Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Economics and Management
Dept. of Industrial Economics and Technology Management

Sindre Folkvord & Petter Norsted Kildebo

Taming the Black Swan:

The effects of and responses to the Covid-19 pandemic

Master's thesis in Entrepreneurship at NTNU School of Entrepreneurship
Supervisor: Roger Sørheim
June 2022

NTNU
Norwegian University of Science and Technology

Sindre Folkvord & Petter Norsted Kildebo

Taming the Black Swan:

The effects of and responses to the Covid-19 pandemic

Master's thesis in Entrepreneurship at NTNU School of Entrepreneurship
Supervisor: Roger Sørheim
June 2022

Norwegian University of Science and Technology
Faculty of Economics and Management
Dept. of Industrial Economics and Technology Management

NTNU
Norwegian University of
Science and Technology

Sammendrag

Covid-19 pandemien og restriksjonene den førte med seg gjorde at verden forandret seg totalt. Fra å være åpen og internasjonalisert, ble verden forvandlet til lukket og innesperret. Dette førte til en sjokkbølge som tvang bedrifter og hele industrier til å håndtere en enorm usikkerhet uten forvarsel. I denne masteroppgaven har vi studert effektene av og responsene til pandemien, gjennom bruk av entreprenørskaps- og ledelsesteori, som entreprenøriell orientering, kunnskapsbaserte ressurser, effektuering, kausalitet og usikkerhet. Krisesituasjonen skapte en helt ny kontekst for å gjennomføre forskning som tillot oss å bruke litteraturen i en annen kontekst enn "business as usual" og mindre kriser.

Oppgaven består av en omslagsoppgave og to forskningsartikler. Omslaget knytter sammen de to artiklene, og er skrevet på en mer komplementær og detaljert måte. Den første forskningsartikkelen, Artikkel 1, er en kvantitativ studie som bidrar til eksisterende litteratur ved å frembringe ny kunnskap om hvilken effekt ulike strategier har hatt for å håndtere usikkerhet. Artikkel 2 er en kvalitativ studie som bidrar til eksisterende litteraturen ved å utforske effekten av underpunktene til entreprenøriell orientering og effektuering.

Gjennom denne oppgaven har vi sett at ingen bedrifter på individuelt nivå har opplevd krisen likt, noe som har ført til at responsen derfor har vært ulik. Basert på den kvantitative analysen, Artikkel 1, som inneholder data fra 442 ulike selskaper innhentet tidlig i pandemien, fant vi flere signifikante sammenhenger. Det kom frem at hvordan en bedrift valgte å reagere på krisen ble påvirket av deres marked og industri, deres innovative tankesett og opplevd grad av usikkerhet. Denne forskningsartikkelen fant også en korrelasjon mellom bedrifters prestasjon og om de hadde håndtert pandemien proaktivt eller reaktivt. Artikkel 2 er en forlengelse av funnene fra Artikkel 1 og ser nærmere på hvorfor bedriftene valgte å respondere nettopp sånn de gjorde, samt undersøke hvilke av reaksjonene som har blitt vedvarende endringer for selskapene. I forskningsartikkelen ble det funnet en relasjon mellom selskapets entreprenørielle orientering, deres marked, fleksibilitet i resurser, opplevde grad av usikkerhet, deres krise-forberedelser opp mot deres respons og prestasjon.

Forskningsartiklene, sett under ett, bidrar med dette til vårt mål om å undersøke hvordan Koronapandemien ha innvirket norske selskaper, hvordan de har respondert og hvorfor de har gjort som de har gjort. De bidrar også til teorien med å se på eksisterende litteratur, entreprenørskap og ledelse, i en ny kontekst - koronapandemien.

Nøkkelord: Usikkerhet, Krise, Entreprenøriell orientering, Entreprenørielt tankesett, Kunnskapsbaserte ressurser, Effektuering, Kausalitet, Beslutningslogikk

Abstract

The lockdown of countries due to the Covid-19 pandemic transformed the world from being open and internationalized to closed and confined. This created a shock wave that forced both industries and individual companies to handle the emerging uncertainty almost instantly. In this Master's thesis we have studied the effects of and the response to the pandemic through the use of entrepreneurial and managerial literature, such as entrepreneurial mindset and orientation, knowledge based-resources, effectuation, causation and uncertainty. The crisis situation created a completely new context for conducting research, enabling us to use the literature in a different context than "business as usual" and smaller crises.

The thesis consists of a cover essay and two research papers. The cover connects the two papers, and is written in a more complementary and detailed manner. The first research paper, Paper 1, is a quantitative study which contributes to the literature with new knowledge related to what effects different strategies had on handling uncertainty. The second research paper, Paper 2, is a qualitative study which contributes to the literature by examining the effect of individual sub-factors of entrepreneurial orientation and effectuation.

Through the study we have found that no individual companies experienced the crisis identically, and the responses of one company has been different from the next. Based on the quantitative analysis of responses from 442 different companies in the early stages of the pandemic, Paper 1 discovered numerous significant relationships. The analysis revealed that organizations' aspirations for their future business environment, innovative mindset, and experienced level of uncertainty all had an impact on how they chose to respond to the pandemic. Furthermore, the paper demonstrated how these responses, whether proactive or reactive, were related to business performance during the crisis. Paper 2 expanded on these findings with a qualitative analysis, delving deeper into why individual companies chose to respond the way they did, and what actions resulted in long-term changes. The paper discovered relationships between the organizations' entrepreneurial orientation, their business environment, the flexibility of their resources, their experienced degree of uncertainty, their crisis preparedness, and their responses and performances during the pandemic.

The findings of the two studies, when combined, contribute to our goal of researching and understanding how the Covid-19 pandemic affected Norwegian companies, how they responded to the crisis, and why they did so. Further, it contributes to the theory by viewing the existing theory on entrepreneurship and management in the context of the new environment of the Covid-19 pandemic.

Keywords: Uncertainty, Ambiguity, Crisis, Entrepreneurial Orientation, Entrepreneurial mindset, Knowledge-Based Resources, Effectuation, Causation, Decision-making logics

Preface

This Master's thesis concludes our education as engineers at NTNU, more specifically NTNUs School of Entrepreneurship. The process has been both educational and rewarding, but also long and time consuming. We have seen the usefulness of the knowledge we have acquired over the years as students, in addition to a lot of new knowledge and many new experiences on the way to the finished result. The process of writing the papers and the thesis have been incredibly challenging, but it is an experience we would never have been without.

Finally, we would like to thank our supervisor Roger Sørheim from the Norwegian University of Science and Technology, for both guiding and challenging us through the work with this thesis. In addition we would like to thank our friends, families and fellow students for both cheering us on and helping us when needed.

The Authors,

Sindre Folkvord

Petter Norsted Kildebo

Trondheim, June 2022

Table of content:

List of tables

List of figures

1 Cover essay

1.1 Introduction

On 12 of March 2020 the Norwegian prime minister Erna Solberg announced that severe and unprecedented restrictions were introduced to the Norwegian society due to the Sars-CoV-2 virus. People were ordered to stay at home, limit their contact and keep at least two meters distance from each other. Businesses were forced to shut down or adapt their operations, and the country went into crisis mode. The day marked a shift in the Norwegian business environment with nothing being as it was before. As an unprecedented crisis impacting the lives of all Norwegians as well as the rest of the world, the Covid-19-pandemic created a completely new business environment characterized by great uncertainty. Sørheim et al. (2021) described the Covid-19-pandemic as an acute and unexpected crisis with significant uncertainty in national and international markets, leaving few companies unaffected. Never before in modern history has the economy and people's lives faced such instability, with the Covid-19 pandemic being dubbed as a "black swan"-crisis (Thorgren & Williams, 2020).

This thesis looks at the effects of and responses to the Covid-19 pandemic of Norwegian companies. Our approach has been to use the existing entrepreneurial and managerial literature as a framework and context to examine and understand the crisis. As students at NTNU School of Entrepreneurship we have been exposed to loads of literature related to this topic with practical examples from decision-making logics and strategic management, however most of these have been in the context of a "normal" environment. We therefore found it interesting to look at this through a period where many changes were made quickly, and where the degree of uncertainty was higher than in a state of "business as usual".

Scholars we have looked at have found that in conditions of uncertainty and ambiguity, such as crises, having an entrepreneurial mindset can be linked to enhanced business performance (Kraus et al., 2012; Rauch et al., 2009). Such a mindset can be found through a company's use of knowledge-based resources and entrepreneurial orientation (EO). Making decisions under uncertainty is also one of the fundamentals of the entrepreneurial process, and it applies to both SMEs and established businesses (Packard et al., 2017). Previous research has also uncovered a relationship between a company's decision-making logic (effectuation or causation) and their strategic orientation (EO) in times of crisis and uncertainty (Mthanti & Urban, 2014; Palmié et al., 2019; Laskovaia et al., 2019). With EO being associated with increased firm performance when employing a causal logic, and negative performance when using an effectual logic. Laskovaia et al. (2019) and Palmié et al. (2019) emphasize the need to investigate the function of EO sub-dimensions, effectuation and causation, in dealing with severe crises and have therefore become our starting point for this thesis.

In order to understand the effect of and the responses of the Covid-19 pandemic, a quantitative- and a qualitative study has been completed. The studies have been presented in two individual papers that have been developed consecutively.

The papers have been used to answer our overall research question: "*What were the effects of and the responses to the Covid-19 pandemic?".* We found several significant relationships between firm specific factors and their external business environment, how they responded to and experienced the pandemic. Through our research we have found that no individual companies experienced the crisis identically, and that the responses of one company has been different from the next. This applies also for the companies' experiences of the Covid-19 pandemic, which varied greatly depending on the business environment the companies operated in, their mindset and resources, and their expectations.

Paper 1 showed several significant relationships based on the quantitative analysis of responses from 442 different companies in the early phases of the pandemic. The analysis showed that the expectations companies had for their future business environment, their innovative mindset and their experienced degree of uncertainty were all influential on how the companies chose to respond to the pandemic. Further, the paper showed how these responses, either proactive or reactive, were related to the performance of the businesses during the crisis. Paper 2 expanded on these findings through a qualitative study, diving deeper into why individual companies chose to respond the way they did, and what changes that became lasting. The paper found relationships between the entrepreneurial orientation of the companies, their business environment, the flexibility of their resources, their experienced degree of uncertainty, their preparations for the crisis, and their responses and performances during the pandemic.

1.1.1 Structure of the thesis

This Master's thesis consists of a cover essay and two papers, where the cover essay is written in a complementary style that requires little background knowledge. It will provide relevant knowledge in its entirety and require little or no background information. The papers, on the other hand, are written more concisely and require more background knowledge from the reader. The papers are based on knowledge that the reader accumulates through the cover, yet each paper is written in such a way that they can be read separately, without having read the cover or the other paper.

The cover essay is structured in 5 chapters, where this chapter (Chapter 1) presents a general introduction to the thesis, its purpose, targets and contribution. Included in the introduction is also a short introduction to the papers. Chapter 2 presents the method used in our papers and consists of our approach with its adherent conceptual model, the target development and our choice of analysis methods. In Chapter 3 a review of the relevant literature is presented, which provides a comprehensive understanding of the literature used in the papers and therefore sets the foundation for our discussions. This discussion is given in the following chapter (Chapter 4) and includes a review of the material before we present a collaborative discussion of parallels, differences, and complementarity of the two papers. Finally, in chapter 5 we propose a conclusion and bring suggestions for further research based on the knowledge gained through this thesis. In addition to this cover essay the papers are attached in their entirety and are thus included as part of this thesis.

1.1.2 Target and Research Questions

With the Covid-19-pandemic being one of the most severe crises the world has experienced in recent times, the current business environment looks quite different from what it was just a few years ago. It is our belief that the world will experience more severe crises in the years to come, and we therefore have had an interest in examining how companies have handled this crisis, gaining knowledge that can be helpful in future crises or situations of uncertainty. The purpose of this master thesis has therefore been to (1) get an understanding of how companies deal with decision-making logics in crisis-situations and (2) understand how entrepreneurial mindset and the business environment play their part in companies' responses to uncertainty. Furthermore, we divided our main target into different research questions (RQ), with adherent hypotheses for the qualitative study done in Paper 1. These RQs are developed with the literature presented in section 1.3.1 as a starting point. Presented below are the research questions, represented in their respective paper:

Paper 1:

- **RQ 1**: "*How did companies respond to the Covid-19-pandemic?*"
- **RQ 2:** "*How were their decisions affected by their mindset and the environment they operated in?*"
- **RQ 3:** "*How were the performance of the companies affected by their response to the pandemic?*"

Paper 2:

- **RQ1:** "*How did the Covid-19 pandemic impact Norwegian SMEs?*"
- **RQ2:** "*How did internal and external factors influence the response of the companies during the crisis?*"
- **RQ3:** "*How did the responses to the crisis lead to lasting changes for the companies after the pandemic?*"

1.1.3 Contribution

This Master's thesis contributes to management and entrepreneurship research by investigating and providing insights into how Norwegian businesses were affected by and responded to the Covid-19 pandemic. We have presented a broad picture of how a large number of organizations were affected and responded, as well as a deeper insight into the stories of individual firms, using two separate research approaches. This has enabled us to provide a unique overview and understanding of the recent pandemic. As we are in the process of putting the crisis behind us, at least in Norway, few other scholars have yet investigated the same subjects as us. Our findings from the two studies provide leaders and researchers with insight that can be used to create strategies that enable companies to be better prepared for the next crisis, then they were for this.

1.1.4 Introduction of research papers

Following are an introduction to the individual papers. This has been added to provide a basic understanding of the papers and the work that has been conducted. The following

chapters *1.2 Method* and *1.4 Discussion and Implications* provide more comprehensive details on development and findings.

Paper 1

The goal of Paper 1 was to examine and understand how businesses responded to the Covid-19 pandemic in the early stages of the crisis, and how these responses were influenced by various factors. Previous research has discovered links between having an innovative mindset, having flexible resources, and the response patterns of companies in previous crises. As Norwegian companies faced varying degrees of uncertainty and differing future expectations, their responses varied. To answer these questions, a data set containing responses from 442 Norwegian businesses was used. These responses were gathered in two rounds: one early in the pandemic's early stages, and one about a year later. Seven hypotheses and sub-hypotheses were developed to test relationships between variables found in the data sets. These have further been tested using PLS-SEM analysis.

Paper 2

Paper 2 digs deeper into the findings of Paper 1, as is a qualitative study of how innovative Norwegian SMEs were affected by the Covid-19 pandemic, as well as how their mindset and resources influenced their responses. Previous research on crisis response influenced the scope of the research, as the pandemic created a completely new business environment never seen before. As a result, it was necessary to investigate these findings in light of the most recent crisis. The data in the paper was gathered through six in-depth interviews with company leaders in order to gain a better understanding of their perceptions and experiences with the Covid-19 pandemic. The paper employs within-case and cross-case analysis to answer the research questions.

1.2 Method

This chapter describes the methods used to collect, analyze and target the data. It gives a deeper understanding and several arguments for the choices we have taken through our work. The method is meant as a composition of what has been done and one will therefore find elements of this in the papers.

1.2.1 Approach

Through the work with our project thesis we knew that a dataset was conducted by our faculty, focusing on how companies have handled the Covid-19 pandemic. Making it the starting point for Paper 1 and this thesis. The hypotheses used for this paper were developed deductively as we did several iterations with more simple analyzes and combinations of the questions from the adherent survey. When the hypotheses were settled, we chose to use a PLS-SEM analysis. The reason for this is that it is well suited for complex cause-effect models with multiple variables (Hair et al., 2017). A more complementary review of this analysis method is presented in section 1.2.4.

After this quantitative analysis was completed, we were left with several unanswered questions and a desire to get an even deeper understanding of how businesses handled the uncertainties of the Covid-19 pandemic. We therefore decided to conduct interviews for a qualitative study, to supplement the data and test some of our findings further. This stemmed from a combination of us experiencing deficiencies with the existing dataset, and us not being able to structure the survey the way we wanted it. For the structuring of our survey we used Laskovaia et al. (2019) as a starting point for measuring companies' sub-dimensions of EO and effectuation. Understanding how the companies acted on a daily basis before the pandemic occurred. Followed by a set of questions focusing on how they perceived and responded to the Covid-19 pandemic, as well as looking into market dynamics and their overall performance. To analyze this dataset we chose to do a within- and cross-case analysis, getting an insight into different effects and responses.

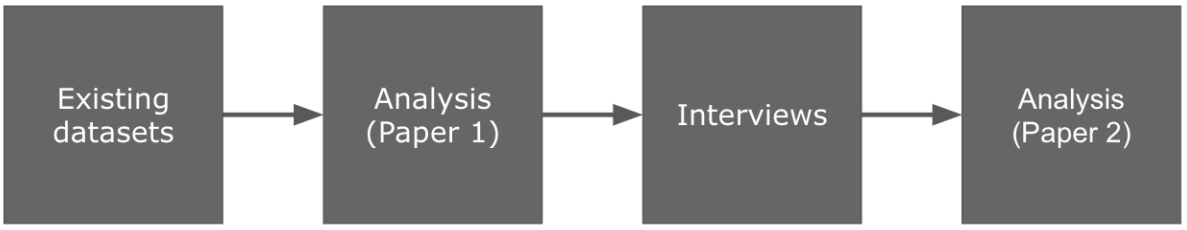


Figure 2.1: Overview of our four step approach

Based on our approach and our findings through working with the papers we have developed a compounded conceptual model (Figure 2.2), visualizing the most central topics that have been looked at through this study. The first conceptual model (shown as the left part of Figure 2.2) represents our quantitative study, Paper 1, and it shows a connection from all the independent variables to the dependent variables, containing *the effects of and responses to the pandemic*. Outside this the most central variable in this model is the *experienced degree of uncertainty,* as we have seen both *entrepreneurial mindset* and *knowledge-based resources* influence it to a greater degree. In this paper

we have also had the opportunity to look at the companies' experienced performance through the pandemic, based on the effects of their responses. Hence, the connection "returns" back into the model. For the second model (shown as the right part of Figure 2.2) we see a somewhat more narrowed model, looking deeper into entrepreneurial mindset and knowledge-based resources through the topics of entrepreneurial orientation and effectuation. External factors like business environment is also implemented in this model, which gave us the opportunity to see how external factors like restriction in the various industries impacted how the companies' responded. Lastly, the model contains a substantial amount of connections between the various variables. The reason for this is that through developing our own questionnaire we were able to a greater extent determine questions and topics that we knew had a close relation.

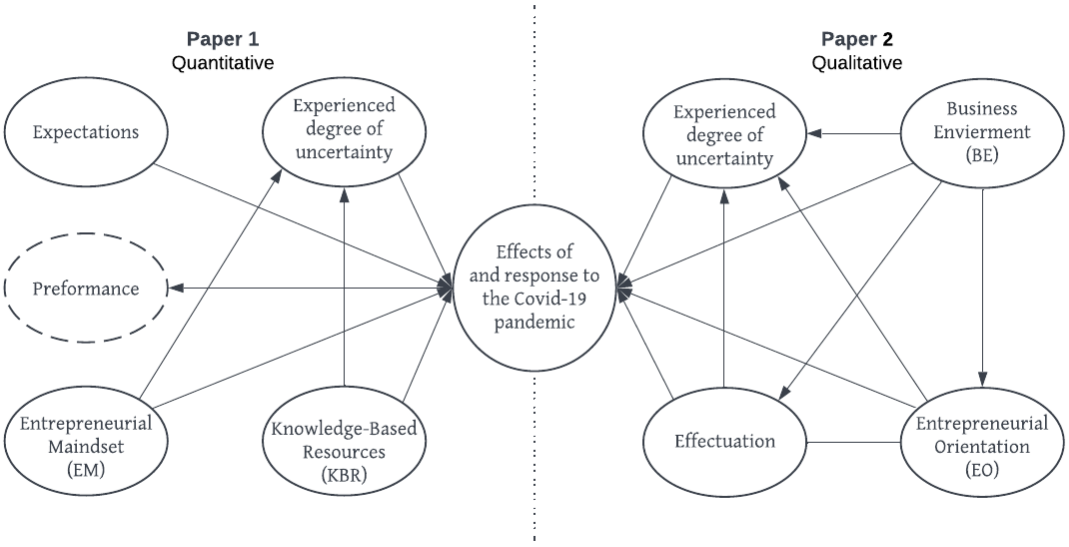


Figure 2.2: Conceptual model for Paper 1 and Paper 2

1.2.2 Target development

As shown in Chapter *2.1 Conceptual Models*, there have been different targets for the two papers. However, they both contribute to the understanding of the *effects of and response to the Covid-19 pandemic*. Two separate target developments, one for each paper, are therefore presented below.

Target development Paper 1

In Paper 1 we presented a measurement model (see figure 4.3 in Paper 1) which was built based on our seven hypotheses and sub-hypotheses. These hypotheses were developed through the use of the theoretical framework based on our literature review, using our pre-understanding of the subjects to define areas of interest. The model takes into account: *Innovative mindset, resources, uncertainty, proactiveness, reactiveness, expectations* and *performance.* The questionnaires used to develop these targets can be found in the appendix. As the survey was designed for another study, we needed to use an exploratory approach to find questions that were suitable for our targets. In the following segments codes for different survey-questions have been used. These are

either started by R1 or R2, indicating which round of survey they are from, and followed by a capital letter, a number and another letter. The capital letter indicates which category the questions are from, and the number and small letter indicates which sub-questions have been used. Each of the questions asked the respondents to answer a number between 1 and 5 based on their experiences, with 1 being "Totally disagree" and 5 being "Totally agree".

Innovative mindset has in this study been defined as; the inclination and ability to use innovation as a strategy to beat the competition, capture new market shares and handle uncertainty. To identify the *innovative mindset* we used the question R1F1a through to R1F1d for both the "new" and "established" companies. As the data for the survey were pre-collected we used questions that were close to or similar to our understanding of the term to create the variables.

Resources has in this study been defined as; the ability of companies to utilize flexible resources to create flexible strategic options that enables them to respond to rapidly changing environments. To determine the use of *resources* among the respondents, questions R1F1e through R1F1h were used to create the variable.

Uncertainty has been defined as; subjective perception of uncertainty experienced by a leader or leadership group in a certain situation. To create the variable for *uncertainty* questions R1C1a to R1C1c were used. To measure proactiveness and reactiveness, we needed to separate the "established" and "new" companies, as there was a difference in the surveys for the two categories.

Proactiveness has been defined as: a firm's ability to be receptive to market signals and aware of the needs of their customers, and utilizing this to respond to changes rapidly. To measure proactiveness and reactiveness, we also needed to separate the "established" and "new" companies, as there was a difference in the surveys for the two categories. Measuring "*proactiveness*" we used questions R1D1a through R1D1i for "established" companies and R1D1f through R1D1h for "new" companies.

Reactiveness has been defined as: the firm's tendency to take passive actions characterized by risk-averseness and defensive strategies, and is the opposite of proactiveness. To create the variable for reactiveness we used questions R1D1g, R1D1j and R1D1k for "established" companies, while R1D1a through R1D1e were used for "new". For the latter category, reactiveness was in some analyzes split into two categories: reactiveness and reducing prices, for more reliable results.

Expectations in this study have been defined as: the subjective expectations of the future business environment of leaders and leader groups. To create the variable, the questions R1B1a through R1B1f were used for both categories.

Lastly, *Performance* has been defined as: the assessment of business performance based on subjective perceptions of leaders and leader groups. The *performance* of the companies were measured using questions R2B1a through R2B1c.

As the relevant questions from the four different surveys were grouped into the different variables listed above, these were further used to test the hypotheses through PLS-SEM analysis.

Target development Paper 2

Having conducted the study for Paper 1 prior to starting working on Paper 2, we used the results from the first study as a starting point for the targets of the second paper.

For this paper we developed the survey in such a way that we could understand how the interviewees perceived their company's operations *pre-pandemic,* and *during the pandemic.* The reason for this was so we could create a baseline for all the companies, giving us the opportunity to generate a basic understanding of how the companies usually worked in "normal" times, and to see how they changed during and after the pandemic. The interviews were conducted semi-structured with open-ended questions and follow-up questions for clarity. For questions where we wanted quantifiable data, we used a seven point Likert-scale. Compared to the five-point scale used in the questionnaires used in Paper 1, this facilitated more nuanced answers. As it takes into account that extreme scores are often not selected or only used for a very strong opinion (Carey & Warner, 2004). The entire survey can be found in the appendix.

To determine the company's pre-pandemic baseline we used Laskovaia et al. (2019) as a starting point as they investigated the shaping role of EO on causal and effectual decision-making logics. From there we decided to look specifically on EO and effectuation. The way we measured a company's EO was through the use of its sub-dimensions, where we studied if the company used to work proactively or reactively, how risk taking they were, their innovativeness, as well as their competitive aggressiveness. For effectuation we used the sub-dimensions to understand how they used precommitments, both in case of risk taking and innovating new products/services, how they looked at affordable loss, if their company resources were perceived as flexible and lastly how experimental they were.

Investigating how the companies operated during the pandemic, we chose to look into their *perception of the situation, responses, business environment* and *performance.* To determine a company's perception of the situation Covid-19 pandemic we asked them about their experienced degree of uncertainty, their perception of the future development of their business environment and consequences the pandemic had for them. For their response we were curious to know how they implemented their "new" business- and product strategies, as well as looking at their company resources and which of their changes have become lasting.

We investigated the business environment of the companies by looking further into how the demand for their products/services were affected by the pandemic, how they were given more or fewer opportunities, and generally how they had experienced the crisis.

Lastly we wanted to understand how the company's performance has been through the pandemic. Which was done by looking at their perceived performance and growth, through asking whether their result had been better than expected and whether their growth had been better or worse than expected. As a supplementary question we also asked whether the probability for their survival and further growth had been strengthened by the pandemic.

1.2.3 Maintaining validity in the datasets

When conducting a study it is natural to question the validity of the results. Validity concerns to what extent the study provides valid responses to the chosen research questions. This means to what extent the data of the study provides a good/relevant representation of the phenomenon that is to be examined. Validity is usually divided into three different categories: term, internal and external validity (Johannesen et al., 2011).

Term validity is whether the data are valid representations of the general phenomena that is examined, which concerns the coherence between the phenomena and the measure (Johannesen et al., 2011). Term validity in this study is secured through the use of terms and measures that have been used in previous studies as far as this has been possible. The questions used in the questionnaire used in Paper 1 were outside our control, but the questions used in the interviews in Paper 2 were designed using previous studies as inspiration and guidance.

Internal validity is concerned with whether or not the study provides a solid enough foundation to substantiate causal relationships. If the study has a high level of internal validity, it provides a solid platform for drawing conclusions about the impacts of the data. In other words, a study with high internal validity will be able to see past competing explanations for the effects of independent variables on dependent variables (Johannesen et al., 2011). In this study's Paper 1, this signifies that the independent variables (ex. innovative mindset and flexible resources) are accountable for the impact of the dependent variable (ex. uncertainty and response), or if there are other variables that have a greater influence. In Paper 2, which is a qualitative study, this has been handled by securing that the research population fit the criteria of our research prior to the interviews, and making sure the data have been collected and interpreted correctly.

External validity is concerned with whether the findings of a study can be generalized and/or translated to other situations other than the one under consideration. This implies that the conclusions are applicable in different contexts and are practical. Essentially, this is about three factors: whether the population differs from those to whom we want to generalize the results, whether the place of the research stands out, and last, whether the time of the research stands out (Johannesen et al., 2011, pp. 367-368). By focusing too much on internal validity the external validity risks to be reduced, as the inclusion of multiple variables to secure strong internal validity may limit the generalizability of the results.

Further descriptions of the validity of the used methods, together with the reliability of the results will be discussed further in section 1.2.4 about analysis methods.

1.2.4 Analysis selection

In this chapter we present the analysis chosen for the papers. For the quantitative study, Paper 1, we used PLS-SEM to analyze the dataset and for the qualitative, Paper 2, we used within- and cross-case analysis. The analysis methods are presented briefly in their respective papers, however a more comprehensive version of them is presented below.

Analysis selection Paper 1

PLS-SEM, which stands for Partial Least Squares Structural Equation Modeling, is a second-generation statistical analysis model. This analytical model differs from first-generation models such as factor and/or regression analysis. Traditional analysis is used to estimate models, such as the connection between one or more independent variables and one or more dependent variables. These models are used either to confirm previously developed theories and concepts, or to investigate new contexts in which there are no existing theories and concepts. This is done, for example, through a regression analysis where one tests how pre-selected independent variables affect the variation in a dependent variable. These analyzes are performed by making simple calculations of each variable separately (Hair et al., 2017; Johannesen et al., 2011; Venturini & Mehmetoglu, 2019).

Because traditional statistical procedures have flaws, more and more research is employing second-generation methodologies. These strategies allow for the inclusion of unseen variables that are indirectly measured by measurement variables, as well as the explanation of measurement errors in the observed variables. The second-generation approaches are known as structural equation modeling (SEM), and there are two types: PLS-SEM, which was employed in this work, and CB-SEM (covariance-based). PLS-SEM is mostly utilized for exploratory research, whereas CB-SEM is used to validate or refute current hypotheses (Hair et al., 2017).

The fundamental advantage of SEM analyses is that they allow for the simultaneous assessment of all variables and parameters in a model. This sets them apart from traditional approaches, which can only employ variables of one unit (the average value). This means that SEM may estimate the associations between several single-unit independent and dependent variables at the same time (Venturini & Mehmetoglu, 2019). This means that PLS-SEM delivers a more accurate picture of the study's data since it does not rely on data creation processes and causal interpretations (Sanchez, 2013). Because PLS-SEM allows for simultaneous estimation of all variables, it is useful when studying complicated models with multiple variables and indicators (Venturini & Mehmetoglu, 2019).

SmartPLS (Ringle et al., 2015), a statistical analysis program, was utilized to conduct the analysis. Different structural models were created to test the various hypotheses, with independent factors grouped together as latent variables and then related to other latent variables. This was done to simplify the models and make determining the links between latent variables easier.

Analysis selection Paper 2

The analyses selected for Paper 2 were within- and cross-case analysis. The reason for this was to firstly gain knowledge and analyze each of them from “within”, before we analyzed them in the light of- and against each other. Although there is no conventional method for conducting a within-case study, Eisenhardt (1989) recommends that the researchers become well acquainted with each specific case because this is the most important aspect of such a study. This is especially important to us since we wanted to dig deeper into the "narrative" the respondent presented about their experiences during the Covid-19 pandemic. We chose to show the within-case analysis by first presenting a baseline table in which we graded the firms based on how their EO and effectuation were

prior to the Covid-19 pandemic. Secondly we gave a short explanation of what they do, in line with Eisenhardt (1989) recommendations, followed by how they dealt with uncertainty under the pandemic, how they responded to it and what have become lasting changes for the company.

As previously stated, the second analysis we used was a cross-case study. This allowed us to compare the data in a methodical manner. The cross-case study is organized around topics that are based on the theoretical framework described in Paper 2. Topics are the primary aspects in the data produced before or throughout the investigation in a quantitative analysis (Ayres et al., 2003). Miles and Huberman (1994) propose a three-step procedure that we followed, which included data reduction, data visualization, and conclusion drawing and verification. The first phase, data reduction, was achieved by identifying subjects for future investigation. We divided the collection into distinct tables depending on the various themes for easy comparison before we presented our finds. Miles and Huberman (1994) state that the data must be checked for plausibility, sturdiness, and confirmability during the verification process. This was accomplished by cross-referencing the facts and the drawn conclusion.

1.2.5 Limitations and reflections

The data analysis conducted in this master's thesis have several limitations and potential shortcomings due to methodical issues as well as data related problems. Throughout the work with the thesis we have had to make several decisions regarding data collection, methodology and analysis methods. With our limited experience with conducting academic research studies, we have not been positioned to be fully certain that our choices have been ideal at all times. As the data we used in the study for Paper 1 was previously collected for another research purpose we needed to tailor our study to use this data. This may have led to inaccuracies that have affected our results and findings. On the other hand, the fact that this data was collected early on in the crisis, long before our study was initiated, has contributed to our results being more relevant in terms of examining and understanding crisis-response. Combined with the qualitative study conducted at the "end" of the pandemic, this has given the thesis a unique position to understand the responses to and effects of the Covid-19 pandemic.

Our choice of quantitative analysis method has affected our findings, as different methods are suited for different types of data examination. As an example the use of data clustering could have been used to find groups of companies with similar response patterns, but PLS-SEM was chosen in favor of this method. The same might have been the case for our qualitative analysis, as other methods than within-case and cross-case analyses might have provided similar quality of findings. With larger data sets with interviewees from a larger population of companies our findings would have been more complete and generalizable. As we only were able to collect data on six companies in the qualitative study due to lack of time and resources, we recognize the fact that our findings represent a glimpse into the stories of the case-companies, rather than a complete overview of the field of research. This was not the objective of this thesis either, and we are therefore satisfied with our approach. The combination of our two research methods have in total created an overview of the subjects that we believe are unique at this moment of time, and that we are proud of having created.

1.3 Literature review

This chapter presents a holistic overview of the literature presented in the papers. The review covers the topics *uncertainty, knowledge-based resources (KBR) and entrepreneurial orientation (EO).* The goal of the review is to give the reader an understanding of the connection between the topics and to present what the literature suggests concerning our RQs. Parts of the literature originates from a literature study we conducted in our project thesis in the course TIØ4530.

1.3.1 Uncertainty

Defining uncertainty and understanding how companies experience it is essential to how they handle it. Cambridge English Dictionary's (CED) defines uncertainty in business-english terminology as the feeling of not being sure what will happen in the future (Cambridge Dictionary, n.d.) (Kildebo & Folkvord, 2021). In this thesis we have looked further into entrepreneurial uncertainty, experienced degree of uncertainty and the uncertainty followed by the Covid-19 pandemic. Giving a theoretical framework to better understand and explain how a business experiences an uncertain situation, like this pandemic.

Uncertainty in an Entrepreneurial manner

Uncertainty is produced by a lack of knowledge, according to Bogevik and Federl (2018), however Packard et al. (2017) argue that most scholars agree that uncertainty is ubiquitous in the entrepreneurial experience. Sarasvathy (2003) adds a new perspective, arguing that uncertainty research focuses on how entrepreneurs consider acceptable loss, potential alliances, various contingencies, and other skills and resources (Kildebo & Folkvord, 2021). Furthermore, according to Shane (2003), uncertainty is described by a mix of Packard et al. (2017) and Bogevik and Federl (2018), and that entrepreneurs face uncertainties regarding their product, market, and competition. According to Sarasvathy (2003), uncertainty might exist in the form of expected outcomes, ideal next moves, and the value of one detail over another (Kildebo & Folkvord, 2021).

The research on entrepreneurial cognition, particularly the study on effectuation and causation, provides the foundation for common perspectives on entrepreneurial uncertainty (Sarasvathy, 2003; Sarasvathy & Dew, 2005). These ideas, according to Sarasvathy (2003), are strongly based on concepts of control and prediction. Entrepreneurs do not need to foretell the future if they can control it, according to the rationale underpinning an effective model of entrepreneurial potential (Bogevik & Federl, 2018) (Kildebo & Folkvord, 2021).

Experienced degree of Uncertainty

Understanding and explaining to what extent your company experiences uncertainty can be difficult, however it can be critical in understanding what response one should have. To get an overview of different definitions we look at Packard et al. (2017) compiled table of scholars who offered several various types of uncertainty typologies (See table 3.1). It is evident to see that most scholars agree that lower degree of uncertainty is characterized as risk, which can be interpreted as the likelihood of something happening. However, there are few other definitions that are comparable, and Packard et al. (2017) claims that several well-known methods classify doubtful definitions based on what

precise information is unclear. In addition Packard et al. (2017) also argues that while scholars within economics and the behavioral sciences focus primarily on risky and ambiguous scenarios (which are potentially measurable), strategy- and entrepreneurship-researchers have become more interested in environmental uncertainty, which seems more relevant to business decision making (e.g., Downey & Slocum, 1975; Downey et al., 1975; Galbraith, 1973; Jauch & Kraft, 1986; Milliken, 1987; Buchko, 1994) (Kildebo & Folkvord, 2021).

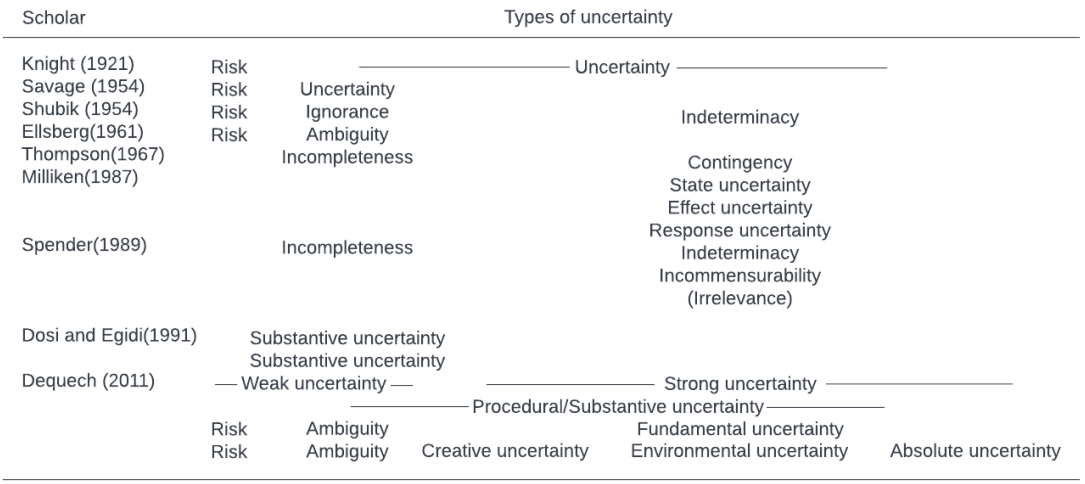


Figure 3.1: Comparison of Uncertainty Typologies (Packard et al., 2017)

As a result, Packard et al. (2017) choose to define types of uncertainty according to whether or not probability can be estimated, following Knight (1921). They provide a matrix, as illustrated in table 3.1, in which the number of options multiplied by the number of outcomes determines the experienced degree of uncertainty. The lowest being risk/ambiguity, and the highest absolute uncertainty (Kildebo & Folkvord, 2021).

Table 3.1: Experienced uncertainty through a set of options and outcomes (Packard et al. 2017).

		Set of outcomes	
		Closed	***Open***
Set of options	***Closed***	*Risk/Ambiguity* *e.g., insurance, gambling*	*Environmental uncertainty* *e.g., make or buy decision*
	Open	*Creative uncertainty* *e.g., find a solution to a problem*	*Absolute uncertainty* *e.g., commercialization of radically new technologies*

In order to get a broader view of the definition of uncertainty, we look at Courtney et al. (1997) standardization of four levels of uncertainty. Shown in table 3.2, these levels are: clear-enough future, alternate future, range of futures and true ambiguity. These levels span from a low level of uncertainty where Courtney et al. (1997) argue that companies can through a single forecast determine their strategy to handle the uncertainty to a high level of uncertainty where a company has no basis to forecast the future. In such events Courtney et al. (1997) recommend tools like analogies and pattern recognition

and/or nonlinear dynamic models are used (Kildebo & Folkvord, 2021). It is especially in situations like this where Sarasvathy (2003) theory on effectuation and causation, presented more comprehensively in section 3.2, plays a central role in how a company responds to uncertainty. The causation process is taking a specific situation as given and focusing on selecting between the means to create an effect. Meanwhile, the effectuation process focuses on taking a set of means and choosing between possible effects that can be created with that set of means (Kildebo & Folkvord, 2021).

Table 3.2: Four levels of uncertainty (Courtney et al., 1997).

	Clear-enough future	Alternative future	Range of futures	True ambiguity
What can be known?	Singel forecast precise enough for determining strategy	A few discrete outcomes that define the future	A range of possible outcomes, but no natural scenarios	No basis to forecast the future
Analytical tools	"Traditional" tool kit	Decision analysis Option valuation models Game theory	Latent-demand research Technology forecasting Scenario planning	Analogies and pattern recognition Nonlinear dynamic models

If we look at Courtney et al. (1997) and Packard et al. (2017) against each other we see a clear resemblance. Where one focuses on what tools are possible to use, while the other looks at opportunities. They both have a four-part fervor that gradually increases towards, what we argue can be seen as the same, absolute uncertainty/true ambiguity. However, Packard et al. (2017) have somewhat more similarity between their middle definitions, creative- and environmental uncertainty, than Courtney et al. (1997)'s "alternative future" and "range of futures" (Kildebo & Folkvord, 2021).

In addition to Courtney et al. (1997) and Packard et al. (2017), McKinsey & Company (Finn et al., 2020) present, in the beginning of the Covid-19 pandemic, a graph that took the duration and magnitude of a crisis into account when determining the experienced degree of uncertainty (see figure 3.2). They simultaneously argued that the Covid-19 pandemic was perceived as a crisis of extreme levels of uncertainty, which we argue fits in the upper parts of Courtney et al. (1997) and Packard et al. (2017) true ambiguity and absolute uncertainty. However, this graph does not take into account various degrees of uncertainty, by only determining if the perceived uncertainty is at a level of extreme uncertainty or not. However, Courtney et al. (1997), Finn et al. (2020), and Pearson and Clair (1998) all agree that standard management operating models seldom show adequate in times of high uncertainty, and firms with deficient procedures might swiftly find themselves facing existential threats (Finn et al. 2020). Summarized by Courtney et al. (1997): "traditional strategic-planning won't help much" (Kildebo & Folkvord, 2021).

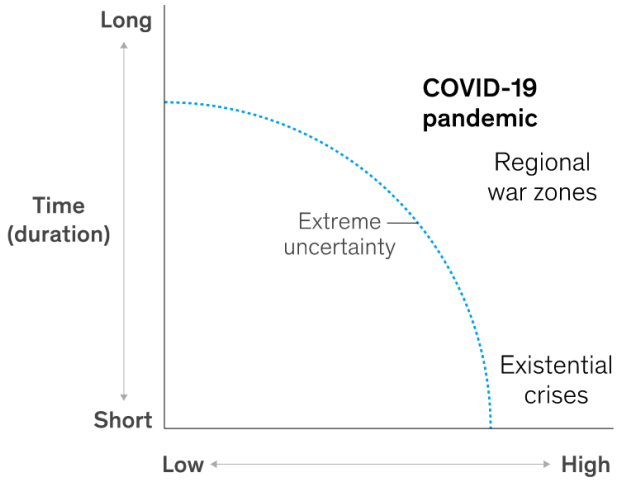


Figure 3.2: Determining experienced degree of uncertainty through duration and magnitude (Finn et al., 2020).

Uncertainty during the Covid-19 pandemic

Shown in the figure above (figure 3.2) argues Finn et al. (2020) that the Cvid-19 pandemic was perceived as an extreme level of uncertainty. Haneberg (2021) refers in his paper to Thorgren and Williams (2020) pointing out that some crises, such as the Covid-19 pandemic, are particularly rare and unpredictable and hence referred to as "black swans''. Meaning, a company can prepare for many types of crises ("white swans"), however not all (Kildebo & Folkvord, 2021). Altig et al. (2020) presents in their paper a summary from Fed Chairman Jerome Powell on the experienced degree of uncertainty of the first part of the pandemic through his 21st of May speech, noting "We are now experiencing a whole new level of uncertainty, as questions only the virus can answer complicate the outlook" (Kildebo & Folkvord, 2021). According to Sørheim et al. (2021), the Covid-19 pandemic is an urgent and unforeseen crisis with significant uncertainty in both international and national markets. Add that most companies have to some extent been affected, however to a varying degree and in a different way (Kildebo & Folkvord, 2021).

Scholars have employed various economic analyses to try to say something about the amount of uncertainty that is experienced in an attempt to draw uncertainty at a common level (Altig et al., 2020; Miescu & Rossi, 2021; Zhang et al., 2020). Stock market volatility, newspaper-based uncertainty metrics, Twitter-based economic uncertainty, and subjective uncertainty measures derived from business expectation surveys are all being studied (Kildebo & Folkvord, 2021). Alternatively, by utilizing unanticipated pandemic-related news and announcements to extract a Covid-19-induced shock and estimate its short-run recessionary implications (Miescu & Rossi, 2021) (Kildebo & Folkvord, 2021).

As the pandemic has recently neared its end in Norway, scholars have only been able to look at short-term effects of the pandemic. It will therefore be important to continue looking at elements like the significance of a diminished global economic activity, changes in demand for products and services, changes in supplier chains, as well as changes in purchasing behavior and preferred market channels (Sørheim et al., 2021). It

will also be exciting to follow what changes companies have made to respond to the uncertainty were temporary or have become persistent. But it will be important to take into account that multiple elements happened concurrently during the initial wave of the pandemic, including shifts in expectations, policy actions, and abrupt increases in uncertainty (Miescu & Rossi, 2021). Making single analyses' from this time range exceptionally difficult to interpret, and hence difficult to explain where uncertainty occurred (Kildebo & Folkvord, 2021).

1.3.2 Knowledge-Based Resources

According to resource-based strategy (RBV) theories, organizations with valuable, rare, and inimitable resources have the ability to outperform others (Wiklund & Shepherd, 2003; Barney, 1995, 1991). These resources are inputs into the manufacturing process (Barney, 1991) and can be classified as knowledge-based or property-based (Wiklund & Shepherd, 2003; Miller & Shamsie, 1996). According to Barney (2001), a corporation must also have a suitable organization in place in order to exploit its resources. With this organization in place, a corporation can respond to environmental changes and new possibilities by taking actions that influence the company's resource base and how these resources are used (Cockburn et al., 2000) (Kildebo & Folkvord, 2021).

There are two types of knowledge: scientific knowledge and distributed information of a particular time and place (Hayek, 1945). When looking for new business opportunities, the latter is the most effective. According to Sarasvathy et al. (2003), this has two major consequences for entrepreneurial opportunities. First, knowledge dispersion can be considered as a primary source of uncertainty, which might lead to opportunities. Second, knowledge dispersion explains the connection between the entrepreneur and the opportunity to identify, create, and exploit new markets (Kildebo & Folkvord, 2021).

Entrepreneurial orientation (EO) refers to an organization's strategic orientation, with a focus on decision-making styles, processes, and practices, as well as the entrepreneurial components of these (Lumpkin & Dess, 1996). According to McGrath et al. (1996), EO is critical to an organization's performance through boosting knowledge-based resources to uncover and exploit new possibilities. EO can help a company obtain a competitive advantage by acting on early indications from both internal and external sources (Lumpkin & Dess, 1996)Entrepreneurial orientation (EO) refers to an organization's strategic orientation, with a focus on decision-making styles, processes, and practices, as well as the entrepreneurial components of these (Lumpkin & Dess, 1996). According to McGrath et al. (1996), EO is critical to an organization's performance through boosting knowledge-based resources to uncover and exploit new possibilities. EO can help a company obtain a competitive advantage by acting on early indications from both internal and external sources (Lumpkin & Dess, 1996) (Kildebo & Folkvord, 2021).

According to Wiklund and Shepherd (2003), EO has a moderating effect on the relationship between knowledge-based resources and firm performance. Knowledge-based resources have a greater beneficial impact on performance for leaders and organizations that are prepared to be innovative, take risks, and be proactive. When explaining the organization's performance, the ability to use knowledge-based resources

is critical. Furthermore, EO can assist in explaining the managerial procedures that enable some organizations to use their resources to identify and adapt to changing surroundings faster than their competitors (Wiklund & Shepherd, 2003; Cockburn et al., 2000) (Kildebo & Folkvord, 2021).

Effectuation and Causation

Effectuation and causation are two concepts used to explain how individuals and businesses act in order to capitalize on new opportunities in terms of available resources. An effectuation response, according to Sarasvathy (2003, p.245), is to "take a set of means as given and focus on selecting between possible effects that can be created with that set of means." This is the inverse of a causation response, which Sarasvathy (2003, p.245) defines as "causation processes take a particular effect as given and focus on selecting between means to create that effect." The following are the differences between the two approaches, according to Chandler et al. (2011): (1) effectuation focuses on short-term experiments to identify business opportunities in an uncertain future, whereas causation tries to predict an uncertain future by defining the final objective up front; (2) effectuation focuses on projects with an affordable loss in a worst-case scenario, whereas causation focuses on maximization of expected returns; and (3) effectuation emphasizes strategic alliances and pre-commitments as tools for controlling an uncertain future, whereas causation relies on planning and analyzing the competition to forecast the uncertain future, (4) effectuation uses flexibility to exploit environmental contingencies, while causation exploits pre-existing capabilities and resources (Kildebo & Folkvord, 2021).

Effectuation can be characterized as multifaceted with the four following dimensions (Haneberg, 2021, p.875; Eyana et al., 2017; Frese et al., 2020)(Kildebo & Folkvord, 2021):
(1) Experimentation: Trial-and-error changes in action over a short period to explore new opportunities and succeed in existing markets
(2) Flexibility: Exploiting contingencies rather than pre-existing knowledge in the firm
(3) Precommitments: Emphasizing the firm’s precommitments and alliances
(4) Affordable loss: Evaluation of actions according to whether the firm can survive an eventual total failure of those actions.

According to Chandler et al. (2011) and Sarasvathy (2003), causation is negatively related to uncertainty, whereas effectuation and experimentation, a sub-dimension of effectuation, are favorably related to uncertainty. Mthanti and Urban (2014) found evidence of a moderating link between effectuation and EO, as well as firm performance. In times of crisis and uncertainty, Laskovaia et al. (2019) discovered that causation was positively related to performance in firms with an EO. In the same organizations and environments, effectuation was found to be negatively connected to performance.One explanation for this link was that the stabilizing effect of causal logic had an especially good effect on organizations with an EO who took a proactive, innovative, and risk-taking approach to achieving their goals and plans (Laskovaia et al., 2019; Covin & Miles, 1999). Palmié et al. (2019) discovered a contrast between promotion- and prevention-focused principles of effectuation. Promotion-focused effectuation principles (experimentation and flexibility) that focus on potential gains are favorably related to EO. Prevention-focused principles (precommitments and affordable loss), which

emphasize on reducing future losses, are inversely associated with EO. Causation, which has a promotion focus, is likewise favorably associated with EO. According to Palmié et al. (2019), some effectuation principles are thus more comparable to causation than to other effectuation principles (Kildebo & Folkvord, 2021).

The perception of crises as permanent or temporary, and continuous or discontinuous, may also influence how businesses respond (Laskovaia et al., 2019). If the crisis is viewed as a permanent and discontinuous change in the business environment, they may profit from employing a causal logic-based response to plan a new course for the organization in the future. Companies, on the other hand, may not respond at all or employ an effectual logic to position themselves to handle the crisis in the short term if the crisis is perceived to be temporary and discontinuous (Laskovaia et al (2019).They argue that external environmental crises have a substantial impact on all types of companies, but that small and medium-sized enterprises (SMEs) are particularly vulnerable. Small enterprises have limited access to additional cash, limited technological and administrative capabilities, a heavy reliance on customers and suppliers, and weak security practices (Laskovaia et al., 2019; Marino et al. 2008; Varum and Rocha 2013) (Kildebo & Folkvord, 2021).

During the Covid-19 pandemic, Haneberg (2021) discovered that the degree of perceived uncertainty experienced by SME managers led to a focus on affordable losses. Those who focused on affordable loss reacted reactively to the uncertainty (Haneberg, 2021, 2020). On the other hand, learning from a crisis resulted in a more open-to-experimentation behavior. Those who experimented were proactive in dealing with uncertainty (Haneberg, 2021, 2020).As a result, effectuation is viewed as a multifaceted term (Haneberg, 2021; Alsos et al., 2016; Frese et al., 2020), with distinct aspects of effectuation affected by different triggers, such as uncertainty and learning (Haneberg, 2021). Personal differences amongst managers are also thought to play an influence in the implementation of certain effectual behaviors (Haneberg, 2021; Alsos et al., 2016) (Kildebo & Folkvord, 2021).

1.3.3 Entrepreneurial Orientation

Lumpkin and Dess (1996, p.137) defines EO as the "intentions and actions of key players functioning in a dynamic generative process aimed at new-venture creation. The key dimensions that characterize an EO include propensity to act autonomously, a willingness to innovate and take risks, and a tendency to be aggressive toward competitors and proactive relative to marketplace opportunities" (shown in figure 3.3) (Kildebo & Folkvord, 2021).

These components may all be present in a firm's new entry engagement process, but it is also possible to succeed in a new entrance with only one or a few of them operational. The extent to which these characteristics can be utilized to forecast the success and nature of a new venture may be determined by external or internal factors. External factors such as the business environment or industry, or internal factors such as the firm's structure or the personal traits of the founders or management team (Lumpkin & Dess, 1996) (Kildebo & Folkvord, 2021).

Miller (1983) developed a model in which EO was defined in three dimensions: innovativeness, proactiveness, and risk-taking. According to Hughes and Morgan (2000), prior to their work, most academics agreed with Miller that EO had only three dimensions. Covin and Slevin (1989), Naman and Slevin (1993), Zahra and Garvis (2000), and Kemelgor (2002), to name a few, all agree with Miller's study. However, Stetz et al. (2000), Kreiser et al. (2002), and Hughes & Morgan (2007) agree with Lumpkin & Dess (1996) and their use of five separate EO dimensions (Kildebo & Folkvord, 2021).

Autonomy

Autonomy is defined as a major dimension of an EO by Lumpkin and Dess (1996, p.140), and it relates to "independent action of an individual or a team in bringing forth an idea or a vision and carrying it through to completion." In an organizational context, this means that the person or team can act without being hampered by organizational limitations. Even though circumstances like resource availability, changes in the competitive landscape, or internal organizational concerns play a role and may influence the direction of the project, they cannot stop the autonomous entrepreneurial processes. The most entrepreneurial organizations have the most independent leaders, which in small firms is usually associated with CEOs who own the company and serve as the knowledge leader. Leaders may communicate knowledge to their organizations by staying up to date on emerging markets and technologies (Lumpkin & Dess, 1996; Miller, 1983) (Kildebo & Folkvord, 2021).

Innovativeness

"Innovativeness reflects a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes," state Lumpkin and Dess (1996, p.142). A company's innovativeness can be demonstrated simply by its willingness to explore new advertising methods and product lines. It could also be demonstrated by a commitment to being at the forefront of new technology developments and new goods (Lumpkin & Dess, 1996) (Kildebo & Folkvord, 2021).

Innovativeness is defined by Hughes and Morgan (2007, p.652) as a "bias toward embracing and supporting creativity, experimentation, technological leadership, and R&D in the development of products, services, and processes to generate novel solutions to customer needs and problems." They also contend that being innovative is an important means of distinguishing oneself and providing solutions that undercut those of competitors' (Kildebo & Folkvord, 2021).

Risk-taking

Firms with an EO are commonly recognized by risk-taking behavior, such as taking on substantial debt or devoting huge resources with the intention of achieving high returns on investments by capitalizing on market opportunities (Lumpkin & Dess, 1996, Hughes & Morgan, 2007) (Kildebo & Folkvord, 2021).

According to Hughes and Morgan (2007), organizations with a low risk tolerance may postpone or avoid introducing new technologies, explore new options and activities, and

respond cautiously to changes in market conditions. As a result, their performance would suffer since they would take little to no action to capture new clients and emerging market prospects (Kildebo & Folkvord, 2021).

Proactiveness

Webster's Ninth New Collegiate Dictionary (1991, p.137) defines proactivity as "acting in anticipation of future problems, needs, or changes." Proactivity is important in the context of entrepreneurial orientation since the indicated forward-looking view is complemented by innovative or new-venture activities (Lumpkin & Dess, 1996). According to Lumpkin and Dess (1996), a proactive organization is a leader rather than a follower because of its willingness and capacity to anticipate and seize new opportunities even if they are not the first to do so (Kildebo & Folkvord, 2021).

According to Hughes and Morgan (2007), proactiveness refers to a forward-thinking mindset in which organizations actively try to foresee future opportunities and use these to develop and introduce new products that can obtain first-mover advantages when entering new markets. Furthermore, this perspective and the development of new products can help to shape the direction of the environment (Kildebo & Folkvord, 2021).

Being proactive can boost a firm's receptivity to market signals and understanding of client wants, and proactive enterprises can position themselves for agility by actively anticipating and planning for rapid change (Hughes & Morgan, 2007). According to Hughes and Morgan (2007), proactive companies are better positioned to take market shares and new consumers swiftly in changing circumstances by mobilizing and employing their resources ahead of their competition. This proactiveness keeps them ahead of their less proactive competitors (Kildebo & Folkvord, 2021).

Competitive aggressiveness

Competitive aggressiveness is defined by Lumpkin and Dess (1996) as the intensity of a firm's efforts to surpass its industry rivals, and it is characterized by a strong offensive stance. This stance is intended to outperform competitors, but it can also be used as a reactive response to defend a market position or enter a market previously identified by a competitor. In contrast to proactiveness, competitive aggressiveness might be perceived as a reaction to a threat rather than an opportunity (Lumpkin & Dess, 1996) (Kildebo & Folkvord, 2021).

Competitive aggressiveness, according to Hughes and Morgan (2007), mobilizes a continual examination of competitors rather than an assessment of the environment. The conclusions of this competitor assessment can then be used to exploit the firm's strengths and competitors' weaknesses to obtain an edge. Instead of passively waiting for others to act, aggressive enterprises use their adaptive capacities to continually undermine the efforts of their competitors in the market (Kildebo & Folkvord, 2021).

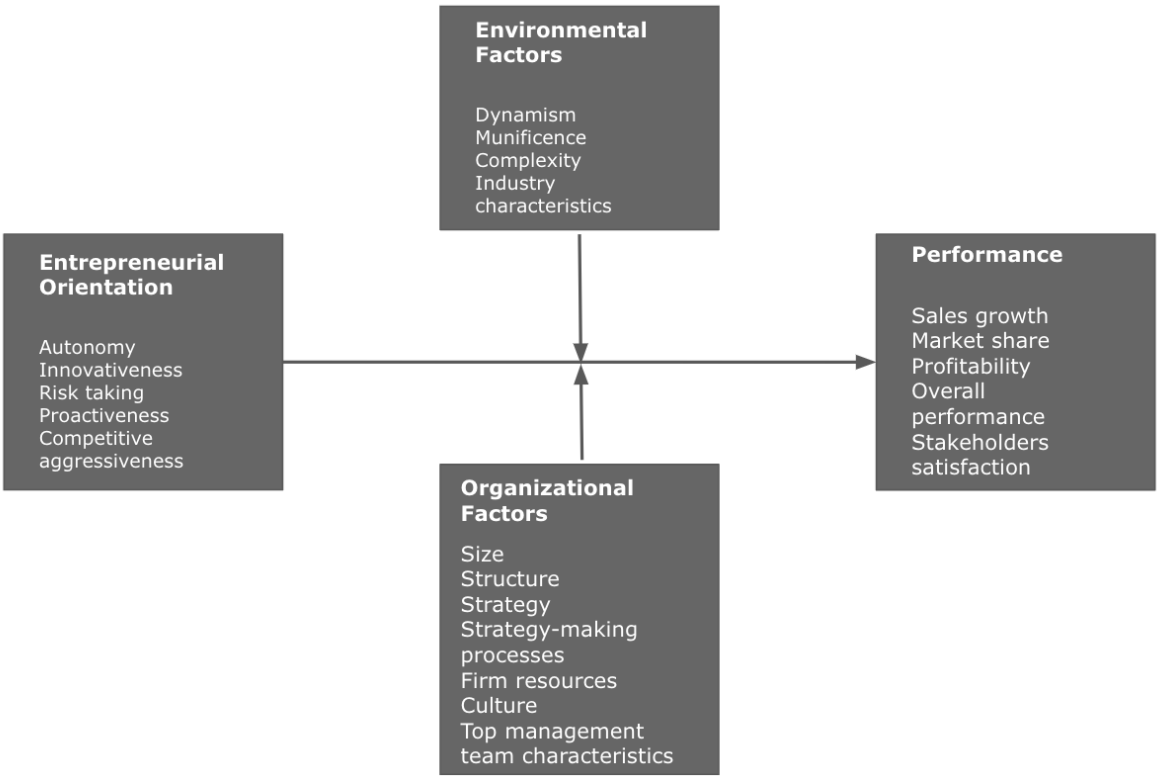


Figure 3.3: Framework of Entrepreneurial Orientation from Lumpkin & Dess (1996).

Entrepreneurial orientation and firm performance

The relationship between EO and business performance, according to Lumpkin and Dess (1996), is context-specific, and the dimensions of EO can be independent of one other in a given situation. Furthermore, the five qualities of autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness were investigated. Lumpkin and Dess (1996) discovered a link between the sub-factors of proactiveness, innovativeness, and competitive aggressiveness and business performance in their study. External variables influence these parameters individually, with some negatively and some positively affected. Firms with an EO and managers who have a high tolerance for ambiguity, for example, outperform firms with an EO and managers who have a low tolerance for ambiguity. A quick-response strategy will also assist organizations with a proactive approach, as this is correlated with higher performance. A quick-response strategy, on the other hand, is connected with lower performance in highly innovative organizations (Lumpkin & Dess, 1996). Companies that are highly innovative and have an "organic" structure are more likely to improve their performance in terms of organizational structure. For organizations with high competitive aggressiveness, this link is inverted, and an "organic" structure is associated with lower performance (Lumpkin & Dess, 1996). Lumpkin and Dess (1996) found that proactivity is positively related to performance in hostile and dynamic environments, with enterprises reporting improved profitability. Competitive aggressiveness has also been demonstrated to have a favorable impact on performance in the same hostile environments (Kildebo & Folkvord, 2021).

Only proactiveness and innovativeness, according to Hughes and Morgan (2007), were directly connected to higher company performance in emerging new enterprises. Risk taking is inversely connected with corporate performance, whereas competitive aggressiveness and autonomy appear to have little effects. As a result, they agree with Lumpkin and Dess (1996) that not all aspects of EO are equally related with improved company success. Hughes and Morgan (2007) found that young, emerging enterprises are unable to profit from the same components of an EO as more mature firms (Kildebo & Folkvord, 2021). According to Wiklund and Shepherd (2003), the relationship between EO and performance is likely more complex than a straightforward main-effect-only relationship, with internal company factors serving as a moderator (Kildebo & Folkvord, 2021).

Kraus et al. (2012) discovered that proactiveness was significantly and positively related to company success, and that this relationship was unaffected by market volatility. This suggests that even when SMEs are functioning in turbulent market conditions, such as the global financial crisis in 2008, behaving proactively has a beneficial impact on business performance. They also agreed with Hughes and Morgan's (2007) findings, demonstrating that these findings were applicable not only for businesses in their early stages, but also for more mature SMEs. Kraus et al. (2012) found no direct association between innovativeness and enhanced company performance in the other categories of EO. In uncertain circumstances, however, they discovered that innovative SMEs outperformed non-innovative SMEs. They discovered a negative association between risk taking and firm performance in the same volatile settings as the financial crisis. Finally, they concluded that in times of market volatility, SMEs should take less risk in terms of innovation and, if feasible, postpone the release of highly innovative items (Kildebo & Folkvord, 2021).

1.4 Discussion and Implications

This chapter consists of a discussion around the findings from the two papers written in relation to this master's thesis. The papers build on each other, as Paper 2 is a continuation of the research done in Paper 1. The discussion will first address the findings from Paper 1, followed by the findings from Paper 2. Then, the findings from the two papers will be discussed.

The goal of this master's thesis was to (1) get an understanding of how organizations deal with decision-making logics in crisis scenarios and (2) understand how entrepreneurial mindset and the business environment in which companies operate play a role in companies' responses to uncertainty. Our goal has been to develop a deeper understanding of how businesses work and why various companies make the strategic decisions that they do. By writing two different papers, one quantitative and one qualitative we have used different methods to get a broader overview of the field of research, and a deeper understanding for each company's situation. As a central guideline for both papers we have used: "*What were the effects of and responses to the Covid-19 pandemic?*" as an overall research question.

1.4.1 Summary of discussion Paper 1

The purpose of Paper 1 was to investigate the relationships between uncertainty, mindset, and resources in the context of the extremely severe Covid-19 pandemic. This was accomplished by developing a structural model and testing it by separating it down into seven different hypotheses and sub-hypotheses, assessing particular correlations. By testing the model against more precise hypotheses, it was possible to examine how uncertainty affected company response, how the firms' attitude drove them to react proactively or reactively, and how the different answers led to changes in company performance. Many of the features we've looked at have previously been explored in other contexts, but few, if any, have looked at these topics in the context of the recent pandemic.

We discovered that there were substantial correlations between the companies' predictions for future demand and how they decided to respond to the crisis. As predicted increases in demand for a company's goods and services resulted in a more proactive response to the pandemic for both established and new companies. On the other hand, we discovered that a predicted fall in demand prompted both proactive and reactive responses, with reactiveness being the most closely related strategy. These findings demonstrate ambiguity in corporate responses when the organization expects its business environment to become more difficult.

We found support for this in previous studies that have looked at different types of crises. Because different leaders and corporations interpret the degree of uncertainty differently, some over- and under-dramatize the severity (Finn et al., 2020; Packard et al., 2017; Courtney et al., 1997). In addition to the perceived intensity of the crisis, Haneberg (2021) and Laskovaia et al. (2019) discovered that whether a crisis is viewed as permanent or temporary influences how a company responds to it. This could explain why respondents in this study reacted both reactively and proactively to a projected fall in demand.

Haneberg (2021) discovered that an increase in experienced uncertainty resulted in greater reactive behavior among a group of Norwegian SMBs during the early stages of the Covid-19 outbreak, which is consistent with our findings. We also discovered a link between an innovative mindset and a proclivity to act proactively. We also discovered that "new" companies were both more proactive and reactive when experiencing a higher degree of experienced uncertainty, which could be related to how previous experiences influence the response to uncertainty. Younger enterprises may have less experienced leaders who have yet to face a major crisis, and the development of the pandemic may have surprised them more than more seasoned leaders. Walker et al. (2021) discovered this relationship by showing that when uncertainty was expected, it elicited fewer responses than when it was unexpected.

Our research also looked at how organizations' innovative mindsets and resource flexibility affected their level of uncertainty, but no significant associations were discovered. Previous research has discovered these associations (Zichella, 2017; Sanchez, 1997), indicating that there is still opportunity for future investigation in our context.

Finally, we examined how the firms' proactive and reactive responses to the pandemic affected their performance. Our findings demonstrate a strong and significant relationship between "established" companies' responses and firm performance, with proactiveness positively related to performance and reactiveness negatively related. There was a significant relationship discovered between proactivity and performance for "new" enterprises, but not between reactiveness and performance.

1.4.2 Summary of discussion Paper 2

The goal of Paper 2 was to investigate how the Covid-19 pandemic affected Norwegian SMEs over the last two years, and how companies' actions were influenced by their mindset and resources. We found that companies' low level of uncertainty may be explained by their high level of EO, as having an entrepreneurial mindset has been associated with improved performance in uncertain circumstances. Companies with an innovative mindset may use their experiences from similar experiences to visualize how their actions might play out in a real-world scenario when confronted with uncertain conditions (De Winnaar, & Scholtz, 2019). When the prospective rewards are good, entrepreneurs have been proven to handle uncertainty better than non-entrepreneurs, which may explain why several of the companies considered the pandemic to be no more uncertain than their normal business environment. This may also be the case for the companies that experienced higher degrees of uncertainty, despite also having high degrees of EO, with their negative business environments affecting them more than the business environments of the others.

Because business leaders perceive uncertainty differently, it has previously been discovered that their subject perception of uncertain situations influences the measures they employ to minimize it (Folkvord & Kildebo, 2022). This is evident in this study, as companies that encountered relatively comparable scenarios viewed these very differently. While one company perceived the pandemic as a "motivational killer" and a potential threat to their business, two other companies took a more balanced approach

to the situation. The differences in the perceived uncertainty of the firms was found to potentially stem from the positivity of their business environments. As one company was in control of their sales process and supply chain, the others were experiencing problems with these.

The company that responded most proactively in the study found itself in a highly "positive" business environment with numerous new opportunities to utilize. These opportunities were theirs to seize, but they needed to act quickly to capitalize on them. Their high level of entrepreneurial orientation and effectuation came in handy in this situation, as their mindset had prepared them to seize unforeseen opportunities. They were particularly proactive and innovative, with a proclivity to experiment prior to the crisis. This combination of characteristics may explain why they were able to capitalize on the new business environment presented by the Covid-19 pandemic. They had also strategically positioned themselves for market expansion prior to the pandemic, allowing them to fully capitalize on these opportunities. According to Hughes & Morgan (2007), proactive organizations may be able to seize new market shares and customers in changing environments, which supports our findings.

We further argue that the companies that experienced little to no negative effects of the crisis did not need to make big adjustments to their operations to prosper. In this environment, a crisis strategy of "business as usual" was preferred, and any significant shifts in focus to deal with the crisis could have swiftly had a detrimental impact. This lack of active response was unexpected in the context of the pandemic, given the corporations' expected behavior based on their high degree of EO. The practically unaffected business environments, on the other hand, partially explains this response, as the companies could continue operating in a "normal" atmosphere. This can be seen in light of the findings of Courtney et al. (1997), who contend that when a company sees its future as clear, a single forecast plan is sufficient to decide the firm's strategy going forward.

In its crisis preparations, one of the corporations differentiated itself from the others. They were in control of their available resources and were able to use them to solve the challenges because they had prepared extensively for such a situation. With a Business Continuity System in place, they were able to keep to their original strategy because they could see through the uncertainty and remain in control of their firm, taking advantage of any chances that arose. Cockburn et al. (2000) support this strategy, stating that companies with an organization in place that can utilize existing resources will be able to adapt to a quickly changing environment. Those that attempt to establish these organizations during a crisis, on the other hand, risk losing focus and the ability to capitalize on opportunities due to a lack of resources (Cockburn et al., 2000). This may have been the case for one of the other companies, as they implemented more professional structures during the crisis to mitigate the negative effects of the restrictions. A third company also used an opposite strategy as they did not use any structure in their strategy, “closing their eyes” and “hoping for the best”. This way of avoiding the use of structures in the strategy has previously been found to be negative in uncertain environments as previous research has found that effectuation is negatively linked with EO in terms of performance in these situations. Causation and planning-based strategies are oppositely positively linked to EO in the same contexts (Laskovaia et al., 2019; Mthanti & Urban, 2014).

The company that suffered the most from the pandemic in our study had a 50 percent reduction in staff through the crisis. This was due in part to the inflexibility of their resources, which were not transferable to their new focus area. In comparison, the other companies in the study were determined to have medium to high levels of flexibility. This could explain why they were better positioned to seize the chances that were presented to them. Sanchez (1997) concurs, stating that a firm's resource flexibility is positively related to its ability to generate strategic flexibility. The tactics can be used to respond to unpredictability and rapid changes.

1.4.3 Viewing the papers in relation to each other

When viewing the two studies in relation to each other we find several interesting results that offer a deeper understanding of the research topics. As Paper 2 is a continuation of Paper 1 it offers results that are complementary to those of the first paper. Combined, the findings from the two studies are able to explain how companies were affected by and responded to the Covid-19 pandemic, as well as why this was the case.

As Paper 1 found that uncertainty led to companies responding both reactively and proactively, this was partially found in Paper 2 as well. The two companies that experienced the highest degree of uncertainty in the study of Paper 2 responded with different strategies, one reactively and one proactively. The one responding reactively did this because they experienced that the crisis "killed" their motivation, and that their resources were inflexible. As the business environment they operated in was highly affected by the crisis they were in a position that forced them to change. On the other hand, the company that acted proactively while experiencing a high degree of uncertainty did this because they were able to re-focus their strategy due to flexible resources. They experienced another kind of uncertainty than the other company, as they were more uncertain about how they were going to continue to grow through the crisis, than they were for not surviving.

Further, Paper 1 found a relationship between the expectations of the companies and their response strategy, as expectations of increased demand led to proactiveness, while an expected decrease led to both reactivity and proactivity. This was also found in the study of Paper 2, as the companies that expected their sales to grow rapidly chose to respond proactively to be able to seize the opportunities they were given. The companies that expected their demand to decrease were divided between proactive and reactive responses. One company expected their demand to decrease, and responded to this reactively by reducing their workforce by 50%, and focusing on sales rather than development. One other company that expected their demand to decrease responded to the crisis by being proactive, and this is also the same company that acted proactively while experiencing a high degree of uncertainty. They responded this way because they were able to use their flexible resources to change their strategy to handle the expected decrease in demand.

Although Paper 1 found no significant relationships between company mindset and flexibility of resources, and perceived degree of uncertainty, it is interesting that Paper 2 found these relationships to be existing. The variables used to assess innovative mindset in Paper 1 do not entirely compare to those used to assess entrepreneurial orientation in Paper 2, which may explain the inconsistencies. One other possible reason for these

differences is that the companies' business environments acted as a moderator between their mindset and their level of uncertainty. Due to the use of PLS-SEM analysis with path coefficients in the quantitative study, nuances between responses of different companies may have been "washed" away as companies with a positive business environment canceled out the responses of companies with a negative business environment and a high degree of uncertainty. In Paper 2, these stories are told separately, giving us insight into how the individual companies dealt with the pandemic and why they chose to respond the way they did. Several companies expressed that the pandemic did not lead to significant uncertainty for them because their normal business environment was already highly uncertain. As they were used to making decisions on a limited information base, the new business environment did not provide any more challenge than internal business problems. This gives further insight into how innovative companies experienced the crisis.

Paper 1 discovered that proactivity was strongly positively related to company performance, while reactivity was similarly negatively related. Based on the interviews in Paper 2 we found that these relationships were somewhat disconnected from the business environment of the companies. As some companies that acted proactively experienced a very positive business environment with prosperous futures, they also performed well throughout the crisis. Similarly, companies that operated in a more negative business environment acted proactively as well, with their performance subjectively being rated as good. This might be explained by the fact that companies assess their own performance relative to how their expectations for the period were, and that this may not be the same as performance in terms of monetary gains.

When assessing the importance of an innovative mindset when choosing how to respond, Paper 2 found that proactivity was a key aspect in being able to exploit new opportunities. Especially the sub-factors of proactiveness and innovativeness were found to be present in the companies that responded proactively to seize new opportunities. As the company that experienced the most positive business environment, and that responded proactively did this to be able to handle an expected increase in demand, they benefited from their entrepreneurial orientation. Another company that did not operate in a similarly positive environment also chose to respond proactively by investing in an e-commerce platform to conduct their sales. As they anticipated that the demand for their products would become higher, they were not positioned to utilize this because of their dependency on retailers. Their entrepreneurial orientation helped them in making this transition rapidly, as they were used to having to pivot quickly as a startup.

1.5 Conclusion and further research

This master's thesis contributes to the research on management and entrepreneurship by examining and providing insights into how Norwegian companies were affected by and responded to the Covid-19 pandemic. Through the use of two different research methodologies we have provided a broad overview of how a large number of companies were affected and responded, and a deeper insight into the stories of individual firms. We have expanded the theory on management and entrepreneurship by showing how the business environments affected the experienced degree of uncertainty of companies, and how this led to responses that were in contradiction to the expected behavior based on existing theory. As previous crises like economic crises have targeted different industries similarly, the restrictions introduced during the Covid-19 pandemic changed this relationship. Our research has thus been able to view the existing theory in relation to the responses of companies in the new context that the Covid-19 pandemic is.

The goal of the thesis was to (1) get an understanding of how organizations deal with decision-making logics in crisis scenarios and (2) understand how entrepreneurial mindset and the business environment in which companies operate play a role in companies' responses to uncertainty. When answering the research question: "*What were the effects of and responses to the Covid-19 pandemic?*", we argue that this is a question with as many answers as there are businesses. As no individual companies experienced the crisis identically, the responses of one company is different from the next. Through our two studies we have found that the experiences of the Covid-19 pandemic varied greatly depending on the business environment the companies operated in, their mindset and resources, and their expectations.

Paper 1 found substantial correlations between organizations' expectations for future demand for their products and whether they behaved proactively or reactively to the crisis. Paper 2 discovered that this was related to how long individual companies expected the crisis to last, with those bracing themselves for a long-term crisis acting more reactively. Those that expected it to be more short-term took more proactive measures to boost their market position for when the situation normalized. Furthermore, Paper 1 discovered no significant correlations between the organizations' innovative mindset, flexibility of resources, and experienced degree of uncertainty. Paper 2 clarified this, as numerous enterprises claimed that their experienced degree of uncertainty was not more than usual as a result of the pandemic, as their normal business environment as Entrepreneurs was already highly uncertain. Paper 1 also discovered strong connections between the organizations' responses, and their experienced degree of uncertainty and innovative mindset. An increase in uncertainty resulted in both reactive and proactive behavior, although an innovative mindset enhanced the chance of proactive responses. Paper 2 went on to clarify that this association was related to the subjective experiences of the corporations. Firms that perceived the crisis as a potential life or death situation faced greater uncertainty than those who saw it as an uncertain situation that did not jeopardize their survival. As a result, when faced with uncertainty, businesses operated both proactively and reactively. Finally, Paper 1 discovered that proactivity was strongly associated with performance for both existing and new enterprises, but reactivity was only inversely related to performance for established firms. This was expanded on further in Paper 2, as the organizations who behaved most proactively experienced positive business environments with new opportunities to exploit. The corporation that responded reactively faced a more difficult business

environment, and this distinction provided a deeper understanding of why the links between response and performance existed.

Further research should be conducted on the business environments of companies, in combination with their responses and outcomes, to get a broader understanding of these relationships. As the research conducted in this Master's thesis has its natural limitations in terms of available resources and time constraints, we acknowledge that other researchers are able to expand on our research. As our research used data collected in the early phases of the crisis, future studies will be able to use more quantifiable performance data than what was available for us as well. In addition, as our second paper examined mainly "young" companies, further research into why more "established" companies responded as they did would be of interest.

As the recent pandemic has neared its end in Norway, and our research has been completed, we end with a quote from one of our interviewees: "*You are welcome to conclude in your master's thesis that we would rather not have any more pandemics, the one we've had was more than enough!*".

References

Alsos, G. A., Clausen, T. H., Hytti, U., & Solvoll, S. (2016). Entrepreneurs' social identity and the preference of causal and effectual behaviours in start-up processes. *Entrepreneurship & Regional Development*, *28*(3-4), 234-258.

Altig, D. Baker, S. R. Barrero, J. M. Bloom, N. Bunn, P. Chen, S. Davis, S. J. Leather, J. Meyer, B. H. Mihaylov, E. Mizen, P. Parker, N. B. Renault, T. Smietanka, P. Thwaites, G. (2020) Economic uncertainty before and during the Covid-19 pandemic. *National bureau of economic research*

Ayres, L., Kavanaugh, K., & Knafl, K. A. (2003). Within-case and across-case approaches to qualitative data analysis. *Qualitative health research*, *13*(6), 871-883.

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of management*, *27*(6), 643-650.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Barney, J. B. (1995). Looking inside for competitive advantage. *Academy of Management Perspectives*, *9*(4), 49-61.

Bogevik, T. & Federl, O. (2018) *A Study of Effectual Behavior Among Student Entrepreneurs - How do student entrepreneurs in a Venture Creation Program behave in a situation of uncertainty?* [Master's thesis, NTNU]. NTNU Open. http://hdl.handle.net/11250/2578711

Buchko, A. A. (1994). Conceptualization and measurement of environmental uncertainty: An assessment of the Miles and Snow perceived environmental uncertainty scale. *Academy of Management Journal*, *37*(2), 410-425.

Carey, P. Warner, J. (2004) Getting the most from organizational surveys.

Cambridge Dictionary. (n.d.). *Uncertainty*. Cambridge Dictionary. Retrieved December 13, 2021, from https://dictionary.cambridge.org/dictionary/english/uncertainty.

Chandler, G. N., DeTienne, D. R., McKelvie, A., & Mumford, T. V. (2011). Causation and effectuation processes: A validation study. *Journal of business venturing*, *26*(3), 375-390.

Chandler, G. N., DeTienne, D. R., McKelvie, A., & Mumford, T. V. (2011). Causation and effectuation processes: A validation study. *Journal of business venturing*, *26*(3), 375-390.

Cockburn, I. M., Henderson, R. M., & Stern, S. (2000). Untangling the origins of competitive advantage. *Strategic management journal*, *21*(10-11), 1123-1145.
Cohen, J., & Normile, D. (2020). World on alert for potential spread of new SARS-like virus found in China. *Science*.

Courtney, H. Kirkland, J. & Viguerie, P. (1997) Strategy under uncertainty*. Harvard Business Review*

Covin, J. G., & Miles, M. P. (1999). Corporate entrepreneurship and the pursuit of competitive advantage. *Entrepreneurship theory and practice*, *23*(3), 47-63.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic management journal*, *10*(1), 75-87.

De Winnaar, K., & Scholtz, F. (2019). Entrepreneurial decision-making: new conceptual perspectives. *Management Decision*.

Downey, H. K. Slocum, J. W. (1975) Uncertainty: Measures, research, and sources of variation. *Acad. Management J.* 562–578.

Downey, H. K. Hellriegel D, Slocum, J. W. (1975). Environmental uncer- tainty: The construct and its application. *Admin. Sci. Quart.*

Eisenhardt, K. M. (1989)*. Building theories from case study research. Academy of management review, 14(4), 532-550*

Enger, W., Saxon, S., Suo, P., & Yu, J. (2020). The way back: What the world can learn from China's travel restart after COVID-19. *McKinsey & Company*.

Eyana, S. M., Masurel, E., & Paas, L. J. (2017). Causation and effectuation behaviour of Ethiopian entrepreneurs: Implications on performance of small tourism firms. *Journal of Small Business and Enterprise Development.*

Finn, P. Mysore, M and Usher, O. (2020) When nothing is normal: Managing in extreme uncertainty. *Mckinsey & company.*

Frese, T., Geiger, I., & Dost, F. (2020). An empirical investigation of determinants of effectual and causal decision logics in online and high-tech start-up firms. *Small Business Economics*, *54*(3).

Galbraith, J. K. (1973). Power and the useful economist. *American Economic Review*, *63*(1), 1-11.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* [Kindle Cloud Reader - Amazon](2 ed.). Retrieved from www.amazon.com

Haneberg, D. H. (2020). Interorganizational learning between knowledge-based entrepreneurial ventures responding to COVID-19. *The Learning Organization*.

Haneberg, D. H. (2021). SME managers' learning from crisis and effectual behaviour. *Journal of Small Business and Enterprise Development*.
Hayek, 1945

Hughes, M., & Morgan, R. E. (2007). Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth. *Industrial marketing management*, *36*(5), 651-661.

Jauch, L. R., & Kraft, K. L. (1986). Strategic management of uncertainty. *Academy of management review*, *11*(4), 777-790.

Johannesen, A., Christoffersen, L., & Tufte, P. A. (2011). *Forskningsmetode for økonomisk- administrative fag* (3 ed.). Oslo: Abstrakt forlag AS.

Kemelgor, B. H. (2002). A comparative analysis of corporate entrepreneurial orientation between selected firms in the Netherlands and the USA. *Entrepreneurship & Regional Development*, *14*(1), 67-87.

Kildebo, P. & Folkvord, S. (2021). *Assignment 2- Pilot study for the master thesis* [Unpublished term paper]. NTNU, Trondheim

Knight F (1921) *Risk, Uncertainty and Profit* (Hart, Schaffner, and Marx, New York)

Kraus, S., Rigtering, J. C., Hughes, M., & Hosman, V. (2012). Entrepreneurial orientation and the business performance of SMEs: a quantitative study from the Netherlands. *Review of Managerial Science*, *6*(2), 161-182.

Kreiser, P. M., Marino, L. D., & Weaver, K. M. (2002). Assessing the psychometric properties of the entrepreneurial orientation scale: A multi-country analysis. Entrepreneurship theory and practice, 26(4), 71-93.

Laskovaia, A., Marino, L., Shirokova, G., & Wales, W. (2019). Expect the unexpected: examining the shaping role of entrepreneurial orientation on causal and effectual decision-making logic during economic crisis. *Entrepreneurship & Regional Development*, *31*(5-6), 456-475.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of management Review*, *21*(1), 135-172.

Marino, S., Hogue, I. B., Ray, C. J., & Kirschner, D. E. (2008). A methodology for performing global uncertainty and sensitivity analysis in systems biology. *Journal of theoretical biology*, *254*(1), 178-196.

McGrath, C., Blythe, J., & Krackhardt, D. (1996). Seeing groups in graph layouts. *Connections*, *19*(2), 22-29.

Miescu , M. & Rossi, R. (2021) COVID-19-induced shocks and uncertainty. *European Economic Review*

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management science*, *29*(7), 770-791.

Miller, D., & Shamsie, J. (1996). The resource-based view of the firm in two environments: The Hollywood film studios from 1936 to 1965. *Academy of management journal*, *39*(3), 519-543.

Milliken, F. J. (1987). Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *Academy of Management review*, *12*(1), 133-143.

Mthanti, T. S., & Urban, B. (2014). Effectuation and entrepreneurial orientation in high-technology firms. *Technology analysis & strategic management*, *26*(2), 121-133.

Naman, J. L., & Slevin, D. P. (1993). Entrepreneurship and the concept of fit: A model and empirical tests. *Strategic management journal*, *14*(2), 137-153.

Packard, M. D. Clark, B. B. Klein, P. G. (2017) Uncertainty Types and Transitions in the Entrepreneurial Process. *Organization Science*

Palmié, M., Huerzeler, P., Grichnik, D., Keupp, M. M., & Gassmann, O. (2019). Some principles are more equal than others: Promotion-versus prevention-focused effectuation principles and their disparate relationships with entrepreneurial orientation. *Strategic Entrepreneurship Journal*, *13*(1), 93-117.

Pearson, C. M. Clair, J. A. (1998) Reframing Crisis Management. *Academy of Management*

Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. *Entrepreneurship theory and practice*, *33*(3), 761-787. (Funnet i WOS entrepreneurial orientation og highest citation)

Ringle, Christian M., Wende, Sven, & Becker, Jan-Michael. (2015). *SmartPLS 3.* Boenningstedt: SmartPLS. Retrieved from https://www.smartpls.com

Sanchez, G. (2013). PLS path modeling with R. *Berkeley: Trowchez Editions,* 383(2013), 551.

Sarasvathy, S. D., Dew, N., Velamuri, S. R., & Venkataraman, S. (2003). Three views of entrepreneurial opportunity. In *Handbook of entrepreneurship research* (pp. 141-160). Springer, Boston, MA.

Sarasvathy, S. D., & Dew, N. (2005). New market creation through transformation. *Journal of evolutionary economics*, *15*(5), 533-565.

Shane, S. A. (2003). *A general theory of entrepreneurship: The individual-opportunity nexus*. Edward Elgar Publishing.

Stetz, P. E., Howell, R., Stewart, A., Blair, J. D., & Fottler, M. D. (2000). Multidimensionality of entrepreneurial firm-level processes: do the dimensions covary?. Frontiers of entrepreneurship research.

Sørheim, R. Aadland, T. Alsos, G. A. Aspelund, A. Eide, A. E. Haneberg, D. H. Lauvås, T. A. Rasmussen, E. and Solheim , M. C. W. (2021) Innovasjon i krisetider – innovasjon og omstilling under covid-19. *Notat på oppdrag for Innovasjon Norge*

Thorgren, S. and Williams, T.A. (2020) Staying alive during an unfolding crisis: how SMEs ward off impending disaster. *Journal of Business Venturing Insights*, Vol. 14, pp. 1-11.

Varum, C. A., & Rocha, V. C. (2013). Employment and SMEs during crises. *Small Business Economics*, *40*(1), 9-25.

Venturini, S., & Mehmetoglu, M. (2019). plssem: A Stata Package for Structural Equation Modeling with Partial Least Squares. *Journal of Statistical Software, 88*, 35.

Walker, A. R., Navarro, D. J., Newell, B. R., & Beesley, T. (2021). Protection from uncertainty in the exploration/exploitation trade-off. *Journal of Experimental Psychology: Learning, Memory, and Cognition.*

Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic management journal*, *24*(13), 1307-1314.

Zahra, S. A., & Garvis, D. M. (2000). International corporate entrepreneurship and firm performance: The moderating effect of international environmental hostility. Journal of business venturing, 15(5-6), 469-492.

Zhang, D. Hu, M. Ji, Q (2020) Financial markets under the global pandemic of COVID-19. *Finencial reacherch letters*

Zichella, G. (2017). *Entrepreneurial Cognition: Three Essays on Entrepreneurial Behavior and Cognition Under Risk and Uncertainty*. Frederiksberg: Copenhagen Business School (CBS) p.14

Paper 1

Norwegian University of
Science and Technology

Sindre Folkvord & Petter Norsted Kildebo

Handling uncertainty: The responses and experiences of Norwegian companies during the Covid-19 pandemic

Supervisor: Roger Sørheim
Trondheim, June 2022

Norwegian University of Science and Technology
Faculty of Economics and Management
Dept. of Industrial Economics and Technology Management

Abstract

This paper focuses on examining and comprehending how businesses responded to the Covid-19 pandemic in the early stages of the crisis, and how these responses were influenced by various factors. Previous research has discovered links between having an innovative mindset, having flexible resources, and the response patterns of companies in previous crises. As Norwegian companies faced varying degrees of uncertainty and differing future expectations, their responses varied. The study is based on three different research questions in the paper: RQ1: "*How did companies respond to the Covid-19 pandemic?*", RQ2: "*How were their decisions affected by their mindset and the environment they operated in?*", and RQ3: "*How were the performance of the companies affected by their response to the pandemic?*". To answer these questions PLS-SEM was used as a method to conduct a quantitative analysis on a data set consisting of responses from 442 Norwegian companies. The responses were gathered in two rounds: one early in the pandemic's early stages (May-October, 2020), and one about a year later (Jun-October, 2021). To test relationships between different variables found in the data sets, seven hypotheses and sub-hypotheses were developed.

The factors of interest for the study were mindset, resources, expectations, uncertainty, response and performance, and these were seen in relation to each other by using a PLS-SEM analysis.

The results of the study showed significant relationships between multiple of the factors, as five of seven hypotheses were supported or partially supported. Expectations and uncertainty were found to significantly affect the responses of the companies. Innovative mindsets were connected to more proactive responses, which were further related to positive business performance, while reactive responses were negatively linked to performance. No support was found for the relationship between mindset and flexible resources, and experienced degree of uncertainty.

Keywords: Uncertainty, Ambiguity, Crisis, Entrepreneurial mindset, Knowledge-Based Resources, Decision-making logics

1 Introduction

Panic. Uncertainty. Bewilderment. These were all feelings experienced by companies worldwide as the deadly coronavirus, known as Covid-19 first emerged at our doorsteps. 12 of March, 2020 will forever be known as the day Norway for the first time in recent times locked down the country to protect its population from a virus. As people were commanded to keep at least two meters distance from each other, stay at home with their family, and conduct their businesses remotely, a completely new business environment was introduced. For business leaders this led to great uncertainty about the future of their companies, and whether they were able to survive the crisis. As the deadly and highly infectious virus spread rapidly over the globe (Cohen & Normile, 2020), it transformed the world from open and internationalized to closed and locked down. Enterprises were forced to shut down, and international travel was suspended (Enger et al. 2020). The repercussions of corporate executives' diverse strategies to mitigate or even capitalize on these unusual environmental problems have been far-reaching.

We know that previous studies have found that whether a crisis is seen as a permanent change of the business environment or a temporary effect, affects how companies respond to a severe crisis (Laskovaia et al., 2019). The degree of experienced uncertainty has also been shown to have the same effect on Norwegian companies during the early phases of the Covid-19-pandemic. Also, a tendency to focus on affordable loss and acting reactively were found when the degree of uncertainty increased (Haneberg, 2021). Further, the flexibility of the firm's resources have been linked to an increased ability to react to uncertain situations by having an overview of the available resources, and being able to utilize these (Cockburn et al., 2000; Barney, 1991). The innovative mindset of business leaders is also previously studied, and entrepreneurs are known to handle uncertain environments well in their pursuit of business success (De Winnaar, & Scholtz, 2019). This innovativeness, and the proactive tendencies of leaders are connected to the firm's ability to differentiate themselves from their competitors, and quickly respond to changes by being receptive to customer needs and market signals (Hughes & Morgan, 2007). Entrepreneurs have also been found to tolerate uncertainty better than non-entrepreneurs, and might accept taking more risks if the projected outcome is desirable (Zichella, 2017).

Previous research has looked into how firms act and respond to crises in uncertain environments, but no one has yet examined how Norwegian businesses did this in the context of the Covid-19-pandemic. Examining these responses can lead to reflections and learning points that could benefit companies in future crises.

In this paper we present a quantitative study looking at actions businesses took to handle the uncertainty during the Covid-19 pandemic. The dataset used in this study consists of 442 Norwegian businesses, represented by both new and more established companies who have responded to two surveys. The first being collected between May and October, 2020, and the second collection a little over a year into the crisis, in the time period from June to October, 2021. The data was collected to get an understanding of how innovation is done during times of crisis. Our study has used this dataset to further look into which actions businesses took during the early stages of the pandemic and how these were connected to the environment they operated in. The results from

the first survey have also been compared to the outcomes of the businesses from the second survey. More specifically, we have looked into the topics of innovative mindset, uncertainty, resources, and response, and how these are connected. Further we have examined the relationships between the mindset of the companies and how they responded to the crisis by being proactive or reactive, developed new technology, captured new markets, ensured financial survival and how this affected their performance.

Research questions:
The collected data and the frame of the paper have been used to create the following research questions:

RQ 1: "*How did companies respond to the Covid-19-pandemic?*"

RQ 2: "*How were their decisions affected by their mindset and the business environment they operated in?*"

RQ 3: "*How were the performance of the companies affected by their response to the pandemic?*"

This paper contributes to the field of entrepreneurship and management research by showing how the expectations of business leaders and their experienced degree of uncertainty affected how they responded to the Covid-19-pandemic. We also show the relationship between having flexible resources and the experienced degree of uncertainty, and how the performance of the businesses were affected by their crisis responses. Other studies have previously looked into similar research topics, but the use of the Covid-19-pandemic as a context for the study is new. This global crisis lacks a counterpart in terms of severity, and few parts of the international business environment were unaffected, making this an extremely interesting context for research.

2 Hypothesis development

2.1 Uncertainty

There are several ways to define the level of uncertainty that individuals and businesses face. The model lines of Courtney et al. (1997), Packard et al. (2017), and Finn et al. (2020) are central. Being able to clearly define the degree of uncertainty a company experiences will be of great benefit to them, as it will help with which tools to use. It will allow one to better determine what is actually uncertain and what can be determined. However, it should be noted that these models are commonly based on the management group's subjective perception of the uncertainty in a situation. This may imply that when determining the degree of uncertainty, it can be over or under dramatized, which could be critical for later decisions based on such models. As a result, the leader's or the leadership group's personal ability to utilize these models will be critical (Kildebo & Folkvord, 2021).

Laskovaia et al. (2019) found that whether a crisis is seen as permanent or temporary affects how companies may respond, and Haneberg (2021) found that the degree of uncertainty experienced had the same effects during the Covid-19 pandemic. In addition it has been found that an increased degree of experienced uncertainty led to a reactive focus on affordable loss in Norwegian SMEs (Haneberg, 2021). Altig et al. (2020) summarized Fed Chairman Jerome Powell's May 21st speech on the level of uncertainty in their article, noting "We are now experiencing a whole new level of uncertainty, as questions only the virus can answer complicate the outlook." According to Sørheim et al. (2021), the Covid-19 pandemic is an acute and unexpected crisis with significant uncertainty in both international and national markets. They all agree that most businesses have been impacted in some way, albeit to varying degrees and in different ways. The literature uses various economic analyses to try to say something about the level of uncertainty that is experienced in an attempt to draw uncertainty at a common level (Altig et al., 2020; Miescu & Rossi, 2021; Zhang et al., 2020) (Kildebo & Folkvord, 2021).

Undoubtedly, there has been a great deal of uncertainty surrounding nearly every aspect of the Covid-19 crisis, including the virus's infectiousness and lethality; the time required for developing and deploy vaccines; whether additional waves of the pandemic would emerge; the duration and effectiveness of social distancing; the near-term economic impact of the pandemic and policy responses; the speed of economic recovery as the pandemic recedes; and whether "temporary" government interventions would be effective (Altig et al. 2020) (Kildebo & Folkvord, 2021).

With uncertainty playing a big role in a crisis, and previous research showing that the degree of experienced uncertainty might lead to altered actions. Walker et al. (2021) discovered that when uncertainty was expected, it evoked fewer responses than when it was unexpected. This has led us to the following hypotheses:

H1a: "The way the companies expected their business environment to change during the pandemic, affected how they chose to respond, either by being proactive or reactive".

H1b: "The degree of experienced uncertainty affected how the companies acted, proactively or reactively".

Entrepreneurs have previously been found to tolerate a lack of information in uncertain situations better than non-entrepreneurs, and that they have a greater willingness to bear uncertainty when the potential gains are promising (Zichella, 2017). Another hypothesis has therefore been constructed:

H1c: *"Companies with an innovative mindset experienced a lesser degree of uncertainty, compared to those without, faced with Covid-19."*

2.2 Knowledge-based resources

There are two types of knowledge: scientific knowledge and dispersed information of particular time and place (Hayek, 1945). Scientific knowledge is typically data that is known in a firm since the management team has information about its employees in the form of CVs, completed courses, and tasks performed. In an uncertain situation, the

management team can swiftly assess what resources they have access to and whether any of their own personnel can help to minimize uncertainty or address a specific problem. If a company cannot locate this information inside, it has the option of immediately seeking external assistance. However, it is important to remember that not all types of knowledge appear on paper, and that there may be individuals who have what is commonly referred to as hidden-knowledge, which can frequently be knowledge of dispersed information of particular time and place. If the company's management team is unaware of this type of knowledge, it can swiftly lead to missed opportunities (Kildebo & Folkvord, 2021).

The fact that a company has a good understanding of its internal knowledge base does not imply that it will be successful in utilizing it. According to Barney (2001), in order to exploit its resources, a firm must also have a competent organization in place. Such internal mechanisms must be in place even before uncertainty or, at the very least, a crisis emerges. Because putting these in place while there is continued ambiguity will involve both wasting time and money, as well as diverting attention away from what is truly vital, which is lowering the uncertainty. A corporation with this organization in place can respond to environmental changes and new opportunities quickly (Cockburn et al., 2000). Something that could be critical for the survival of the business in a crisis (Kildebo & Folkvord, 2021).

The flexibility of the resources of a firm have been linked to the creation of strategic flexibility in the preparation for an uncertain future. These flexible resources can be used to create flexible strategic options that enable a company to respond to a rapidly changing environment (Sanchez, 1997). Connecting this to the experienced degree of uncertainty has led us to the following hypothesis:

H2: *"Companies with flexible resources experienced a lesser degree of uncertainty, compared to those with more fixed resources faced with Covid-19".*

2.3 Innovative mindset

Innovativeness has been directly linked to a company's ability to separate itself from competitors and produce solutions that can undercut those of the competition (Hughes & Morgan, 2007). Companies with an innovative mindset focus on employing innovation as a strategy to outperform competitors, grab new market shares, and deal with uncertainty. An innovative mindset captures a narrower spectrum of management approaches than entrepreneurial orientation, but it is a measure of how a company leverages innovation as a competitive strategy (Lumpkin & Dess, 1996) (Kildebo & Folkvord, 2021).

Proactivity has been specifically linked to a company's greater ability to be receptive to marked signals and be conscious of their customers' wants, and then use this to adapt to changes swiftly. Firms that are proactive in rapidly changing environments may be better positioned to capture new market shares and customers. This perspective, along with the development of new products, can help shape the direction of the environment (Hughes & Morgan, 2007) (Kildebo & Folkvord, 2021).

Proactiveness and innovativeness are both subfactors of the term entrepreneurial orientation, which describes characteristics of highly innovative and entrepreneurial

organizations (Lumpkin & Dess, 1996). Entrepreneurial mindset has been linked to better decision making in uncertain business contexts, as entrepreneurs may employ metacognitive awareness to aid in decision making. Based on previous experiences of a similar nature, this awareness allows entrepreneurs to visualize their decisions and how they might affect their firm (De Winnaar, & Scholtz, 2019) (Kildebo & Folkvord, 2021). This has led us to the following hypothesis:

H3a: "Companies with a higher degree of innovative mindset acted to a larger extent more proactively than those with a no/lower degree of innovative mindset during the Covid-19-pandemic".

Because proactivity is positively linked to the ability to operate in rapidly changing environments, the following hypotheses have also been developed:

H3b: "*A proactive response to the crisis led to an increased performance for the companies*"

H3c: "*A reactive response to the crisis led to decreased performance for the companies*"

The hypotheses of this study have been summarized in the following figure:

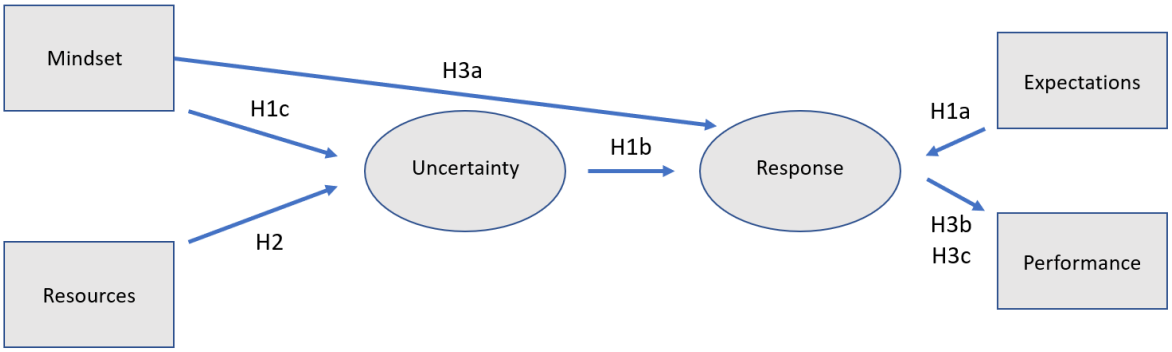


Figure 1.1: Summary of hypothesis in the study

3 Data and methodology

3.1 Research setting and sampling

The setting of the research has been in two different time periods: in early phases of the Covid-19-pandemic (May-October 2020) and approximately one year of the crisis (June-October 2021). This gives insight into how the respondents experienced facing the pandemic shortly after it started, and after dealing with it for some time. The study includes respondents from 442 innovative Norwegian companies that had received the skatteFunn-grant. The respondents were divided into two different groups: established and new companies. These groups were pre-determined based on the age of the companies, with established companies being older than 5 years and new being younger than 5 years.

3.2 Data sources and structuring

The data sources of this study were two different rounds of surveys targeting new and established firms, making it a total of four different questionnaires. In order to get reliable results from the data analysis the data from the four different surveys needed to be "cleaned" and structured. This was especially necessary for the use of the data in the analysis software SmartPLS (Ringle et al., 2015), as the program needed the related data to be put in the same worksheet. Also, the questionnaires for the new and established firms contained several non-matching questions that could not be used directly in relation to each other. Four different worksheets were therefore created to be used to answer the different hypotheses: Established firms with answers in round 1, established firms with answers in both rounds, new firms with answers in round 1 and new firms with answers in both rounds.

Table 3.1: Questions used for the PLS-SEM analisis (*Translated by the authors*)

Target	Group	Code name	Question
Innovate mindset	New and Established	R1F1a	I/we often envision a business opportunity before others
		R1F1b	I/we are very good at putting ideas and business opportunities into practice
		R1F1c	I/we are very good at obtaining the resources needed to utilize good ideas
		R1F1d	I/we often manage to find resources to work with new ideas internally, by making changes in what we use our resources on
Recourses	New and Established	R1F1e	There are many alternative uses for the company's most important resources
		R1F1f	It is easy to switch the company's resources from one application to another
		R1F1g	The cost of switching from one application to another is low
		R1F1h	The company's resources can be used to develop, create and deliver a wide range of products or services
Uncertainty	New and Established	R1C1a	The Covid-19 pandemic makes it very difficult to know how the business environment of the company will change in the future
		R1C1b	It is very difficult to predict the long-term consequences of the Covid-19 pandemic for the company
		R1C1c	It is very difficult to assess what consequences the decisions we make now will have for the company in the future

Proactiveness	Established	R1D1a	We have developed new products and/or services during the Covid-19 pandemic
		R1D1b	We are oriented towards new customer groups
		R1D1c	We have used new sales channels
		R1D1d	We have improved the products or services
		R1D1e	We have made the production of goods or services more efficient
		R1D1f	We have become more effective on the input factors
		R1D1g	We cut costs where we can, for example by reducing production, laying off employees or reducing wages
		R1D1h	We reduce our prices to maintain our market share
	New	R1D1f	We develop new products or services that are better adapted to the new situation
		R1D1g	We are oriented towards new customer groups
		R1D1h	We initiate new collaborations with partners
Reactiveness	Established	R1D1g	We cut costs where we can, for example by reducing production, laying off employees or reducing wages
		R1D1j	We are applying for public support schemes or crisis packages
		R1D1k	We take measures to strengthen liquidity, such as postponing payments, applying for a grace period or credit, or bringing in accounts receivables earlier
	New	R1D1a	We postpone investments and stop development projects to save money
		R1D1e	We are applying for public support schemes or crisis packages
Expectations	New and Established	R1B1a	We have had or will have major challenges in obtaining deliveries
		R1B1f	We are experiencing or expecting great pressure on our liquidity
Performance	New and Established	R2B1a	Has the company's financial progress been much worse or much better than expected?
		R2B1c	Has the probability that the company will succeed been weakened or strengthened?

4 Data analysis and results

4.1 Method

The analysis of the data and the hypotheses has been done through PLS-SEM-analysis', which is an abbreviation for partial least squares structural equation modeling. This method is well suited for complex cause-effect models with multiple variables. It allows for the indirect inclusion of measurements of unobserved variables through indicator values, in addition to being able to handle errors in the measurement of the observed variables. PLS-SEM differs from traditional statistical analysis' such as factor- and regression, by testing all the variables and indicators at the same time instead of one by one. The method is mainly used to explain the variance in the dependent variable by examining the model, which is in line with the purpose of this study (Hair et al., 2021).

To conduct the analysis the statistical analysis-software SmartPLS (Ringle et al., 2015) has been used. Here different structural models have been designed to test the different hypotheses, with independent variables being grouped together in latent variables and then these have been connected to other latent variables. This has been done to simplify the models and make it easier to determine the relationships between latent variables. An example is that the questions R1F1a, R1F1b, R1F1c and R1F1d (measuring the mindset of the respondents) were grouped together into the latent variable *Innovative mindset*. This variable was again linked to the latent variable *Uncertainty* which consisted of the questions R1C1a, R1C1b and R1C1c (measuring experienced degree of uncertainty).

The datasets that have been analyzed in this study consist of data from two different categories of businesses from two different "rounds". Because of differences in the questions in each questionnaire the hypotheses have been tested individually for the two categories. This has been done to ensure that enough data have been included in the study, as a removal of the unique questions for each group would result in validity- and significance issues.

4.2 Data validity

4.2.1 Convergent validity:

Convergent validity measures the relationship between the different measurement variables and the same variable. The measurement variables have the purpose of measuring the same variable in different ways/approaches, and they should therefore converge and share a high degree of variance. To evaluate the convergent validity in the reflective variables, we need to check the values of the different measurement variables ("loadings") and average variance extracted (AVE). The AVE-value shows that the measurement variables explain more than 50% of the variance in the variable.

In this study values above 0.6 for the loadings have been deemed to be sufficient to be included in the analysis, and the values below this threshold have been removed (Hair et al., 2021). The exceptions are the loadings below 0.6 that did not significantly improve the values of the other validity dimensions when removed, as these were kept (Hair et

al., 2021). For AVE the threshold has been set to >0,5 in this study, which is in line with recommended values (Hair et al., 2021).

Some of the results in this study show values of 1 for all the validity measures which is not ideal, but because these are single-factor variables (measurement variables) they are fine to include in an PLS SEM-analysis (Garson, 2016). These single-factor variables have been used to create models that offered valid results where the different questions of the questionnaire were too different to be used together.

4.2.2 Internal consistency reliability

To assess the internal consistency reliability, we must examine the data's Chronbach's alpha and composite reliability. Internal consistency reliability is used to determine whether or not variables are stable enough to be used as unobserved variables. On the other hand, composite reliability indicates the total "real" variance relative to the total variance on the collective variance between the observed measurement variables and has the same desired value-range as Cronbach's alpha (Hair et al., 2021). Because Chronbach's alpha and composite reliability have flaws, both are used to obtain an accurate picture of the data's reliability.

In this study Cronbach's alpha- and composite reliability-values above 0.6 have been accepted, with the desired range being between 0.7 and 0.95 (Hair et al., 2021).

4.2.3 Discriminant validity

Discriminant validity is concerned with whether a variable truly differs from another variable based on empirical standards. This means that the variable is unique and explains phenomena that no other variables in the model do. It is normal to check cross loadings and that the AVE is greater than the internal quadrated correlation when evaluating discriminant validity. Cross loadings demonstrate that a measurement variable measures more strongly for the variable it is meant to measure than for other variables (Hair et al., 2021 ; Sanchez, 2013). AVE > internal quadrated correlation (also known as the Fornell-Larcker criterion) indicates that there is a stronger correlation within the variable than there is with other variables (Hair et al., 2021).
In this study this has been controlled by using the built-in function for measuring the Fornell-Larcker criterion in SmartPLS (Ringle et al., 2015). Only values that passed this criterion were included in the final results.

4.2.4 Structural model

The structural model shows the relations between the main variables in the conceptual model, and makes it possible to evaluate the abilities of the model to predict the relations (Hair et al., 2021). In this study the structural model has been designed to fit all the hypotheses that were tested, but the analysis has been split into smaller models for more precise results.

4.2.5 Multicollinearity

The first step in analyzing the structural models is to ensure that they are multicollinear. This entails ensuring that the variables that predict another variable do not overlap. This means that there cannot be a perfect/near perfect relationship between the latent variables used to test the hypotheses in this study. We have used variance inflation factor (VIF) to measure multicollinearity, and the values below 3 have been seen as acceptable (Sarstedt et al., 2017).

4.2.6 The explaining power of the model

Further, the analysis of the structural model consists of evaluating the explaining power of the model. This is done by estimating R^2, which is a measurement of how much of the variance in the dependent variable is caused by the independent variables (Hair et al, 2021; Sanchez, 2013). The closer R^2 is to 1, the more of the variance the independent variables explain. Acceptable values of R^2 are contextual, and vary both in regard to the complexity of the model and the field of study (Hair et al., 2021). In this study no specific threshold for R^2 has been set, and the values have been evaluated individually.

4.2.7 Coefficients between the variables

PLS-SEM measures among other things the path coefficients between the variables in the models. These coefficients are used to establish the relationships between the variables in the models, and how these affect each other. As an example a path coefficient of 0,5 indicates that an increase in the independent variable, leads to an 0,5 increase on the dependent variable. This can again be used to test different hypotheses (Hair et al., 2021).

A bootstrapping procedure is required to determine the significance level of the results. With replacement, a large number of samples are drawn from the original sample in this procedure. The number of samples required to obtain an acceptable result from bootstrapping must be at least equal to the number of observations in the data set (Hair et al., 2021). In this study 10000 samples have been used to test the significance. An important output of the bootstrapping procedure is a set of t-values and *p*-values which is used to classify the significance-level of the results. p=0,05 indicates a significance-level of 5%, p=0,01 of 1% and p=0,001 of 0,1% :

*p< 0,05 = t > 1,96
**p < 0,01 = t > 2,576
***p< 0,001 = t > 3,291

Variables with significance level above 5% (p=0,05) have not been used in the analysis of the results and the discussion in this paper.

4.3 Measurement model

This model is an extension of *Figure 1.1: Summary of hypothesis in the study*, and shows how all the PLS-SEM analyses below are connected. In contrast to figure 1.1 the

response variables are splitted into two, proactive and reactive. This also applies to the variable expectations, which we have looked at through *increased demand, decreased demand* and *trouble with deliveries (*only for established companies*).* This has meant that we have had the opportunity to test all our hypotheses, both for new and established companies

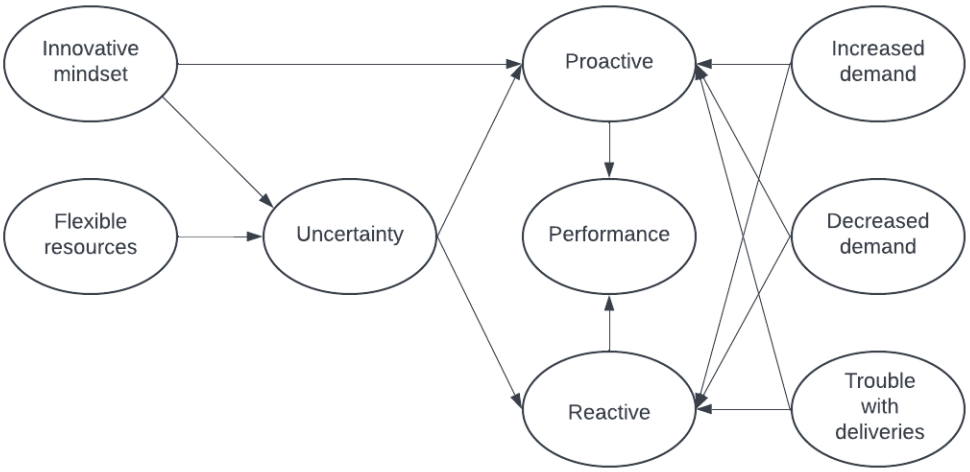


Figure 4.1: Complete measurement model for all hypothesis

4.4 Analysis

4.4.1 Analysis of hypothesis H1a

H1a: *"The way the companies expected their business environment to change during the pandemic, affected how they chose to respond, either by being proactive or reactive"*

Established:

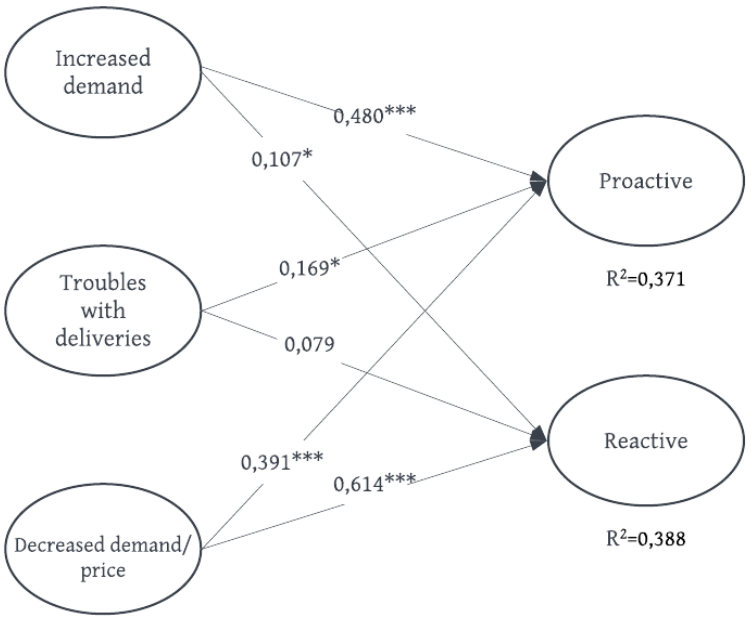


Figure 4.2: PLSM-SEM analysis testing hypothesis H1a for established businesses

Table 4.1: Validity and reliability measurements for *hypothesis H1a for established businesses*

	AVE >0,5	Cronbach's alpha 0,6-0,95	Composite reliability 0,6-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Increased demand	1,0	1,0	1,0	Ok	-	Ok
Troubles with deliveries	1,0	1,0	1,0	Ok	-	Ok
Decrease in price /demand and liquidity issues	0,583	0,638	0,805	Ok	-	Ok
Proactive	0,490	0,829	0,870	Ok	0,371	Ok
Reactive	0,585	0,646	0,808	Ok	0,388	Ok

For established businesses the PLS-SEM analysis shows that there are multiple significant relationships between the latent variables. For the relationship between an expected increase in demand and proactivity the path coefficients are 0,480 (***p= 0,000 and t= 9,701), which is strong and significant. For the relationship between an expected decrease in demand and proactiveness the coefficient is 0,391 (***p=0,000 and t= 6,991) which is significant. In relation to the connection between an expected decreased demand and reactiveness this is on the other hand weak, as the coefficient for this relationship is as strong as 0,614 (***p= 0,000 and t= 12,676). This means than an increase by 1 on how an established firm expected the demand of the company to decrease, the likelihood of them acting more reactively increased by 0,614. With all values for validity being in the desired range, and the R-squared for proactivity and reactivity being 0,371 and 0,388, these relationships are really strong. An expected increased and decreased demand, and expected troubles with deliveries therefore accounts for 37,1% of the proactive response and 38,8% of the reactive response.

New:

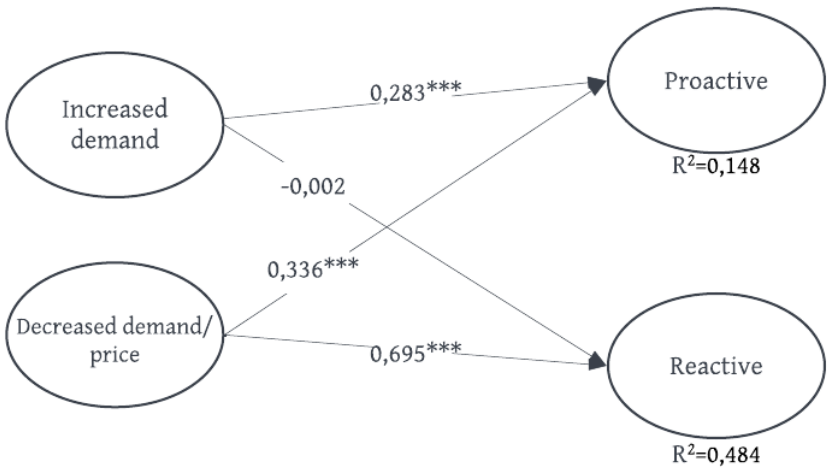


Figure 4.3: PLSM-SEM analysis testing hypothesis H1a for new businesses

Table 4.2: Validity and reliability measurements for hypothesis H1a for new businesses

	AVE >0,5	Cronbach's alpha 0,7-0,95	Composite reliability 0,7-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Increased demand	1,0	1,0	1,0	Ok	-	Ok
Decrease in demand	0,499	0,665	0,797	Ok	-	Ok
Proactive	0,694	0,780	0,872	Ok	0,148	Ok
Reactive	0,561	0,734	0,835	Ok	0,484	Ok ÷

The analysis shows a significant relationship between how the new firms expected their demand to increase or decrease, and if they chose to respond reactively or proactively. For the relationship between decreased demand and price and reactiveness the path coefficient is 0,695 (***p= 0,000 and t= 21,357), which is a strong and significant value. Looking at the r-squared for reactiveness the latent factors of increased/decreased demand account for 48,4% of the reactiveness-factor. For the relationship between expected decreased demand and proactiveness the path coefficient is 0,336 (***p= 0,000 and t=5,572) and the coefficient for increased demand is 0,283 (***p= 0,000 and t= 4,634). Both latent variables therefore are significantly connected to the proactive response of new firms. The values of the different data-variables are all in the range to or close to what are determined to be valid in this context.

4.4.2 Analysis of hypothesis H1c and H2

H1c: *"Companies with an innovative mindset experienced a lesser degree of uncertainty, compared to those without, faced with Covid-19"*

H2: *"Companies with flexible resources experienced a lesser degree of uncertainty, compared to those with more fixed resources faced with Covid-19"*

Established:

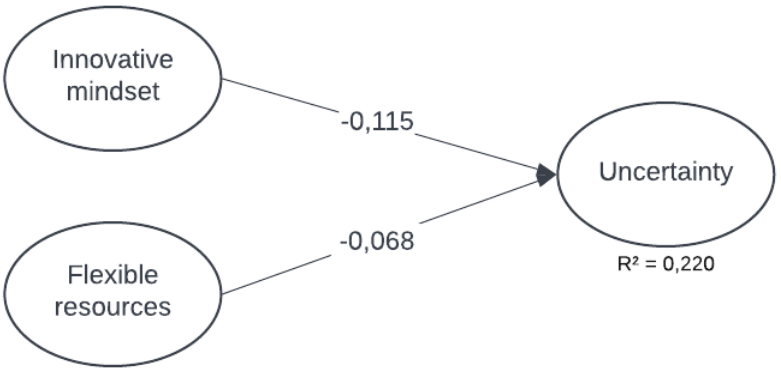


Figure 4.4: PLSM-SEM analysis testing hypothesis H1c and H2 for established businesses

Table 4.3: Validity and reliability measurements for hypothesis H1c and H2 for established businesses

	AVE >0,5	Cronbach's alpha 0,7-0,95	Composite reliability 0,7-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Innovative mindset	0,533	0,711	0,819	Ok	-	Ok
Flexible resources	0,623	0,819	0,866	Ok	-	Ok
Uncertainty	0,712	0,801	0,881	-	0,22	Ok

The analysis shows no significant relationships between the innovative mindset of the companies and the experienced degree of uncertainty of established companies (-0,115, p=0,209, t=1,258). The same is true for the relationship between the flexibility of firm resources and the experienced degree of uncertainty (-0,068, p=0,594, t=0,533). The validity and reliability of the variables were found to be satisfying.

New:

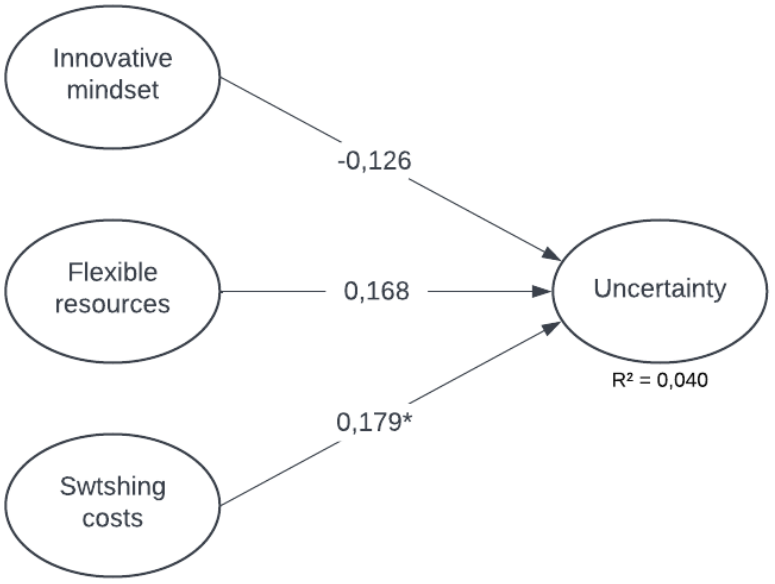


Figure 4.5: PLSM-SEM analysis testing hypothesis H1c and H2 for new businesses

Table 4.4: Validity and reliability measurements for hypothesis H1c and H2 for new businesses

	AVE >0,5	Cronbach's alpha 0,7-0,95	Composite reliability 0,7-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Innovative mindset	0,516	0,690	0,809	Ok	-	Ok
Flexible resources	0,629	0,737	0,834	Ok	-	Ok
Switching costs for resources	1,000	1,000	1,000	Ok	-	Ok
Uncertainty	0,746	0,846	0,898	-	0,040	Ok

The PLS-SEM analysis showed a significant relationship between the switching costs of firms resources and the experienced degree of uncertainty (0,179, *p=0,013, t=2,497). Further, no significant relationships between the innovative mindset (-0,126, p=0,273, t=1,097) and the flexibility of firm resources (0,168, p=0,121, t=1,551), and the experienced degree of uncertainty of new companies was found. The validity and reliability of the data were found to be within the desired value-range.

4.4.3 Analysis of hypothesis H1b and H3a

***H1b**: "The degree of experienced uncertainty affected how the companies acted, proactively or reactively"*

H3a: "Companies with a higher degree of innovative mindset acted to a larger extent more proactively than those with a no/lower degree of innovative mindset during the Covid-19-pandemic"

Established:

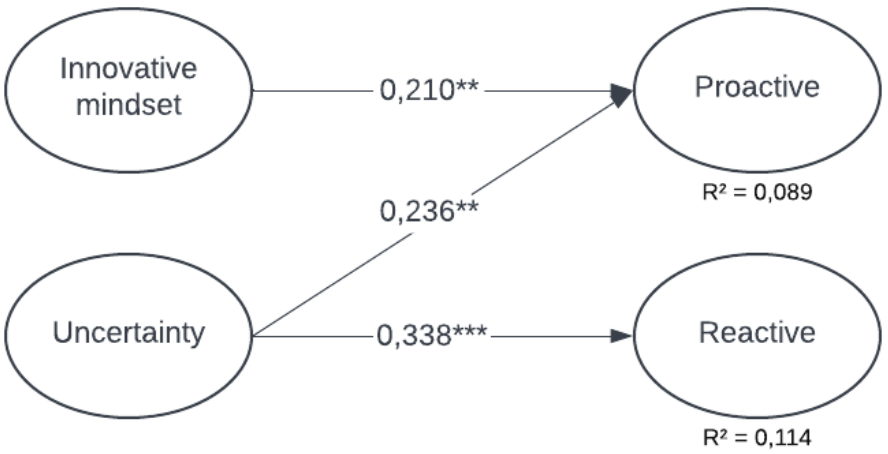


Figure 4.6: PLSM-SEM analysis testing hypothesis H1b and H3a for established businesses

Table 4.5: Validity and reliability measurements for hypothesis H1b and H3a for established businesses

	AVE >0,5	Cronbach's alpha 0,7-0,95	Composite reliability 0,7-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Innovative mindset	0,566	0,640	0,794	Ok	-	Ok
Uncertainty	0,713	0,801	0,882	Ok	-	Ok
Proactivity	0,520	0,818	0,866	-	0,089	Ok
Reactivity	0,508	0,676	0,805	-	0,114	Ok

The PLS-SEM-analysis showed a significant relationship between the degree of experienced uncertainty against proactivity (0,236, ***p*= 0,004 and t= 2,890), and reactivity (0,338, ****p*= 0,000 and t= 5,539). There was also a significant relationship between innovative mindset and proactivity (0,210, ***p*= 0,023 and t= 2,271). Uncertainty and proactivity have satisfactory values for AVE, Cronbach's alpha and Composite reliability with AVE being above 0,5, and the others being above 0,7. The factors of reactivity have questions regarding validity, with the values for Chronbachs alpha being below 0,7 (0,676). On the other hand the values for AVE and composite reliability were strong, and the results may therefore be used further. The R-squared for the relationships are on the weaker side with uncertainty explaining 8,9% of the proactivity factor, and 11,4% of the reactivity factor.

New:

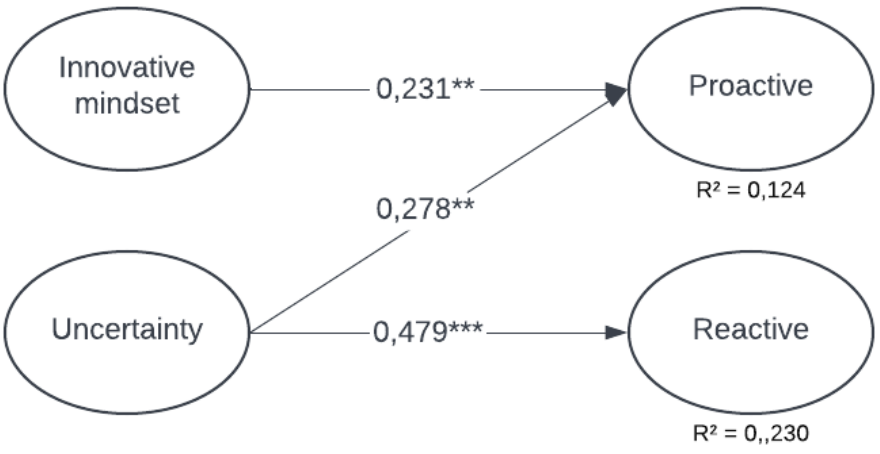


Figure 4.7: PLSM-SEM analysis testing hypothesis H1b and H3a for new businesses

Table 4.6: Validity and reliability measurements for hypothesis H1b and H3a for new businesses

	AVE	Cronbach's alpha	Composite reliability	VIF < 3	R-squared	Fornell-larcker criterion
Innovative mindset	0,511	0,690	0,806	Ok		Ok
Uncertainty	0,764	0,846	0,906	Ok		Ok
Proactivity	0,693	0,780	0,871	-	0,124	Ok
Reactivity	0,557	0,734	0,831	-	0,230	Ok

The analysis showed a significant relationship between the degree of experienced uncertainty against proactivity (0,278, ***p= 0,000 and t= 4,843) and reactivity (0,479, ***p= 0,000 and t= 11,300). There was also a significant relationship between EO and proactivity (0,231, ***p= 0,000 and t= 3,988). All factors have satisfactory values for AVE, Cronbach's alpha and Composite reliability with AVE being above 0,5, and the others being above to 0,7. Innovative mindset has a Cronbach's alpha of 0,690, and while this is below 0,7 it can still be viewed as sufficient (Hair et al., 2021). The R-squared for the relationship between uncertainty and reactivity is strong, explaining 23,0% of the variable, while it explains 12,4% of proactivity.

4.4.4 Analysis of hypothesis H3b and H3c

H3b: *"A proactive response to the crisis led to an increased performance for the companies"*

H3c: *"A reactive response to the crisis led to decreased performance for the companies"*

Established:

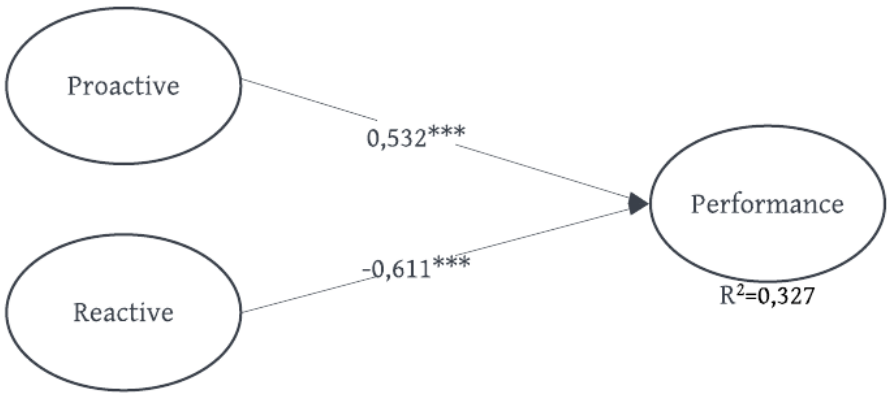


Figure 4.8: PLSM-SEM analysis testing hypothesis H3b and H3c for established businesses

Table 4.7: Validity and reliability measurements for hypothesis H1b and H3a for established businesses

	AVE >0,5	Cronbach's alpha 0,7-0,95	Composite reliability 0,7-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Proactive	0,542	0,859	0,892	Ok		Ok
Reactive	0,506	0,680	0,803	Ok		Ok
Performance	0,783	0,859	0,915	-	0,327	Ok

Our analysis found strong and significant relationships between proactivity and reactivity, and the performance of firms. Proactive response was found to be positively linked with performance (0,532, ***p=0,000, t=4,469). Opposite, reactive response was found to be negatively linked with performance (-0,611, ***p=0,000, t=4,469). As the variables were all inside the desired value-range of validity and reliability measurements, the results are valid. The R-squared of the analysis is 0,327, indicating that the responses of the companies were heavily influential on their performance.

New:

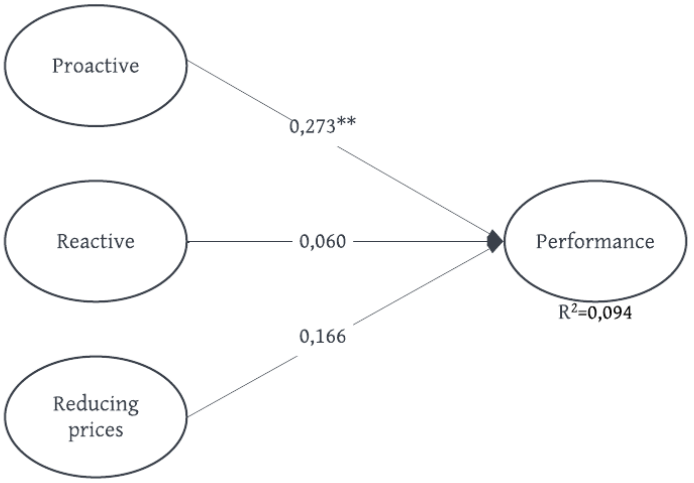


Figure 4.9: PLSM-SEM analysis testing hypothesis H3b and H3c for new businesses

Table 4.8: Validity and reliability measurements for hypothesis H1b and H3a for new businesses

	AVE >0,5	Cronbach's alpha 0,7-0,95	Composite reliability 0,7-0,95	VIF < 3	R-squared	Fornell-larcker criterion
Proactive	0,682	0,769	0,865	Ok		Ok
Reactive	0,524	0,682	0,759	Ok		Ok
Reducing prices	1,000	1,000	1,000	Ok		Ok
Performance	0,776	0,855	0,912		0,094	Ok

The analysis found a significant relationship between proactivity and performance for new companies (0,273, **p=0,007, t=2,681). This indicates that proactive responses were positively linked to performance of the companies. For the relationships between reactivity and reducing prices, and performance no significant results were found. The reactivity variable was in this case split into *reactivity* and *reducing prices* for improved validity and reliability of the results. In total the three variables describe 9,4% of the performance variable, which is low.

5 Results

The hypotheses that were developed and tested in this study have been summarized in the following tables (Table 5.1 and 5.2), showing whether they were supported, partially supported or not supported based on our findings:

Table 5.1: Summary of hypothesis and findings for established businesses

Hypothesis	Path:	Path coefficients	t-values	Significance levels	p-values	Supported/ not supported
H1a	Increased demand → Proactive	0,480	9,701	***	0,000	Supported
	Decreased demand/ price → Proactive	0,391	6,991	***	0,000	
	Decreased demand/ price → Reactive	0,614	12,676	***	0,000	
H1b	Uncertainty→Proactivity	0,236	2,268	**	0,004	Supported
	Uncertainty→Reactivity	0,338	5,539	***	0,000	
H1c	Innovative mindset → Uncertainty	-0,115	1,258		0,209	Not supported
H2	Flexible resources → Uncertainty	-0,068	0,533		0,594	Not supported
H3a	Innovative mindset→Proactivity	0,210	2,268	**	0,023	Supported
H3b	Proactive→Performance	0,532	4,469	***	0,000	Supported
H3c	Reactive→Performance	-0,611	6,129	***	0,000	Supported

Table 5.2: Summary of hypothesis and findings for new businesses

Hypothesis	Path:	Path coefficients	t-values	Significance levels	p-values	Supported/ not supported
H1a	Increased demand → Proactive	0,283	4,634	***	0,000	Supported
	Decreased demand → Proactive	0,336	5,572	***	0,000	
	Decreased demand → Reactive	0,695	21,357	***	0,000	
H1b	Uncertainty→proactive	0,278	4,744	***	0,000	Supported
	Uncertainty→reactive	0,479	11,300	***	0,000	
H1c	Innovative mindset → uncertainty	-0,126	1,097		0,273	Not supported
H2	Flexible resources → uncertainty	0,168	1.551		0,121	Not supported
H3a	Innovative mindset→proactive	0,231	3,988	***	0,000	Supported
H3b	Proactive→performance	0,273	2,681	**	0,007	Supported
H3c	Reactive→performance	0,060	0,318		0,751	Partial support
	Reducing prices→ performance	0,166	0,146		0,144	

6 Discussion

The purpose of this study was to examine the relationships between uncertainty, mindset and resources in the context of the extremely severe crisis which was the Covid-19-pandemic. This was done through the creation of a structural model that was tested by breaking it down into seven different hypotheses and sub-hypotheses measuring specific relationships. By testing the model in more specific hypotheses it was possible to analyze how uncertainty impacted the responses of companies, how the mindset of the companies led them to react proactive or reactive, or how the different responses led to changed performance of the companies. Many of the aspects we have examined have been studied in other contexts before, but few or none have yet looked at these topics in the context of the recent Covid-19-pandemic.

Our study found several significant relationships that are of great interest when studying innovation and management in the context of a severe crisis.

We found that there were significant relationships between the expectations the companies had for their future demand, and how they chose to respond to the crisis. As an expected increase in demand for the goods and services of a company, led to a more proactive response to the pandemic, both for established and new firms. On the other hand we found that an expected decrease in demand led to both proactive and reactive responses, with reactiveness being the most linked strategy. This shows support for our hypothesis H1a. These findings show an ambiguity in the responses of firms when the expectations of the company are that their business environment would become tougher. We find support for this in previous studies that have looked at different types of crises. With the degree of uncertainty being interpreted differently by different leaders and companies, some over dramatize and some under dramatize the severity (Finn et al., 2021; Packard et al., 2017; Courtney et al., 1997). In addition to the perceived severity of the crisis Haneberg (2021) and Laskovaia et al. (2019) found that whether a crisis is seen as permanent or temporary affects how a company might respond to the crisis. This might explain why an expected decrease in demand led to both reactive and proactive behavior among the respondents in this study. As proactive behavior was found to improve performance in this study, it might also imply a close connection between the business environment of companies, and their performance.

Further we found support for hypothesis H1b by showing a relationship between the degree of experienced uncertainty and how the firms responded by being proactive or reactive. Haneberg (2021) found that an increased degree of experienced uncertainty led to more reactive behavior among a group of Norwegian SMBs in the early phase of the Covid-19-pandemic, which is in line with our findings. Also we found a relationship between having an innovative mindset and the propensity to act proactive, which was a support for hypothesis H3a. In the latter hypothesis the new companies were both more proactive and reactive with increased experienced degree of uncertainty, which might be related to how previous experiences affect the response to uncertainty. Younger firms might have less experienced leaders that have yet to experience any severe crises, and the emergence of the pandemic potentially were more surprising for these than for more experienced leaders. This relationship has been found by Walker et al. (2021) which found that when uncertainty was expected it led to less reactions than when it was unexpected.

Our study also looked at how the innovative mindset and the flexibility of the resources of the companies affected their experienced degree of uncertainty, but no significant relationships were found. Support for hypothesis H1c and H2 were therefore not found in this study. Previous research has found these relationships (Zichella, 2017; Sanchez, 1997), which indicates that there exists a room for further research in our context as well.

Lastly we looked at how the proactive and reactive responses to the pandemic impacted the performance of the firms. Our results show a strong and significant relationship between the response of the new companies and the performance of the firms, with proactiveness being positively linked to performance and reactivity being negatively linked. For the new firms there was found a relationship between proactivity and performance, but the same relationship was not found for reactivity. Our study therefore finds support for hypothesis H3b in both new and new firms, while H3c is only supported for new firms.

This is in line with the findings of Hughes & Morgan (2007) which found proactivity to be positively linked to the ability of a company to be receptive to market signals and customer needs. And to further use this to adapt to rapidly changing environments to capture new market shares and customers.

7 Limitations and Further Research

Our study has used data that was collected early on in the pandemic, and this has enabled us to get an unique insight into the early thoughts and experiences of Norwegian business leaders. As a result our study is one of the first to investigate the relationships we have looked at in this context, making its contribution to the field of research significant.

The study also has its weaknesses, with the analyzes conducted having several limitations and potential shortcomings due to methodical issues as well as data related problems. Throughout the work with the paper it became clear that the data that was used originally had been collected for another purpose. With the data coming from four different surveys (Round 1, established and new, Round 2, established and new) problems related to inconsistency in the questionnaires arose. Several of the questions were only asked to one of the groups (established or new) and this made the process of viewing the data in relation to each other difficult. As a result the analysis has been conducted in a way that allowed for as much of the data to be included for each group, with the possibility to compare the results being more difficult. In practice this meant that questions that were linked to the latent variables in the PLS-SEM-analysis differed for the two groups. We as authors therefore chose to create these latent variables to best answer the hypotheses that were created based on the research questions.

Problems with questions being different in the survey for established and new companies have made the analysis' more difficult and less precise than if they were the equal. Using data collected for another purpose might lead to this. The sample size of companies that answered in both rounds were also low (small sample size), leading to difficulties in conducting a full comparison between the two rounds.

This study has found several interesting relationships between uncertainty, knowledge-based resources and innovative mindset, but with the above mentioned limitations of the study there exists several topics of further interest. Future studies should look more into how entrepreneurial orientation and knowledge-based resources affected the responses to the covid-19-pandemic. This relationship has been found in previous crises (Laskovaia et al., 2019), but has yet to be studied in the context of the recent pandemic. Researchers should also look further into how the business environments of the companies affected them during the pandemic, as their expectations for the future was found to be significantly linked to their responses in this study.

8 Conclusions and Implications

This paper contributes to the research on management and entrepreneurship by examining how the Covid-19 pandemic affected Norwegian companies. As the study has used data collected early on in the crisis, our results offer a unique insight into how companies expected their businesses to be affected, how they chose to respond and how they performed during the pandemic. As the study included over 400 Norwegian companies, the results are to a large degree representative for a greater population of businesses. The results can therefore be used to understand and learn from this crisis to prepare for the next one.

We have used three different research questions to look further into the responses to and effects of the pandemic, which further resulted in several hypotheses. When answering **RQ1:** "How did companies respond to the Covid-19-pandemic?", we see that companies were divided in how they chose to respond. Our findings indicate that there was no clear preferral of response to the crisis, as some companies responded proactively while others acted reactively.

When answering **RQ 2:** "*How were their decisions affected by their mindset and the environment they operated in?*" our findings show that several factors were significantly impactful. Firstly, the way firms expected the pandemic to affect them were found to significantly impact if the companies responded to the pandemic by being proactive or reactive. Further, we found that the innovative mindset and experienced degree of uncertainty were significantly impacting the responses of the companies. An increased degree of uncertainty led to more reactive responses, while a higher degree of innovative mindset led to more proactive responses.

Our third research question, **RQ 3** concerned the performance of the companies in relation to their responses**: "***How were the performance of the companies affected by their response to the pandemic?*". We found that the performance of firms were significantly affected by whether they chose to respond proactively or reactively to the pandemic. The results showed somewhat different results for established and new companies. For established companies we found a strong and significant relationship between proactive responses and increased performance, with a similarly strong and significant relationship between reactive responses and negative performance. For new companies we found a significant relationship between proactivity and improved business performance.

Our study has found several interesting relationships between mindset, resources, business environment, response and performance of companies during the Covid-19 pandemic. We therefore contribute to the research on management and entrepreneurship by providing new insights to the handling of the recent crisis. Bridging the gap of the existing theory and understanding of crisis responses, and those of the Covid-19 pandemic.

References

Altig, D. Baker, S. R. Barrero, J. M. Bloom, N. Bunn, P. Chen, S. Davis, S. J. Leather, J. Meyer, B. H. Mihaylov, E. Mizen, P. Parker, N. B. Renault, T. Smietanka, P. Thwaites, G. (2020) Economic uncertainty before and during the Covid-19 pandemic. National bureau of economic research

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17(1), 99-120.*

Cockburn, I. M., Henderson, R. M., & Stern, S. (2000). Untangling the origins of competitive advantage. *Strategic management journal,* 21(10-11), 1123-1145.

Courtney, H. Kirkland, J. & Viguerie, P. (1997) Strategy under uncertainty. *Harvard Business Review*

De Winnaar, K., & Scholtz, F. (2019). Entrepreneurial decision-making: new conceptual perspectives. *Management Decision.*

Finn, P. Mysore, M and Usher, O. (2020) When nothing is normal: Managing in extreme uncertainty. *Mckinsey & company. https://www.mckinsey.com/business-functions/risk-and-resilience/our-insights/when-nothing-is-normal-managing-in-extreme-uncertainty*

Garson, G. D (2016). Partial least squares: Regression & structural equation models. Raleigh. *NC: Statistical Publishing Associates.*

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). A primer on partial least squares structural equation modeling (PLS-SEM). *Sage publications.*

Haneberg, D. H. (2021). SME managers' learning from crisis and effectual behaviour. *Journal of Small Business and Enterprise Development.*

Hayek, F. A. (1945). The use of knowledge in society. *The American economic review,* 35(4), 519-530.

*H*ughes, M., & Morgan, R. E. (2007). Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth. *Industrial marketing management,* 36(5), 651-661.

Kildebo, P. N. & Folkvord, S. (2021). Connecting the dots: The effect of Knowledge-based resources and Entrepreneurial Orientation on the handling of uncertainty. *Unpublished manuscript. Norwegian University of Science and Technology, Trondheim.*

Laskovaia, A., Marino, L., Shirokova, G., & Wales, W. (2019). Expect the unexpected: examining the shaping role of entrepreneurial orientation on causal and effectual decision-making logic during economic crisis. *Entrepreneurship & Regional Development,* 31(5-6), 456-475.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of management Review,* 21(1), 135-172.

Miescu , M. & Rossi, R. (2021) COVID-19-induced shocks and uncertainty. *European Economic Review*

Packard, M. D. Clark, B. B. Klein, P. G. (2017) Uncertainty Types and Transitions in the Entrepreneurial Process. *Organization Science*

Ringle, Christian M., Wende, Sven, & Becker, Jan-Michael. (2015). SmartPLS 3. Boenningstedt: SmartPLS. *Retrieved from https://www.smartpls.com*

Sanchez, R. (1997). Preparing for an uncertain future: Managing organizations for strategic flexibility. *International studies of management & organization,* 27(2), 71-94.

Sanchez, G. (2013). PLS path modeling with R. *Berkeley: Trowchez Editions,* 383(2013), 551.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial least squares structural equation modeling. *Handbook of market research,* 26(1), 1-40.

Sørheim, R. Aadland, T. Alsos, G. A. Aspelund, A. Eide, A. E. Haneberg, D. H. Lauvås, T. A. Rasmussen, E. and Solheim , M. C. W. (2021) Innovasjon i krisetider – innovasjon og omstilling under covid-19. *Notat på oppdrag for Innovasjon Norge*

Thrane, C. (2017). Regresjonsanalyse: En praktisk tilnærming.*Cappelen Damm*

Walker, A. R., Navarro, D. J., Newell, B. R., & Beesley, T. (2021). Protection from uncertainty in the exploration/exploitation trade-off. *Journal of Experimental Psychology: Learning, Memory, and Cognition.*

Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance research letters, 36, 101528.*

Zichella, G. (2017). *Entrepreneurial Cognition: Three Essays on Entrepreneurial Behavior and Cognition Under Risk and Uncertainty.* Copenhagen Business School (CBS).

Paper 2

NTNU
Norwegian University of
Science and Technology

Sindre Folkvord & Petter Norsted Kildebo

How did startups respond to the Covid-19 pandemic, and what made them do this?

Supervisor: Roger Sørheim
Trondheim, June 2022

Norwegian University of Science and Technology
Faculty of Economics and Management
Dept. of Industrial Economics and Technology Management

Abstract

This paper is based on a qualitative study on how innovative Norwegian SMEs were affected by the Covid-19 pandemic, and how their mindset and resources influenced their responses. The scope of the research was influenced by previous research on crisis-response, as the pandemic created a completely new business environment never previously seen before. There was therefore a need to look into these findings in the context of the most recent crisis. The data collected in the paper was collected through in-depth interviews with leaders in the companies, to get a deeper insight into their perceptions and experiences with the Covid-19 pandemic. The paper uses three different research questions to investigate these relationships: RQ1: "*How did the Covid-19 pandemic impact Norwegian SMEs?*", RQ2: "*How did internal and external factors influence the response of the companies during the crisis?*", and RQ3: "*How did the responses to the crisis lead to lasting changes for the companies after the pandemic?*". To answer these questions the paper uses within-case and cross-case analysis to describe the individual experiences and responses of the companies, and to analyze the companies in relation to each other.

The results from the study shows that Norwegian SMEs were affected by the Covid-19 pandemic to a varying degree, where some experienced that the future of their business was threatened, while others continued with "business as usual". In relation to the second research question, we found that the experienced degree of uncertainty, the business environment the companies operated in, the entrepreneurial orientation of the company and the flexibility of their resources all impacted the responses of the firms. Lastly, we found that the responses to the pandemic led to several different lasting changes for the companies. As most became more digitized permanently after the crisis, some adopted a more risk-averse business strategy based on their experiences, while others adopted a more pro-risk strategy. Despite differences, all companies experienced that their ability to handle future crises were strengthened as a result of the pandemic.

Keywords: Uncertainty, Ambiguity, Crisis, Entrepreneurial Orientation, Entrepreneurial mindset, Effectuation, Decision-making logics

1 Introduction

Imagining your business being forced to shut down operations and limiting all physical contact with customers, suppliers and even your own team. This was for many an unthinkable event. However on the 12 of march Norway, alongside the rest of the world, decided to restrict all physical activities, in order to prevent the deadly Covid-19-virus from massively spreading. Bringing along extreme levels of uncertainty and making it almost impossible for businesses to predict the future. Giving leaders great difficulties operating their companies and bringing challenges to their decision-making logics.

In previous crises, and times of uncertainty and ambiguity, having an entrepreneurial mindset has been connected to improved business success (Kraus, 2012; Rauch et al., 2009). This effect was found to be moderated by a firm's entrepreneurial orientation (EO) during a severe economic crisis in Russia (Laskovaia et al. 2019). With EO consisting of several sub-dimensions, Laskovaia et al. (2019) argue that the role of these sub-dimensions as well as those of effectuation and causation, in dealing with decision-making logics during extreme uncertainty should be investigated. This has therefore become the theoretical basis of this paper.

The overarching purpose of this paper was to investigate how the Covid-19 pandemic affected Norwegian SMEs over the last two years, and how company actions were influenced by their mindset and resources.

In a previous paper (Folkvord & Kildebo, 2022) we found several interesting relationships between uncertainty, knowledge-based resources (KBR) and having an innovative mindset. We recommended that future studies should look more into how entrepreneurial orientation and effectuation affected the responses to the Covid-19 pandemic. Together with the recommendations presented by Laskovaia et al. (2019) this has been used as the starting point for our research. Through a qualitative study, based on 6 interviews with Norwegian SMEs, we have presented analyzes that have the primary goal of displaying how the firms responded to the pandemic, why they did this, and how the different sub-factors of EO and KBR have played a role in these responses. The three following research questions have been created to investigate these relationships:

RQ1: "*How did the Covid-19 pandemic impact Norwegian SMEs?*"

RQ2: "*How did internal and external factors influence the response of the companies during the crisis?*"

RQ3: "*How did the responses to the crisis lead to lasting changes for the companies after the pandemic?*"

This paper contributes to the field of management and entrepreneurship research by examining and explaining how Norwegian SMEs experienced and responded to the Covid-19 pandemic. As the crisis has been the most severe crisis in centuries, the lessons learned from the handling of the pandemic can be used to better prepare companies for future crises. We show how the business environment and perceived degree of uncertainty have affected the response of the companies, and how their degree of

entrepreneurial orientation and effectuation mediated these. Further developing the research on these areas.

2 Theoretical framework

The theoretical framework provides insights and helps to create a basic understanding for the relevant literature for this paper, as well as building a foundation for the reflections, results and analyzes. In this paper, we address the theories surrounding *uncertainty*, *entrepreneurial orientation* and *effectuation*.

2.1 Uncertainty

According to Bogevik and Federl (2018) uncertainty is caused by a lack of knowledge, which agrees well with Countney et al. (1997) and Sarasvathy (2003), which states that uncertainty exists in the form of analyzing opportunities, likelihood for outcomes and optimal next steps. For an entrepreneur this manifests in their daily operations where they are facing uncertainties about their product, market, and competition (Bogevik & Federl, 2018). Where literature of entrepreneurial cognition, particularly that of effectuation and causation, serves as the foundation for prominent views of entrepreneurial uncertainty (Sarasvathy, 2001; Sarasvathy & Dew, 2003) (Kildebo & Folkvord, 2021).

Courtney et al. (1997) and Packard et al. (2017) present two different frameworks for assessing the degree of uncertainty a business experiences. Courtney et al. (1997) focus on what can be known with a view to future prospects, spanning from a clear-enough future where single forecast precision is enough for determining the company's strategy, all the way up to true ambiguity, where the company has no basis to forecast the future. Packard et al. (2017) present a matrix determining uncertainty through the set of options and the set of outcomes a company has. Spanning from risk and ambiguity, which can be seen as a form of gambling or having insurance, to absolute uncertainty, where commercialization of radically new technologies often occurs. Finn et al. (2020) address that the duration and magnitude of a crisis are the most important determinants of uncertainty. Courtney et al. (1997), Finn et al. (2020) and Person and Clair (1998) all agree that in times of absolute/extreme uncertainty traditional management operating models rarely prove adequate, and organizations with inadequate processes can quickly find themselves facing existential threats (Kildebo & Folkvord, 2021).

In the context of the Covid-19 pandemic Finn et al. (2020) argue that the Covid-19 pandemic represents a level of extreme uncertainty, based on their framework for determining the level of uncertainty. Sørheim et al. (2021) describes it as an acute and unforeseen crisis that created significant uncertainty in worldwide and national markets. Adding that most businesses have been impacted in some way, although to differing degrees and in various ways. Representing the joint perceptions of business articles written during the pandemic.

As leaders determine the degree of uncertainty they experience, this can be over or under dramatized based on their subjective perception. And this could have a critical

impact on the decision making strategies that companies use to handle the situation (Folkvord & Kildebo, 2022).

2.2 Entrepreneurial Orientation

Autonomy, risk-taking, proactiveness, competitive-aggressiveness, and innovativeness have been identified as dimensions of entrepreneurial orientation (Lumpkin & Dess, 1996). Some academics advocate for the employment of solely proactiveness, risk-taking, and innovativeness (Miller, 1983; Covin & Slevin, 1989; Naman & Slevin, 1993; Zahra & Garvis, 2000; Kemelgor, 2002; Wiklund, 1999). Despite disagreements about which criteria should be included, EO has been proven to positively improve corporate performance in uncertain times. Some have discovered a relationship between EO and overall performance, while others have discovered a relationship between certain sub-dimensions for organizations in various stages and industries (Kraus et al., 2012; Wiklund & Shepherd, 2003; Lumpkin & Dess, 1996). In light of the significant uncertainty surrounding the Covid-19 pandemic, it would be most interesting to examine the individual EO factors and how they have affected business performance (Kildebo & Folkvord, 2021).

Proactiveness has been specifically connected to a firm's greater ability to be responsive to market signals and aware of their customers' wants, and use this to respond to changes quickly. Proactive enterprises may be better positioned to seize new market shares and customers in rapidly changing markets (Hughes & Morgan, 2007). As a result, proactiveness is an EO component that can be quite important for a firm's performance during times of considerable uncertainty (Kildebo & Folkvord, 2021).

Kraus et al. (2012) discovered that proactiveness was significantly and positively connected to company success, and that this relationship was unaffected by market volatility. This shows that even in volatile market conditions, such as the 2008 global financial crisis, acting proactively has a positive impact on corporate performance. They also agreed with Hughes and Morgan's (2007) findings, demonstrating that these findings applied not only to early-stage enterprises, but also to more mature SMEs (Kildebo & Folkvord, 2021).

Innovativeness has also been connected to a firm's ability to separate itself from competitors and offer solutions that can undercut those of the competition (Hughes & Morgan, 2007). This aspect would also be of great interest in a fast changing environment such as the Covid-19 crisis when looking at which specific EO factors affect business performance during uncertain times (Kildebo & Folkvord, 2021). In the other areas of EO, Kraus et al. (2012) discovered no direct relationship between innovativeness and improved company performance. However, in challenging environments, they discovered that innovative SMEs outperformed non-innovative SMEs. In the same uncertain environment as the financial crisis, they identified a negative relationship between risk taking and firm performance. Finally, they concluded that in times of market instability, SMEs should take less risks in terms of innovation and, if possible, delay the release of highly innovative items (Kildebo & Folkvord, 2021).

Further, entrepreneurial mindset has been linked to better strategic planning in uncertain business environments, as entrepreneurs may employ metacognitive skills to aid in decision making. Based on previous experiences of a similar nature, this awareness allows entrepreneurs to envision their decisions and how they might affect their firm (De Winnaar, & Scholtz, 2019). Entrepreneurs have been shown to be more tolerant of a restricted knowledge base than non-entrepreneurs. They have also demonstrated a stronger willingness to accept uncertainty in instances when the prospective profits are appealing (Zichella, 2017).

2.3 Effectuation

The effectual or causational nature of a company's decision-making logic can have a significant impact on how they respond in a crisis or unclear circumstances. Sarasvathy (2003) defines effectuation as taking a given set of means and focusing on the effects that can be achieved with these means. Causation is the process of taking a given outcome and focusing on the means required to generate that effect (Kildebo & Folkvord, 2021).

Effectuation is viewed as a multidimensional concept with four aspects (Haneberg, 2021; Eyana et al., 2017; Frese et al., 2020): (1) Experimentation, (2) Flexibility, (3) Precommitments, and (4) Affordable loss. Furthermore, differing perspectives exist on how these sub-dimensions relate to company performance (Kildebo & Folkvord, 2021).

In times of crisis and uncertainty, Lakovaia et al. (2019) and Mthanti & Urban (2014) argue for a moderating relationship between effectuation (negative) and causation (positive), and EO. Palmié et al. (2019) found that the sub-dimensions of effectuation influenced EO and business performance individually. Causation was found to be inversely associated with performance during times of uncertainty by Sarasvathy (2003) and Chandler et al. (2011), although effectuation as a whole was found to be favorably associated with the same situations. The ideas of effectuation and causation, and their link to entrepreneurial orientation, appear to be altered by the context in which enterprises operate. Laskovaia et al. (2019) discovered that whether a crisis is perceived as permanent or temporary influences how businesses behave (Kildebo & Folkvord, 2021).

It has been discovered that a company's overview of its internal resources is insufficient to exploit these in a crisis. To properly employ their resources, the corporation must also have a suitable organization in place prior to the crisis. With this in place ahead of time, the organization can focus on utilizing its resources to adapt to rapidly changing environments and opportunities, rather than attempting to build these up during the crisis (Cockburn et al., 2000).

The flexibility of a firm's resources has also been connected to the development of strategic flexibility in the face of an uncertain future. With these adaptable resources in place, the organization may develop flexible strategies to respond to unpredictable and fast changing surroundings (Sanchez, 1997).

During the Covid-19 pandemic, Haneberg (2021) discovered that the degree of perceived uncertainty encountered by SME managers led to a focus on affordable losses. Those

who concentrated on affordable loss reacted reactively to the uncertainty (Haneberg, 2021; Haneberg, 2020). On the other hand, learning from a crisis resulted in a more open-to-experimentation approach. Those who experimented were proactive in dealing with uncertainty (Haneberg, 2021; Haneberg, 2020). As a result, effectuation is viewed as a complex term (Haneberg, 2021; Alsos et al., 2016; Frese et al., 2020), with distinct aspects of effectuation affected by different triggers, such as uncertainty and learning (Haneberg, 2021). Personal differences amongst managers are also thought to play an influence in the implementation of certain effective behaviors (Haneberg, 2021; Alsos et al., 2016) (Kildebo & Folkvord, 2021).

2.4 Entrepreneurial Orientation, Effectuation and Causation

We have found that the literature on entrepreneurial orientation, effectuation and causation demonstrates a link between several sub-dimensions of the concepts (Kildebo & Folkvord, 2021). Further, we discovered that some sub-dimensions of effectuation positively affected EO while others negatively affected it. The aim of this study has therefore been to understand how these sub-dimensions have played its part during the Covid-19 pandemic. Giving us the opportunity to test the scholars through an ongoing crisis. As mentioned we have had great inspiration from Laskovaia et al. (2019) on the understanding of companies' different tasks on EO and effectuation. Furthermore, the sub-dimensions of EO have varied implications on the success of an organization and we challenge this through the use of different external factors, like uncertainty and business environment. These interactions are critical for understanding how different aspects of organizations' decision-making techniques and strategic orientation affect one another in terms of handling a crisis.

We therefore decided to take a closer look at SMEs we knew had a potential of having an entrepreneurial mindset. As we have seen, the preliminary data that has been collected on the Covid-19 pandemic show how firms have acted in accordance with the existing literature (Kildebo & Folkvord, 2021). We therefore base our argumentation for the importance of viewing both decision-making methods like effectuation and causation, and strategic orientations (EO) in relation to each other and the Covid-19 pandemic, on our previous work (Kildebo & Folkvord, 2021; Folkvord & Kildebo, 2022).

3 Methodology

The following chapter outlines the research method used in terms of collecting, structuring and analyzing the data for this paper. We designed the research method to answer the research questions presented in the introduction, with a focus on maintaining as valid and reliable data as possible.

3.1 Research design

When selecting the methodological approach we considered different alternatives, but decided to use a single-case study with the purpose of elucidating a response or a set of responses, why they were made and with what result (Schramm, 1971). Due to the lack of time and the desire to get deep into the selected cases we were also inspired by

Small-N-study where the goal is to go in depth on a few units, usually between five and ten, from different contexts to shed light on a phenomenon (Jacobsen 2015). Therefore, we considered this combination of studies as a good choice since the goal is to create a holistic understanding of how companies have responded to the uncertainty Covid-19 inflicted on them.

3.1.1 Selection of cases

The companies interviewed in this paper were selected through our network, because then we were able to choose companies that we knew met our criteria. We leaned on the hypothesis that it would be easier to conduct interviews with a greater depth with companies we already had a relationship with, than with companies selected at random. The selection criteria was that the company had to be between 5 and 10 years old (operate as a startup/scaleup) and that they needed to have cash flow from sales when the Covid-19 pandemic started.

3.2 Data collection

We used Semi-structured interviews as our primary data source, which, according to Gioia et al. (2013), are at the heart of successful qualitative research. The interviews were conducted to obtain a full description and personal experience of a phenomenon from the interview object so that we could subsequently comprehend and analyze the data (DiCicco-Bloom & Crabtree, 2006; Gioia et al., 2013).

The prepared questions were open-ended, and if the responses caught our interest, we asked follow-up questions (DiCicco-Bloom & Crabtree, 2006; Gioia et al., 2013). During the interviews, we never interrupted the speakers, instead allowing them to tell us what they found important. According to Gioia et al. (2013), allowing the interview object to take the researcher to material linked to the research question, makes it easier to investigate and find new concepts. It also allowed us to have in-depth discussions about the numerous concerns that surfaced in an open discussion (DiCicco-Bloom & Crabtree, 2006).

3.2.1 Structuring of the data

The questions that were used in our interviews were grouped together in six different categories, which were again divided into two more categories. These have been illustrated in the figure below:

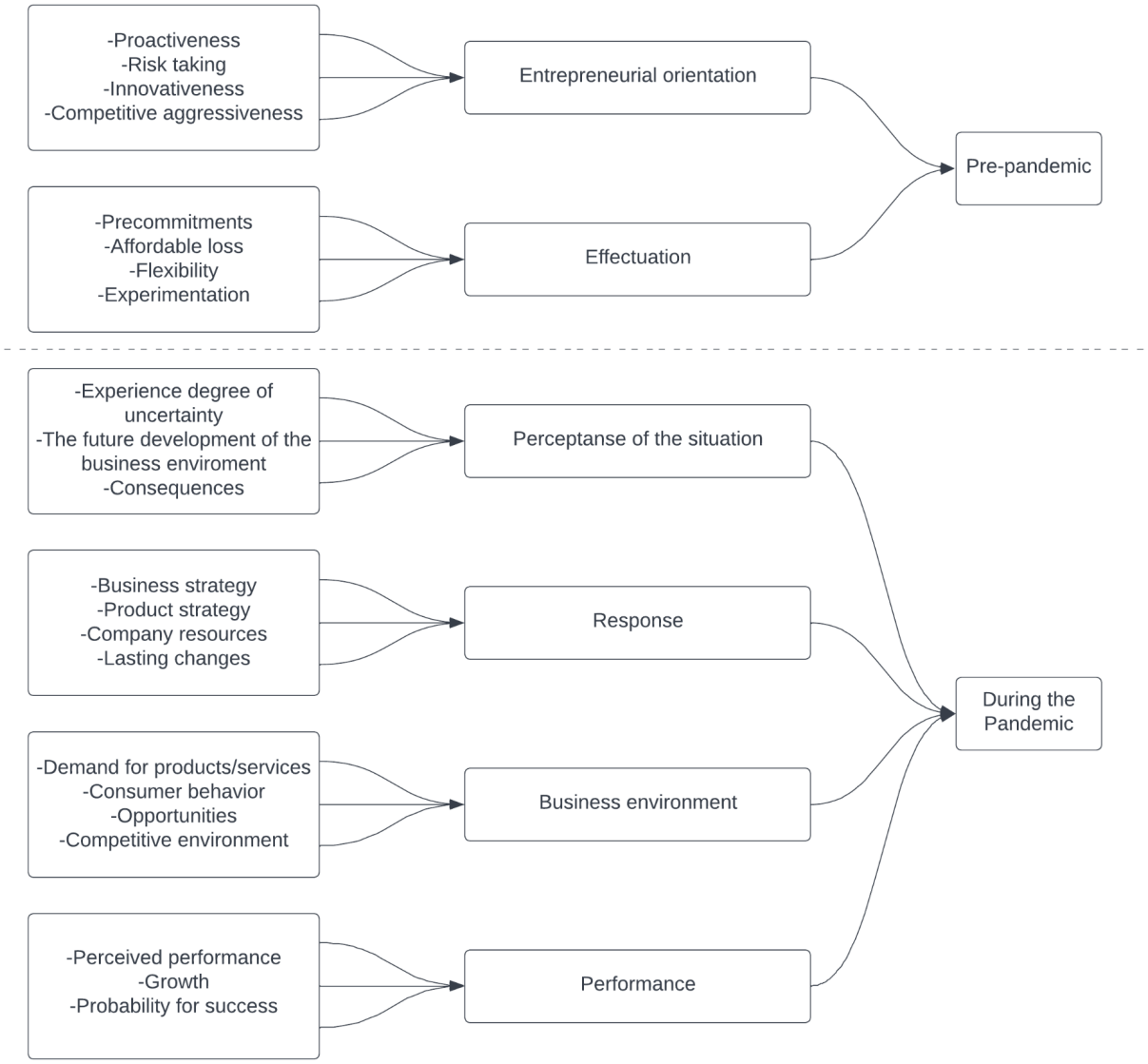


Figure 3.1: Overview of the questions, grouping and categories

The duration of the interviews varied, as this is the nature of semi-structured interviews. All interviews were recorded and transcribed by us. The interviews were conducted with only one of us present in the interview, this to save time and maintain the closeness one of us had to the subject being interviewed. However, both have read all transcripts and coded them both individually and against each other. The following table summarizes key information about the six interviews that have been conducted for this study:

Table 3.1: Overview of the interview objects and duration of the interview.

Company alias	Role at company	Interview duration
Alpha	CEO	60 min
Bravo	CEO	45 min
Charlie	Former CEO	45 min
Delta	COO	60 min
Echo	CEO	45 min
Foxtrot	CEO	60 min

3.3 Data analysis

According to Eisenhardt (1989), data analysis serves as the foundation for all theory development, but it is also one of the more difficult elements in terms of complexity. As the basic approach of the qualitative analysis, we used a within-case analysis followed by a cross-case analysis.

3.3.1 Within-case analysis

To begin, we employed a within-case analysis, which is a data analysis tool that helps researchers deal with the massive amounts of data that might be collected in a study. Although there is no standard method for conducting a within-case analysis, Eisenhardt (1989) insists that the researchers must become intimately acquainted with each specific case because this is the most important aspect of such an investigation, and thus believes that this is a good analysis method for this type of data. In this project, we evaluated the completed interviews in the form of short explanations of what they do, and how they dealt with uncertainty under the pandemic (Eisenhardt, 1989). We gathered inspiration and advice from past assignments and research articles because of the little standardized approach for a within-case study.

3.3.2 Cross-case analysis

Secondly we used a cross-case analysis to systematically compare the collected data from our interviews. The cross-case analysis consists of themes based on the framework of entrepreneurial orientation and effectuation, presented in the theoretical framework above. In a qualitative analysis the themes are the central elements in the data, produced prior or during the research (Ayres et al., 2003). Miles and Huberman (1994) presents a three step guide that we followed, which consists of data reduction, displaying the data and conclusion drawing and verification. The first step, data reduction, has been completed through the identification of subjects we wanted to investigate further. We grouped the collection into separate tables, divided by the themes, for simple comparison in the following phase. Miles and Huberman (1994) state that the data must be checked for plausibility, sturdiness, and confirmability during the verification process. This was accomplished by cross-referencing the facts and the drawn conclusion.

3.4 Reflections on the method

When used incorrectly, the qualitative research approach has some drawbacks that can reduce the study's validity and reliability. Validity is concerned with whether the results are deemed to be valid, whereas reliability is concerned with how "real" the results are (Jacobsen, 2000). In the next sections, we have discussed the validity and reliability of the methods utilized in this study.

3.4.1 Validity

Internal validity reflects whether or not the outcome is considered valid (Jacobsen, 2000). We employed procedures that have been shown to boost the validity of our study. To begin, we examined the case-companies before the interviews, as this is an efficient technique for verifying that the respondents are appropriate for the research. We were confident that our population met our predetermined criteria as we contacted companies already affiliated to our network. Furthermore, we coded the data individually because this is a well-known strategy for identifying new insights in the obtained data and strengthening the empirical grounding of the findings (Eisenhardt, 1989).

3.4.2 Reliability

Concerns with reliability include if any factors in the research contributed to the study's conclusions (Jacobsen, 2000). To ensure the reliability of the collected data in this research we used questions that were similar to those used by Laskovaia et al. (2019). This was done to make the comparison of the results in relation to previous studies easier, as these studies were the inspiration for this research. Furthermore, we were aware of the possibility of the interviewer effect prior to the interviews (Jacobsen, 2000), and we focused on maintaining a consistent style and conduct as interviewers throughout the process. All of the interviews were also taped so that we could confirm that the material we gathered was appropriately comprehended during the analytical process. This is seen to be a better way of data collection than merely taking notes (Jacobsen, 2000). We used inter-coder dependability as a final precaution to assure the reliability of research's reliability (Jacobsen, 2000). This meant that we coded the data separately before comparing the results in order to act as each other's critical opponent, which is a suggested strategy for data reliability (Gioia et al., 2013).

3.5 Data introduction

The data in this study have been collected from six different Norwegian SMEs that have been determined to be “innovative” based on our previous knowledge of their operations. They have been anonymized to maintain the integrity of their data, and have been given code-names for simplicity. In the following table the companies/cases are presented:

Table 3.2: Company presentation

Company	Industry	Market	Goods/Service	Sales method
Alpha	Transportation	Global with Europe as a focus area	Accessories	B2C
Bravo	Transportation	Global with Norway as a focus area	Consumer products	B2C
Charlie	Outdoor equipment	Scandinavia, Europe and North-America	Consumer products	B2C
Delta	Energy	Scandinavia, Europe and North-America	Service (Software)	B2B
Echo	Aquaculture	Global with Norway as a focus area	Service (Hardware-enabled software)	B2B
Foxtrot	Outdoor equipment	Norwegian and some european	Consumer products	D2C

In the following table, the "base-line" scoring on EO and effectuation of the companies prior to the pandemic have been summarized based on the conducted interviews:

Table 3.3: Findings from the interviews on the sub-dimensions of entrepreneurial orientation and effectuation

	Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
Entrepreneurial Orientation						
Proactiveness	Medium	High	High	Medium	High	High
Risk taking	High	High	Medium/ High	Medium/ High	Medium	Medium
Innovativeness	Medium	High	High	Medium	High	High
Competitive aggressiveness	Low	Low	Low	Medium	Low/ Medium	Low
Effectuation						
Precommitment	High	Medium	High	High	High	Medium
Affordable loss	Low	High	Medium/ High	Medium/ High	Medium	Medium
Flexibility	Low/ Medium	High	High	Medium/ High	High	Medium
Experimentation	Low/ Medium	High	High	Low	Low/ Medium	High

4 Findings

Following we present our empirical findings from this study. The findings are structured, as presented in the method, in a whinin-case analysis followed by a cross-case analysis.

4.1 Within-case analysis

In the following segment the cases have been analyzed individually. Each analysis is led by a table describing the companies' "scoring" on the individual sub-dimensions of EO and effectuation prior to the pandemic. These results therefore create a baseline for how the companies have previously operated when not affected outside of a crisis situation. The scores are used as a reference point when analyzing the responses of the companies in the study. These are followed by a description of the case-company's response to the pandemic. The classification of low, medium and high has been done by us based on our subjective interpretation of the responses from the companies.

Alpha

Table 4.1: Base-line for company Alpha

Entrepreneurial Orientation				Effectuation			
Proactiveness	Risk taking	Innovativeness	Competitive aggressiveness	Precommitments	Affordable loss	Flexibility	Experimentation
Medium	High	Medium	Low	High	Low	Low/ Medium	Low/Medium

This company makes consumer goods for the transportation industry, selling their products both direct to customers and through dealers. As Covid-19 started, they went into a process of changing strategy, focusing more on sales than developing new products. The company managed to operate with the use of digital solutions as their ability to conduct physical sales meetings was removed, but this resulted in sales stagnating for 2 years. The company's response to the Covid-19 pandemic has been perceived as overall reactive, as they waited for changes to occur. They also lost a major share of their technical workforce, which was a result of their change in company focus, lack of experimentation and the pandemic. Themself summarizes the crisis with: "*we managed, it was not a matter of course*".

Alpha claimed to have no direct competitors, and are therefore perceived as having a low competitive aggressiveness. Through the Covid-19 pandemic, there has been a sharp rise in prices in their markets, due to shipping and material costs. Pressuring their margins, which has led to them also having to give in and increase their prices. Despite this increase the company has seen a willingness to pay for their products, giving them hope for future sales. The fact that Alfa changed their focus towards sales gave them a great level of uncertainty as their normal channels, physical meetings and conferences, were shut down. This posed major challenges for their company's growth and motivation. Even though the pandemic is considered over, the company still battles different aspects of uncertainty stemming from the crisis. The largest being the supply of new cars, where production is taking longer than expected, due to the continued effects of the pandemic, and the ongoing Ukraine-Russia war, which causes purchasers to be reluctant with their orders to lower their own risk. Despite the combination of having to

catch up two years with stagnated sales and new uncertainty coming along, the company has had overall growth in sales through the pandemic.

The company has been through a rough time with great difficulties in the market, but has earned well from being frugal and the security they have had through a large inventory. The fact that the company survived the pandemic represents a strength and endurance that can provide subsequent returns in the future when they can sell digitally, at conferences and physically. Giving them the opportunity to again strengthen their workforce, both on the technical and commercial side.

Bravo

Table 4.2: Base-line for company Bravo

Entrepreneurial Orientation				Effectuation			
Proactiveness	Risk taking	Innovativeness	Competitive aggressiveness	Precommitments	Affordable loss	Flexibility	Experimentation
High	High	High	Low	Medium	High	High	High

The Bravo company develops and sells products to the transportation industry. They are on a global scale delivering to more than 30 different countries and have a large product portfolio with more than 50 items. The company has a high level of experimentation, which can be seen through their development of different products and in that they have found better production methods than their suppliers have today. Business-wise, Bravo did not experience any major consequences of the restrictions, as they already had a distributed workforce. Described in the words of their CEO's: "*We were exceptionally digital*". Their experienced level of uncertainty was low and they indicated that they did not care about uncertainties that lie one or two years ahead.

Their industry was characterized by large volumes and low margins. This was also much of the basis for their existence, because this has led to opportunities that they have seized. The company is willing to take risks and describe this as an effect of them not being obligated to have low risk, which larger companies in this industry often is. Giving them the opportunity to lose money over short periods of time, as there can be major upsides for them in the long run. As of now there are no direct competitors, which gives them an even more significant advantage to seize opportunities that arise than larger and older companies in the industry. An example of this was the opportunity they took when the use of micro mobility increased during the pandemic, also increasing their potential sales.

Their use of digital aids has become a lasting change for the company as they still conduct meetings digitally, for what they describe as practical reasons. They have also invested in e-commerce and focused on what will take the company to the next step. The company has had more opportunities through a historical view, with the number of customers they have taken on and new products they have developed over the last two years. This has given success to the company, but they think maybe they would have had even more if the pandemic had not occurred. They are therefore modest to say that the pandemic gave them many new opportunities.

Charlie

Table 4.3: Base-line for company Charlie

Entrepreneurial Orientation				Effectuation			
Proactiveness	Risk taking	Innovativeness	Competitive aggressiveness	Precommitments	Affordable loss	Flexibility	Experimentation
High	Medium/ High	High	Low	High	High	High	High

Charlie is a company that sells outdoor equipment to customers, with their primary market being Scandinavia, Europe and North-America. They see themselves as both a goods and service supplier. The company has been built on a strong belief that it is important to be in continuous change, which was made clear through their statement: "*Changing is part of our DNA*". Their resources were seen as flexible and could be moved from one department/project to another, if they believed it could generate a greater return of investment (ROI), or that one project is more likely to succeed than another. When the covid-19 pandemic erupted, Charlie acted quickly and summoned a management meeting, where they decided to continuously monitor internal processes to be in control of their operations, and this led the company over to a phase focusing more on product development and professionalization.

The industry they operate in is conservative, but functional, and where margins are important. Charlie has no direct competitors, but a large number of substitutes. When they develop new products they use a combination of market- and internal as well as a gut feeling. Through the Covid-19 pandemic the company experienced a decrease in demand, which was frustrating when they had control on the supplier side, which many had great challenges with. This was due to the restrictions imposed on the western world leading to reduced demand, while they were able to continue production in Asia. The company viewed themselves as opportunistic which was reflected in their proactive work ethic, and they were perceived as particularly risk willing with development of new products. Which is highly represented through the statement of their former CEO: "*You can not be experimental and not be willing to pay the price*".

Before the Covid-19 pandemic, the company was already working with many remote employees, which gave them great benefits in the early phases of the pandemic. Combined with their great ability to change, this can explain some of the reasons why the company, despite their decline in demand, strengthened its operational structure and increased the number of employees. The company's biggest challenge during the crisis was the difficulty of not knowing the rules of the game in the environment in which they operated. However, they summarize the pandemic as a great opportunity to develop, as a company put under greater pressure and stress often develops faster and are strengthened.

Delta

Table 4.4: Base-line for company Delta

Entrepreneurial Orientation				Effectuation			
Proactiveness	Risk taking	Innovativeness	Competitive aggressiveness	Precommitments	Affordable loss	Flexibility	Experimentation
Medium	Medium/ High	Medium	Medium	High	Medium/ High	Medium/ High	High

The Delta company provides Software as a Service (SaaS) and some hardwear-enabled software. They provide their service to energy companies in Scandinavia, Europe and North-America. Their competitive landscape is somewhat divided, where they in some areas have great competition, while they in other areas experience having a monopoly. The company is one of the older ones in this study and has through its growth acquired another company, giving them more resources, however challenges in terms of exploitation and affiliation. Delta experienced a high degree of uncertainty, because they initially were afraid that purchasers had to pause all activities, but this uncertainty diminished rapidly after understanding that this was not the case.

Many of the customers in their market are larger state-owned companies that operate with tenders, leading to increased competition and making it hard to secure technical quality, because of "low cost providers". Which has led to episodes where they later have helped competitors on projects because they were not able to complete the assignment. In their industry it is also common to do *joint industry projects* to lower the risk for everyone involved. Making it easier to test and experiment with new products and solutions with a lower risk. A major challenge with this type of industry is that it is expected to have a regularity of up to 99.8%, which entails high demands on deliveries, making purchasing processes often long and requires a lot of conviction.

Delta's response to Covid-19 was to assemble a management team, which met every day to handle new policies and requirements. To handle the uncertainty the company also used a Business Continuity System (BCS), which they previously used to train for hacker attacks. Giving them support and a framework within *crisis management*. Before the pandemic broke out, they had already opened up for the employees to work from home. Which meant that they had experience with this, and therefore did not see digitalisation as a big challenge. They were more concerned about the health of their employees and therefore focused a lot on facilitating good home offices. In the aftermath of the pandemic, they have had some challenges in getting the employees back to the office and have therefore had various measures for this, to maintain an affiliation to the company. Which can be seen in the context of their COO's statement: "*I believe the transition from a start-up to a growing company is tougher than the Covid-19 pandemic*".

Echo

Table 4.5: Base-line for company Echo

Entrepreneurial Orientation				Effectuation			
Proactiveness	Risk taking	Innovativeness	Competitive aggressiveness	Precommitments	Affordable loss	Flexibility	Experimentation
High	Medium	High	Low	High	Medium	High	Low/Medium

This company sells both hardware and software to other businesses, with the hardware serving as an enabler for the software's delivery. As a result, they see themselves as B2B service providers. Being a startup, the company's normal environment is fraught with uncertainty, and the emergence of the Covid-19 pandemic had no significant impact on the company. They assessed the current state of their business and how the crisis would affect them in the first phase of the crisis before continuing to do what they had been doing previously. Because they perceived their normal environment as highly uncertain, they did not consider the degree of uncertainty caused by the pandemic to be significant.

The company's industry was not adversely affected by the pandemic, and there was no decrease in demand for their products. As they also had focused on using precommitments to sign long-term deals with their customers, these contracts were a "safety net" for the company. In the transition towards a fully digital operation, they discovered that their customers accepted doing sales meetings on digital communication platforms to a greater extent, allowing the company to be more effective in their sales process. They adopted a sales-strategy directed at more digital sales-meetings and conducted training to improve the skills of the sales-people in this domain. This also allowed them to enter markets that were previously out of reach due to the high costs associated with traveling to customers on a global scale. The pandemic also had a positive impact on their ability to attract the talent they required for their development. Many of these new employees had come from large corporations that did not "*take adequate care of their employees*," while others had been temporarily laid off due to the pandemic.

Because the pandemic had no severe consequences for the company, but rather increased demand, they did not make many major changes to their operations or products. As stated by their CEO: "*It did not affect us much. We would have taken another crisis*". The most noticeable change was in their approach to working remotely from the office, and they had employees who relocated to other cities but were still able to work for them. As a result, the increased degree of working from home has been accepted as a permanent change in how the company operates.

Foxtrot

Table 4.6: Base-line for company Foxtrot

Entrepreneurial Orientation				Effectuation			
Proactiveness	Risk taking	Innovativeness	Competitive aggressiveness	Precommitments	Affordable loss	Flexibility	Experimentation
High	Medium	High	Low	Medium	Medium	Medium	High

This company makes consumer goods for the sporting industry. They were fortunate to operate in a market that was affected positively by the emergence of the pandemic. Because of the restrictions imposed on Norwegian society, most Norwegians were forced to find new ways to spend their free time, which resulted in a rapid increase in the sales of sporting goods. This company, like most others, experienced a brief period of increased uncertainty as a result of the changed business environment, but they quickly realized that this was more of an opportunity than an existential threat.

As they assessed the situation, they realized that the most difficult challenge they faced was meeting the rapidly increasing demand for their products. This entailed hiring new employees to handle the increased workload and the logistics of ordering larger batches of products from their manufacturers, as well as ensuring that they had enough working capital to support this strategy. As the market expanded due to the pandemic, they didn't mind what their competitors were doing because there were enough customers to keep everyone happy. This relationship with the competitors existed prior to the pandemic, but it was strengthened during the crisis. As the orders piled at a rapid pace, there was some uncertainty due to the unknown duration of the crisis. "*How long should we expect the pandemic to last, and how much inventory should we have?*" The company made the strategic decision to take the risk of having a larger stock of products, knowing that they would be able to sell them off eventually. This was made possible by a product portfolio that did not require any changes to remain relevant in the coming years.

The company grew during the pandemic, and they estimated that it accelerated their business by at least a few years due to increased demand caused by restrictions. They have also adopted a more pro-risk strategy because they now know how to handle rapid changes in demand, and have a robust product range. As a result, they now have larger stocks and pending orders at manufacturers as part of their long-term strategy. The CEO stated: "*It is always difficult to estimate how the future looks like, but we are confident that we can sell off our inventory anyways, and we would be able to handle rapid changes in demand in the future as well*

4.2 Cross-case analysis

The following segment is a cross-case analysis between the different cases, where the findings from the interviews have been summarized and co-presented in different tables:

Table 4.7: Findings from the interviews on the market characteristics of the industries and the response of the companies

	Business environment	Dominant influencing factors	Experienced degree of uncertainty (1-7)	Response	Lasting changes
Alpha	No physical meetings and therefore difficulty in training customers, as well as no conferences	More acceptance for doing sales digitally	High/medium degree of uncertainty (5)	Lost 50% of their team (Combination of the pandemic and company development), focus shifted towards sales	Digital sales channels

Bravo	More limited than before Covid-19, but not critically limited or changed. Delays and uncertainty with supply and shipping	Use of micromibillity increased during the pandemic, resulting in a higher sales ratio for that area	Low degree of uncertainty (3)	Investing in e-commerce and facilitation for home office	Digital meetings
Charlie	Lost sales opportunities do to strict shutdowns in important markets	Consumers traveled less → reduced need for products	Medium/high degree of uncertainty (5)	Facilitation for home office	More professionalism on an operational level
Delta	No significant impact on the market → Business as usual	Decision-making processes at customers have taken longer than usual	High degree of uncertainty (7) in the early phases of the pandemic, which quickly fell to a medium/low (3) when they had assessed the situation	No significant response to the crisis as they continued with their original plans. Facilitation for home office. Changed travel habits	Working more from home, and allowing employees to relocate to other cities if necessary
Echo	Slightly positive impact on the industry → Business as usual	More acceptance for doing sales digitally	Low degree of uncertainty (2) due to little affected industry → Business as usual	No significant response to the crisis as they continued with their plans. More working from home	Working more from home, and allowing employees to relocate to other cities if necessary. Changed way of ordering and stocks.
Foxtrot	Rapidly increasing demand due to restrictions imposed on the society →lots of new opportunities	No physical fairs were held, resulting in a changed way of marketing	Low degree of experienced uncertainty (3) in the early phases of the pandemic	Actions were taken to meet a rapidly increasing demand → Increasing number of employees and inventory	Placing larger orders at manufacturers and keeping larger inventories as they know they can sell their products eventually → increased willingness to take risks

Based on the findings in the within-case analysis the companies have been put together in groups based on their response to the crisis. This has been done to simplify the

process of comparing the responses of the companies with the others, and to easier find relationships between their mindset and actions.

4.2.1 Business environment

Table 4.8: Effects in business environment

	Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
Business environment	No physical meetings and therefore difficulty in training customers, as well as no conferences	More limited than before Covid-19, but not critically limited or changed. Delays and uncertainty with supply and shipping	Lost sales opportunities do to strict shutdowns in important markets	No significant impact on the market → Business as usual	No significant impact on the market, but limited opportunity to conduct regular sales meetings	Rapidly increasing demand due to restrictions imposed on the society →lots of new opportunities
Dominant influencing factors	Few opportunities to continue with their original sales process	Use of micromibillity increased during the pandemic, resulting in a higher sales ratio for that area	Consumers traveled less → reduced need for products	Decision-making processes at customers have taken longer than usual	More acceptance for doing sales digitally	No physical fairs were held, resulting in a changed way of marketing

When the pandemic first emerged, the business environment of many companies were heavily affected. As the world is diverse and complex, this was not the case for all companies, as some felt little to none of the damaging effects of the crisis. In our study this has also been the reality. We have seen that companies that relied on doing physical sales meetings lost the ability to continue conducting these because of the restrictions that were put on mobility and contact.

This was the case for Alpha, Bravo and Echo, where this was especially challenging for Alpha as they were dependent on showing the value of their products to the customers first-hand to prove their excellence. As the industry fairs around the world were closed down due to the restrictions, the company could not travel to meet their customers. With the company being in a critical phase of their commercialization process in the beginning of the crisis, they missed out on a lot of sales because of this. They were also affected indirectly by their customers having issues with supply of their products, as the products of Alpha were add-ons to these. The company did experience that their customers became more positive towards doing the sales process digitally, but in total they experienced a demanding business environment.

Bravo was also set up for doing their sales through physical sales channels, but were to a lesser extent forced to change their process. They were dependent on retailers to sell their products, and when the restrictions were introduced they did not know how these would be affected. On the other hand they experienced a great demand for their products as Norwegians were forced to stay at home, spending more money on micromobility. The increased sales were a welcoming effect for the company, but they also found themselves in the difficult position of being dependent on suppliers in Asia,

where the restrictions were most severe initially. This, combined with the issues related to shipping created a somewhat challenging business environment.

Opposite to Bravo, Charlie lost much of its sales due to the reduced frequency of travel of the population. As the consumers traveled less, fewer bought their products and they found themselves in a more difficult situation than normal. Unlike Bravo, their supply chain worked well despite them also having their manufacturers in Asia, and they experienced few issues in this domain. They therefore found themselves in a business environment where the demand was smaller than the supply, as their main markets of Norway, Europe and North-America went into saving mode.

Delta experienced that their business environment largely remained the same through the pandemic. As they have mostly governments as customers these continued to buy their services even though they were forced to digitize their sales process. The most prominent effect of the pandemic was that the decision processes of their customers took longer than before. Their products were all software-based and they could therefore successfully reach their customers through digital channels.

Echo has similar experiences as Delta, as their customers were little affected by the pandemic and continued to buy their products and services. As they were forced to change from physical to digital sales processes they experienced that their customers also became more positive about conducting the entire sales process this way. With an international reach of their business, Echo therefore was able to reach new markets without having to travel to each customer, saving large amounts on travel expenses. They also found that lots of highly skilled workers became available on the market because they were not satisfied in their previous job, or they had been laid off.

Foxtrot was the company that had the most positive business environment during the pandemic, as they benefited heavily on the restrictions and the new travel pattern of Norwegians. With people spending their vacations in their home country, many spent more time outdoors and therefore needed new outdoor equipment. The size of their market increased rapidly and the demand was greater than the supply. As the restrictions closed down all fairs that they had previously used to market their products they lost the opportunity to continue their marketing as they had done before. This was however not a problem, as their sales started to grow organically.

4.2.2 Experienced degree of uncertainty

Table 4.9: Experienced degree of uncertainty for the companies

	Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
Experienced degree of uncertainty	(5) High/ medium degree of uncertainty	(3) Low degree of uncertainty	(5) High/ medium degree of uncertainty	(3) Low degree of uncertainty → Business as usual	(2) Low degree of uncertainty → Business as usual	(3) Medium/ low degree of uncertainty

In the initial phases of the pandemic, the uncertainty businesses experienced varied heavily. Some experienced little to no uncertainty, while others feared for the existence of their life's work.

As the pandemic closed in on Norway and the society went into lockdown, Alpha experienced a high degree of uncertainty (5). The fairs they were supposed to introduce and sell their products on were canceled, and their previous "modus operandi" were discarded. The CEO of the company experienced this uncertainty as a motivational killer, and the company struggled keeping their employees motivated through the crisis. As they were dependent on dealers to make their sales, they also experienced a great deal of uncertainty related to how the introduction of a new product would be welcomed.

Bravo on the other hand experienced a low degree of uncertainty (3) as their demand grew as a result of the crisis. They viewed the situation as one that would not heavily affect them in the long run. As a startup they were already in a highly uncertain environment, and the pandemic therefore did not scare them as much as it might have done for a more established company.

Due to less travel during the pandemic, Charlie experienced a high degree of uncertainty (5), especially related to the customer-side of their business. As their main markets of Norway, Europe and North-America locked down they were unsure about whether they would be able to sell their products. They felt that they no longer knew the "rules of the game" in their industry, and as a result they were unable to calculate how the market would react to their actions. The crisis was not felt as an existential threat, but they saw the need to respond in order to maintain their position in the market.

Delta perceived their situation as highly uncertain for a short period in the initial phase of the crisis, but this quickly changed to a business-as-usual-view. They were already used to working remotely, as they had their team distributed across several locations and continents. This made the transition to working from home a smoother process than for many other companies. As a software business with governmental customers they had also prepared extensively for crises prior to the pandemic, and they therefore knew what they were supposed to do in such a situation. The fact that their customers were stable organizations also contributed to a calmer business environment.

With a market almost unaffected by the pandemic, Echo also experienced the pandemic as more or less a business-as-usual situation, with a low degree of experienced uncertainty (2). Similar to Bravo, being a startup they already operated in a highly uncertain environment with a need for handling "crises" on a daily basis. They therefore did not view the pandemic as something more challenging than their normal operation. The only thing they saw as a potential problem was the reduced opportunities to conduct physical sales meetings, but this was quickly deemed to be more of an opportunity than a threat.

Foxtrot also experienced a low degree of uncertainty (3) as they almost immediately after the restrictions were enforced found that their sales increased rapidly. As they were already positioned to sell their products directly to their customers through their own web-site they also did not need to make any changes to their operations other than working from home. As a small and agile team they had little problems with this transition as well. The company was also fortunate enough to have already placed large orders of their products prior to the pandemic as they were anticipating a large growth in

their market. This also removed the uncertainty that other companies had regarding the supply chain.

4.2.3 Response

Table 4.10: The companies overall response to the Covid-19 pandemic

	Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
Response	Reactive → Reduced their team by 50%, shifted focus	Proactive → Invested in e-commerce to utilize increased demand	Proactive → Changed their focus to product development	Neutral → Were heavily prepared for a crisis prior to the pandemic	Proactive → Trained their sales team in digital sales and hired new talents	Proactive → Doubled their workforce in order to meet an expected long-term demand

As they experienced the crisis as highly uncertain and a motivational killer, Alpha responded in a reactive manner to the pandemic. They moved their operations to their home offices, but did not feel that they were able to create the same team dynamics as they did before. With their team of four being specialized in their respective tasks they were not positioned to make changes to their strategy without changing this. As a result they ended up losing 50% of their team because they no longer had any work for their product developers, as they transitioned to a focus on sales. In this process they also became a more professional organization that was focused on capitalizing on the products that they had developed. In terms of supply of their products they were strongly positioned with fairly large stocks of products in storage. With a product that would have benefited heavily from physical demonstrations for customers, it was difficult to sell these through digital channels. According to themselves they tried to seize every opportunity that they were given, but they also were given little to no help from the Norwegian government as they fell outside the support schemes as a startup. In terms of response strategy they "*closed their eyes*", and "*hoped for the best*", when making their decisions.

Bravo experienced the start of the pandemic as sort of a shock, but as they already were a distributed team with employees in multiple countries they were used to working remotely. This made the transition to working full time from home a more smooth process than for many others. As they also gained access to their R&D-facilities fairly quickly they were able to continue their operations much like before. Because of the restrictions, the market for mobility-products increased rapidly and Bravo therefore needed to act to seize the new opportunities. Their previous sales channels had been directed towards retailers, but with an uncertainty about whether these were able to operate as before they needed to change their approach. Therefore they chose to invest in e-commerce. This was done to be able to meet the increased demand. A problem for the company was that they had their manufacturers located in Asia, and because of rising prices on shipping, they had to adapt to a new way of transporting their products by air. This was way more expensive than before, but was necessary to be able to get their products delivered to the customers.

On the 12 of March, 2020 Charlie put together a "war room" where the management team were able to continuously monitor the operations of the company. They were not afraid of their business not surviving, but they felt a large degree of uncertainty faced with the new restrictions. As Bravo they were already working remotely in their normal operations and this made them able to easily transition to working from home. In contrast to other companies they did not experience problems with their supply chain, but their sales were heavily affected by the reduced travel of their customers. As a result they chose to reduce the risk of their activities to a minimum and become more conservative in their approach, keeping their possibilities "open" for new opportunities. The monitoring of the company also led to a maturing process where the company became much more precise and professional in the operations. Cash flow was controlled to avoid problems because of the reduced sales. They also chose to shift their focus towards product development as they already had the resources in-house.

Unlike most other companies, Delta was heavily prepared for a crisis as they had trained for a crisis situation through their daily operations as a software provider for governmental customers. When the restrictions were introduced they assembled a team of leaders that met on a daily basis to handle new guidelines and demands. They had already implemented a business continuity system that enabled them to act calm and collected in the crisis, making decisions based on a predetermined strategy. As their team already operated in multiple countries and continents they were used to working remotely already and their operations were therefore not affected significantly. They introduced measures to mitigate the negative effects on employees working from home over longer periods, as this was seen as crucial to keep the spirits high in the company. These measures included weekly newsletters and holding general meetings to keep the spirits of the employees high.

Echo responded to the crisis by being somewhat proactive, even though they themselves don't believe this. When the company chose to continue with "business as usual" through the pandemic they fought through a range of decisions that less entrepreneurial firms might have found way scarier. As the CEO of Echo experienced the degree of uncertainty to be as low as two, they were able to look through all the blurry predictions of the future, and act proactively by adapting their company. They found themselves in a position where lots of highly skilled professionals were available for hire, and Echo therefore had the opportunity to hire people that were previously out of reach. As they grew their number of employees by over 100% through the pandemic, they took on great responsibilities in terms of commitments to their workers. The pandemic made many of their customers more accepting towards doing deals digitally and this opened a new area of potential sales for the company. With their salesforce previously being drilled in doing physical sales meetings, they conducted training in how to do digital sales meetings. This was a proactive move by the company as they positioned themselves for a changed way of working for the future, targeting to grow their business through the crisis.

Because of a rapidly increasing demand for their products, Foxtrot needed to respond to be able to seize this opportunity. As they were already positioned to make sales in a digital environment, they faced other challenges such as handling the increased volume of sales. The company therefore expanded their workforce by 50% in order to be able to deliver their products to the customers and keep them happy. As the CEO of the company expected that the demand for their products would continue to be high for an

extended period of time, they chose to increase their orders of products. This was a high-risk strategy as they put themselves in a position where they held larger stocks of products, without knowing for certain that these would be sold. To mitigate this risk they made sure that they had products that would be able to sell for years to come without a need for updated versions. This allowed them to respond to the massive demand without risking running out of cash with an unsellable inventory.

4.2.4 Lasting changes

Table 4.11: Lasting changes for the companies

	Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
Lasting changes	Digital sales channels	Focus on e-commerce and digital meetings	More professional organization with more control over cash flow	More acceptance for employees working from home	-More acceptance for employees working from home -Changed way of ordering from manufacturers	-Placing larger orders of their products and keeping larger inventory →More pro-risk

As the pandemic has come to a halt for the time being, companies have gone into an operation mode of post-crisis management. The recent crisis has pushed forward changes in strategy and operations that would not have been likely before.

Alpha has made several changes to their business model as a result of the pandemic, and their company is not the same as it was going into the crisis. As they needed to change their focus towards sales, they let go of 50% of their employees that were focused on product development. This led to a more "grown up" organization according to the CEO. It has also made them more dependent on suppliers and partners in the development of new products, as they no longer do this themselves. As they are a turnkey supplier, they have needed to change their manufacturers from Asia-based to Europa-based companies. Despite the need for major changes to the company, Alpha believes that they have handled the crisis very well, and that they have come out as a stronger company on the other side. With a stronger track-record they are now able to increase their sales rapidly when the sales fairs are being reopened and they can interact with their customers once more. Nevertheless they assume that they have been pushed back by one or two years in their development because of the crisis.

Bravo needed to change their focus towards e-commerce as a result of the restrictions that reduced their ability to fully rely on retailers to sell their products. This has become a permanent change in their business model, as they now sell most of their products through their own web-site. As a result they have been able to enter markets in several countries through the crisis, and they are now better positioned for success than ever. With their working style being more digital even after the pandemic, they have also made lasting changes to the way they conduct team meetings. They experienced success with holding their meetings completely digital even if they were in the same room, and this is something that they will continue to do. As the pandemic has continued in Asia,

they have lately experienced that even though Norway has reopened business, the rest of the world has not and this affects their supply chain.

As a result of the pressure and stress Charlie was put under during the crisis, they underwent a maturing process along the way. This has led them to become a more professionalized organization where they have better control of the operations of the business. The precision levels and their cash flow are now monitored and they are better prepared for a turbulent business environment. This professionalization has led to a strengthening of the operational team in the company. As their results were on track with their expectations prior to the pandemic, they believe that they have been significantly strengthened as a company because of the changes they have made. The focus on product development during the crisis positioned them for the reopening of the society with increased consumer spending that they were able to utilize.

Delta has changed the way they work in terms of flexibility working from home, but they have elsewise done few other changes that have become lasting strategies. As they were already heavily prepared for a crisis, they have continued and updated their response to future crises, but they are more afraid of hacker attacks than they are for another pandemic. They have expanded their workforce, but this has been accredited to the natural growth of the company, rather than an effect of the pandemic.

Even though they continued with business as usual through the crisis, Echo has made changes that they view as lasting strategies. They have become more open to employees working from home, and they have been flexible towards those who have needed to relocate during the pandemic. As a result of their customers being more accepting of digital sales processes they have also continued to conduct their sales meetings through digital platforms. This has allowed them to enter new markets in other countries and continents with more ease. Lastly they have changed the way their purchasing of products are being done. With "just-in-time" being the preferred strategy before the crisis, this is now long gone. As they prepare for future crises they now purchase their products twelve months ahead, and hold ten times the inventory as before.

Foxtrot have continued with their larger orders of products even after the pandemic, as they have learned that they are able to sell out their inventory long-term anyways. They have also adopted a more pro-risk strategy as they have handled a world-wide crisis without being severely affected. This means that they have taken on larger commitments in terms of a larger workforce and inventory, as they feel comfortable in their ability to succeed also in the future. As a result of the pandemic, they assess that their development has been pushed forward by a couple of years, and they are therefore superbly positioned for future growth.

5 Discussion

The goal of this study was to examine and understand how the Covid-19 pandemic affected Norwegian SMEs over the last two years, and how company actions were influenced by their mindset and resources. Through the within-case and cross-case analysis we got a deeper insight into how the individual companies responded to the

pandemic, and why they did this. The following chapter discusses the findings from the analysis in relation to each other and the research questions of the paper.

The low degree of uncertainty experienced by Bravo, Delta, Echo and Foxtrot may be explained by their high degree of EO as having an innovative mindset has been linked to better performance in uncertain times. As companies with an innovative mindset face uncertain situations they might use their experiences from related experiences to visualize how their actions would play out in a real world scenario (De Winnaar, & Scholtz, 2019). Entrepreneurs have also been found to tolerate uncertainty better than non-entrepreneurs when their potential gains are favorable, and this ability might explain why several of the companies found the pandemic to be not so uncertain. This may also be the case for Alpha and Charlie, who also have high degrees of EO, but they might have been affected more from their business environment than the others.

As leaders of companies experience uncertainty differently, it has previously been found that their subject perception of uncertain situations affect the strategies they use to mitigate this (Folkvord & Kildebo, 2022). This can be found in this study as well in the cases of Alpha, Bravo and Charlie, as they experienced somewhat similar situations that were perceived totally differently. As Alpha experienced the start of the pandemic as a "motivational killer" and a potential threat to their company, Bravo and Charlie had a more calm and collected approach to the situation. Even though Bravo perceived their uncertainty to be significantly lower than Charlie, this can potentially be attributed to their more positively affected business environment. As they had issues related to costs and supply chain, Charlie was more concerned with their ability to sell their products, and this can be seen as more severe.

Foxtrot was the company that acted most proactively of the companies in this study. As mentioned they found themselves in a highly "positive" business environment where they were given lots of new opportunities to succeed. These opportunities were theirs to take, but they needed to respond in a proactive way in order to profit from them. In this situation their high degree of entrepreneurial orientation and effectuation came in handy, as their mindset had prepared them to seize new opportunities. Specifically they had a high degree of proactiveness and innovativeness, and a tendency to experiment prior to the crisis. This combination of traits might explain why they were able to exploit the new opportunities they were given because of the Covid-19 pandemic. They had also proactively positioned themselves for market growth that enabled them to fully seize these opportunities. This is supported by Hughes & Morgan (2007) which stated that proactive companies might be able to seize new market shares and customers in changing environments. We found the same relationship in a quantitative study on response to the Covid-19 pandemic of Norwegian companies, as a higher degree of EO was positively linked to proactive response (Folkvord & Kildebo, 2022). Further, this is supported by Kraus et al. (2012) that found proactiveness to be positively related to improved performance, even in volatile markets.

Based on how Delta and Echo responded to the pandemic and how little it affected them, we can argue that they did not need to make major changes to their operations to succeed. A crisis strategy of "business as usual" was thus the preferred strategy in this situation, and any significant shifts in focus to deal with the crisis could have quickly had a negative impact. In relation to the expected behaviour of the companies based on their high degree of EO this lack of active response was unexpected in the context of the

pandemic. On the other hand the nearly unaffected business relationship explains this response, as the companies could continue operating in a "normal" environment. This can be viewed in light of the findings from Courtney et al. (1997) which argue that when a company looks at its future as clear, a single forecast strategy is enough to determine the strategy of the company going forwards.

Delta differed from the other companies in their preparations for the crisis. As they had prepared extensively for such a situation, they were in control of their available resources and were able to utilize these to handle the situation. With a business continuity system in place, they were able to stick with their original strategy as they were able to look through the uncertainty and still be in control of their business, exploiting any opportunities they were given. This strategy is supported by Cockburn et al. (2000) which stated that companies who have an organization in place that could utilize the available resources, would be in a position to adapt to a rapidly changing environment. In contrast, those who try to create these organizations during a crisis risk losing their focus and ability to exploit opportunities because of a lack of resources (Cockburn et al., 2000). This may have been the case for Charlie, as they implemented more professional structures during the crisis to mitigate the negative effects of the restrictions. Alpha also used an opposite strategy as they did not use any structure in their strategy, "closing their eyes" and "hoping for the best". Previous research has found that effectuation is negatively linked with EO in terms of performance in times of crisis and uncertainty, while causation and planning-based strategies are positively linked to EO (Laskovaia et al., 2019; Mthanti & Urban, 2014). Therefore, our findings agree with those of previous research.

The company that was most negatively affected by the pandemic was Alpha, as they ended up reducing their workforce by 50%. This was partly attributed to the lack of flexibility of their resources, as they were not transferable to their new focus area. On the opposite side, the other companies in this study were found to have medium to high degree of flexible resources. This may explain why they were better positioned to seize the opportunities they were given. Sanchez (1997) supports this, as the flexibility of a firm's resources are positively connected to the ability to develop strategic flexibility. The strategies can be utilized to respond to unpredictable and rapidly changing environments.

6 Limitations and Further Research

This study has been conducted as a part of a master's thesis, and the research methodology might lack the full academic quality of those of more experienced academics. Nonetheless, our research has benefited from the exclusive access we have been given to the information of companies in our network. This has given the collected data an elevated degree of honesty, as there has been a mutual trust between us as interviewers and the interviewees during the process. Having this intimacy with the case companies might also affect the quality of the research negatively, as the close connection might raise questions about biased data-collection from our side. This may be because of our prior knowledge to the companies, which might have influenced how we have phrased questions and follow-on questions. Also, this study is based on a relatively

small population of eight companies, and in a larger research project this number would have been significantly higher.

This study does not cover all the aspects of the Covid-19 pandemic and the responses of companies, and because of our chosen focus there are areas of potential interest that have been left out. Our analysis indicates that the most prominent factor of influence on the response to the pandemic was the business environment that the companies operated in, rather than their mindset and resources. Because of the limited research population in this study we recommend that future studies look into more specifics of the business environments of different industries during the crisis. A larger population of respondents could offer a more detailed overview of this, and make a solid foundation for a deeper understanding of the responses to the Covid-19 pandemic.

7 Conclusions and Implications

This paper has sought to examine and understand how the emergence of the Covid-19 pandemic affected innovative Norwegian SMEs by asking three different research questions. As we have seen the pandemic affected the businesses in one way or another, but the effects were significantly different between the individual companies. For many the business environment they operated in dictated how much they were able to do in response to the crisis.

When answering **RQ1:** "*How did the Covid-19 pandemic impact Norwegian SMEs?*", we have to take into account several factors. Some companies experienced that their demand increased rapidly, while others were unable to continue their sales operations as before. In this study we have found that market trends that affected different industries played a major role in this. As the population traveled less than before some companies, like Bravo and Foxtrot, were given lots of new opportunities to seize, while others like Charlie lost much of their room for maneuvering. The restrictions that were introduced to society also affected businesses differently, and some like Alpha, Bravo and Echo were forced to change their sales process, while others were able to continue with business as usual.

We therefore argue that the Covid-19 pandemic impacted Norwegian SMEs to varying degrees, as some were forced to deal with new business environments and challenges that had never been previously relevant, while others were nearly unaffected. This made the gap between those who were "fortunate" and "unfortunate" larger than previously experienced. As the restrictions and the corresponding customer behavior were nearly impossible to predict in advance, the business environment of a company could change completely from one day to another.

RQ2 concerns how internal and external factors influenced the response of Norwegian SMEs to the Covid-19 pandemic, and to answer this we must assess multiple factors. As companies prior to the crisis had a modus operandi that were shaped by their mindset, these were to a varying degree affected during the pandemic. In our study we have seen that proactiveness has been positively linked to the ability to seize opportunities that have arisen because of the crisis, while inflexible resources were found to limit this ability.

Answering **RQ2:** "*How did internal and external factors influence the response of Norwegian SMEs to the Covid-19 pandemic?*", we argue that internal and external factors in fact did heavily influence the response of the companies. The experienced degree of uncertainty had a significant impact on how the companies chose to respond to the pandemic, as some felt their motivation were killed off, while others saw no need to worry. Further, the business environment of the companies were important. A positive environment combined with a low of uncertainty led to more proactive behavior, while a negative environment characterized by uncertainty led to a more reactive behavior. The responses to these different experiences were moderated by the mindset and resources of the firms, as proactiveness was found to be crucial in the ability to seize opportunities. Risk taking was also found to play an important role in the ability and willingness to utilize an expanded room for maneuvering for the companies, as the outcome of their decisions were highly uncertain. The flexibility of companies' resources were also central in the responses as those with inflexible resources were to a little degree able to change their focus without needing to change their organization. Those with flexible resources were on the other hand able to adjust their operations to their new business environments. The focus on precommitments as a way of reducing risk related to the future of the business also moderated the responses, as this gave the companies more long-term clarity than for those without.

The final research question, **RQ3:** "*How did the responses to the crisis lead to lasting changes for the companies after the pandemic?*", is one that offers differing answers. As most companies needed to adapt to a digital business environment, most have continued with this strategy even after the pandemic, as it offers the employees more flexibility. Further, we see that several of the companies have adopted a strategy that disfavors risk, as they have organized their operations to be ready for future crises. This resembles the work Delta did prior to the pandemic, where they created a Business Continuity System to handle their response. Others, like Foxtrot, have adopted a more pro-risk strategy as they have discovered that their business was more robust than previously thought. We argue that the responses to the crisis led to lasting changes in all the companies that have positioned them to be able to handle a future crisis better than the recent. Several of the companies experienced that their organizations were forced to become more professional, as the need for precision and control was crucial to manage their business environment. This professionalization might be a side effect of the pandemic that could lead to a more solid and rapid development of the companies who survived the crisis.

This study contributes to the research on management and innovation by examining how Norwegian SMEs were affected by and responded to the Covid-19 pandemic. Expanding on the prior knowledge on the topics by using the recent pandemic as a new context of research. As the crisis has been the most severe global crisis in recent times, the ability to learn from this will be crucial in handling future crises that are expected to come. In retrospect it may have been for Norwegian SMEs during the Covid-19 pandemic as with the famous quote of Friedrich Nietzsche: "*What doesn't kill you, makes you stronger*

References

Alsos, G. A., Clausen, T. H., Hytti, U., & Solvoll, S. (2016). Entrepreneurs' social identity and the preference of causal and effectual behaviors in start-up processes. *Entrepreneurship & Regional Development*, *28*(3-4), 234-258.

Ayres, L., Kavanaugh, K., & Knafl, K. A. (2003). Within-case and across-case approaches to qualitative data analysis. *Qualitative health research*, *13*(6), 871-883.

Bogevik, T. & Federl, O. (2018) *A Study of Effectual Behavior Among Student Entrepreneurs - How do student entrepreneurs in a Venture Creation Program behave in a situation of uncertainty?* [Master's thesis, NTNU]. NTNU Open. http://hdl.handle.net/11250/2578711

Chandler, G. N., DeTienne, D. R., McKelvie, A., & Mumford, T. V. (2011). Causation and effectuation processes: A validation study. *Journal of business venturing*, *26*(3), 375-390.

Cockburn, I. M., Henderson, R. M., & Stern, S. (2000). Untangling the origins of competitive advantage. *Strategic management journal*, *21*(10-11), 1123-1145.

Courtney, H. Kirkland, J. & Viguerie, P. (1997) Strategy under uncertainty*. Harvard Business Review*

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic management journal*, *10*(1), 75-87.

De Winnaar, K., & Scholtz, F. (2019). Entrepreneurial decision-making: new conceptual perspectives. *Management Decision*.

DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. In *Medical Education*. https://doi.org/10.1111/j.1365-2929.2006.02418.x

Eisenhardt, K. M. (1989)*. Building theories from case study research. Academy of management review, 14(4), 532-550*

Eyana, S. M., Masurel, E., & Paas, L. J. (2017). Causation and effectuation behaviour of Ethiopian entrepreneurs: Implications on performance of small tourism firms. *Journal of Small Business and Enterprise Development.*

Finn, P. Mysore, M. and Usher, O. (2020) When nothing is normal: Managing in extreme uncertainty. *Mckinsey & company.* https://www.mckinsey.com/business-functions/risk-and-resilience/our-insights/when-nothing-is-normal-managing-in-extreme-uncertainty

Folkvord, S. Kildebo, P. N. (2022). *Handling uncertainty: The responses and experiences of Norwegian SMEs during the Covid-19 pandemic*[Unpublished term paper]. NTNU, Trondheim

Frese, T., Geiger, I., & Dost, F. (2020). An empirical investigation of determinants of effectual and causal decision logics in online and high-tech start-up firms. *Small Business Economics*, *54*(3).

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*. https://doi.org/10.1177/1094428112452151

Haneberg, D. H. (2020). Interorganizational learning between knowledge-based entrepreneurial ventures responding to COVID-19. *The Learning Organization*.

Haneberg, D. H. (2021). SME managers' learning from crisis and effectual behaviour. *Journal of Small Business and Enterprise Development*.

Hughes, M., & Morgan, R. E. (2007). Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth. *Industrial marketing management*, *36*(5), 651-661.
Knight F (1921) *Risk, Uncertainty and Profit* (Hart, Schaffner, and Marx, New York)

Jacobsen, D. I. (2015) *Hvordan gjennomføre undersøkelser?: Innføring i samfunnsvitenskapelig metode.* (3. utgave) Oslo: Cappelen Damm akademisk

Jacobsen, D. I. (2000). *Hvordan gjennomføre undersøkelser? Innføring i samfunnsvitenskapelig metode* (1st ed.). Høyskoleforlaget AS.

Kemelgor, B. H. (2002). A comparative analysis of corporate entrepreneurial orientation between selected firms in the Netherlands and the USA. *Entrepreneurship & Regional Development*, *14*(1), 67-87.

Kraus, S., Rigtering, J. C., Hughes, M., & Hosman, V. (2012). Entrepreneurial orientation and the business performance of SMEs: a quantitative study from the Netherlands. *Review of Managerial Science*, *6*(2), 161-182.

Laskovaia, A., Marino, L., Shirokova, G., & Wales, W. (2019). Expect the unexpected: examining the shaping role of entrepreneurial orientation on causal and effectual decision-making logic during economic crisis. *Entrepreneurship & Regional Development*, *31*(5-6), 456-475.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of management Review*, *21*(1), 135-172.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management science*, *29*(7), 770-791.

Mthanti, T. S., & Urban, B. (2014). Effectuation and entrepreneurial orientation in high-technology firms. *Technology analysis & strategic management*, *26*(2), 121-133.

Naman, J. L., & Slevin, D. P. (1993). Entrepreneurship and the concept of fit: A model and empirical tests. Strategic management journal, 14(2), 137-153.

Packard, M. D. Clark, B. B. Klein, P. G. (2017) Uncertainty Types and Transitions in the Entrepreneurial Process. *Organization Science*

Palmié, M., Huerzeler, P., Grichnik, D., Keupp, M. M., & Gassmann, O. (2019). Some principles are more equal than others: Promotion-versus prevention-focused effectuation principles and their disparate relationships with entrepreneurial orientation. *Strategic Entrepreneurship Journal*, *13*(1), 93-117.

Person, C. M. Clair, J. A. (1998) Reframing Crisis Management. *Academy of Management*

Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. *Entrepreneurship theory and practice*, *33*(3), 761-787. (Funnet i WOS entrepreneurial orientation og highest citation)

Sanchez, R. (1997). Preparing for an uncertain future: Managing organizations for strategic flexibility. *International studies of management & organization*, *27*(2), 71-94.

Sarasvathy, S. D., Dew, N., Velamuri, S. R., & Venkataraman, S. (2003). Three views of entrepreneurial opportunity. In *Handbook of entrepreneurship research* (pp. 141-160). Springer, Boston, MA.

Schramm, W. (1971). Notes on Case Studies of Instructional Media Projects.

Sørheim, R. Aadland, T. Alsos, G. A. Aspelund, A. Eide, A. E. Haneberg, D. H. Lauvås, T. A. Rasmussen, E. and Solheim , M. C. W. (2021) Innovasjon i krisetider – innovasjon og omstilling under covid-19. *Notat på oppdrag for Innovasjon Norge*

Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic management journal*, *24*(13), 1307-1314.

Wiklund, J. (1999). The sustainability of the entrepreneurial orientation—performance relationship. Entrepreneurship theory and practice, 24(1), 37-48.

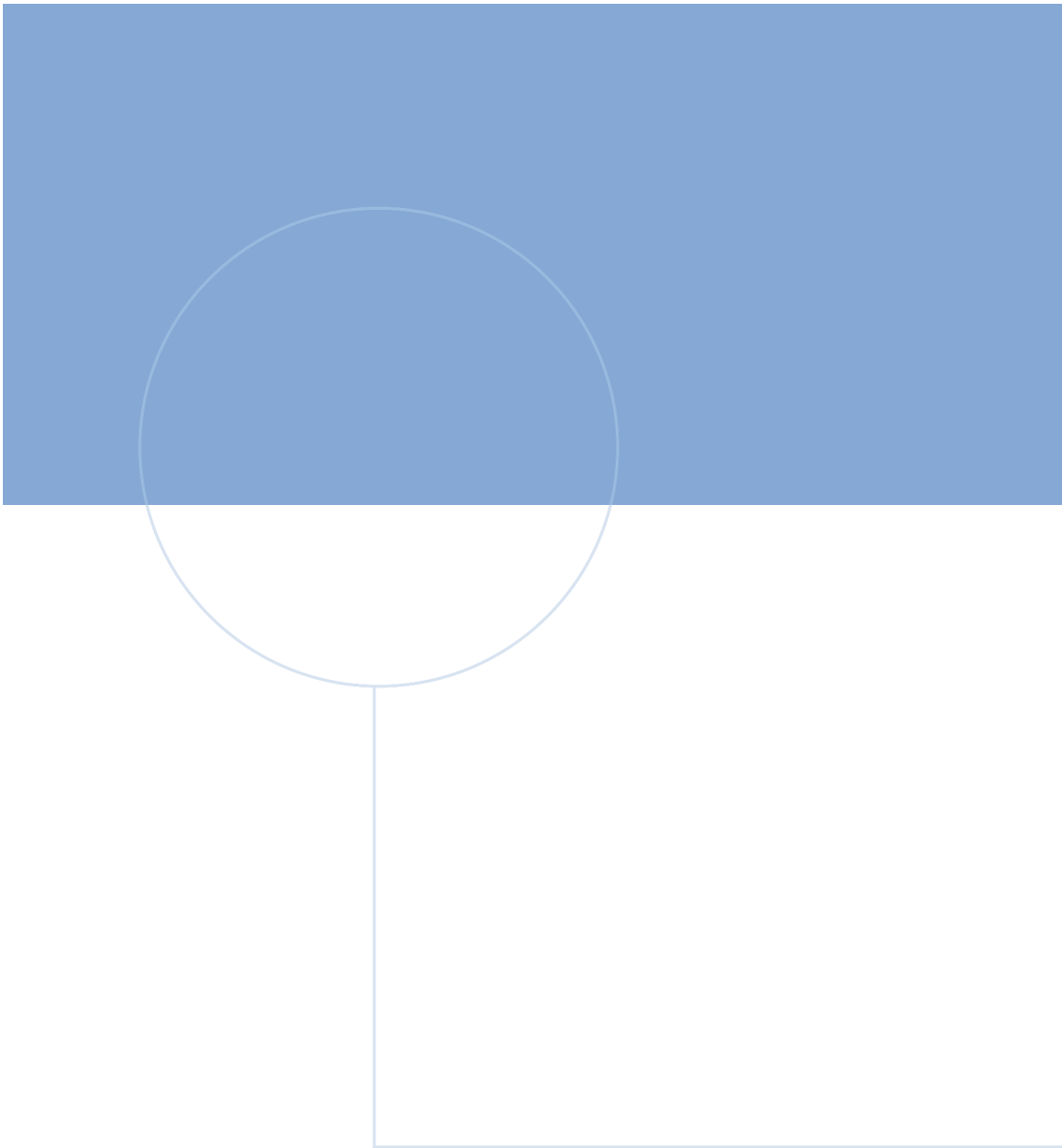
Zahra, S. A., & Garvis, D. M. (2000). International corporate entrepreneurship and firm performance: The moderating effect of international environmental hostility. Journal of business venturing, 15(5-6), 469-492.

Zichella, G. (2017). *Entrepreneurial Cognition: Three Essays on Entrepreneurial Behavior and Cognition Under Risk and Uncertainty*. Frederiksberg: Copenhagen Business School (CBS) p.14

Appendix

Abbreviations:

BE: Business Environment
B2B: Business-to-business, type of commerce transaction in which businesses sell products or services to businesses.
B2C: Business-to-consumer, type of commerce transaction in which businesses sell products or services to consumers.
CEO: Chief Executive Officer
COO: Chief Operating Officer
D2C: Direct-to-consumer, type of commerce transaction in which businesses sell products or services directly to consumers.
EO: Entrepreneurial Orientation
EM: Entrepreneurial Mindset
KBR: Knowledge-Based Resources
PLS-SEM: Partial least squares - structural equation modeling
R&D: Research and development
RQ: Research questions
SME: Small and medium-sized enterprises



NTNU

Norwegian University of
Science and Technology