that the culture might actually have been actively enforced by decision-makers in the industry. Interviewee 9 stated that it was an explicit objective to "push the staff to be able to operate with as few as possible". Interviewee 7 said the same thing, and that the key to succeeding is to ensure loyalty to the employer: "the situation is probably even worse at the very high-end restaurants, where the staff has less leverage since it's such an important career step for them to work at such places." He continued by underlining that putting pressure on the staff is a balancing act: "You want to push it as far as possible, but there is a limit to how hard you can be on your staff. If you pass it, conflict will follow and you risk losing them. We had a period when almost all staff quit due to excessive understaffing." This might be part of the reason that no other industry in Sweden has a higher employee turnover, with only 65% remaining with the same employer until the next year according to Petersson (2011). Petersson further suggests that this turnover in itself has been actively promoted by restaurants, motivated by the belief that employees that stay in the same job for too long get comfortable, which leads them to lose their alertness and drive.

Even if the current approach to staffing and scheduling might have benefited the employers in the past, things are changing rapidly. Several interviewees stressed how it has gotten increasingly difficult over time to find qualified staff. A staff shortage has developed over several years, and after the pandemic "the situation has gone out of control" according to Interviewee 8. There is reason to believe that this is not only a temporary imbalance, but that structural factors in the industry are causing the problems. A major trade magazine, Hotellrevyn, reported that the employers are experiencing a staff shortage while a large part of the qualified workforce is unemployed at

the same time (Andersson, 2022). The article suggested that the unemployed do not accept returning to unsustainable conditions, with temporary contracts and unhealthy working hours. Interviewee 5 had just chosen to resign from his contract for similar reasons. Going forward, it seems like restaurants will need to rethink their staffing culture if they are to remain competitive.

5.2.2 Inventory Planning and Food Waste

The empirical study found that inventories are generally planned in a similar way as schedules and that the result suffers from similar problems. Again, "gut feeling" was a major theme in how interviewees described the process. Often, a standard order was made every week and complementary orders were added multiple times throughout the period to cover up for shortages. As Interviewee 9 expressed it: "food was always ordered on short notice, often ad-hoc when we were close to running out."

Like scheduling, inventory planning often goes wrong. A German study (Strotmann et al., 2021) estimated that a fifth of all food in the sector goes to waste, which makes up 14% of total food waste across the economy. Several interviewees claimed that the inventory accounts for around a third of total costs, so a fair estimation would be that wasted food amounts to approximately 5% of restaurant expenses. Interviewee 11 emphasized that food waste was "a big problem for restaurants, maybe the biggest problem of them all." He interrupted the interview to consult with the head chef about how often the inventory orders fail and got the answer "every time". In addition to food, the beverage inventory is also an important issue. First, some of it expires quickly, such as beer on tap (Interviewee 7). Second, significant amounts of capital tend to be tied up in alcohol, which harms profits (Interviewee 6). Naturally, undersized inventories are problematic too due to the possibility of running out. With regards to food, "prepping is a huge risk since prepared food needs to be consumed the same day, or at least the day after. If you prepare too much it goes to waste, but it's even worse to make too little so that it runs out and the guests get mad", as Interviewee 6 expressed it. Inventory concerns extend through the entire value chain. Interviewee 12, a Managing Partner at a wine distributing company, said that "the restaurants are short-sighted and often purchase just

a day or two in advance. In practice, this means that we act as their safety stock and take a hit by tying up our own capital. Our profits would increase if the restaurants were more proactive." No doubt, ad-hoc replenishments are necessary for restaurants today if they are to avoid running out of stock, but it should be noted that they often come with an extra fee in addition to the administrative effort required (Interviewee 9). Just like staffing and scheduling, inventory planning seems to be a source of concern for most restaurants and a potential area for future efficiency improvement.

On the staffing side, several notable macro trends with the potential to stimulate an industry transformation could be identified. In a similar way, there are external factors that could disrupt the current approach to inventory planning. First, growing commitment for sustainable development might influence what restaurants consumers choose to support. Food waste is a natural component of sustainability, as reflected in the fact that halving global food waste has explicitly been included as goal 12.3 in Agenda 2030 (United Nations, 2022). Second, food is getting more expensive. Price hikes during the spring of 2022 followed after several years' of steady growth (Swedish Board of Agriculture, 2022). Food has always been an important expense for restaurants, and throwing food away has never been good business. Considering the macro trends, however, it might become even more detrimental in the future.

5.3 Technology and Innovation

This section will summarize some key findings from both the interviews and the literature review about how technology and innovation are perceived by restaurants. Three conclusions stand out: technology and innovation strategies are nonexistent, digital solutions are seen as tedious and complicated, and the value of technology products is evaluated subjectively.

If the interviewed restaurant managers were surprised to be asked about their long-term general strategies, they were even less prepared to reflect upon their strategies for technology and innovation. Hardly any interviewee seemed to abide by an explicit logic for these matters. There was also a general lack of formalized processes, for example regarding technology

purchasing. Interviewee 2 was more or less the only exception, which he seemed to be aware of: “Unlike the vast majority of my colleagues, I have a tech background and see how it could help us solve some of the problems we’re struggling with. I’m really surprised by how little is done in the industry to realize the potential of digitalization.” Although the findings of the interview study, which mainly focused on the *Lunch and dinner restaurants* and *Hotel restaurants* segments, were consistent on this topic, it should be noted that some other segments seem to have come further. Fast food restaurants, for example, generally have more formalized procedures for innovation, such as concept testing, prototype product builds, market research, and consumer trials (Lee, Hallak, & Sardeshmukh, 2019).

Even if they were not used to thinking strategically about it, many interviewees seemed to have fairly strong opinions about digital technologies. Many were critical of the current options due to experiences of software bugs, poor accessibility, insufficient integration capability between systems, and tedious installations. Interviewee 9 exemplified that “there are countless scheduling softwares with various functions, but they are not user-friendly. The user has to fill in a lot of stuff manually because the systems are not automated properly. A restaurant uses multiple softwares, but it seems impossible to get them to talk to each other. Most are expensive and cumbersome and it’s really difficult to pick out the best deal.” Interviewee 7 complained that they were not always compatible on all platforms, which was important because the managers preferred to use a PC while the staff wanted to check the schedule on their smartphones. In a comment about a major scheduling software, Interviewee 11 said that “it’s constantly bugging, slow, and has a confusing user interface. It really isn’t intuitive for me or my colleagues how we should use it.”

Like there were no formal procedures for purchasing technology, there were no formal procedures for evaluating it either. When asked about their attitude to specific softwares, most interviewees answered along the lines of “I somehow like it”, or “I just don’t feel comfortable with it”, but could seldom specify what features or characteristics caused these notions. Interviewee 1, with a background in the technology sector, had noticed the same thing: “for technology providers in this industry, it’s not only about

creating value, but it’s also a lot about creating a subjective experience of value.”

5.4 Networks and Competition

This section describes the tough competitive landscape of the restaurant industry and the tendency of neighboring restaurants to form partnerships. While these two phenomena might seem contradictory, it is argued that their coexistence is both rational and consistent with literature.

First, while there are several ways to define competition, there does seem to be credit in the claims of fierce rivalry in the restaurant industry. In the most simple perspective, looking at the fragmentation of the market, the conclusion is obvious. The number of firms is huge, and neither controls a large enough share to have market power. A more appropriate assessment of competition, however, focuses on the long-run profit structure of the industry, as suggested by Porter (2008). In 2019, the median profit margin of restaurants in Sweden amounted to a meager 2.9 %, compared to, for example, construction at 4.5%, medical industry at 5.9%, or software at 19.3% (Statistics Sweden, 2022f). Previous studies have shown that low profit margins are persistent over time in the industry and that they are shared by restaurants across borders (Opstad, Idsø, & Valenta, 2022). In other words, there is clear evidence of competitiveness in the long-run profit structure of the industry.

Based on the apparently credible claims of significant competition in the restaurant industry, it would be natural to assume that neighboring restaurants see each other as rivals. After all, the nature of the product hardly allows competition without geographical proximity, so who else would restaurants compete with if not their neighbors. Still, the interview study arrived at the opposite conclusion: antagonism is rare, and most restaurants seem to form intimate, cooperative networks with their neighbors.

The cooperative local networks appeared as a common theme in most interviews. While a larger number of interviews and a more focused scope

would be necessary to understand the phenomenon in full, the results were sufficient to suggest some initial hypotheses. First, the networks are informal and lack distinct boundaries. They should not be understood as membership clubs or explicit strategic alliances. Second, multiple networks seem to coexist and overlap within the same geography. For example, one owner and general manager mostly cooperated with restaurateurs in his city who, like him, had a foreign background. Third, larger restaurants or enterprises with multiple venues dominate their networks and indirectly influence the decision-making of all restaurants in their networks. For example, Interviewee 7 mentioned that they had chosen their software systems by asking a leading competitor for advice. Fourth, the role of cooperative local networks goes beyond knowledge exchange. Interviewee 10 mentioned that they borrowed provisions from any of their neighboring competitors whenever they ran out. A final result regarding the local cooperative networks is that certain types of actors were often included, while others were mostly absent. In addition to restaurants, the communities included suppliers of food and beverages, hotels, nightclubs, event agencies, and some other related businesses. They did not, however, seem to include technology providers or any kind of educational institutions, not even vocational schools with a restaurant or hospitality profile.

With Porter's perspective on competition, the lack of rivalry among local restaurant communities might not be all that surprising. Low entry barriers, one of the forces of competition according to Porter, is a distinctive industry feature, which was also highlighted by Interviewee 1 and recognized by Opstad et al. (2022). It is important to note that it "is the threat of entry, not whether entry actually occurs, that holds down profitability" (Porter, 2008:81). This argument reduces the importance of geographical proximity. Even a rural restaurant without any competitors within a 30 minutes drive can experience competitive pressure since the threat of a new establishment in its vicinity can never be ignored. To synthesize the interview findings about cooperative local networks with Porter's perspective, perhaps the relations between neighboring restaurants should not be understood as an exception to a competitive environment, but as a result of the threat from potential new entrants. The stronger the partnership is between existing

actors, the more difficult it will be for a new actor to enter and disrupt their local market.

5.5 Norms and Attitudes

This section aims to summarize some distinctive features of the industry mindset or culture. Businesses in all sectors are managed by individuals, but perhaps attitudes matter even more in a sector where explicit strategies are rare. Most of the themes below will be recognized from the previous chapters. There is a good reason for that since it is theorized that behaviors across these areas are shaped by an underlying industry mindset.

First, risk avoidance is the norm. While innovativeness and originality might be celebrated in other industries, several interviewees in the empirical study claimed that tradition was rather the ideal for restaurant managers. Interviewee 11 meant that "we continue doing things the same way for the simple reason that we've always done it like that, nobody wants to place a bet on changing an established habit." There does however seem to be some variation in the intensity of this culture, as expressed by Interviewee 5: "Curiosity and openness towards new ways of working are rare. Change is very slow since most managers are 35–55 years old and were trained a couple of decades ago, even if those will eventually be replaced by younger managers who tend to be more alert. Larger restaurants are also a bit more receptive, but that doesn't matter much when 60–70% of them are small."

In this context, the mindset towards technology is of particular importance. Here, the interview responses turned out a bit contradictory. Some were skeptical, like Interviewee 8 who claimed that "this is a very complex industry. Digital solutions can probably work elsewhere, but instinct will always be fundamental to manage a restaurant successfully." Interviewee 1, on the other hand, meant that "there is a great openness and curiosity towards new technology, and high hopes for the opportunities that they might bring", and continued that "people don't necessarily understand what can and what cannot be done, and I would say that the lack of knowledge about digitalization is sometimes the source of fascination and exaggerated expectations." With this observation, he pinpointed a general takeaway from

the interviews; some restaurant managers are negative to innovation, others are positive, but most share a somewhat "foreign" attitude to new technology.

A final and essential cultural feature is the "we are family" attitude. Professional pride and loyalty shined through in most interviews. As expressed by Interviewee 10: "If you don't have the restaurant mindset, you probably don't belong in the industry. Even if it's hard work, we are all a family. This is what attracts a lot of people, becoming part of a community, getting discounts, and being able to cut the queue with free entrance to certain places. Sacrificing yourself for the team is part of the deal."

5.6 The Service-Oriented, Fragmented, and Analogue Restaurant Industry

While the scope of this study is limited to the restaurant industry, it is worth noting that some other sectors share many of the distinctive features. The new term "SOFA industries" is proposed to define this group, referring to their service-oriented offerings, their fragmented market structures, and the relatively analog core of their value proposition. In addition to the restaurant sector, it is proposed that the criteria are likely to be met by a number of other industries: carpentering, painting, hairdressing, and even trucking to some extent.

The term is designed to address a need within innovation literature. For example, Von Tunzelmann & Acha (2006) criticize "low-tech" as an ambiguous classification of industries and ask if any industry in developed countries really meets that criteria today. Still, "low-tech" is most often the term with which this group of industries is defined in literature. For example, it has been recognized that "low-tech" industries deserve more attention in innovation research and that the "traditional science and technology model of innovation is not applicable" to them (Trott & Simms, 2017:605). While the claim might essentially be correct, it is not necessarily accurate to blame it on their "low-tech" attributes. Consider two carpenters, one who uses manual hand tools and another who uses advanced power tools. One of these is "low-tech", while the other by any reasonable standard

is not. Does the traditional science and technology model of innovation apply to one, but not to the other? Probably not. No matter if they use high-tech tools or not, they represent a SOFA industry, which is the dominant structural factor explaining their behavior regarding technology and innovation.

6. Key Challenges of Commercialization

The empirical market investigation showed that the way restaurants currently approach scheduling and inventory planning could be questionable. Inaccurate planning seems to be causing problems in multiple ways, and there are indications that the industry is ready for a transformation in this area. Furthermore, to iterate the scope, it is assumed for the purpose of the study that a solution like the one Precognitio aims to launch can have a role in establishing new ways of working. Even considering this assumption and the favorable circumstances above, commercialization is not necessarily straightforward. This chapter summarizes the most important findings from the case study concerning commercialization challenges. First, market-related factors are reviewed, partly with a theory base of the technology acceptance model (TAM), diffusion of innovations theory (DOI), and crossing the chasm theory (CTC). Thereafter follows a short discussion regarding a couple of specific challenges related to the fact that the business case company is an early startup.

6.1 Market Challenges

6.1.1 Industry Mindset

As was found in the market study, a distinct mindset is shared among most restaurant managers. There is no reason to define this full set of attitudes and habits as an obstacle to commercialization – cultures exist in all industries, and presumably, all of them incorporate both opportunities and challenges. With that said, a unique culture requires a unique strategy, and it can be theorized that the standard theory modeled for high-tech industries is not entirely applicable in this case. This section outlines four key market elements of particular importance to address in an effective commercialization strategy.

First, the empirical study found that restaurant managers are operations-focused, which aligns with earlier research. For example, Lee et al. (2019) proposed that intense day-to-day operations cause time constraints so that managers are simply too busy to investigate long-term opportunities. This causes a negative feedback loop since the managers do not take the time to consider time-saving innovations. Still, it would be misguided to fully attribute the operational orientation to stress. The empirical study also confirmed the earlier research of Lee et al. (2019) by concluding that restaurants do innovate to a greater degree with regard to food, beverages, and customer service. This indicates that a lack of innovation in other areas might also be caused by a lack of attention. It should be noted that these findings do indeed concern *innovation* rather than *technology adoption*, even if the latter is more directly relevant for a commercializing company. Consider, however, the theory of absorptive capacity. As suggested by Cohen & Levinthal (1990), a firm that does not internally deal with innovation in a certain area is less likely to be able to evaluate and utilize outside knowledge in the same area. In simple terms, if restaurants are not innovating beyond food, beverages, and customer service, there is reason to believe they are not absorbing innovations beyond these areas to a great degree either.

Second, the market study concluded that restaurant managers tend to be risk-averse. Lee et al. (2019) suggested that restaurants prefer incremental or imitative innovations, which could be another indication of such a mindset. The fragmented industry landscape, dominated by very small actors, could partly explain why managers think this way. If a large firm successfully implements an innovation, it can capture greater benefits than a small firm could in the same scenario, since improvements can be leveraged across the whole organization. Similarly, the costs of failed innovations are unlikely to be detrimental if the firm is large enough to "act as its own insurance company". The cause of risk aversion among restaurant managers could also relate to identity. Based on the interviews, few managers seemed to take pride in bold gambles. Instead, the norm was to maintain traditions and an industry heritage.

Third, with regards to TAM, it is worth asking how the mindsets of restaurant managers could influence *perceived usefulness* and *perceived ease of use*. The factors are subjective in nature, and literature has suggested that they are systematically undervalued by prospective adopters (Gourville, 2006). Again, there are no structured processes in the industry for technology purchasing to complement subjective, implicit evaluations. Several interviewees (8, 10, and 11) were by default critical of technology, claiming that it is often malfunctional or difficult to use. The reason for this could be that current options for restaurant technology are poor, but it could also be interpreted as an indication that there is an industry bias against perceived ease of use. At the same time, some were very optimistic about what digitalization could be capable of achieving, to a degree that is probably not even generally matched by digital innovators. Perhaps, while restaurants tend to undervalue ease of use, they might overvalue usefulness.

Finally, there is a possibility that manager attitudes are reflected within internal organizations in a way that could obstruct implementation even after a top-level commitment has been achieved. Naturally, the adoption of an innovation does not stop with the first individual of each enterprise. For it to be successful, organizational support is necessary. Considering how restaurant managers do not systematically think strategically about technology, it is unlikely that there are processes and cultures in place to enable the diffusion of them through their internal organizations. The impact of this might be even greater in those restaurants where decision-making is delegated to multiple individuals, assuming that the social leverage for carrying through change is also shared by multiple people in those organizations.

6.1.2 Network Dependence

Similar to the industry mindset, the existence of network dependencies is not in itself an obstacle to commercialization. As suggested by Rogers, it is natural that innovation uptake happens within social systems and that social relations have a central role in enabling it. Still, certain aspects characterizing the specific networks in the restaurant industry might deserve particular attention in the development of an optimal commercialization strategy.

First, all interviewees seemed to see themselves as followers rather than leaders within their respective networks, even if some were owners of relatively sizable restaurants. This might be a consequence of the risk aversion – a tendency to sit back and observe competitors rather than taking the initiative. Identity could also be the reason, as suggested by Tsai, Wang, & Chen (2021:129): "technology adoption is a question of maintaining a social identity". While Tsai et al. specifically refer to small businesses, they characterize them by a lack of resources for technology adoption, which is more or less true for all restaurant actors no matter their size. In other words, if the "innovator" identity is not celebrated socially, even dominating actors might reject it. Claims of Lee et al. (2019:54) that "restaurant entrepreneurs generate new ideas by . . . imitating the practices of leading competitors" might suggest that leading competitors are innovators, but based on the interview study it seems like even the big players prefer imitation to a great degree.

Second, there is reason to further consider imitation with respect to the specific innovation in focus for this study – a sales forecasting software used to improve the decision-making of restaurant managers. Management innovations like this are implemented "behind the scenes", which makes them harder for competitors to observe or imitate (Lee et al., 2019). A culinary innovation, such as a new plant-based substitute for meat, will naturally be presented to guests and is therefore susceptible to diffusion to other restaurants. The effects of improved planning, on the other hand, only affect guests on an indirect level. For this reason, other restaurants might remain unaware of them, especially since there does not seem to be a lot of knowledge exchange concerning management innovations within the cooperative local networks.

A third remark concerning networks within the restaurant industry is their local nature. Interviewees always referred to partners within their own city. Several networks seemed to exist within the same geography, even if they were overlapping and had "loose" boundaries. The localness of networks suggests that successful commercialization nationally cannot be achieved by

finding a few national lead customers, but that those need to be found in every city and community.

Finally, the empirical study implied that restaurant industry networks lack connections to natural technology hubs. Universities, startup communities, technology corporations, and the like often play a significant role in the creation and transfer of knowledge. In the high-tech context, it has been shown that these are essential to companies as sources of innovation, while low-tech companies tend to rely on competitors and customers for the same thing (Robertson et al., 2009). High-tech innovations are unlikely to originate among any of these two groups.

6.1.3 Mind the Gap

There is a striking resemblance between the attitudes generally found in the restaurant industry and those that Rogers and Moore attribute to the later stages of the innovation diffusion process. According to Moore (1998), risk aversion, follower mentality, and skepticism towards technology are all characteristics of the late majority and the laggards, but in the restaurant industry, they appear to be the norm. The typical restaurateur seems hesitant to accept an innovation if it is not already widely adopted within the local cooperative network, even if it solves a real problem and requires only a limited behavior change. Interviewee 1 and Interviewee 2 appeared to be a bit more open to renewal, but they did not seem able to drive through social change within their communities, as is the role of early adopters in the DOI theory. Instead, they had become frustrated by the rigidity of their industry and given up any attempts of instigating radical change.

It is possible that the challenges related to Moore's chasm are even greater among restaurants, and perhaps in other SOFA industries too. The innovators and early adopters might make up an even smaller portion of the population, while their behavior and attitudes might be even more isolated from the mainstream. Furthermore, without a strong social capital among the early adopters, crossing the chasm becomes an ever greater obstacle.

6.2 Startup Challenges

A commercialization strategy that does not build on an understanding of the prospective customers is unlikely to be successful, but market factors are not the only considerations for a complete strategy. Naturally, the traits of the commercializing company matter for what strategies are feasible and effective. This chapter presents two key challenges relating to the fact that the business case Precognitio is an early startup company. It has been suggested that, while startups are successful in inventing new technologies with market potential, they find the commercialization stage to be particularly difficult (Gans & Stern, 2003).

6.2.1 Credibility

Startup companies are often seen as high-risk partners. Without a known brand, a substantial organization, and an established industry network, a startup constantly needs to prove its worth to external stakeholders.

The company and the product concept of the business case are new to the market, meaning that the credibility of both needs to be proved. Popovic & Fahrni (2004:931) studied a similar case, where the prospective customers "were very skeptical about a new revolutionary technology promoted by a start-up company." Despite initial suspicion, the company was successful due to a strong reference case early on. By leveraging an early partnership with a renowned corporation, they could convince other prospective customers of their ability to deliver a functioning technology. In this business case too, it is proposed that the first few contracts have immense value as reference cases and that some degree of skepticism should be expected until those reference cases have been obtained.

It is possible that partnerships with incubators, origins at prestigious universities, or venture capital ownership can complement reference case catalogs as sources of credibility for many startups, but this approach is less likely to be successful towards this SOFA market compared to in high-tech contexts. Neither incubators, universities, nor venture capitalists are generally part of the local cooperative networks that have shown to be so important for restaurants. Those are the social contexts influencing

restaurant decision-making, partnerships with actors without connections to them are unlikely to be perceived as reliable quality marks. Furthermore, few restaurant managers have a university background which might further lead them to disregard the value of academic institutions as credibility-providing partners.

6.2.2 Integrations and Bundling

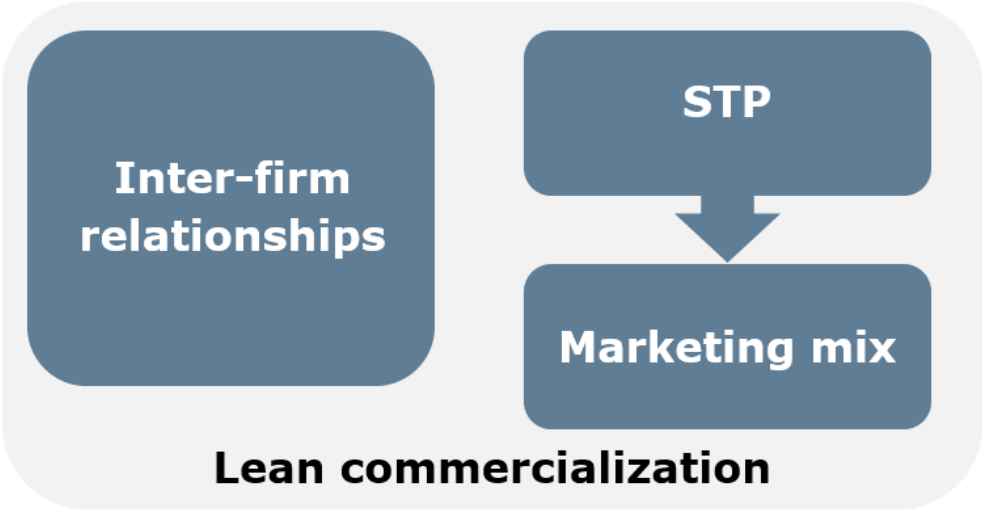
Several interviewees (1, 2, 8, 10, 11, and 12) expressed strong opinions about technology. Some of these were favorable from the perspective of a new entrant, in the sense that the market seems unhappy with what is currently offered in terms of software. Some might be more difficult to accommodate for new entrants compared to incumbent competitors. A specific source of discontent was the multitude of different systems that were difficult to choose from and that did not seamlessly merge with each other. There is a risk that the business case Precognitio could be perceived as yet another one of those, and therefore be met with opposition. The product in itself requires certain integration with other systems, particularly regarding access to data. Since “seamlessness” seems to be important for how customers perceive ease of use, they must work well from the start. In contrast to incumbent restaurant software providers, startups generally cannot provide bundles of multiple technologies that are integrated by default, which makes this challenge more significant for Precognitio.

7. Proposed Commercialization Strategy

This chapter outlines a commercialization strategy that is tailored to address the identified challenges. First, lean commercialization is suggested as a set of underlying principles to guide the approach. Second, a brief strategy for inter-firm relationships is introduced, answering how the business case company ought to cooperate with various relevant stakeholders. Third, the general strategic direction is laid out based on the STP framework. The main topic in this section is the identification of the right customers to target as well as the right positioning to choose relative to competitors in order to attract this target audience. Finally, the key tactical considerations are discussed through the marketing mix model. Figure 6 shows an overview of how the strategy is structured.

The general aim of the strategy is to overcome the identified key commercialization challenges so that adoption among lead customers can be promoted. With such a starting point, based on Rogers' and Moore's theories of diffusion, the company would be in a promising position for achieving widespread adoption in the population as a whole.

Figure 6. Framework structuring the components of the proposed commercialization strategy.



7.1 Lean Commercialization

Standard commercialization theory primarily builds on the experiences of established companies in high-technology sectors. These generally possess resources that are not available to the average startup, with regards to both physical, financial, human, and immaterial capital. Such resources certainly have implications for the commercialization setting. For example, they allow the companies to invest more heavily in R&D, develop broader product catalogs, and take on more risk – a failed commercialization attempt is a failed project if you are a large corporation, but a failed company if you are a small startup. At the same time, established companies might be at a disadvantage in other perspectives, since size could be negatively correlated with both pace and responsiveness to disruptive opportunities. To ensure that the proposed strategy in this study accommodates the unique challenges and opportunities that are typical for startup conditions, the lean commercialization framework is applied to guide the general approach.

One central suggestion based on this framework is that the market launch could benefit from being based on insights from preceding concept and business model verifications carried out with minimum viable products. In other words, prototype versions of the product should be launched to trial customers in order to gain feedback. There are several advantages to such a procedure. Naturally, the functional aspects of the technology can be tested and improved. Likewise, it poses an opportunity to evaluate and get feedback on the market approach as well. In addition, it provides a "soft introduction" of the product concept to some potential lead customers. If they are initially hesitant to *adopt* the product, they could perhaps be convinced to at least *test* it. Finally, it aids the recognition of who these lead customers actually are, since this is not necessarily apparent if the market is observed from an external perspective. Their willingness to test and their responses to test outcomes indicate what adopter groups users belong to. The MVP process should enable knowledge creation by focusing on the collection of quantitative and qualitative data. This should probably be the main objective of all early customer relations, rather than any short-term financial profitability.

The commercialization approach should follow an iterative logic. For a lean startup, no strategy is finalized and rigid before execution. Instead, the hypotheses should regularly be reviewed and adjusted depending on the market response. In that perspective, the proposed strategy of this study should not be seen as a roadmap from start to finish. Instead, it is a tentative guide to where the early iterations should focus. Throughout the process, choices and assumptions across the entire strategy should be continuously revised and refined.

The iterative approach has consequences for how the business case Precognitio could manage the identified challenge relating to a wide chasm between adopter groups among restaurants. This is indeed theorized to be of major importance for how the product can eventually diffuse from the early adopters to the early majority. Still, it should not necessarily shape the strategy of Precognitio in the short term. While the wide chasm indicates that the commercialization approach will eventually have to transform drastically towards a focus on penetration within niche markets, the short-term goal should remain – attracting, satisfying, and achieving traction among the lead customers.

7.2 Inter-Firm Relationships

As noted, certain commercialization challenges are associated with the inevitable conditions of a startup company. Mostly, these relate to either credibility issues or to the potential for achieving seamless integrations with other technologies used in the restaurant industry. If an incumbent restaurant software provider would launch a similar product, they would already be familiar with the market and they would have full control over integrations with the rest of their technology offering. In other aspects, established players might be at a disadvantage. A rigid internal culture is unlikely to promote radical innovations that overthrow the status quo, and even if they would be accepted internally, they might collide with customer expectations and harm an established brand of tradition, especially if the technology would not be perceived well by the market. Alliances and partnerships could enable opportunities for leveraging the strengths of startups and incumbent players alike while avoiding the risk of pitfalls.

With regards to alliances with incumbent restaurant software providers, it is worth highlighting the current fragmentation of that market. The market structure sets the preconditions for how alliances can be formed. In this case, there is no distinct market leader with exceptional resources at their disposal, but many small or medium-sized competitors, which has two significant consequences for this topic. First, the internal capabilities for research and development among incumbent players are not necessarily very advanced. A single dominant player, on the other hand, could be expected to convert a strong commercial leadership to a strong technological leadership. Second, as has been suggested by Gans & Stern (2003), a fragmented market increases the bargaining power of a startup that is seeking partnerships. If one potential partner would reject collaboration, there are other potential paths for Precognitio to take, which puts them in a favorable position for negotiation.

Considering the specific product concept of the business case, it might be negative to limit the inter-firm relationships strategy to one single company. There are clear scale advantages of the product due to the data access aspects. Furthermore, the population of innovators and early adopters appears to be relatively slim and geographically scattered, so too few of them may be present in the current customer base of any incumbent player. Instead, partnerships with multiple actors could create a competitive advantage by unlocking a majority of the market.

Finally, with regards to credibility, an alliance strategy should not be restricted to or even focused on incumbent restaurant software providers. In fact, the market analysis found that restaurant managers mainly refer to their local cooperative networks for knowledge and new initiatives and that software providers are not part of those. Instead, the strategy could target actors with more social influence, such as successful restaurateurs or other industry profiles. By identifying and cooperating with stakeholders of that kind in each geography, it is theorized that the business case company will be perceived as a more credible actor.

7.3 Segmentation, Targeting, Positioning

This section outlines strategic aspects of the commercialization approach. Using the STP framework, a target segment is identified, and a positioning is defined relative to competitors within that segment. Again, the overall aim of the strategy is to overcome the identified commercialization challenges and to attract the lead customers who can stimulate the diffusion of the technology within their local cooperative networks. As Chiesa & Frattini (2011) have shown, network acceptance and "word of mouth"-success are strongly related to both strategic and tactical decisions in the commercialization process.

7.3.1 Segmentation

The segmentation builds on the market analysis by highlighting the factors that set customer groups apart. In other words, it aims to recognize which potential customer groups are present and what unique features characterize each group. The distinctive features that shape adoption behavior are of particular importance for separating the segments, so different segments are expected to respond differently to a given value proposition or commercialization attempt. For that reason, a central presumption is that it is often more effective and efficient for a commercializing company to focus the value proposition on one or a few groups rather than on the whole market.

To achieve its purpose and to be practically applicable, segmentation should meet four criteria: the size of segments should be *measurable* and each potential target segment should be *substantial*, the overall structure of segments should be *stable* over time, and the segments should *respond differently* to strategic and tactical decisions. (Vincent, 2016)

For natural reasons, measurability is often a question of time and resources. No matter the factors of segmentation, the ambitiousness of pre-launch market studies matters for how accurate measurement can be achieved. In this case, regarding the Swedish restaurant market, Statistics Sweden provides extensive high-quality quantitative data. As presented in Table 10, this system builds on a classification of restaurants by "type", which is

therefore the starting point for segmentation in this study, since it allows accurate and efficient measurability. The classification has been used by the public agency since at least 2008 (Statistics Sweden, 2022a) and is considered to fulfill the stability criterion proposed by Vincent (2016).

Table 10. Turnover by restaurant type (Statistics Sweden, 2022d).

Restaurant type	**Total turnover in 2019 (M SEK)**
Hotel restaurants	15 598
Cafés	9 077
Fast food	18 323
Lunch and dinner restaurants	63 194
Restaurants in the vicinity of event venues or traffic	9 056
Pubs, bars, and nightclubs	21 099
Workplace restaurants	4 180
Total market	140 527

With measurability achieved, the next criterion is to ensure that segments are substantial. Considering the objective of the business case company to achieve mainstream market adoption in the long term, it is clear that the *Lunch and dinner restaurants* type will eventually need to be addressed. For that reason, it is suggested that segments are excluded if they are neither substantial in themselves or connected to the *Lunch and dinner restaurants* to a sufficient degree that they can credibly be expected to bridge adoption to them in the long-term. The local cooperative networks found in the market analysis provided insights into how such diffusion can be theorized to play out. *Cafés* and *Workplace restaurants* were largely absent from these. At the same time, they are probably too small to be able to independently sustain profitable commercialization in the long run. With that in mind, they are neither attractive long-run prospects nor promising bridges to the mainstream market, and therefore they are excluded as potential targets.

The final criterion to meet in segmentation is that segments should respond differently to commercialization strategies and tactics. A key finding of the market analysis is that the fragmentation of the restaurant industry, as an essential component of the SOFA characterization, is important for their behavior, especially concerning risk aversion. In this context, it should be noted that while the restaurant market is fragmented as a whole, not all segments provided by Statistics Sweden are necessarily fragmented internally. The Swedish hotel and fast food sectors alike are rather dominated by a few large players. While this study has not allowed an in-depth qualitative investigation of their unique attitudes to technology or behaviors in response to commercialization attempts, there is good reason to believe that they differ from the *Lunch and dinner restaurants* type dominated by independent restaurants. For example, they are more likely to be run by dedicated management organizations, they have technological and digital competence in-house, and they are likely to follow more structured processes to purchase and evaluate technology.

While *Hotel restaurants* and *Fast food* are distinguished from the others (*Lunch and dinner restaurants, Restaurants in the vicinity of event venues or traffic*, and *Pubs, bars, and nightclubs*) due to their relative lack of fragmentation, they should not be expected to fully behave the same way as each other. First, hotel restaurants are bundled with hospitality services, which is generally the primary offering of those actors. It is natural to assume that decision-making of the restaurant is shaped by how decisions are expected to impact the hospitality side of the business too. Second, it was found that hotels are generally part of the local cooperative networks, while this is not the case for fast food companies.

What is left at this point is to establish if the three remaining proposed segments – *Lunch and dinner restaurants, Restaurants in the vicinity of event venues or traffic*, and *Pubs, bars, and nightclubs* – can be expected to respond differently to a commercialization attempt to a degree that motivates separation of them into different segments. One important component of that distinction is if their needs are similar or not. *Pubs, bars, and nightclubs* stands out a bit from the others in that regard. In contrast to

other restaurants, the offering of these is not primarily tied to the kitchen, but rather to the bar. This is likely to have a very relevant consequence: the need for efficient planning decreases with regards to both food inventory and scheduling of kitchen staff. These are both fundamental aspects of the business case product concept, so the segment is expected to stand out in terms of their response to the value proposition. While *Restaurants in the vicinity of event venues or traffic* are certainly unique in terms of their audience, the operational or management related dynamics are not likely to be distant enough from those of *Lunch and dinner restaurants* to motivate separation, so for that reason, those two types are regarded as one segment. This leaves four segments in total: *Hotel restaurants, Fast food, Pubs, bars, and nightclubs,* and *Lunch and dinner restaurants* (from here including those in the vicinity of event venues or traffic). As shown, these segments are measurable in size, stable over time, expected to respond differently, and either substantial in themselves or likely to bridge diffusion to the substantial mainstream market.

There is, however, a need to achieve more granularity in the segments to ensure internal homogeneity, especially since the *Lunch and dinner restaurants* segment covers half the total market. In 5.1.2 Refined Segmentation, some additional factors were introduced that can be used for this purpose. The qualitative market study indicated that the ages of managers matter for their attitudes to new technologies and that the geographical surroundings of restaurants are important due to the reliance of managers on local cooperative networks for knowledge exchange. In addition, it was concluded that larger restaurants are more impacted by variations in demand since the difference between the minimum and maximum capacity is larger. For these reasons, *Manager age*, *Restaurant size,* and *Big city vs. small city or rural* are introduced as additional dimensions of segmentation on top of the segments proposed above. While this decreases measurability, since Statistics Sweden does not survey data by those parameters, it is believed to be essential to achieve sufficient focus.

7.3.2 Targeting

The purpose of targeting is to select one or several segments with maximum potential for commercialization. Essentially three factors play into the

choice: the needs and expected responses of each segment, the value proposition of the business case company, and the competing value propositions towards that segment.

First of all, there might be good reason to avoid strategies targeting multiple segments in this business case. An undifferentiated mass-market strategy, where the same value proposition is presented to several segments, can be generally risky in the high-tech context according to Vincent (2016). Again, customer needs and behaviors related to the product concept differ significantly between the segments. With that in mind, the undifferentiated strategy is risky due to the possibility that a competitor chooses to differentiate its offer to individual segments, which could allow them to achieve more effective value propositions. An alternative way to target multiple segments, the differentiated strategy, avoids this by approaching each segment with a unique marketing mix. This, however, is probably not appropriate in the startup context where resources are slim and better utilized by maximizing the value provided to one group of customers. What finally remains is the niche marketing strategy, in which the highest potential segment is identified and becomes the single target for commercialization. Of course, the iterative approach of lean commercialization is applied – it is always a possibility to pivot to new segments further on. In the long run, the ambition is to expand to the rest of the market by leveraging experiences and resources won in the niche segment.

As already noted, *Pubs, bars, and nightclubs* are likely to appreciate only part of the product concept. With less need to plan inventories or kitchen staff schedules, this segment might be harder to convince and the group might lean towards the late majority end of the diffusion process. Even more important – they appear to be a suboptimal starting point for technology diffusion to the other segments. If a value proposition is tailored to their needs, a large part of the potential of the product will diminish for the reasons above, which will undermine its attractivity towards other segments.

Fast food is eliminated for a similar reason – the segment is not internally fragmented but rather dominated by large corporations. A sales strategy that

works for them is unlikely to work for independent restaurants relying on local cooperative networks. After all, an owner/manager restaurateur cannot be expected to behave the same way as a dedicated technology procurement team.

Hotel restaurants and *Lunch and dinner restaurants* differ in certain ways, with the complementary offering of hospitality and more limited internal fragmentation characterizing the former. Still, there are notable similarities too. Both segments benefit from the full range of benefits brought by the product concept, and both rely on local cooperative networks for partnerships and knowledge exchange. For this reason, it is believed that a similar marketing mix can address both, so neither of these high-level segments is eliminated. Instead, the additional factors for segmentation, *Manager age*, *Restaurant size*, and *Big city vs. small city or rural*, are used to pinpoint the optimal niche within them. As was found in the market study, young managers are generally more positive about new technologies and open to disruptive changes in management processes, larger restaurants have more need for the product, and the big city restaurants are rooted in large, urban local cooperative networks.

To conclude the targeting, it is suggested that Precognitio applies a niche market strategy targeting both *Hotel restaurants* and *Lunch and dinner restaurants* located in big cities with young managers and of significant restaurant size.

7.3.3 Positioning

Within the identified target segment, an appropriate positioning should communicate the benefits of the value proposition in relation to competing offers. This way, it should help consumers realize how the product serves their unique needs in a superior way.

Positioning of new product categories is a special case. First, the customers lack prejudices regarding the product – they do not take any special features or configuration for granted. Second, they most likely are not aware of any competing offers to use as benchmarks. Both of these factors are sources of freedom for the commercializing company. For these reasons, a strategy can

be built around any factors believed to be important for the customers. (Vincent, 2016)

With that identified starting point, the relevant question is: what matters to the customers in this segment? The insights from the market study are a natural base to build on for answering this question. As noted, user-friendliness and seamlessness are probably the two most important technology features to customers in this segment. These factors were the main reasons for dissatisfaction with current softwares, so it is suggested that addressing them successfully can be a promising path to achieving sustainable competitive advantage over time, which will be necessary due to the possibility that competing value propositions could eventually target the segment.

7.4 Marketing Mix

The marketing mix structures tactical decisions that follow after the strategic orientation of segmentation, targeting, and positioning. In other words, the marketing mix should be consistent with the positioning and tailored to serve the needs of the target segment. Naturally, the identified commercialization challenges should continue to be addressed too. An overall alignment of the marketing mix with STP and the commercialization challenges is theorized to optimize the potential for product trial and adoption by the lead customers. As noted, this is the first step to achieving diffusion through the market as a whole. Indeed, consistency is key to success. As shown by Chiesa & Frattini (2011:452), contradictory decisions within the marketing mix are often the cause of "inability to satisfy the innovation's early adopters or to elicit support from its adoption network".

7.4.1 Product

At the concept level, the business case focuses on a particular product. This is normal in this stage of the marketing mix, where the purpose is to "look for ways to enhance its value for the target market" (Vincent, 2016:271). There are many ways to configure, design, present, brand or bundle any technology or product concept. These are the kinds of decisions in focus for this section. Commercialization of a *technology* instead of a *whole product*

risks leading to failure, since the customers cannot effortlessly perceive the benefits.

Being the key feature in the eyes of the target customers, user-friendliness is the core of the chosen positioning. The whole product configuration is a central component of that feature, which should therefore guide the decisions in this section.

It is proposed that the perceived user-friendliness, as the interviewees highlighted repeatedly in the market study, in reality, consists of two parts First, technical functionality is suggested to be a factor. If the system does not work as intended or is slow, the perceived ease of use will suffer. Avoiding this is a matter of excellent technical execution and rigorous testing. Second, behavior change is suggested to be a component. If the prospective users believe that they would need to change their habits and mindsets, or update a lot of complementary products to adopt the new technology, their perceived ease of use will also take a hit. A radical product does require a behavior change, so by definition, it is assumed that it cannot entirely be avoided in this case. While an innovative plant-based burger patty can be stored, prepared, and served just like a beef patty, the inherent purpose of the forecasting software is to transform the planning mindset of restaurants.

The resistance that is expected to arise due to the need for behavior change can be avoided in two ways. The first route is simply to outweigh it with phenomenal value, or *relative advantage* as referred to by Rogers. As suggested by Gourville (2006), if the product is a lot better than the alternative, the customers will be willing to adopt it even if it requires them to significantly change their behavior. Naturally, the commercialization strategy as a whole strives to maximize value, for example by targeting the segment that is believed to derive the most benefit from the product. The second route is to configure the product to be behaviorally compatible, in other words setting it up in a way that avoids the most drastic disruption, to quote Gourville (2006:104): “Companies create value through product change, but they capture that value by minimizing behavior change.”

Using Rogers' framework, behavior change relates to several attributes of innovation. First, it should be *compatible* with current products and processes. To achieve this, a customer study could investigate which software systems are used by the target segment and ensure that integration with those is possible. Furthermore, the application could be made available on whatever devices the prospective adopters are used to. Habits is another aspect of compatibility. If restaurant managers revise their planning every day, the forecast must perhaps be updated and made available to them with the same frequency, and so forth. In addition to compatibility, *complexity* could also contribute to the experience of behavior change. If the product is perceived as complex, the prospective adopter will expect that significant effort will have to go into training. For that reason, it is suggested that the presentation should be kept simple and in a format that the user can relate to, for example modeled by how weather forecasts are normally presented. A final attribute relating to behavior is *trialability*. If the customers know that a behavior change can be reversed, they might be less anxious about going out of their comfort zone. Trialability partly relates to pricing, that the early customers are not bound by long contracts, but also to technical aspects, such as installation. Quick and effortless implementation at each unique restaurant is a prerequisite for enabling trial periods.

Besides facilitating trialability, a simple installation process could bring other benefits too. As noted, potential customers may perceive startups as high-risk partners, which could make them hesitant to put in substantial effort to implement their products. For that reason, it is suggested that installment should be seamless and that the user experience should be as effortless as possible without any significant need for training.

The market study indicated that restaurant managers might be particularly subjective in their evaluation of product utility. It has also been suggested that radical innovations generally amplify such tendencies; the prospective user finds it difficult to imagine the state of things after implementation, and therefore cannot be confident enough to estimate its value (Chiesa & Frattini, 2011: 443). For that reason, it is suggested that the business case Precognitio should explore the opportunities for integrating value quantification into the product. Consider, for example, how an electric car

monitors and presents energy consumption so that the driver is reminded of the acquired savings. Similarly, it might be possible to measure the impact of sales forecasts on over- or understaffing, as well as the reduction of food waste, in order to make the value provided more observable to the user.

Observability is an important product attribute in Rogers' framework too, but in that context with a slightly different meaning. In DOI theory, observability takes an external perspective: to what degree can other potential adopters see that someone is using and benefiting from the product? This question is proposed to be particularly relevant due to the local cooperative networks. Recall that the key motivator for restaurants to adopt new technologies was that they saw them being implemented in their network. Due to the nature of the product, observability is difficult to achieve, but not entirely impossible. A concrete way could be to provide an "informational label" to the restaurant. Today, many Swedish restaurants put stickers on the door to signal certain characteristics they believe are positive for their brand: sustainability classifications and collective agreement adherence are the two most prominent examples. Due to the social impact benefits of the product, a similar approach might be possible to improve observability. A "synthetic" kind of observability can also be integrated with the promotion, by simply showing potential customers user cases in their cooperative local networks.

A final consideration with regards to the product is to keep it simple. As suggested by Chiesa & Frattini (2011: 451): "configuration of the product at launch should include only a limited number of functions designed to satisfy the compelling reasons to buy of early adopters." Instead, the lean commercialization approach is again the best way to go. Early on, a distinct focus on the core functionality can ensure perfection of the basics and reduce the risk of malfunction or poor design. When the product has been adopted and functionality has been established, more features can be added in later iterations. Considering the reinvention principle of DOI theory, this also enables a favorable position for long-term diffusion to other adopter groups: an innovation has to evolve as it spreads through the population to increasingly hesitant and risk-averse adopter categories.

7.4.2 Promotion

The aim of promotion should be to communicate and amplify the value proposition and the product benefits. In practice, it includes all activities that are used to convey information to the market, such as advertising, PR, sales promotions, and personal selling. (Vincent, 2016)

The radical product of the business case is relatively complex. Even if it is configured to minimize the complexity, it is unlikely that a simple advertisement, such as a poster or short video, will effectively communicate the concept in full. For that reason, it is instead suggested that personal selling should be the key mode of promotion. This allows more in-depth introductions to the product concept through consultations over the telephone or face-to-face. As is common for new products about which customer knowledge is limited, the objective should be to stimulate awareness and to educate the prospective audience (Vincent, 2016). Note that there is no need to educate them about the technical novelties "under the hood", but that a value-based selling approach focusing on benefits should be applied. The backside of personal selling is a relatively high cost per sale. In this case, this is proposed to be acceptable due to the high value of each early customer. These provide both feedback and data for technical improvements and also act as lead customers to stimulate diffusion to the rest of the population.

The focus on early adopters also brings risk. While their relative enthusiasm about technology can be leveraged to achieve adoption, it might also cause unrealistic expectations. Since the objective is that they should share their experiences within their industry networks, disappointment among the early adopters would be a major problem. This creates a dilemma – the value proposition should be communicated positively, but the claims about the product must correspond to its actual performance so that they do not cause dissatisfaction.

While the targeting of sizable restaurants in big cities with young managers has ensured that the focus segment is likely to contain a relatively high number of innovators and early adopters, far from all actors in this segment belong to those categories. That brings up the question of how promotion

can be designed so that the right recipients are reached. Early adopters are distinguished mostly by "hidden" characteristics: their drive and motivation, their enthusiasm for technology, their appetite for risk, their abilities as strategic visionaries, and their organizational support for carrying through change. While these are believed to correlate with the visible factors above, individual early adopters cannot be identified through any systematic categorization. Luckily, interacting and integrating with the right community can be enough to catch the attention of potential early adopters (Popovic & Fahrni, 2004). Following the principles of lean commercialization, the first sale is preceded by a considerable process of interactions with the industry, including pre-launch market studies, concept testing, and prototype testing. These activities provide opportunities for approaching, and being approached by, a significant number of industry actors who could potentially belong to the early adopter category. By definition, the early adopters are actively seeking opportunities for strategic improvements, and are therefore disproportionally inclined to reach out to disruptive actors that they become aware of in their communities. For the company, the important thing is to identify those and to build relations with them that are going to prove to be valuable later on.

Naturally, the case company Precognitio should take advantage of all kinds of market insights to set up an effective promotional approach. For example, it was found that decision-making structures vary across restaurants. In some cases, an owner/manager makes all decisions about scheduling, which causes stress for this individual. In other cases, decisions are delegated among the staff, which decreases the decision quality. By identifying which of these cases is true for each restaurant, they can be approached with promotions highlighting how the product helps solve their specific need. Another market insight that can be leveraged is the current industry trend of labor shortage, which is a clear argument in favor of better staffing procedures, as well as the high food prices, which is a rational reason to improve inventory planning.

With personal selling as the basic approach, sales promotions in the form of product trials can also be a powerful tactic. For such campaigns to be possible, however, the decisions regarding product and pricing must be

aligned with them. As suggested, the installation has to be simple, and as will be suggested, the price model must allow discounts early on without inhibiting the long-term openness for a profitable price level that allows profits to be made.

7.4.3 Price

First of all, perhaps counterintuitively, price does not necessarily belong to the most important components of the marketing mix in a business case like this. While a very high price might certainly discourage potential customers, it is unlikely that a cheap deal has a great impact on their willingness to adopt the technology. After all, there are other costs to switching: monetarily with regards to training, and psychologically with regards to behavior change. As shown by Chiesa & Frattini (2011:452), “choices related to pricing and distribution channels appear to affect neither the support the innovation receives from its adoption network nor the post-purchase attitude of early adopters.”

With regards to the price level, moderation is likely to be advantageous early on. Partly due to credibility aspects, engaging in a partnership with a startup is a high-risk venture, especially considering the radical technology For this in mind, the customers might not be willing to pay a high price. In a more holistic, strategic perspective, this hesitance is not necessarily is not a great problem. The aim in the early commercialization phase is not short-term profit, but to establish a competitive value proposition and build a foundation from which to cross the chasm to the mass market in the long-run. At the start, significant resources are required to attain each new customer. Eventually, especially as the innovation reaches the early majority, customer acquisition costs drop rapidly. Each early customer advances the adoption process, which provides substantial value to the firm (Moore, 1998; Rogers, 1995). In addition, early customers provide feedback that helps guide the lean commercialization process (Gbadegeshin, 2018). Using standard methods of evaluating the value of customers, such as customer lifetime value (CLV), early customers of new technologies will appear to be very unprofitable. With high customer acquisition costs, high costs of delivery, and often slim prices, the monetary profit from the first customers is likely to be negative. For decision-making to reflect the full

value of those relations, however, margins cannot only be based on monetary revenue. Instead, the value of early customer feedback and knowledge input (FKI) and contribution to the diffusion process (CDP) must be accounted for. An adjusted version of CLV might be more appropriate in such scenarios, and is therefore proposed here as a refined way to evaluate customer value. It is suggested that this new measure can be referred to as "adjusted customer value", and defined as follows: adjusted customer value = CLV + FKI + CDP. By recognizing the full value of early customers, negative monetary margins early on are not only acceptable, but rational, assuming that *adjusted customer value* is positive.

It should be noted, however, that the value of FKI and CDP decreases for every new customer that adopts the product. Eventually, the monetary CLV will account for the majority of adjusted customer value. In simple terms, there comes a day when the product needs to be sold at a monetary profit for its value to be captured. Adjusted customer value should be positive at all times. For that reason, CLV must grow as the case company gains traction and credibility while the technology moves through the diffusion process since the two other components of adjusted customer value are strictly decreasing.

While the consideration above is partially an issue for the future, tactical decisions today shape how the market will respond to tactical decisions tomorrow. If the product is introduced as a bargain, the customers will perceive it as such and might reject price increases further on. To avoid this, it should be clear from the start that the price is going to increase. Promotional trials, as suggested already, could be one effective way to achieve this. The observability of benefits also matters for the openness of customers to price increases. If the amount of created value is not obvious to them, it might be possible to apply a dynamic pricing model, for example by charging a fee that equals a percentage of savings. A final method of stimulating openness to price increases is to make use of the competitiveness that was identified within the restaurant industry. In such an environment, there are natural mechanisms to facilitate the spread of efficiency improvements. With slim margins and low entry barriers, the restaurants that do not implement them will simply go out of business. In

other words, as long as the savings acquired through product usage exceed its price, competitive forces will stimulate adoption. Furthermore, the apparent willingness of restaurants to work together to fend off new entrants could be used to the advantage of Precognitio. Sharing of data could be a very potent way to create synthetic entry barriers. If the product can be established as a facilitator of partnerships between restaurants, their willingness to accept price increases might increase.

Whatever price level is decided, the revenue model is an important decision too. In the business case, where a software product is in focus, a subscription model is the natural choice. There are three reasons for this. First, the suggested marketing mix is likely to stimulate long-term relations with customers. Personal selling necessitates personal contact with each individual customer and it has been suggested that future iterations should add functionalities to the product, so personal relations will probably persist as new features are launched further on. By charging a monthly fee, for example, the value of these relationships, in addition to the isolated value of the product, can be captured by the case company. Second, recurring revenue streams are positive for long-term profitability. With one-time payments, the value of a new customer is exhausted by the first transaction, whereas that is not the case for subscriptions. Third, a subscription might be perceived as a more limited commitment from the perspective of new adopters. A startup might be seen as a high-risk partner, so a requirement to pay in full upfront is probably not ideal.

7.4.4 Distribution

While promotion relates to how the company delivers information to the prospective customers, distribution is concerned with how the actual product is brought to them. Similar to price, Chiesa & Frattini (2011) have shown that it is not the most important part of the marketing mix, at least not with regards to adoption network support or post-purchase attitudes of early adopters.

A central consideration with regards to distribution is the use of intermediaries, such as service partners or retailers. For non-physical products, direct channels are often the most favorable approaches, especially

in the B2B case and if the product is technologically complex (Vincent, 2016). Therefore, it is the natural choice in this case. Especially during the early phase, when the customer relations concern knowledge exchange to a great degree – outbounds to educate the customers and inbounds to learn from their feedback. There is an obvious risk that an intermediary could disrupt such information flows. Furthermore, personal selling, as was suggested as the primary mode of promotion, can be integrated with distribution to strengthen customer relations and reduce costs. In the end, the choice for the short-term seems straightforward, but the possibility of distribution partnerships in the long-term should not be excluded. These could be beneficial due to the opportunities for bundling with complementary softwares and the access to established customer bases.

8. Conclusion and Contribution

This is the final chapter of the report, which summarizes the main findings and relates them to the purpose of the study. Conclusions are outlined along with key recommendations to the case company. Thereafter follows a discussion about the contributions to academic research, including reflections regarding the generalizability of results as well as limitations in the approach. In the end, some suggestions for further research arising from the study results are outlined.

8.1 Main Conclusions

The purpose of the study built on the hypothesis that three distinct characteristics made the commercialization context of the business case unique. First, the company was a startup. Second, the innovation was radical. Third, the prospective market had SOFA features. As a broad conclusion, it was confirmed that all of these three factors had significant implications for commercialization challenges and thereby for the choice of strategy:

1) The startup context had implications for credibility and the opportunities for achieving integrations and bundling.
2) Customers might be hesitant due to the radicalness of the product and must be convinced to change their behavior.
3) Industry attitudes along with network dependencies create unique market conditions for commercialization.

Based on these insights, it can credibly be claimed that standard commercialization theory is partly misleading in this kind of context. The primary reason is theorized to be that it is formulated based on cases with customers in high-technology sectors. With regard to commercialization frameworks, mainstream alternatives could be used, but the emphasis and contents do not necessarily reflect the standard case.

With regards to strategy, the simultaneous difficulty and importance of achieving early traction were highlighted in the study. Such traction is a

necessary step for eventually crossing the chasm to the mass market, but substantial effort might be necessary to convince each customer early on. Even in this difficult case, however, there are opportunities to leverage, and the right strategy can avoid or reduce the impact of the identified key commercialization challenges.

Note that the scope of this study assumed that the solution was functional, addressed a genuine need, and had the potential to create value for customers. Without those criteria fulfilled, it is natural that most commercialization attempts would fail despite excellent strategic execution.

8.1.1 Research Question Findings

The study concentrated on two research questions:

RQ1) What key challenges are associated with the ambition of the business case company to commercialize its invention?
RQ2) How could a commercialization strategy be formulated to effectively address the key challenges identified in RQ1?

Regarding the first question, several challenges were found. A number of market features relating to industry mindsets were suggested to deserve particular attention from the perspective of commercializing companies. For example, restaurant managers tend to be operations-focused and risk-averse. Adding to the industry mindsets, it was recognized that the decision making of Swedish restaurant managers is guided by social influence from local cooperative networks. A commercialization strategy that fails to consider those is unlikely to be successful. In addition, a couple of notable company-related challenges were also identified in terms of credibility and opportunities for integrations and bundling. Startups are not smaller versions of large companies, but operate under fundamentally different conditions.

On the strategy side, several approaches with the potential to overcome the commercialization challenges were proposed. In short, these aimed to promote adoption among lead customers by emphasizing product benefits while minimizing the resistance caused by risk aversion and hesitance toward behavior change. Lean commercialization was found to be a useful

framework to allow iterative strategic improvements. No commercialization strategy planned from start to finish in advance is likely to be flawless, but iteration is even more important in the startup case where the objective is to search for a business model rather than to sustain one.

8.2 Recommendations for the Business Case Company

First of all, the company's claims of challenging conditions for commercialization seem credible. Many commercialization attempts fail, and there are several particularly difficult aspects to the circumstances around the business case. There is good reason to put significant effort into building a robust strategy. Even if that is done competently, there is a high risk of failure, as is the norm when radical innovations are launched to the market.

Precognitio is recommended to concentrate the strategic attention on the identified key commercialization challenges. The most promising way to overcome them is to focus the launch on lead customers so that those can later be leveraged to facilitate widespread adoption. The case company should target the proposed segment with a marketing mix designed to emphasize product benefits rather than technological features and to minimize risk and behavior change among the adopters. A key recommendation, however, is to see the proposed strategy as tentative. Following the lean commercialization logic, this is a credible starting point, but it is not the final roadmap. Instead, Precognitio ought to continuously evaluate the market response and pivot whenever it does not meet expectations.

While this study has concentrated on commercialization challenges, it does not suggest that there are no opportunities present. Precognitio is an early mover, and the startup identity can certainly be an asset in several ways. After all, there are many examples of industries that resisted change for a long time until a startup entered and transformed them fundamentally. Despite greater resources, the very rigidness of established corporations might obstruct them from achieving such radical innovation. Furthermore,

the market study indicated that the restaurant industry is going through a transformative time, with several macro trends putting pressure on the status quo.

8.3 Academic Contributions

The study addresses several gaps identified by scholars in commercialization theory. The underrepresentation of startup cases in literature has been highlighted by several. Both low-tech industries in general and the foodservice industry in particular have been proposed as areas where research has been lacking. This study has accommodated these suggestions, among others, to provide a valuable contribution to literature. By taking on an explorative approach, the results outline the dynamics in a unique business context and open multiple paths for further research.

In addition, the master's thesis has contributed with terminology to refine the academic language within the innovation field. For example, the “SOFA” industry classification has been suggested to replace the term “low-tech”, which is often inaccurate and misleading. “Local cooperative networks” has been introduced to characterize a certain form of informal partnerships between small companies. Finally, the “adjusted customer value” formula has been proposed as a useful framework for quantifying the value of customers in the early commercialization phase.

8.4 Generalization of Results and Conclusions

In principle, the master's thesis is particularly relevant for generalization within three areas:

1) Commercialization *by* startups.
2) Commercialization *of* radical high-technology innovations.
3) Commercialization *to* SOFA industries.

It is theorized that the findings and recommendations of the study are transferable to all three of these areas, although caution should be taken due to contextual differences. After all, it is unlikely that individual cases meet all these criteria. Even if some rare exceptions would, there are always

additional factors that could impact the validity of findings. Overall, generalizability was not an aim in the methodological design, but the study is still likely to be relevant for guidance in multiple areas, including those above.

8.5 Limitations

The scope of the study was narrow and included multiple assumptions. First, the focused attention on early commercialization omits both earlier and later phases of the innovation process. For this reason, the conclusions might direct too little attention to how activities in this phase relate to those in the other phases. Second, the findings in general are tightly linked to the unique business case context and cannot be transferred to other contexts without caution. Third, with regards to recommendations to the case company, the scope did not allow a review of any other markets than the restaurant industry or an in-depth investigation of cooperative commercialization strategies. Naturally, there is a chance that both of these areas provide fruitful business opportunities that were left unexplored in this master's thesis.

The role of the author as a “researcher/entrepreneur” due to his involvement in the business case company in several ways provided favorable conditions for the study. An industry network could be leveraged and nuanced participant observations could be achieved based on previous knowledge. At the same time, the dual role could have implications for the perceived impartiality of the researcher. As described in 2.3.4 Objectiveness, a number of measures were taken to avoid this. Still, the applicability of certain conclusions, such as those that relate to the specific company, might be perceived as limited. Overall, however, the market-oriented scope of the study is suggested to reduce the implications of any such concerns.

With regards to assumptions, a fundamental one was that the sales forecasting technology was functional and had the potential to create value for the prospective market, but this is not seen as a limitation to the study. Any company investigating commercialization strategies will find itself in a similar position, with the *unconfirmed belief* that there is value to capture.

These are the conditions under which commercialization strategies are formed. It would have been impossible to credibly survey the pre-launch attitudes of the market if the product had already been adopted and proven.

8.6 Suggestions for Further Research

The explorative approach of the study was designed to outline the main features of a domain in which only limited research had previously been conducted. A central purpose of this was to provide direction to future scholars. Due to the results indicating that standard commercialization theories were partly inappropriate in this context, there is an urgency to research the area further. There is a need for more explorative studies since this one was only able to touch upon a narrow part of the field. Further on, research should also aim to confirm, quantify, and generalize the results from this and other explorative studies.

If the methodology of this study was to be replicated in future research, there are opportunities for improving it further. Participant observation through entrepreneurial engagement with a company enabled excellent opportunities for data collection, but the focus on a single business case had implications for the generalizability of results. If a future study could be based on similar participation in multiple companies, it is believed that such problems would be reduced to a great degree. Another measure to improve the methodology could be to observe a business case company throughout the implementation of a commercialization strategy as well.

It is suggested that SOFA industries should be of particular interest for further investigation. There is evidence that the “low-tech” term that is often used in innovation theory can be misleading whereas SOFA more accurately pinpoints the features that set most of those cases apart. A first step to continue the research in this field would be to map the dynamics of other SOFA industries concerning innovation and technology adoption, to conclude if they are similar to those in the Swedish restaurant industry, as has been theorized in this report.

With regards to the restaurant industry, the cooperative local networks deserve further attention. Their significance was repeatedly highlighted in interviews and is likely to extend beyond the domain of technology adoption.

Similarly, the concept of adjusted customer value could be applicable and relevant to any context where product traction is involved. This is not restricted to the startup context or radical innovations. While it was introduced as part of a qualitative argument in this master's thesis, it is quantifiable in nature. Future research could also consider the utility of the concept in corporate finance or startup company valuation.

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Appendices

Appendix I. Template for exploratory interviews about the restaurant industry

Personal aspects

- What role does the interviewee have?
- What background does the interview have?
- What motivates the interviewee professionally?

Venue or organization

- What type of organization does the interviewee represent? If it's a restaurant, which kind?
- What size does the venue have? (Number of seats, revenue for example)
- Where is the venue located?
- What kind of customers does the venue cater to?
- For how long has the venue been in business?
- What products and services does the venue offer?

Pain points

- What problems keeps the manager awake at night?
- What do they think influences the success of their business?

Staffing and Scheduling

- How does the scheduling process work?
- Who does the scheduling?
- How far ahead is scheduling made?
- Are adjustments made after the schedule is set?
- Are there issues with over- or understaffing?
- How confidently is the manager in predicting future sales and workload?

- What is the minimum/maximum amount of staff working at the same time? In different functions?

Food waste

- Are they experiencing issues with food waste? How much?
- What do they believe are the causes?

Sales trend

- Are sales volatile over time? Does it impact workload and optimal capacity?
- What factors do they think cause variations in sales?

Current systems and technology procurement

- What softwares do they currently use? (POS, scheduling, inventory planning, business intelligence)
- What do they think about their current systems?
- What do they pay for their current systems?
- Who decides what systems to get?
- What relations do they have with the software providers?
- Why do they choose a certain software provider?

Interest in product

- What do they think about the potential of digitalization?
- What kind of data do they have about their sales and operations?
- What features and characteristics would be important for them in a sales forecasting software?
- If a sales forecasting software worked and met those criteria, would they be willing to pay for it? What price?

Next steps

- Is there anything else you want to comment on this topic?
- Do you know anyone else that you think I should talk to?
- I will return to you with any takeaways or quotes, so that you can approve or comment on them ahead of publication