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# Seeds of Success: How Government Grants aid early-stage Startup Performance?

A quantitative research on government grants in the Nordic Context

Accounting and Finance
Master's thesis

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The startup ecosystems of the Nordic countries have been growing significantly during the last decade. As the global business environment is changing, the focus countries of the study, Finland, Sweden, and Norway, have all noticed a need to focus on knowledge-intensive industries thriving with innovation and research. Startups are focal engines in the midst of these industries, which are agile and ambitious companies constantly fighting serious adversities to become leaders in their respective fields. To alleviate these adversities, the Nordic countries have established government-run grant programs that offer either funding or mentoring services to their domestic startups.

No previous research on Nordic government grants had been done, and due to the remarkable significance of the growing startup ecosystems for the countries, the role of these grants as supportive instruments is relatively high. Moreover, the academic literature, in general, provides very little information on the effectiveness of government grants, and especially on what features make a government grant effective in supporting startups to survive and later prosper. These findings validated the need for this research. The objectives of this research were divided into two separate entities. Firstly, the study aimed to investigate how effective government grants are in supporting early-stage startups and consequently creating societal value in the Nordic countries. Secondly, it explored why some government grants perform better than others.

The study was conducted as a quantitative analysis supported by an extensive literature review. Five grants and 678 companies were included from Finland, Sweden, and Norway. Multiple statistical analysis methods were utilized, including linear and binary logistic regression analyses. The study found that the Nordic startup grants had a significant positive impact on their domestic startups. The effect was noticed as significant on all three performance indicators used: employee growth, survival rate, and funding rate. Furthermore, the study found no government grant features to significantly influence above-average performance. However, weak signals were found, implying that mentoring services and thorough application processes positively impact startup performance. Moreover, grant size was not found to significantly impact government grant performance. As the significance of the Nordic startup ecosystems has increased rapidly, further research is needed, where a more significant heterogeneity of studied grants is advised.

**Key words**: Government grant, startup, early-stage, Nordics

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Pohjoismaisen startup-ekosysteemit ovat kasvaneet merkittävästi viimeisen vuosikymmenen aikana. Maailman liiketoimintaympäristön muuttuessa tutkimuksen kohteena olleet maat, Suomi, Ruotsi ja Norja, ovat kaikki huomanneet tarpeen keskittyä innovoimiseen sekä tietointensiivisiin teollisuudenaloihin. Startupit ovat keskeisiä moottoreita näiden alojen kehitykselle. Ne ovat ketteriä ja kunnianhimoisia yrityksiä, jotka taistelevat jatkuvasti ankarien haasteiden kanssa tullakseen johtaviksi yrityksiksi omilla aloillaan. Näiden haasteiden lievittämiseksi Pohjoismaat ovat perustaneet hallitusten hallinnoimia apurahaohjelmia, jotka tarjoavat joko rahoitusta tai mentorointipalveluita kotimaisille startupeilleen.

Aiempaa tutkimusta liittyen Pohjoismaisten hallitusten myöntämiin apurahoihin ei oltu tehty, ja kasvavien startup-ekosysteemien suuren merkityksen vuoksi näiden avustusten rooli tukivälineinä on verrattaen korkea. Lisäksi yleinen akateeminen kirjallisuus tarjoaa hyvin vähän tietoa hallituksen myöntämien avustusten tehokkuudesta, ja erityisesti siitä, mikä tekee apurahasta tehokkaan startupien selviytymisen ja myöhemmän menestymisen tukemisessa. Nämä löydökset toimivat tämän tutkimuksen motiiveina. Tutkimuksen tavoitteet jaettiin kahteen erilliseen kokonaisuuteen. Ensiksi tutkimuksen tavoitteena oli tutkia, kuinka tehokkaita hallituksen myöntämät apurahat ovat varhaisvaiheen startupien tukemisessa ja siten yhteiskunnallisen arvon luomisessa Pohjoismaissa. Toiseksi pyrittiin vastaamaan siihen, miksi jotkut hallituksen myöntämät apurahat suoriutuvat paremmin kuin toiset.

Tutkimus toteutettiin kvantitatiivisena analyysina, jota tuki laaja kirjallisuuskatsaus. Tutkimukseen sisältyi viisi apurahaa ja 678 yritystä Suomesta, Ruotsista ja Norjasta. Tutkimuksessa hyödynnettiin useita tilastollisia analyysimenetelmiä, kuten lineaarista regressioanalyysiä ja binääristä logistista regressioanalyysiä. Tutkimus osoitti, että Pohjoismaiden startup-apurahoilla oli merkittävä positiivinen vaikutus maiden kotimaisiin startupeihin. Vaikutus oli havaittavissa kaikissa kolmessa käytetyssä suorituskykymittarissa: työntekijämäärän kasvu, selviytymisaste ja rahoitusaste. Tutkimus ei havainnut apurahojen ominaisuuksia, jotka hyvin merkittävästi vaikuttaisivat niiden suorituskykyyn. Tutkimuksessa löydettiin kuitenkin heikkoja signaaleja, jotka viittaavat siihen, että mentorointipalvelut ja perusteelliset hakuprosessit vaikuttavat myönteisesti tuettujen startupien suorituskykyyn. Lisäksi huomattiin, että apurahojen koko ei vaikuttanut merkittävästi niiden suorituskykyyn. Pohjoismaisten startup-ekosysteemien voimakkaan kasvun myötä lisätutkimukselle on perusteltu tarve, missä suositellaan käytettävän heterogeenisempaa joukkoa tutkittavia apurahoja.



**Avainsanat:** Apuraha, startup, pohjoismaat

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# 1 Introduction

## 1.1 Background and motivation

The Nordic business environment as we know it is changing. As significant manufacturing sectors are moving abroad or have faced a decrease in demand, the countries have found new opportunities in digitalization and sustainability. (Heikkilä et al. 2017, 3.) The high educational ceiling is driving the region's innovativeness, and we are seeing more and more breakthrough tech companies taking over their specific market on a global scale (the Nordic Council of Ministers 2021). Of course, large companies are also innovating and making changes to their strategies, but at the heart of these positive phenomena are Nordic startups, which have steadily increased their societal significance within the last decade (Finnish Venture Capital Association 2022 & Danske Growth 2022). The startup scenes of Finland, Sweden, and Norway have all grown severalfold during the period, and are currently employing hundreds of thousands of employees and are swiftly becoming one of the new cornerstones of the Nordic economies (Business Finland 2024; Business Sweden 2024; Oslo Business Region 2023).

These groups of enthusiastic companies pursue innovation with higher pace and agility due to their lean structures and forward-pushing mindset. They may play a critical role in economic development by generating jobs, bringing in foreign funds, and solving issues from their business environment, increasing the development pace of the aforementioned positive phenomena. (Kreutzer 2018) Nordic societies have noticed this and are trying to find ways to support the growth environment for their domestic startups to further boost the growth of their startup ecosystems. The key objective behind the support activities is to help as many startups as possible break out into a situation where they provide a societal surplus. Many support instruments are already available, ranging from advisory programs to monetary aid. In the early stages of a company's journey, non-dilutive grants have emerged as the most significant. (Kreutzer 2018) The dynamics of this phenomenon set the main focus for this research.

Startups, in general, are young and often small companies with a unique product or service designed to grow quickly with high scalability and significantly impact the market. (Cockayne 2019, 1.) At the beginning of a startup's journey, they are often incapable of creating revenue, but the team needs funding for their product or service's research and building phase. (Davila et al. 2003, 690.) The most common ways to get funding are to give equity to venture capital firms or angel investors in exchange for cash, lend money, or pursue bootstrapping, which means that the founders try to grasp finances from their own pocket and the early operational revenue of the company. (Bauer et al. 2023, 10-12.) At least most startups end up in this pivotal phase, but not even half get through.

Based on a study presented in a book by Jamie Pride, 92% of startups die within the first three years of operation, and the main reason for this is the lack of funding (2018, 11.). Here, societies have come to help, as there are most likely multiple hidden diamonds within the 92% of dying startups that could provide vast societal benefits if helped through the initial periods of their journey. Especially in young startup ecosystems, such as the ones in the Nordics, the financing environment is often inadequate to efficiently serve the needs of an ecosystem, which increases the significance of government support (Toumanoff 1984, 529-530.).

The focus instrument of governmental help is government grants, which serve as a unique form of financing for startups, offering non-dilutive capital that does not require giving up equity. The grants can help startups get the funding needed with less risk, fewer equity losses, and the potential for gaining additional credibility in the market. (Kreutzer 2018) However, the startups might often need to fight for the grants. Governments have application processes for the grants and demands for where the money must be used, which increases society's odds of getting more companies to reach the situation of societal surplus creation. Most government grants are targeted for early-stage startups, as they are often in the tightest spot in terms of financing. (Islam et al. 2018, 12.)

Even though the importance of these grants as key instruments of support for startups is well stated, the effectiveness of the grants in achieving the desired outcomes of creating societal surplus is less understood. With precious public funds being allocated to these grants, there is a significant need to study their efficiency further. Questions like do some Nordic countries better utilize the grants than others and how? could changes in grant structures or distribution criteria lead to more successful startups? drive the motivation for this thesis. If the answers would be found, governments could be more efficient in aiding their domestic startups, which accelerates innovation creation and consequently economic growth (Aghion & Howitt 1998, 1; Cai & Etzkowitz 2020, 202.).

Despite the substantial economic impact, there exists a significant gap in the academic literature concerning the effectiveness of government grants in supporting startups to survive and later prosper, particularly in the Nordic context. As of this moment, there are no academic studies discussing this topic in the Nordic context. Moreover, the thriving startup ecosystem and a broadly changing business environment of the Nordics add to the interest in conducting the study of this region. This study aims to fill this research void by conducting a statistical analysis of the performance of government grants across the Nordic countries. In doing so, the research hopes to find what makes good a government grant program, further offer actionable insights for all stakeholders around the topic and help increase the societal benefits derived from government grants.

## 1.2 Research objectives, questions, and methodology

The objectives of this research are divided into two separate entities. Firstly, the study aims to understand what specific granting activities the governments in the Nordics have had and how these activities have impacted the performance of early-stage startups and, consequently, the generation of societal value in the Nordics. Secondly, it recommends how governments can design grant programs that generate maximum societal surplus.

The objectives of the research are approached with these research questions:

1. Are government grants effective in supporting early-stage startups and consequently creating societal value in the Nordic countries?
2. Why do some government grant programs perform better than others in supporting their domestic startups?

To meet the objectives, the study will first provide a broad literature review, followed by the empirical phase, in which a quantitative approach will be adopted. The literature review consists of three sections, which all utilize at least two prestigious theories to lead the discussions. The chapter aims to build a logical framework on why startups should be supported and how. The utilized literature ranges from critical theories and studies of startup development to theories on economic growth and studies on government grants' performance. The first section discusses the potential benefits startups can bring to society. Then, actions and resources that are found beneficial for startups are presented. Lastly, the ambitions and beneficial design elements of government grants are discussed.

Quantitative data will be gathered from government databases, venture capital platform Dealroom, and public company records to conduct varied statistical analyses focusing on how the grants have performed and how the performance of these grants differs through certain grant features. Various statistical analyses are executed, including linear and binary logistic regression analyses. The dataset consists of 678 companies, which are distributed to five grant groups and three control groups. The grant-specific data is collected from 2018 and 2019. Metrics such as volume of grants given, startup survival rates, number of people employed, and rate of additional funding acquired will be collected to answer how the regional grants have helped their ecosystems and how they have performed compared to each other.

Multiple restrictions are enabled to narrow down the scope of this research and better answer the research questions stated before. First, the study will only focus on non-dilutive government grants that do not ask for equity in return for the given funds. Governments can help their entrepreneurs in multiple ways, which include loans, advisory help, working spaces, and grants (Kreutzer 2018). However, the study will only assess the impact of non-dilutive grants. Moreover, there may be non-dilutive grants for certain types of startups. This study only focuses on grants that aim to help startups in the early stages of their journey. In this study, an early-stage startup is a company that may already have revenue but has not raised an A-series funding round yet and has below 50 employees. Observations focused on early-stage startups will be discussed through the terms “startup”, “early-stage startup”, and “startup in their early stages”. When the term “startup” is used, a wider group of startups may also be discussed, but this will be separately noted.

The research also gathers data only from the Nordic region. Of the region’s five countries, Finland, Sweden, Denmark, Norway, and Iceland, the three first are included. Government grants are given to startups worldwide, so literature will still be searched globally, and the results are expected to serve stakeholders around the world. Yet the focus will still be on the Nordic environment, which differs significantly from other parts of the world regarding its societal structure. (Nordic Embassy) Lastly, the statistical data will be collected from as many up-to-date scenarios as possible. Thus, the scope of this research is on the current situation of the phenomenon, which may make it incomparable to some earlier studies. The incomparability is primarily due to possible regulation changes and the increased startup activity the region has seen during the last decade. (the Nordic Council of Ministers 2021)

This study is conducted with ethical considerations held in high regard. The research follows the ethical principles outlined in the Finnish National Board of Research Integrity guidelines for research in humanities and social and behavioural sciences (TENK 2023). Ethical considerations are of the utmost significance for all academic research, and as it involves human subjects, a special focus is kept on the matter throughout the study.

### 1.3 Structure of the thesis

The research is divided into eight chapters. The first chapter, Introduction, presents the background and motivation for the study. It also states the research questions and presents a brief introduction to the methodology of the research. The second chapter dives into the key concepts of this study and discusses the nature of these phenomena. It provides an overview of the character and typical situations of early-stage startups and takes a closer look at government grants as funding instruments. The third chapter includes a literature review, which discusses the theoretical background for the research questions. The key theories for startup success, such as the lean startup -framework and resource-based view, are presented alongside economic theories, such as the Endogenous Growth theory and Keynesian Economic theory. The chapter aims to provide a solid theoretical framework for which to build in the empirical phases of the study.

The fourth chapter presents a broader discussion of the methodology of the research. Research design is presented in more depth alongside the principles for collecting data and selecting focus groups. The quantitative analysis framework is presented in detail, followed by a broader introduction to applied research ethics. The fifth chapter dives into the empirical findings of the study. The quantitative findings are presented, where the granting activity of the regions is showcased first, followed by presentations on the grants' overall performance in supporting their regional ecosystems and the specifications on what type of grants perform the best in creating societal benefits through admitting grants to their regional early-stage startups. Chapter six includes discussions on the findings of the research. The seventh chapter presents the study's conclusions alongside an evaluation of the research. This is followed by a summary chapter. Lastly, references are showcased at the end of the research.

# 2 Funding environment of early-stage startups

The environment around startups is a complex entity with varied opportunities and challenges. The funding environment is at the heart of it all, as it enables startups to pursue their ambitions. To better understand startups, their situation, and governments' part within the environment, this chapter provides a detailed look into these phenomena. It is essential that the typical approach, character, and situation of startups is presented so that the more in-depth observations can be better understood. Moreover, government actions and grants as instruments are introduced, which sets up further discussions around the motives and characteristics of these concepts. The chapter builds a foundation, on top of which the study can build a discussion considering the study's research questions.

## 2.1 Characteristics and challenges of early-stage startups

### 2.1.1 Definition of a startup

As stated by Penrose, a company is society's basic unit for the organization of production. (2009, 59.) A startup company is one form within the spectrum of all companies that drives to discover or create unmet market needs and scale a viable business model. Startups, especially in the early stages of their journey, are distinguished by their small size but possess a strong ambition for scalability and significant growth. (Slavik et al. 2021, 1-2.) The startup's journey begins with a business idea, that is, through research and development brought into a venture opportunity, which may then seek to fulfil the found market needs (Vogel 2017).

Startup entrepreneurs have a highlighted role in the success of their company, as the challenges to tackle before breaking out as successful are often great due to the disruptive characteristics of startups (Lumpkin & Dess 1996, 136.). In a study made by Schoar, entrepreneurs are divided into two categories: subsistence and transformational entrepreneurs. Of the two, subsistence entrepreneurs start businesses purely to provide income. On the other hand, Transformational entrepreneurs aim to develop companies that solve societal problems, provide income for others, and grow as big as possible. Startup entrepreneurs are the epitome of transformational ones, as the objectives stated above fit the startups' description perfectly. (2010, 57.)

The success of startups is often followed by the companies’ innovativeness, adaptability, and entrepreneurial alertness. Younger and smaller companies work less complexly than larger enterprises, allowing them to be more agile. They are often highly motivated due to the opportunities ahead, the fast-paced environment, and the newness of the situation, which adds up to the pace of development. They are also often exploring solutions that are not in use yet, which enables them to create significant competitive advantages through technological advancements. (Hyytinen et al. 2015, 567.) In conclusion, startups form a unique group of companies that build on innovation, scalability, and adaptability, setting them apart from traditional business enterprises. High risks often shadow their journey, but if they redeem successful, they can provide varied societal benefits by offering jobs, bringing in foreign funds, and solving contemporary challenges across various domains (Haltiwanger et al. 2017, 52.).

### 2.1.2 The early-stage

Within the term startup, various sub-groups can again be put into narrower descriptions. In 1983, Churchill and Lewis set five stages for small business growth, which identified the following stages: existence, survival, success, take-off, and resource maturity. Of these five stages, existence and survival identify a young company's early stages, or in this research's case, a startup. The success stage is more of a decision phase, in which a company decides whether it wants to grow further or stabilize its business. The last two phases, take-off and resource maturity, define the later stages of a startup, in which a company aims to proliferate and adapt to the new needs that come with getting big. (34-40.) These last two stages set a turning point for early-stage startups, becoming scale-ups, a sub-term for late-stage startups. (Duruflé et all 2017, 1.)

To separate the focus group of this study under the sub-term early-stage startups, the content of the first two classes and Picken's thoughts in his 2017 study can be used. An early-stage startup has yet to achieve sustainability in its business and, as such, is still facing a high risk of failing. (588.) Startups' phases can also be roughly divided by the number and type of funding rounds they have raised. Raising equity is a standard procedure for startups. Within the professional field of venture capital, the rounds the early-stage stage startups are raising are often either pre-seed or seed rounds. (Molnár & Jáki 2020, 64.) These rounds pose a high risk for investors as the companies have not yet reached sustainability and are still validating their business model and go-to-market strategy. Thus, the rounds are vital for early-stage startups, which need funding to stay alive. (Picken 2017, 588.)

Many features that identify a startup have already been mentioned, yet some are further highlighted with early-stage startups. It is already stated that startups are small in size and have high ambitions. In early-stage startups, these are emphasized, as it is often only a few people working for the company. Griva et al. state in their study published in 2023 that two company culture traits, the clan culture and the adhocracy culture, are strongly present in especially early-stage startups. These traits represent that the companies have a strong focus on growing outside of their current situation, flexibility, and taking care of their employees and customers. (3.) In the same study, Griva et al. state that the skills of entrepreneurs are further highlighted in the early stages of their startup. In these stages, founders often have a large variety of responsibilities, which demands them to be skilful in many fields of business in order to become successful. (4.)

### 2.1.3 The many challenges of startups

The Introduction chapter presented the statistic that 92% of startups die within the first three years of operation. (Pride 2018, 11.) Some surpass the early-stage phase and move into the scale-up phase within the first three years, but most startups falling short within the timeframe have more likely been in their early stages. Hence, it is evident that early-stage startups face various significant challenges. A study by Slavik et al. in 2021 stated that the most typical reason for the failure of a startup was the quality of their business model. Early-stage startups must succeed in creating a business model that answers the demands of their market and is easily scalable. If the startup fails to succeed in this, the company's hit profitability becomes at least challenging, if not impossible. It also emphasizes the other challenges, such as being capable of establishing tight relationships with first customers. (3.)

When diving into something new, one is often quite unaware of all the potential challenges with the innovation. Thus, it is essential in the early stages to get to know the business environment and its needs as well as possible. To know more, early-stage startups should establish strong relationships with their first customers to learn the real pain points, that must be overcome. Yet this is often easier said than done and the lack of domain knowledge is still one of the main reasons for startup failures. (Baum & Silverman 2004, 415.)

Moreover, the lack of domain knowledge may not always be the reason why companies don't react properly to market demands. In a study by Nummela et al., some early-stage startups were found to become overconfident when stakeholder support was strong and the team was technologically stronger than their competitors. This led to failures, as the market demands appeared to be different than what the overconfident teams had imagined. (2016) This showcases another challenge: early-stage startups should be confident and excited, but they must also stay humble to the market throughout their lifespan.

Another market that nearly all early-stage startups must respect is the employee market. Finding suitable talent may be challenging as early-stage startups lack legitimacy and may easily fall under the radar of potential employees searching for work, as large enterprises take most of the coverage in the labour market. The companies may have to give up much equity to get the best talent to join, and they must invest substantial time in searching for and persuading potential employees. (Rocha & Grilli 2023, 22.) Often, the best way for startups to succeed in this is to exploit their network as much as possible. If startups can find talent from their network, they get people whose skills they already know, which lowers the risk of failed hires, and they may get through the initial hiring needs a lot quicker. (Keogh & Johnson 2021, 44.)

Early-stage startups also need money to acquire the needed talent. The most spoken about, evident, and tough challenge early-stage startups face is that they almost always require substantial funding to get through their journey's development and research phases (Baum & Silverman 2004, 415.). Living isn't free, so startups must pay wages to fully engage their early employees in the development. If a startup selects not to raise cash, it is probable that the pace of the development slows down significantly, as not as many people, or perhaps not as talented people, can be brought on board. Various other business costs may also be inevitable, especially for companies that build physical products. (Rocha & Grilli 2023, 23.)

To sell your still very speculative business idea to a potential investor and get them convinced to give you tens or even hundreds of thousands of euros, when the foreseeable revenues are still far away, may be quite a tough task (Baum & Silverman 2004, 415.). Raising loans isn't easy either as the payback times are longer, risks significantly higher due to the novelty of startups' businesses, and the monetary value of collateralizable assets is often low. These three factors limit early-stage startups' access to all external funding, including venture capital and bank loans, which causes a major challenge for most companies in their early stages. (Hyytinen et al. 2015, 565.)

Due to the ambitious character of startups, they must also play a long game when searching for funding. They cannot grant all their equity on the first funding round, even if the investors would demand in return for the asked sum of cash, as, at least in most cases, the founders want to keep the control and main monetary potential to themselves. Thus, they must be capable of selling a valuation high enough to the funding counterpart. Unfortunately, evaluating an early-stage startup is often challenging and almost pure guesswork due to the weak predictability of future cash flows. Most of the value in an early-stage startup is built around non-monetary factors, which decreases the valuation compared to more sustainable businesses due to higher risks. (Miloud et al. 2012, 151-152.)

When the startup's non-monetary features are evaluated, many characteristics appear impactful for the company's valuation. In a study by Agyare et al., the researchers found that industry relevance, location, usage of management accounting systems, and company age are startup characteristics that may affect valuations. When the founding team is evaluated, the number of founders, prior experience, and level of education are seen as relevant for the valuation. (2022, 229.) Thus, startups may help their negotiation position even without having present cashflows by focusing on matching or developing the characteristics mentioned above.

The macroeconomic situation considerably impacts the significance of the funding challenge. In a study conducted by Nanda and Rhodes-Kropf in 2013, the research group found that t became easier for early-stage startups to receive funding. during hot macro-economic times, companies that possessed significant innovations got funded more than during average macro-economic times. The phenomenon, of course, works the other way around as well. When the macroeconomic situation is challenging, potential investors become more risk-averse, and the challenge gets even more burdensome for early-stage startups. (416.) To add to the challenge of finding funding, a study made by Keogh and Johnson proposes that startups should also find a suitable financing option for their skillset. Achieving this has been seen to lower the risk of failure, which narrows the optimal funding options for early-stage startups. (2021, 44.)

## 2.2 Funding opportunities

### 2.2.1 Basics of startup funding

It is both a blessing and a curse that there are plenty of funding opportunities that early-stage startups may try to capitalize on. Bootstrapping, raising or lending money from family and friends, Venture capital, private equity, and loans are among the most typical options. In contrast, crowdfunding, accelerators, incubators, and government grants may not be discussed as much. (Bauer et al. 2023, 11-19.) In this part, the most utilized funding options, except for government grants, are discussed to give context to the complex funding environment of startups. As the focus of the research, government grants will be discussed later in the section.

Yet, the funding landscape has not always been as broad as it is nowadays. After the Financial crisis of 2008, equity and debt providers became more risk-averse, which decreased their impact on the field of startup financing. (Fraser et al. 2015; Block et al. 2018, 240.) Debt providers also had to face new regulations and legal responsibilities, which further inflated this phenomenon (Hornuf et al. 2021, 1507.). However, the market responded, and new funding options, such as crowdfunding, emerged to fill the widened funding gap for startups (Block et al. 2018, 240.). Nowadays, all the old and new options are still available, but the balance between them alters according to macroeconomic conditions (Bauer et al. 2023, 11.).

To contemplate which funding options startups should seek to find the best fit for them, more features regarding the options than just the demands of the money must be taken into consideration. Depending on the stage the startup is in, they may also need guidance and networking aid to get them on the right track. Especially in the early stages, startups need these features and are willing to give equity away, which reduces their autonomy in managing the company. (Fraser et al. 2015) As the startup matures, the need for guidance decreases, and they turn to seek funding options that let them maintain their autonomy (Gras et al. 2017, 228; Udell & Berger 1998, 661.). Therefore, there are multiple factors that rule out which options fit certain startups. All features will be discussed as we dive into the specific funding options.

### 2.2.2 Founders, family, and friends

First, we will investigate one of the most common funding options in terms of usage rate, funding from the pockets of the entrepreneurs, their friends, or their families. (Ahmed & Aassouli 2022, 25.) Raising money from the inner circle of the founders may be vital for the startup's survival in the early stages. It is also a reliable and accessible source to start with. (Frid 2014, 336-337.) However, raising family and friends may impact social relationships, bring additional pressure to the founders, and often offer little networking assets (Chua et al. 2011, 475.). Thus, this option positively impacts the survival changes of startups, offers few additional benefits, and may pose autonomy challenges through moral problems.

When family and friends are brought on board, the entrepreneurs' money is often also included in financing the startup. External funds are also often welcomed in the later stages of the startup as needed, which decreases the difficulty of that option in terms of survival. (Gregory & Allen 1998, 660.) Nevertheless, another option within the previously mentioned instrument group is to pursue funding the company's growth entirely from the pockets of the founders. This option, called bootstrapping, is challenging, as the ones using it commit to fully financing the startup with their own money and early operational incomes. (Waleczek et al. 2018, 536-537.)

Bootstrapping is a creative way to manage a business when resources are scarce. (Grichnik et al 2014, 310.) Money is taken from any source that does not ruin the founders' personal finances but helps the startup get forward. Bootstrapping is used primarily in the early stages of startups, which has a lot to do with the fact that bootstrapping is often a necessity. (Ebben & Johnson 2006, 851.) The use of bootstrapping decreases significantly in the later stages of startups, which emphasizes this. If no other sources are available, founders must bootstrap, but when other options become available, they quickly turn off from bootstrapping. (Ebben & Johnson 2006, 857.)

Yet bootstrapping may also be a strategic decision. It enables founders to keep full autonomy, has lower costs of capital, and often lower risks than for example loans from banks or family. (Grichnik et al 2014, 322.) However, bootstrapping does not include any guidance benefits and may become quite costly for the founders (Bauer et al. 2023, 20.). Moreover, it is not the fastest way to grow either, as there are more limitations for recruiting and investments (Rocha & Grilli 2023, 23.). Study made by Waleczek et al. shows that bootstrapping is more common for new business founders than serial entrepreneurs. (2018, 547.) This may be due to the larger networks of serial-entrepreneurs or their desire for higher pace of development.

### 2.2.3 Equity instruments

Any funding options found from the inner circle of the founding members do not generally fulfil all the needs that early-stage startups have. Thus, often, at some point in the early stages, some external private equity investors come along. (Waleczek et al. 2018, 537.) When an early-stage startup decides to begin searching for external funding in return for its equity, the two main options are venture capital funds and angel investors. Venture capital funds are companies that collect investments to form the fund and then invest the collected money into startups of all kinds. (Agyare et al. 2022, 229.) They aim to find startups that break through and become highly successful, which would then raise the value of the equity stake they gained when they first invested in the company. If they achieve this, they may earn significant profits for the whole fund. This is the main objective of most, if not all, venture capital funds globally. (Zider 1998, 132.)

They typically diversify the collected funds to around 20 startups to decrease the risks of individual investments. (Milosevic et al. 2020, 37-38.) However, venture capital funds are still hazardous investment targets, as a tiny percentage of all startups make a large majority of profits for the whole group. Hence, venture capital funds bet that they can find one of the companies earning their place in that small group, which could then enable the whole fund to reach its targets. This investment philosophy is often called the Power Law of venture capital, which sets a standard for all startups that seek venture capital investments. (Mallaby 2020) The specific percentages differ between studies, but the ratios have regularly been over the 80 to 20 ratio of the Pareto principle, which illustrates the scale of the phenomenon. (Mallaby 2020; Brynjolfsson et al. 2011, 1373.)

From the startup's perspective, the standard is that if they get funded, they are expected to return the initial investment in large multiples. That is a tall ask, which is why venture capital may not be the best investment option for all. It sets high expectations, which is followed by high pressure. (Brynjolfsson et al. 2011, 1373.) These high standards also drive venture capital funds to invest in deep due diligence with all potential investments.

These may be complex and burdening processes for startups, and they raise the bar for getting the investment. (Baum and Silverman 2004, 415.)

However, if a startup can attract attention from venture capital funds, they should highly consider the option. Venture capital funds invest a lot of time in their portfolio companies and thus offer much guidance and scouting help. These are very valuable assets for startups, especially when in their early stages. Moreover, being a portfolio company of a venture capital fund is a significant boost for credibility. (Milosevic et al. 2020, 38-42.) Venture capital funds are known to have thorough due diligence processes and are also academically proven to increase the performance of their investees, which is also great from a publicity standpoint for investee startups. (Andrieu & Groh 2012, 1158.)

On the contrary, venture capital funds tend to also take much control over their portfolio companies. They demand much information and want to actively participate in the company's management. (Hellman & Puri 2022, 194.) Moreover, they often receive significant ownership stakes, which gives them considerable power to impact the startup's actions. This takes quite a lot of autonomy from the founders, which may disturb some teams, especially in the later stages of their startup. (Bauer et al. 2023, 13.)

There are a variety of venture capital funds focusing on startups of different sizes and situations. Some funds are built to invest specifically in early-stage startups. (Bauer et al. 2023, 13.) These funds are often filled with relevant connections and domain knowledge from early-stage startup building. Hence, they generally make great venture capital partners for early-stage startups. However, due to the high-risk profile of early-stage startups, the expected returns are also very high, even for venture capital funds (Picken 2017, 588.). Large corporates have also taken part in the venture capital field by establishing their funds. These are often highly focused on the corporation's industry, but if the industries match, corporate venture funds may also pose an opportunity within the realm of venture capital. (Kang et al. 2021, 129.)

The less-intense option for venture capital funds is angel investors. Angel investors (Angel) are typically wealthy individuals interested in investing in startups of all sizes (Kerr et al. 2014, 21.). Typically, angels offer smaller investments than venture capital funds, which increases their interest in early-stage startups. The invested amounts are generally sized such that other funding sources are also needed on the side. (Block et al. 2019b, 307.) Yet Angels tend to group up together, which could solve this problem, as one could get multiple angels on board simultaneously (Hellman et al. 2021, 455.). Angels may have other motives than monetary benefit when investing, as many want to make positive social contributions by aiding new promising companies (Bauer et al. 2023, 13.).

Most angels have deep business experience and an interest in aiding their portfolio companies. Hence, they can offer moderate guidance and networking help, which still falls short of the help venture capital funds can provide. Yet, they usually have little structure to their actions, which limits their involvement. However, it also makes the due diligence processes more informal when compared to venture capitalists. (Drover et al. 2017, 1822.) They also tend to give more trust and freedom to the founders, which suits the startup's general interests (Bauer et al. 2023, 13.).

In addition to angels and venture capitalists, family offices are also regularly seen to invest in startups. Due to the size of startups, many equity investors look elsewhere, but family offices can also be seen as potential investors. (Block et al. 2018, 243.) They can offer substantial investments and help from experienced managers but are generally more risk-averse than venture capitalists. Hence, their investments tend to focus on scale-up companies. (Block et al. 2019a, 338-342.) They are also often more challenging to find than venture capital funds or angels and tend to pursue much control (Bauer et al. 2023, 14.).

Initial public offerings (IPO) may also appear as a feasible funding option for startups, but due to the high complexity and regulation of such measures, they are very rarely used by early-stage companies. (Blomkvist et al. 2022, 2.) Successful scale-ups can benefit from IPOs when pursuing for quick growth, but usually the option is not even within the reach of startup companies. (Drover et al. 2017, 1822.) Moreover, IPOs would have a significant impact on a startup's autonomy and bring little guidance benefits. Thus, they are rarely seen as a primary option of funding for a startup. (Bauer et al. 2023, 23.)

### 2.2.4 Debt instruments

Varied debt options are among the most used funding sources for startups of all sizes (Berger & Udell 1998, 627.; Chen et al. 2016, 599.). They generally offer minimal autonomy losses as in traditional instruments; no equity is demanded, and the lender does not demand any control over the company (Block et al. 2018, 242.). Hence, the startup can secure funding but hold all ownership benefits themselves. Bank loans are the typical choice when debt instruments are discussed. Banks can offer substantial funding but often demand rigorous review processes, covenants, and currently available revenue streams. (Thies et al. 2019, 1379.) This causes significant problems for startups in the early stages as they are often still building their product. Therefore, they only have assumptions of future revenue streams and lack much other relevant information about their business. (De Rassenfosse & Fischer 2016, 238.) This can make bank loans unreachable for early-stage startups.

Moreover, bank loans offer minimal guidance benefits due to their limited willingness to participate in the company's operations (Bauer et al. 2023, 17.). Thus, bank loans should not be seen as the only funding option for any early-stage startup that needs coaching and networking aid. They can play a significant supporting role in the financing structure if the review process can be passed. On the other hand, bank loans are an excellent option for later-stage startups as they often possess the needed information and prioritize autonomy over guidance benefits. (Gras et al. 2017, 228; Udell & Berger 1998, 661.) Bank loans can also offer smaller capital costs, highlighting their suitability (Block et al. 2018, 245.). Loans similar to bank loans can also be acquired from individuals or investment companies, but these loans often have higher capital costs and may possess a convertible structure. This may make them easier to obtain but causes higher risks for autonomy and provides less financial aid. (Bauer et al. 2023, 18.)

Small companies such as startups also rely on credit options for temporary funding. Credit lines are often quite expensive, so they should be paid back as soon as possible, but they may offer an easy bridge solution for temporary funding shortages. Credit lines can be acquired from banks, suppliers, or, for example, companies focused on credit agreements. (Berger & Udell 1998, 619.) They offer no guidance benefits, autonomy losses, and high capital costs (Bauer et al. 2023, 17.). Thus, credit lines should never be the primary funding option for any type of startup, but as said, they may offer a tremendous short-term safety blanket option. However, credit lines may sometimes emerge as the only available source of external funding. In these cases, startups take a significant risk if they decide to fund their operations solely with credit. However, if they get their operations to succeed fast, it may pose a lucrative opportunity. (Berger & Udell 1998, 619.)

Berger and Udell found in their study that small companies tend to seek all their debt instruments from a single provider. This poses benefits as the provider can follow the company’s journey and build trust in their operations over time. This may ease loan negotiations, opening more debt options, especially for early-stage startups. Banks also favour customers who focus on all financial services under one provider. Thus, startups can get better loan terms from the chosen provider than from unknown providers. (1998, 645.) Long relationships may also increase the guidance benefits available from debt instruments, favouring the decision to focus bank services under one provider (Baum & Silverman 2004, 414.).

A reasonably new debt option that differs a bit from the other is venture debt. Venture debt providers specialize in aiding companies in their early stages, which decreases the level of review and track record demand for startups. (Block et al. 2018, 244.) They do not necessarily have to show past revenues or financial statements to get the loans, which makes them a more viable option for early-stage startups (De Rassenfosse & Fischer 2016, 238.). Besides this lowered demand for reviews, the option is similar to other debt options. Minimal guidance or networking benefits are provided; in most cases, no equity is asked for. (Lehnertz et al. 2022, 1432.) However, as the companies do not have to show as much evidence of their trustworthiness, the risk for the debt providers is increased. Consequently, this increases the price of these instruments. The prices are not nearly on the level of credit lines, but the increase is significant compared to traditional bank loans. (Block et al. 2018, 244.) Thus, venture debt instruments may emerge as lucrative options for startups that cannot secure traditional loans but still could use supporting financial instruments to fill the funding gap their other guiding investors cannot fill.

### 2.2.5 New instruments

Due to technological development and the 2008 financial crisis, new funding instruments have emerged to disrupt the market with their unique promises. Startups’ funding market cooled down after the crisis, which created space for new solutions. (Fraser et al. 2015; Hornuf et al. 2021, 1507.) These solutions focused on the agility benefits provided by technological advancements and significant guidance benefits, which were significant for startups operating within the cold funding environment. (Block et al. 2018, 240.)

Crowdfunding is the leading new option, focusing on modern technological opportunities. It has emerged as a popular instrument, especially for early-stage companies. In crowdfunding, a startup raises funds from a broad and geographically dispersed group of investors on a digital platform that offers the structure for such an act. (Thies et al. 2019, 1378.) Crowdfunding can be used for equity or debt funding, giving the funds in exchange for equity or interest. Crowdfunding has also emerged as one of the hottest topics in academic research around startups due to its unique characteristics. (Mochkabadi & Volkmann 2018, 75.) The funding processes are often quick and easy to manage, which makes the option great for early-stage startups (Mochkabadi & Volkmann 2018, 87.).

However, the long distance to investors and their non-professional status leads to little guidance or networking benefits (Cumming et al. 2022, 1021.). Also, a large group of investors can burden small businesses, as questions and demands come from several directions. The large group can be utilized for broad feedback via surveys, but for actionable help, it is not the most effective option (Walthoff-Borm et al. 2018, 515.). The competition within crowdfunding platforms can be challenging. Succeeding to raise a sufficient crowdfunding round demands much work, and it is still far from certain if the round gets invested in total.

Companies must put them on display in front of a large crowd, which includes risks for know-how diffusion. (Bauer et al. 2023, 17.) Failed crowdfunding rounds may also cause a lot more harm to the company's reputation than failed pitches to single investors (Mochkabadi & Volkmann 2018, 106.). However, crowdfunding can offer agile funding aid for startups who manage to get through the competition but offer limited guiding aid. A large group of investors also possesses some autonomy risks, especially in equity crowdfunding, when the company must also give ownership stakes to the investors. (Bauer et al. 2023, 17.)

As the last funding options, the ones that answered the increased need for guidance are presented (Block et al. 2018, 240.). Accelerators and incubators are two very similar options, with the general difference that incubators last longer and are not as profit-oriented as accelerators (Isabelle 2013, 17-18.). The key offering of both options is centred around significant guidance benefits. Both are usually built programs where startups may apply, and which nurture and guide the accepted startup's first steps by offering professional help, workspaces, and vast networking opportunities. (Van Rijnsoever et al. 2017, 606.) Accelerators and incubators demand equity for their services, the principal value of which is in their programs'ding and facilitating the benefits. Both can offer funding for their most promising members, but the sums are often small. Hence, both can only be seen as subsidiary funding sources. (Cumming et al 2019, 258.)

The guidance services may also pose a high risk for autonomy losses, as the programs tend to heavily control the member companies' actions. Due to this and the high costs of capital caused by equity losses, accelerators and incubators are only fitting for early-stage startups. (Bauer et al. 2023, 15.) Therefore, they often only approve companies at the beginning of their journey. (Cumming et al 2019, 253.) All in all, accelerators and incubators offer superior guidance and networking benefits but cannot fulfil all funding needs, even for an early-stage startup. They also pose high autonomy costs due to equity losses, which may be increased by programs' tendencies to seek control over startups' operations.

In summary, startup funding is a complex phenomenon yet filled with many opportunities. (Block et al. 2018, 240.) Startups may search for funding in exchange for equity or interest, of which equity opportunities are often easier to obtain for early-stage startups due to the companies' risky profiles but high promises. Most equity investors provide significant non-monetary benefits but hinder the startups' autonomy by controlling ownership. Debt providers may offer lower capital costs and higher levels of autonomy but cannot provide much guidance. (Bauer et al. 2023, 23.)

In the early stages, the guidance factor plays a significant role, as professional help and the right contacts are often needed to get the company on the right path (Fraser et al. 2015). Hence, venture capitalists and angel investors are a great fit in the early stages (Milosevic et al. 2020, 38-42.; Drover et al. 2017, 1822.). Accelerators and incubators can also be very helpful but are often incapable of satisfying all monetary needs (Cumming et al 2019, 258.). Crowdfunding may also be an option, but startups should be cautious when striving for such an option (Bauer et al. 2023, 17.). Venture debt lenders can also offer funding at early stages but cannot offer the guidance needed by an average early-stage startup (Lehnertz et al. 2022, 1432.). As startups mature, more options, such as family offices and bank loans, become increasingly available. Startups' need for guidance decreases, and motives for retaining autonomy and low capital costs are highlighted. Thus, debt options become more suitable in later stages. (Bauer et al. 2023, 23.)

As showcased, there are no options that could be seen as perfect for startups. Early-stage startups, especially, must often give a lot of their autonomy away to get the needed

| Instrument | Acquiring difficulty | Cost of capital | Guidance | Impact on autonomy | Volume of funding |
|---|---|---|---|---|---|
| Family & Friends | Low | Moderate | Low | Moderate | Low |
| Bootstrapping | Low | Low | Low | Low | Low |
| Venture capital | Moderate | High | High | High | High |
| Angel investors | Moderate | High | Moderate | Moderate | Moderate |
| Family offices | High | High | Moderate | High | High |
| IPOs | High | High | Low | High | High |
| Loans | High | Moderate | Low | Low | High |
| Credit lines | Low | High | Low | Low | Low |
| Venture debt | High | Moderate | Low | Low | Moderate |
| Crowdfunding | High | High | Moderate | Moderate | Moderate |
| Accelerators | Moderate | High | High | High | Low |
| Incubators | Moderate | High | High | High | Low |
| Government grants | Moderate | Low | Low | Moderate | Moderate |

Table 1 Summary of startups' funding instruments

support. Often, different options are combined to find structures that offer the needed support with little negatives (Bauer et al. 2023, 23.). For example, angel investment can be combined with venture debt instruments, which could allow an early-stage startup to retain much of its autonomy, get enough funding with a moderate cost of capital, and get the needed guidance and networking support.

Uniting characteristics between all the options is that a startup must fight to get the pursued funding and give something in exchange. Moreover, in most cases, there are no significant restrictive rules for where to use the acquired funds. If these rules exist, they are often negotiated together with the startup. Hence, the funds provided can often be used efficiently where the startup needs them most. Restrictions decrease a startup's autonomy and slow its development if the restrictions do not suit its situation. (Bauer et al. 2023, 15.) All these uniting characteristics do not always apply to government grants, which will be assessed next. Above is a summary (Table 1) of the assessed funding instruments and their discussed features.

## 2.3 Government grants as an option

### 2.3.1 Governments as investors

Due to the significant economic benefits of successful startups, governments all over the globe have become increasingly relevant as funding providers (Ayoub 2017, 1100.). They differ from traditional investor characters by their motives, which are focused on fostering economic development and job creation instead of solely creating profit (Colombo 2019, 614.). Supporting the startup economy has proven to be an efficient way to support innovation creation and entrepreneurialism, which can provide a significant economic surplus (Butler et al. 2016, 297.). Due to these objectives, they are willing to invest in risky projects with straightforward terms (Wallsten 2000, 83.). This can make governments a very lucrative funding source for startups, but the political agenda of putting society before single startups can also cause difficulties (Bauer et al. 2023, 15.).

Governments usually want to source their funds in a way that brings benefits not only for the startup but also for society at large (Wallsten 2000, 83). Thus, most funding opportunities include restrictions on how to use the funds (Lerner 2009, 20.). In general, governments provide various funding options for startups, including grants, loans, and equity investments (Duhautois 2015). The investments are usually channeled through specific agencies or programs, that may be run by the government itself or they may be given to other institutions such as universities or associations (Ayoub 2017, 1101.). In most cases, startups must apply to get funding, which can sometimes appear to be quite difficult due to complex application processes or tough competition (Lerner 2009, 21.).

### 2.3.2 Introduction to government grants

Government grants are among the most used government funding instruments (Duhautois 2015). These grants are non-repayable and non-dilutive funds allocated to support startups' growth journey (Butler et al. 2016, 307.). Grants can be issued as direct deposits or optionally as tax credits, which can indirectly ease startups' financial difficulties. (Hall & Van Reenen 2000, 449.) Grants often focus on supporting companies with innovations and technologies that aim to scale abroad shortly (Lerner 2009, 15.). Governments often have multiple grant options because they aim to support startups of all sizes. (Butler et al. 2016, 297.; Islam 2018, 39.) Grants aimed at early-stage startups are often easier to get but are smaller and include many restrictions (Butler et al. 2016, 297.). Many of these grants do not include any competition. Thus, all companies that can fit the demands set for applicants can receive the funding. (Ayoub 2017, 1102.) Therefore, such grants can be very lucrative funding options for startups.

Larger grants are usually issued for promising later-stage startups that need significant funding to accelerate their growth (Islam 2018, 39.). Advanced research projects may also be supported with larger grants if significant business opportunities emerge if the project is carried out successfully (Islam 2018, 36.). More significant opportunities often come with stricter application processes and rigorous competition, as they pose more risk for the government. (Murray 2012, 1787.) Governments also issue industry-specific grants to support the development of a particular piece of society's structure (Lerner 2009, 20.). Due to the vast significance of climate change for the future of our globe, a current trend in the field is to issue grants to companies that are creating innovations for more efficient energy distribution or less polluting manufacturing. Technology innovations have also been popular, granting targets in recent decades. (Kreutzer 2018, 50.) Specified grants serve great opportunities for suitable companies as the demands of the grants are often more suitable for the companies when compared to non-specified grants. However, their existence decreases the opportunities given to startups in general.

Besides financial benefits, grants may sometimes include moderate guidance benefits, which are provided as a direct part of the programs or through partnerships with other institutions, such as universities. (Butler et al. 2016, 297.) Grants can also be seen as a sign of credibility if they are known to implement well-thought-out due diligence processes for their applicants (Islam 2018, 35.) As grants do not demand equity or control, the autonomy of the granted companies is also retained (Bauer et al. 2023, 11.). Therefore, grants pose many benefits for startups, which usually surpass the challenges that may come with them.

As said, most grants have strict conditions for where the money must be invested after receiving funds. The most common use cases for the funds are different research initiatives, which may be achievable for startups without outside help. Then, the funds are directed to support other domestic companies, and the funded companies perform acts generally seen as beneficial for startups. Thus, using the funds supports governments' aspirations in the big picture. (Lerner 2009, 20.) Funds may even be directly allocated to, for example, the living expenses of the founders (Ayoub 2017, 1103.). These conditions may significantly limit the receiving companies as the situations and investment needs often differ significantly between early-stage startups. (Baum & Silverman 2004, 412.) This restricts the autonomy of the founders and may make some otherwise relevant grants unusable for startups.

As these conditions are combined with the complex and sometimes competitive application processes, and, especially with the early-stage grants, small grant sizes that cannot alone carry startups through the early stages of development, the benefits achieved by the grants may not always be significant (Islam 2018, 36.; Lerner 2009, 20.). However, suppose startups can fulfil the standards set by grants, get through the application processes with moderate investment time-vice, and find a way to efficiently use the money within the given conditions. In that case, government grants can be significantly beneficial (Butler et al. 2016, 308.). They can offer a cheap supplementary funding source for early-stage startups with moderate guidance benefits. Especially for early-stage startups, whose founders cannot carry the financial risk themselves and who are not far enough to get funded by VCs or angel investors, grants can emerge as highly significant (Lerner 2009, 15.). Next, the discussion around the concepts specified in this chapter is continued with a literature review, which provides an extensive look into how startups provide value and how they should be supported to maximize the potential benefits.

# 3 Literature review on efficient startup support

Before diving into the empirical investigation on what early-stage grants have achieved the most success in supporting their field of startups and what outcomes this support has provided for society, we discuss the literature explaining this phenomenon. The utilized literature ranges from key theories and studies of startup development to theories on economic growth and studies on government grants' performance. In this chapter, we first discuss the potential benefits startups can bring to society and focus on identifying the level of success startups should achieve to appear significantly beneficial.

Secondly, we turn our attention to investigating what makes early-stage startups appear as successful. Identifying the needs and demands that must be overcome to get startups over the previously set level of success makes the pivotal support points where government grants can help easier to recognize. Lastly, we discuss the design elements enabling early-stage startup grants to answer the most significant support points. By setting the key characteristics for effective early-stage startup grants, the empirical investigation of Nordic startup grants will then be precisely backgrounded. Thus, the key objective of this chapter is to provide a solid theoretical framework, which can be utilized in identifying efficiency and providing societal benefits of startup grants in the empirical phases of the study.

## 3.1 Startups as part of economies

During the last few decades, startups have significantly increased their impact on economies worldwide. (Bonaventura et al. 2020, 345.) For example, in Finland, the Finnish Startup Association has stated that they assume startups to overcome traditional economic cornerstones, such as the forest industry in revenue by 2030 (Suomen Startup-yhteisö 2022). Nowadays, startups are seen as a critical driver of innovation, which can significantly boost economic growth and job creation (Bonaventura et al. 2020, 345.; Bauer 2023, 2.). Thus, they have steadily attracted more recognition from the media and policymakers (Lerner 2009, 14.). Recent studies have also noticed that misallocating entrepreneurial talent and distortions for startup funding are some of the most significant factors in creating productivity differences across economies. This further highlights the significance innovative and young companies can have for societies if they manage to make their environment beneficial for startups to thrive. (Butler et al. 2016, 295.)

### 3.1.1 Startups in the Triple Helix model

To better understand how the varied impacts of startups originate and of which benefits they consist of, prestigious theories such as the Triple Helix model and the Endogenous growth theory are utilized. A startup's capability to create innovations at an outmatched pace is the heart of all the impacts on which these theories are based. (Hyytinen et al. 2015, 567.; Etzkowitz & Zhou 2017, 1.: Aghion & Howitt 1998, 1.) In the Triple Helix model, government, industries, and universities form an interlinked combination that drives societal innovation development. All three sectors play their part in the combination, and the structure is inefficient if one is not filling its role. (Etzkowitz & Zhou 2017, 1.)

The government offers aid and funding and leads the strategic lines of society; universities provide new information and educate the innovators, and industries bring the innovations to use. If, for example, government aid is weak, universities tend to suffer from underfunding, lowering the level of talent that can be provided for industries. Academic research proposes that no clear boundaries between the three should exist, but preferably, all three should overlap to enable a more flexible environment. This has been seen as beneficial as the most favourable environments for innovation are at the intersections of the sectors. (Cai & Etzkowitz 2020, 202.)

Startups may possess academic elements, as they are often spinouts of academic research projects, supported by universities via entrepreneurship projects, or founded by students or recent graduates (Audretsch 2014, 320.) They often receive either indirect or direct support from governments, such as funding or professional support, and their aim is to succeed within the industries sectors, which is also their main sector for operations (Cai & Etzkowitz 2020, 202.; Ayoub 2017, 1100.). Hence, startups are deeply within an intersection of the sectors, which makes their environment optimal for innovation creation. In economies where the Triple Helix structure has been built to support these intersections, startups have emerged as very effective engines in creating disrupting innovations and new industries, which is often followed by high returns and significant growth. (Bonaventura et al. 2020, 345.; Cai & Etzkowitz 2020, 202.)

Silicon Valley is the most famous example of this kind of environment, and to this day, it is still the most powerful region in providing lucrative startups. In Silicon Valley, the government poured much funding into helping universities turn their successful research into companies. The industry sector recognized the potential of Silicon Valley and further supported the innovation processes, which enabled Triple Helix to meet its full potential. Silicon Valley has continued to nurture its environment with the same ideology, bringing it to where it is today. (Etzkowitz & Zhou 2017, xi-xiv.)

The evidence gained from, for example, Silicon Valley has motivated various governments to support the dynamics of their Triple helix so that more companies have beneficial environments to grow in (Etzkowitz & Zhou 2017, 2.). Strong support for universities enhances innovation creation, which lures corporations in, as they want to stay ahead of their competitors, in which innovations can be of great importance (Bonaventura et al. 2020, 345.). The impact of startups on innovation creation and, consequently, economic development is increased when all three sectors play together to support the environment of the startups (Cai & Etzkowitz 2020, 202.). This combination is the essential idea of the Triple Helix model, which states that the effect is the key to efficient society-wide innovation creation and economic development. (Etzkowitz & Zhou 2017, 2.)

### 3.1.2 Endogenous growth through startups

As startups are seen as the main actors within the intersections, they appear significant for economies and their development (Etzkowitz & Zhou 2017, 1.). The Endogenous Growth theory also supports this argument, as it sees innovation development as one of the critical drivers of economic growth. (Aghion & Howitt 1998, 1.). The theory states that economic growth is not solely reliant on external factors like capital accumulation or population growth. Instead, it highlights the importance of internal factors, particularly innovation, knowledge accumulation, and human capital development, that can be actively influenced by the three sectors of the Triple Helix model. (Jones 1995, 759.; Aghion & Howitt 1998)

As the theory highlights the importance of society’s internal learning for economic development, young innovative companies are often central to the theory’s functioning (Acs et all. 2009, 17.). As startups, in the intersection of the three helixes, are at the forefront of innovation, their significance for the theory is undeniable (Cai & Etzkowitz 2020, 202.; Bauer 2023, 2.). Innovation is heavily interlinked with the other focus drivers: knowledge creation and human capital development. (Aghion & Howitt 1998, 354.) Thus, startups can play a significant role in the development of these drivers as well, which highlights the importance of startups within the framework.

Startups are knowledge-intensive entities that aim to create new solutions and technologies to solve or mitigate societal problems. They experiment with technologies, engage in research and development activities, and often collaborate with universities and research institutions. (Hyytinen et al. 2015, 567.; Audretsch 2014, 320.) Startups also have a remarkable capacity for risk-taking. By pursuing unconventional ideas, they support a culture of continuous development and can find solutions that more risk-averse entities would not have found themselves. (Haltiwanger et al. 2017, 52.) Therefore, startups heavily contribute to knowledge creation within their society, which can lead to productivity improvements and the development of entirely new industries. (Etzkowitz & Zhou 2017, 1.; Lerner 2009, 14.)

Once new information is created, spillover effects often occur, which spread the new information and its possible benefits to society. In other words, when startups create innovations, they can benefit from it themselves, but the information may also diffuse to other companies and industries, accelerating the accumulation of knowledge. (Aghion & Howitt 1998, 79.) Hence, the creation of information can contribute to the growth of their whole ecosystem, not just to their success. However, startups often want to secure their most important innovations with patents, diminishing the spillover effects. However, the innovations may only sometimes be patentable or applicable to other industries, which does not threaten the position of the innovator startup. (Acs et all. 2009, 17.)

These effects are particularly efficient within startup ecosystems, where startups, universities, and other supporting institutions cooperate to help the ecosystem's companies grow, consequently making the whole ecosystem more prosperous. (Roundy et al. 2018, 1.) The ecosystems foster an environment conducive to innovation and entrepreneurship, in which spillover effects are also enhanced (Acs et all. 2009, 17.). Companies share learnings and best practices, which raises the general quality of companies within an ecosystem (Roundy et al. 2018, 6.). The growth of startups within an ecosystem may spark a multiplier effect, in which success leads to the creation of more startups, resulting in the continuous growth of the ecosystem (Acs et al. l. 2009, 17.). These phenomena are focal points in the Endogenous Growth theory, which suggests that economies can achieve sustained, long-term growth when society keeps innovating and accumulating information (Aghion & Howitt 1998, 11.).

The third factor contributing to economic growth in the Endogenous Growth theory is human capital development. Human capital includes the skills, knowledge, and education of a nation's workforce, which are seen as critical for productivity and innovation. (Aghion & Howitt 1998, 327.) Investments in human capital are essential for increasing the productiveness and the innovation capabilities of a nation, which are both highly significant drivers of economic growth (Aghion & Howitt 1998, 328.).

As startups pursue challenging and knowledge-intensive initiatives, they need a skilled workforce to succeed in their execution. As startups grow, they aim to hire individuals with specialized skills in fields such as engineering, design, and business. (Leung et al. 2006, 665.) If the universities-helix of the Triple Helix model is not capable of aiding them in full, they must seek talent from other countries, which brings specialized knowledge to their society (Cai & Etzkowitz 2020, 202.; Etzkowitz & Zhou 2017, xii.). These recruiting operations, together with innovative challenges and active coaching at work, significantly contribute to human capital development, as a well-educated and trained workforce enhances society's productivity and innovativeness. (Aghion & Howitt 1998, 173.; Rocha & Grilli 2023, 14.)

### 3.1.3 Impact on job creation

With the need for a workforce, startups can contribute significantly to job creation. In the US, startups have accounted for approximately 20 per cent of total gross job creation, even after they accounted for only 3 per cent of total employment. (Decker et al. 2014, 3.; Haltiwanger et al. 2013, 350.). However, startups are volatile entities, which create many jobs when companies are founded but also lose a lot of them due to the high failure rates of startups (Haltiwanger et al. 2013, 348.). Thus, startups cause a lot of turnover in the employee market, but based on a study by Decker et al., the total impact for long-lasting job creation is still significantly positive (2014, 4.).

Most surviving startups stay small but still contribute to long-lasting job creation (Decker et al. 2014, 10.). Failing startups, of course, lose the employees they once had, which decreases the total impact. However, some startups become wildly successful and consequently create many new jobs. Decker et al. noticed that the jobs created by the very successful startups make up for the losses caused by the failed ventures, which leaves the small but surviving startups as the group that creates a long-lasting impact on job creation. (2014, 4.) As the small companies combine the large majority of the surviving companies, the impact of long-lasting job creation is significant, even after many startups are lost in the first years of their operations (Decker et al. 2014, 10.).

Governments have noticed this effect, which is one of the key reasons why they actively support entrepreneurship (Bonaventura et al. 2020, 345). Startups not only create but also develop beneficial skills, which is why governments have started entrepreneurship programs targeted at unemployed people. Thus, they alleviate unemployment and build human capital resources. These startups may not succeed as well, but they offer a motivating platform to build competence, which is a significant win for the government in itself. (Caliendo et al. 2015, 165-166.)

The job creation effect of startups also spans other industries, as innovations increase productivity growth. Productivity growth should increase demand and, therefore, create new jobs. Innovations may cause temporary job losses when existing tasks executed by humans become obsolete. (Aghion & Howitt 1998, 123.) However, as innovations increase productivity, the implementing entities become more profitable, encouraging companies to expand their operations. This so-called "Capitalization effect" creates a favourable tradeoff in the long run, as noticed by Aghion and Howitt in their study in 1998. The increased profitability also causes new demand for the expanding companies' suppliers, contributing to job creation. (143.)

Consequently, the new jobs created outside of startups themselves again enhance the skills and knowledge of a nation's workforce (Aghion & Howitt 1998, 143.). As more people are employed and old employees are assigned to new, often more knowledge-oriented, jobs, people learn new skills and gather new knowledge (Aghion & Howitt 1998, 156.). Learning by doing is one of the focal ideas of the Endogenous Growth theory in explaining phenomena that increase the human capital resources of an economy, and these events are a prime example of how societies gather resources through this idea (Aghion & Howitt 1998, 143.).

All in all, startups significantly contribute to human capital creation by creating jobs themselves and indirectly for other industries through beneficial innovations (Decker et al. 2014, 3.; Aghion & Howitt 1998, 123.). They also increase human capital resources by hiring and coaching skilful employees and indirectly cause the same increases for other industries as their customers adjust and expand their operations, which poses new challenges and more knowledge-oriented positions for their employees (Rocha & Grilli 2023, 14.; Aghion & Howitt 1998, 156.). This highlights the critical position of startups within the Endogenous Growth theory, and consequently for economic growth, as human capital resources form the theory's third cornerstone for the continuous growth of an economy (Aghion & Howitt 1998, 354.).

### 3.1.4 Drivers of sustainable development

The Endogenous Growth theory also sees innovation as one of the critical drivers of sustainable development. If society wants to sustain growth, but also preserve our globe’s limited resources and promote social challenges, it must support innovation. (Aghion & Howitt 1998, 155.) In the theory, technological progress is seen as a public good, as successful innovation can benefit society as a whole (Aghion & Howitt 1998, 123.). These innovations create competitive advantages by being simultaneously more efficient and more sustainable. Hence, they can provide economic growth, but also help societal challenges, which makes them highly significant especially in our modern times. (Baldassarre et al. 2017, 176.)

In today’s world, sustainability is one of the leading trends in research and business, as many significant challenges threaten the future of our life on this planet. Consequently, sustainability is also one of the leading drivers of innovation. (Markard et all. 2012, 955.; Dyllick & Hockerts 2002, 130.) This trend has also attracted startups. Many startups are currently seeking solutions that are economically applicable but also help solve significant sustainability challenges (Todeschini et al. 2017, 759.). Sustainability has emerged as a new approach when companies seek competitive advantages due to sustainability’s current importance for societies. (Larson 2000, 305.)

To solve sustainability issues, the solutions must change how our society operates (Baldassarre et al. 2017, 175.). As startups are effective engines of disruptive innovations and are not afraid of risky and experimental innovation processes, they again emerge as a significant group for creating development (Hyytinen et al. 2015, 567.; Haltiwanger et al. 2017, 52.). Sustainable innovations strive to exploit market inefficiencies that cause sustainability issues by creating new solutions that are more effective money-wise but also decrease, for example, pollution (Larson 2000, 305). Hence, they create value for multiple stakeholders simultaneously, including customers, shareholders as well as the environment and society (Baldassarre et al. 2017, 175.). A significant driver of these innovations is growing regulation around sustainability topics. As companies are commanded to act within set limits for, for example, pollution, startups can help them to adapt to the new environment by innovating new solutions. (Larson 2000, 305.)

Governments are also regulated, and they may also implement their own regulations to speed up their sustainable development (Armitage et al. 2012, 247.). Being more sustainable than other nations can be a competitive advantage for nations as well as companies, which adds up to the motive governments have for supporting innovation (Pieroni et al. 2019, 203.). Of course, by being more sustainable, they are also creating a healthier living environment for their citizens (Baldassarre et al. 2017, 175.). Consequently, governments have increased their focus towards sustainability a lot during the last decades, which is altering all three helixes of an economy to be more focused on sustainable development (Pieroni et al. 2019, 203.; Cai & Etzkowitz 2020, 202.).

### 3.1.5 Capital Inflows and Competitive Markets

Now, the impacts startups have on innovation, knowledge accumulation, and human capital development have been discussed. As stated in the Endogenous Growth theory, all three are focal drivers of economic growth (Aghion & Howitt 1998). However, the direct financial benefits startups can bring to their economies have not yet been discussed, which can add to the startups' capability to drive economic growth. As startups grow quickly, they need substantial funding, which may be sought abroad if the domestic market cannot fulfil their financial needs. This can enrich the home market as international funds flow in to pay the business expenses of the funded startups. (Chorn & Siek 2017, 128.) If a startup achieves significant success, it can expand abroad, which may again increase the capital inflow to the home market.

As innovations are put into action, startups also foster the economic dynamism of an economy. They increase competition and create new disruptive approaches, which drive established companies to innovate themselves. The increased pressure is one of the most essential parts of the emergence of continuous growth and efficiency increases (Aghion & Howitt 1998, 205.). Yet all three phenomena are caused by innovation, which ties them back to the Endogenous Growth theory (Aghion & Howitt 1998, 205.). All in all, all beneficial impacts of startups are tied to the three key factors of the theory. Yet the significance of startups has also been shown for all three factors, which enable economies to pursue sustained, long-term growth (Aghion & Howitt 1998, 99.). Thus, it is evident that startups can have a significant positive impact on economies when they are in a favourable environment (Cai & Etzkowitz 2020, 202.).

Why do all governments not adjust their Triple Helix to support startups? The main reason is opportunity costs. A government must pour a lot of money and effort into making its environment beneficial for innovation. (Lerner 2009, 14.) Moreover, most governments are supporting, but more is needed to develop their innovation ecosystem into a significant driver of economic growth (Butler et al. 2016, 296.). Most startups fail, and to increase the number of successful startups, the government must increase their support (Ayoub et al. 2016, 1104.). The money is often needed elsewhere and often in places where the received benefits are instant and include less risk. Hence, allocating funds to innovation is not always an easy decision. The support must also be allocated right to have an impact. Otherwise, startups will just eat money, which does not lead to significant improvements. (Lerner 2009, 20.) However, the support is encouraged by evidence that supporting startups is often a lucrative long-term investment (Lerner 2009, 15.).

### 3.1.6 What makes a beneficial startup?

To better understand the beneficial effects of startups, the characteristics of a beneficial startup should be defined. As most startups exit within their first five years, the aforementioned benefits are generated mainly by the startups that survive (Pride 2018, 11.). Nevertheless, the ones that fail still contribute to low-term job creation and can cause significant spillover in their early times (Haltiwanger et al. 2013, 350.; Aghion & Howitt 1998, 79.). Still, surviving is the main factor for startups to appear significantly beneficial. Survival enables startups to take their innovations to market, where their impact increases. (Decker et al. 2014, 4.) Consequently, creating and implementing society-developing innovations is the second key factor. As the innovations are successfully brought into the market, they can cause the efficiency increases they are designed for and cause more spillover as they get more recognition. (Jones 1995, 759.; Acs et all. 2009, 17.)

Survival also accelerates market dynamism and contributes to long-term job creation (Aghion & Howitt 1998, 205.; Decker et al. 2014, 10.). Hence, it is evident that the more startups survive, the greater the benefits. From the surviving startups, those that emerge as highly successful and become large-sized companies should be separated. The surviving startups that stay relatively small can make a moderate contribution to all the benefits mentioned above (Decker et al. 2014, 10.). Yet when startups grow significantly, all the benefits are increased by significant multipliers (Decker et al. 2014, 4.). Highly successful startups also contribute to economic growth by bringing in foreign capital through international funding and expansion, which is rarely the case for moderately successful yet surviving startups (Chorn & Siek 2017, 128.).

Therefore, when economic benefits are sought from startups, societies should focus on developing an environment where startups can, first and foremost, survive. If they can increase the survival rate of their startups, the benefits across the board should increase. Moreover, more highly successful startups should also emerge from a larger group of surviving startups. However, societies should also prioritise identifying and increasingly supporting the most prominent startups to make the environment beneficial for surviving startups to emerge as highly beneficial. Combining the two priorities should lead to a more successful startup field, which produces more surviving startups and increases the rate of highly successful startups from the group of surviving companies.

## 3.2 Features of surviving startups

In Chapter 2, the various challenges startups face are discussed. The challenges, including, for example, unfitting business models, insufficient market knowledge, and recruitment and funding difficulties, are still being constantly overcome by numerous successful startups (Bonaventura et al. 2020, 345.). Literature on the topic presents many theories that propose actions which have helped startups on their journey. This section uses prestigious theories to determine what startups need to have or do to increase their odds of becoming successful. With this discussion, the study aims to highlight the path to success, which should help initialise the exploration of what specific pain points governments should support to best help their domestic startup field.

Two key theories, the Lean Startup theory and Resource-based View theory (RBV), are used as the core theories of this section, which both highlight the significance of efficient resource allocation for startups. Both theories are staple theories of startup building and have been extensively used as a basis for startup research. They also offer a general view of how startups should be run, which is why they offer a great foundation for a detailed discussion, which will be supported by specific actions brought from additional literature. (Shepherd & Gruber 2020, 968.; Zahra 2021, 1841.)

### 3.2.1 Lean Startup Theory's approach

Lean Startup theory proposes a systematic approach to creating and managing startups. The theory highlights the efficient use of resources, rapid experimentation, and customer feedback as the critical factors for startup success (Shepherd & Gruber 2020, 968-969.). One of the most significant challenges startups face is finding a business model that fits the demands of their market (Slavik et al. 2021, 3.). Without sufficient knowledge of their market, the startup cannot be sure that their product fits the market, increasing the need for customer feedback and adaptability (Blank & Eckhardt 2023, 1562.). Regarding the theory, successful startups do not risk wasting resources on building a complete product without proper knowledge of the market's needs. Instead, they first build a so-called minimum viable product (MVP), the simplest version of their product vision, allowing the startups to test their hypotheses and gather feedback. (Shepherd & Gruber 2020, 978.)

As they launched the MVP, they established a Build-Measure-Learn feedback loop, which they utilized to gather customer experiences to develop the MVP. By proceeding as such, they get to know their customers and their actual needs without heavy investments in development and iterate the product further based on the given feedback. (Shepherd & Gruber 2020, 978.) This approach helps startups to find a suitable business model faster and build organizational adaptability, which is crucial for survival, as startups often face changing market conditions and unexpected challenges (Blank & Eckhardt 2023, 1563.). By systematically testing hypotheses, startups can identify and address potential risks early in development. Suppose the initial product vision was directly built in total. In that case, these risks might be left unnoticed, which may cause the company to fail, as many resources have already been invested in building something that does not fit the market. (Blank & Eckhardt 2023, 1562.)

In addition to the business model's experimentation practices proposed by the theory, success-predicting actions do not necessarily need the support of customers. In their 1987 study, Sandberg and Hofer proposed that successful startups craft their business models around field-tested strategies and select industries under development or evident disequilibrium. They also succeed in creating barriers for subsequent entry, which provides them space and time to build, develop, and scale their solution without strong competitors that could endanger their unique proposition. (24.) These actions do not count the actions directly proposed by Lean Startup theory off, but rather work as complimentary actions, which have also been shown to predict the success of startups.

If a significant risk for the current business model emerges, Lean Startup theory proposes that startups should be able to pivot. By pivoting, the theory means an action in which a startup significantly changes its product or business model. These changes may be challenging for the personnel of a startup, primarily when the startup has worked a long time for a product and has a strong vision around it. (Shepherd & Gruber 2020, 978.) Sometimes, even if the risk is noticed, companies may fall for overconfidence in their product, which causes them to fail as they do not adapt their product to the actual needs of the market (Blank & Eckhardt 2023, 1562.). A study by Nummela et al. noticed that these scenarios often happen with companies with solid domain knowledge and stakeholder support, primarily seen as benefits but can also lead to overconfidence (2016, 62.). However, successful startups are seen as capable of carrying out pivots, which is seen as the best option for companies that begin questioning the fit of their current business model (Shepherd & Gruber 2020, 978.).

By starting with an MVP, actively iterating the product further based on gathered feedback, and executing pivots whenever needed, startups avoid building anything the market does not want (Blank & Eckhardt 2023, 1564.; Shepherd & Gruber 2020, 978.). It increases efficiency in using scarce resources and promotes a culture of adaptability and experimentation, all seen as critical features for startups seeking success (Shepherd & Gruber 2020, 968.). Another prestigious theory, the Market Orientation theory, shares the theory's strong focus on customers. Literature on the theory states that market-oriented companies prioritize understanding their customers' needs and preferences and appear more successful because of it (Han et al. 1998, 30.). A deep understanding of market dynamics allows startups to identify and leverage unique propositions, which can give them a competitive advantage in their market. The theory also proposes that market orientation enhances the adaptability of an organization. (Han et al. 1998, 31.) Hence, the theory's proposed approach is well aligned with Lean Startup theory's arguments for how successful startups come to life.

### 3.2.2 Resource-Based View's approach

The second essential theory, the Resource-Based View, focuses on how companies can gain a competitive advantage by leveraging their unique resources and capabilities. RBV argues that successful companies, in this case startups, succeed in identifying their valuable resources that competitors lack, which they successfully turn to their advantage. (Wernerfelt 1984, 173-174.) These resources may include assets like patents, unique processes, or skilled employees. As startups' resources are often scarce, resources like networks or culture can also emerge as highly significant. Due to the scarcity of resources, the available resources should also be aligned with the company's core competencies. The alignment increases the efficiency of their resources, as they are focused on building what the company is best at, which is seen to increase the probability of survival. (Zahra 2021, 1845-1847.)

In practice, there are two ways to look at the proposition. First, successful startups, that face scarcity, concentrate their focus on solving a specific problem, that suits their competence, well and fast, rather than solving multiple problems at once partly and slowly. Moreover, successful startups concentrate their resources on actions that get them towards solving the problem as quickly as possible and with as high quality as possible. By focusing on their strengths as such, startups enable them to leverage their resources efficiently, which can open them a path to a competitive advantage. (Zahra 2021, 1845-1847.) The valuable resources should also be protected by, for example, patents or fringe benefits, which help startups maintain the resources and build barriers for subsequent entry (Wernerfelt 1984, 173.)

The sources for valuable resources have previously been distributed into three categories, which Kaplan et al. coordinated to an analogy of horse racing. The founding team, like a jockey leading his/her horse, leads the startup's vision. The business, with all its attributes, drives the company forward just as a horse drives its jockey. And the industry sets the level of competition just as a race does for the jockey and his/her horse. All three classes can set the pair into a winning situation, but if neither of the three is above competition, the win will probably go to another pair. (2009, 112.) In startup literature, the competitiveness of the jockey, or as it often is for startups, jockeys, is highlighted as the most important of the three.

### 3.2.3 Value of the founding team

Multiple predictors of success considering the founding team have been found in previous studies, which are mostly tied to the team's previous experience. (Cooper et al. 1994, 389.; Nummela et al. 2016, 62.) Firstly, a high level of education has been noticed as one predictor. Education leads to better problem-solving skills and discipline and may enhance the team's knowledge of the problem the company is about to solve. (Cooper et al. 1994, 389.) Previous management expertise and experience from the domain field have also been noticed as predictors of success, but literature includes differing approaches to their significance. The research conducted by Cooper et al. in 1994 noticed that domain expertise gave founding teams a head start within their market, which led to increased survival rates and higher levels of success. The teams were able to avoid certain risks that less experienced teams had to find on the go, as they did not know the market as well. The teams with domain knowledge could also leverage their networks more effectively, as a significant part of their networks were within the correct industry. (390.)

On the other hand, the study did not recognize significant benefits from previous management experience (Cooper et al. 1994, 390.). Interestingly, a study conducted by Nummela et al. in 2016 found that domain expertise does not necessarily predict success if the team lacks managerial competence to run the company. Moreover, the study argues that managerial incompetence can be a significant antecedent of failure. The managerial experience prepares startups for challenges and problems that, for example, changing market conditions may initiate. Managerial qualities also tend to increase self-awareness, which helps startups to notice their weaknesses. Thus, they can also solve these weaknesses quicker than inexperienced counterparts. Managers should also be capable of simultaneously handling both the scope and vision of the business and the flow of resources, which drive the vision forward. This capability is seen to enhance with experience, which again highlights its importance. (62.)

Thus, both domain knowledge and managerial competence have been proven as predictors of success and are complementary to each other. Hence, they will both be argued as qualities significant for startups, and they can create a competitive advantage, especially together. Research made by Sandberg and Hofer in 1987 also recognized that successful entrepreneurs had the capability to recognize their lack of critical skills for running their business, and also to develop those skills. Notably, the ability to fix one's own behaviour to better serve the company's needs has been seen as a significant success-predicting skill. (24.)

All in all, the founding team is central to the success of a startup. Keogh and Johnson showed that it is even more important than the company's idea for future growth and eventual profitability. (2021, 44.) What comes to the headcount of the founding team, Cooper et al. noticed that teams perform better than single entrepreneurs, which they assumed is because teams can withstand more challenges as they have support in themselves, they may possess more critical skills such as managerial competence or domain knowledge, and they bring in broader networks and resources. (1994, 390.) The creation of valuable resources starts with a crafty and skilful founding team, which is why they are at least a part reason for a startup's ability to create valuable resources if they cannot directly become such themselves (Zahra 2021, 1845-1846.).

### 3.2.4 Company's features as valuable resources

Many features of the horse, or in this case, a startup, can turn into valuable resources, as companies are not just their innovations, business model, or employees, but the combination of them all (Zahra 2021, 1846.). However, innovations are often the one resource creating the opportunity to pursue a startup in the first place. Hence, their importance as one of the critical resources of a startup is evident. As startups are claimed to be engines of society-changing innovations, innovations are more than often the central critical resource startups aim to leverage. (Hyytinen et al. 2015, 567.) Nevertheless, the leveraging part still includes actions that successful startups do better than others, which may sometimes be even more important than the quality of the innovations. (Hyytinen et al. 2015, 576. & Sandberg & Hofer 1987, 24.)

A study by Hyytinen et al. in 2015 recognized that extensive innovativeness might harm a startup's chances of survival. This is caused by the prolonged time needed to reach the market, complex revenue streams, and high demand for funding, all of which are products of a startup thriving to innovate something completely new. All three also increase the startup's risk profile, which causes a higher failure rate. (576.) Successful startups recognize this and use, for example, the tools of Lean Startup theory to decrease the risks of their operations (Shepherd & Gruber 2020, 968.). Our economy needs novel and disruptive innovations, but startups should be capable of proving their potential first by leveraging MVPs or sticking to more straightforward solutions when they present significantly more lucrative business opportunities. (Bonaventura et al. 2020, 345.; Shepherd & Gruber 2020, 978.). By acting as such, they can turn their innovation into a truly valuable resource without carrying as much risk.

Successful companies have also been noticed to take good care of their intellectual property rights. Innovations cannot be fully leveraged if they aren't protected by patents, which have been noticed to decrease risks significantly in the eyes of potential investors. (Schaberg 2023, 91.) Of course, not all innovations can be patented, and some may be so hard to replicate that they create sufficient borders for subsequent entry without any protection (Wernerfelt 1984, 173.). However, if patenting is a viable option, it is evident that startups should pursue such an opportunity. Being patented provides startups safety and credibility in the eyes of customers, investors, and employees. Yet, it increases the value of innovation and thus helps a startup leverage it as a valuable resource. (Schaberg 2023, 91.)

As said, for example, patents can used to lure in skillful employees. This could be a great benefit, as a founding team can only get a startup to a good start by themselves. Successful startups have been noticed to succeed in recruiting skilful talent to fuel their growth (Leung et al. 2006, 665.). A capable workforce filled with domain expertise and special skills is a crucial asset for a startup; that is an asset in itself but also helps leverage other valuable assets. (Shi 2015, 766.; Leung et al. 2006, 665.) Startups must be crafty and loud to acquire this talent, where high-quality brand work and lucrative employee policies separate the best from the others (Zahra 2021, 1846.; Moser et al. 2015). Nevertheless, there is also a lot more to leveraging a workforce into a competitive advantage than just recruiting prowess.

Startups are often labelled as having a clan type of culture, where excitement and big dreams colour their day-to-day work (Koskinen 2021, 178-179.). Based on a study by Griva et al. in 2023, this is not a coincidence. They argue that startups often have a combination of clan culture and so-called adhocracy culture, which leads their companies to seek external positioning, show concern for their people, promote flexibility, and be sensitive towards their customers. (3.) A culture as such is highly favourable for a startup, as it encourages their employees to think big along the founding team and keeps employees happy and engaged as they are treated with respect. Moreover, it supports the startups' need to leverage their customers to develop their products further. (Koskinen 2021, 179.)

Successful startups promote this kind of culture to the fullest, which helps them to turn their workforce into a valuable resource (Zahra 2021, 1846.). As many companies struggle to keep their employees motivated, they cannot always get everything out of their resources (Dobre 2013, 53.). Especially here startups can create advantage, as engaging cultures are more accessible to build around big ambitions and something new (Koskinen 2021, 178-179.).

A part of being a crafty human capital builder is learning valuable skills in-house (Zahra 2021, 1846.). As resources are scarce, startups cannot always hire new employees to fill every need; instead, they invest in organizational learning. If a company is willing to offer possibilities and, first and foremost, encourages employees to learn, it can again help itself to turn its workforce into a competitive advantage. In 2018, Sekliuckiene et al. argued that organizational learning is one of the most critical factors in raising startups to the next level. Successful startups are noticed to invest a lot in organizational learning, which they enhance by creating systems around it. Moreover, they can scale the system as they grow, which is set to respond to the needs of a growing workforce. As the startup grows, a need for inter-organizational learning becomes more important, which is emphasized within the best systems. (126.)

### 3.2.5 Leveraging markets

The third source of valuable resources encapsulates everything that is around the company. In the Kaplan et al. 2009 study, this third source was identified as the race, or in business terms, the industry (112.). Yet here, networks are discussed alongside the competitive environment of the industry. Multiple studies have noticed the positive effect networks can have on startup success. (Keogh & Johnson 2021, 44.; Sekliuckiene et al. 2018, 126.; Bonaventura et al. 2020, 349.) Keogh and Johnson even highlighted the value of networks as one of the most important predictors of success in their 2021 study. (44.) By having broad networks, startups may have easier access to skilful talent, investors, and first customers (Bonaventura et al. 2020, 349.).

However, startups must also be capable of leveraging their networks. Broader networks, the better, but without sufficient social capabilities and absorptive capacity, startups cannot utilize this asset as much as they otherwise could. A study by Bandera et al. in 2019 showed that the social skills of startup entrepreneurs significantly affected their survival changes. Social skills naturally affect many other functions of a company as well. However, as the study focused on leveraging networks, the findings highlight both the importance of networks and sufficient social skills. The study also noticed that overconfidence may lead startups to think too highly of themselves and, thus, unwilling to ask for help from their networks, leading to higher failure rates. (549.) Hence, startups should aim to broaden their networks, be willing to leverage them, and have access to social capital, enabling them to turn the networks into a valuable resource.

Literature includes various arguments for what makes a market favourable for a startup. Nevertheless, it seems multiple market situations can favour startups if they know how to utilize the situation. Hence, it seems that often there are possibilities for success if a startup knows what it is up against and what it has that can help it leverage these opportunities. Still, some conditions can be easier to leverage than others. A study made by McDougall et al. in 1992 found that high market growth is one factor indicating that a market includes many opportunities for startups to exploit. Because of high demand levels, there is open space for new actors, but incumbent companies are also more interested in accelerating their development within the space through new solutions. Thus, growing markets pose opportunities for new independent startups but also for startups looking to develop complementary solutions that can help the incumbent companies get a competitive advantage with enhancements to their current propositions. (282.)

The same study also made a more surprising finding, which shows that non-growing, stable markets may also pose great opportunities. They found that high-technology startups performed better when their chosen market was not growing before their entry. (McDougall et al. 1992, 281.) This may be because such markets have less competition over new solutions, which should create more excitement around single radical innovations. In high-growth markets, there should be more competition in developing new solutions, which decreases the chances of a single startup to separate itself.

A study made by Kask and Linton in 2014 explored similar phenomena from a different approach. Their study focused on explaining which market states fit different innovations the best. They proposed that so-called dominant solutions used by a large majority of a market determine whether it is calm or turbulent. Calm markets have such a solution, which is why the development of these markets is slow. On the other hand, turbulent markets include more competition as many companies are pursuing to reign the next dominant solution. (529.) The study found that calm markets are more favourable for incremental innovations because when the majority of a market's companies are operating similarly due to the existence of a dominant solution, more minor enhancements such as better customer service or more efficient marketing can create a more significant impact (Kask & Linton 2014, 515.).

Moreover, when a dominant solution exists, stakeholders within the market are afraid to take on radical innovations due to high change costs and the risk that the possible next dominant solution will not outperform the current solution used by all competitors (Kask & Linton 2014, 515.). Yet these fears do not exist in turbulent markets, and no dominant solutions exist either. Stakeholders are searching for dominant innovations, accelerating competition and making them more adaptable to radical innovations. Moreover, as no dominant solutions exist, incremental innovations' relevance decreases as stakeholders seek significant competitive advantage through potential dominant solutions. Hence, radical innovations are found to be a better fit for turbulent markets. (Kask & Linton 2014, 529.)

The last two studies discussed can be seen to be slightly interrelated. Kask and Linton argue that disrupting calm markets with radical innovation is possible but demands a revolutionary solution that is seen as such improvement that stakeholders are willing to take the risk and pay the consequent change costs for it. (2014, 516.) This may be easier in steady, non-growing markets, where there is less competition over radical or incremental innovations, as stakeholders do not have many other options to seek competitive advantage. However, both market characteristics should be considered when deciding which market to enter and with what kind of innovation.

McDougall et al. argued that, especially in high-growth markets, startups succeed by developing complementary solutions that they can develop in cooperation with incumbent companies (1992, 282.). A study made by Gans and Stern in 2003 further divides this argument into scenarios based on other market conditions. They found that when the intellectual property protection of a startup is on a high level, but incumbent companies hold needed complementary assets of a specific business, pursuing cooperation is the more lucrative option. On the other hand, when the needed resources are available for startups, and they have well-protected their intellectual properties, it may be better to enter the market as a competitor. (348.)

Moreover, if potential partners face significant change costs due to cooperation, establishing their operations is again the preferred option. (Gans & Stern 2003, 347.) If intellectual property protection is weak and barriers to entry are low, competitive strategies are often the better option. Yet, suppose a competitive strategy is chosen, and intellectual property protection is low. In that case, successful startups use a "stealth" strategy to stay hidden from incumbent firms before their market entry to increase the barriers of subsequent entry. Thus, they have more time to utilize the competitive edge provided by their innovation before the competition can catch up. (Gans & Stern 2003, 348.)

All in all, successful startups put much thought into choosing which market to enter and planning how to adapt their proposition to fit the stage of the chosen market. Yet, sometimes, startups may pursue creating entirely new markets. A study made by Echambadi and Bayus in 2014 noticed that if the opportunity to create an entirely new market poses significant value, the option is often advantageous for startups. The study shows that the first companies contributing to the creation of the market are in a good position if the market emerges as valuable. However, creating a market demands resources, so startups with above-average resources manage better in such initiatives. (20-21.)

The study also argues that startups should avoid joining newly established markets, as they do not get the first-comer advantage and are threatened by large companies that are often waiting for markets to ripen before joining. Thus, even if a startup is early, its chances to survive decrease significantly if it is not onboard at the very beginning of a market's creation. (Echambadi & Bayus 2014, 20-21.) Therefore, market entry timing is precious when new markets are discussed, but it is also in all other scenarios.

Startups cannot fully decide their timing, but they should still notice its effects on their market and act accordingly (Chung et al. 2007, 393.). When timing is discussed, startups with radical innovations must also consider their market's readiness. Sometimes, new innovations may pose high advantages in the market, but customers are not yet ready to adapt to the innovation as they are not educated enough. Hence, being too early can also threaten startups' success, which they may overcome by pivoting or trying to educate their potential customers. To avoid being too early, communicating with potential customers before creating a product is again the best practice. (Arli et al. 2018, 392.)

When beneficial features of a market are discussed, there is more to the equation than just the components of a competitive landscape. Startups always come from somewhere, and legislation, wealth level, education system, safety, and government support of that region highly impact the chances of their regional startups surviving. (Busenitz et al. 2000, 1000-1001.) All the mentioned components can contribute to making a growth environment better or worse for startups. The impacts are so significant that some founding teams may even move to different countries for better chances to build successful companies. (Schäfer & Henn 2018, 328.) The existence of thriving startup ecosystems may also lead to these decisions.

Based on a study made by Autio et al. in 2017, startup ecosystems are communities pursuing entrepreneurial opportunity discovery, pursuit and scale-up. Ecosystems create significant horizontal spillovers within the community as members are often willing to voluntarily share their experiences, resources, and learnings with other members. The government and successful local entrepreneurs often support ecosystems, enabling them to hand digital and spatial affordances to member startups. Ecosystems also gather large networks of relevant professionals around them, which helps startups broaden their networks. Hence, startups may profit significantly from startup ecosystems. By engaging in ecosystems, they may get needed guidance, benefits, resources, contacts, and opportunities, for example, emerging from startup competitions held within an ecosystem. (80-82.)

To summarize, startups cannot always decide their circumstances, but to become successful, they must be capable of realizing their situation and adapting their operations based on that. By investigating their possible markets, their timing, and the features of relevant incumbent companies, they can significantly improve their chances of success. They should also strive to leverage the benefits their society offers in terms of ecosystems or other suitable forms of support. Markets are not necessarily valuable resources as themselves, but they may offer opportunities for startups to create such assets. Successful startups notice these opportunities and leverage them to become more resourceful and educated, which can become competitive advantages needed for the aspired success.

### 3.2.6 Benefits of financial savviness

As noted earlier, funding is often the most significant challenge that startups must tackle (Baum & Silverman 2004, 415.). In this discussion, funding has been left out of the horse race analogy, even though it could be included in the company category. However, funding is rarely something that startups can turn into a competitive advantage. Moreover, it is often the main thing startups aim to acquire by showing promise with the valuable resources they already possess. (Davila et al. 2003, 690.) Hence, successful startups' actions around funding are separated as their discussion.

Startups often fight with the liability of newness, which causes stakeholders to question their trustworthiness and capabilities. As young and small companies, startups cannot show evidence for everything they promise, which causes employees, customers, and especially investors to be more cautious about what they promise to a startup. (Shepherd et al. 2000, 406.) In literature, successful startups have found creative ways to work around the liabilities of newness and thus reach a legitimate status quicker in the eyes of their stakeholders. With funding, creativity is used for two purposes. First, successful companies pursue finding efficient ways to allocate their funds, but they are also agile in their activities when searching for funding. (Zahra 2021, 1845-1846.)

What comes to creative allocation activities, efficiency in gathering resources around critical competencies, minimizing risks with agile product development, and focusing on solving one niche problem at a time have already been mentioned. However, successful startups have also shown how cost savings can be achieved by, for example, crafty purchasing activities. In Silicon Valley, startups have capitalized on bankruptcy estates, where they have found cheap office apparel. Some startups have used recycled materials as the base of their innovations to lower their manufacturing costs. Conveniently, these actions can also be seen as sustainable, which increases the brand value of these companies. (Zahra 2021, 1847.)

Moreover, the excellent practice has also been recombining existing solutions and building innovations without building anything flavoursome from scratch. The new bundles can create business opportunities as such. However, existing innovations with slight reconfiguration can also be turned into new business models, which may provide efficient ways to find new scalable opportunities. (Zahra 2021, 1847.) Some startups have also found relief to their financial shortages through novel solutions in their offerings to their customers (Siems et al. 2012, 437.). Software as a Service offerings and their yearly subscriptions paid upfront are critical examples of how startups have managed to make the cash flow of their products efficient without compromising on the efficiency of their unit economics.

If startups can incorporate the presented resourcefulness into their company culture, it can turn into a valuable resource. If startups frequently think outside the box and turn funding concerns into advantages, they can alleviate the problems with their scarce resources and the liability of newness. (Zahra 2021, 1847.) When searching for creative solutions, the level of networks and human capital a startup has played a significant role in making these initiatives successful. Hence, startups must first obtain other valuable resources to make resourcefulness a valuable asset. (Leung et al. 2006, 666-667.)

However, more than crafty purchasing activities are needed to enable fast growth in the future. Quick scaling wastes much money, as investments in marketing, workforce, and, for example, bigger office space are needed. Hence, successful startups have also found ways to acquire significant amounts of capital, which has permitted their future growth (Zahra 2021, 1848-1849.). Literature has found multiple practices for how best startups seek funding and sustain a funding structure that secures their longevity (Bauer et al., 2023, 10-12.). Indeed, the valuable resources startups have played a highly significant role in whether they get funding or not. For example, a company's resourcefulness may increase investors' trust, as they see that the company has not burned their money unnecessarily in the past. (Zahra 2021, 1849.) Yet practices for convincing investors or planning favourable financial structures are not directly related to valuable resources discussed earlier.

Successful startups consider four factors when planning a financial structure: how much money they need? What instruments should they use? How can the new partners help them besides funding? Moreover, how much can they pay? (Denis 2004, 309-310.) When raising money, whether from investors or lenders, startups want to give up as little of their assets as possible (Denis 2004, 307.). With equity investments, startups do not want to waive too much of their stock because they need to keep their cap table investable. Successful startups succeed in keeping the majority ownership of the company on the founding team, which is also significant for further investors. They see that the startup is motivated enough only when they can set the course for the company and also have most of the potential monetary benefits for themselves. (Hechavarría et al. 2016, 142.)

This restricts the amount of money startups should raise per round. However, they must also raise a sum that enables them to proceed with their strategy, which will help them to be in a better negotiating position for the next funding round. (Hechavarría et al. 2016, 142.) In general, successful startups raise several funding rounds before IPO or exit, and they should be able to significantly increase their valuation between every round to raise more money in every round for the same amount of equity. Thus, they can scale their operations without giving up too much control to their investors. (Bauer et al. 2023, 23.) It is highly significant for startups to steadily increase their valuation, as investors see the so-called down rounds, where the valuation does not grow, as very alarming signals of the potential of a startup (Broughman & Fried 2012, 1110.).

Therefore, startups must find a balance between getting enough funding to proceed with their chosen strategy without giving too much control away (Hechavarría et al. 2016, 142.). Moreover, they must also figure out what guidance benefits they need and how much they are ready to give up on top to get the demanded benefits (Bauer et al., 2023, 23.). This makes planning funding rounds a complex challenge that may require altering growth strategies or changing the whole course of a company (Hechavarría et al. 2016, 142.). As early-stage startups do not have as many funding options available due to their liabilities of newness, the challenge becomes even more tasking. They must often give more equity away than they would like to to move forward. (Bauer et al. 2023, 23.; Hechavarría et al. 2016, 142.)

As mentioned, valuation is a focal piece in the middle of all the complexity (Miloud et al. 2012, 151.). As valuation sets the price for the asked funds, startups benefit from having the capability to negotiate a favourable valuation level with potential investors. Yet evaluating a startup company is often challenging, as proposed valuations are often based on expectations without solid evidence. When revenues are low or non-existent, trustworthy calculations are complex to make. However, on the other hand, the valuations have to be often set to a level not supported by basic valuation methods of stock markets to reach a balance between getting enough funding without letting go too much equity. Therefore, arguing a valuation can be even more challenging than calculating one. (Miloud et al. 2012, 152.)

A study by Dittman et al. in 2004 noticed that startups that succeed in acquiring funding used multiple funding methods to argue their value. Thus, their propositions were seen as more trustworthy and more challenging to deny. (634.) Moreover, a study by Miloud et al. 2012 found that basing valuations on inputs such as founding team, idea, and its potential provided more success for startups than arguing valuations with doubtful calculations (170.). Yet, if a startup has strong competence in finance and shows advanced calculations based on relevant indicators of startup performance, it can also appear more trustworthy and competent. All in all, startups can significantly improve their chances to succeed if they have the know-how to negotiate sufficient valuations that help them stay on track with their strategy without waiving too much control.

Successful startups also have tools to increase their valuations by creating "buzz" around them (Kolbe et al. 2022, 15.). Due to the increased societal significance of startups, they have also gathered more interest from the media. Moreover, social media platforms like LinkedIn offer startups an excellent platform for creating excitement within their market. (Gloor et al. 2020, 2.) Startup and government-run grant competitions also pose opportunities for startups to make a name for themselves (Passaro et al. 2016, 428.). Media coverage and competition wins have both been shown to increase the success probabilities of startups; the main reason is more accessible access to funding (Stolz & Stenberg 2022, 619.; Gloor et al. 2020, 2.). As said, startups do not want to settle on unfavourable valuations, which indicates that the wins also help them to sell at higher valuations.

In addition to publicity, startups should also invest in their brand in their early stages. An aesthetic visual look draws attention and builds trust, making getting contacts and performing convincing pitches much easier. (Ruzzier & Ruzzier 2015, 32.) Of course, good marketing also helps the business of startups in general and can even be developed into a valuable resource. Yet, it has been noticed to help with acquiring funding as well. (Kaiser & Berger 2021, 493.) Equity investors especially seek jackpots when they invest in startups, and for a jackpot to happen, a startup must have an eye for what excites its audience and what does not (Zider 1998, 132.). Creating a distinctive brand is an early indication that a startup possesses this feature.

In the literature, the primary funding option of startups is clearly stated. Startups should be able to fund their ongoing functions with their revenue as soon as possible. (Weking et al. 2019, 6.) Hence, the approach of Lean Startup theory is again favourable, as with an MVP, startups can reach the market in less time (Blank & Eckhardt 2023, 1563.). If startups can show revenue, they are also a more trustworthy investment prospect for all other funding sources, which can then focus on funding their growth rather than their current day-to-day operations (Weking et al. 2019, 6.). Of course, this is not always possible, but when creating a strategy, the possibility of accessing early revenue sources should always be assessed.

Another prestigious theory, the Pecking order theory, heavily favours this approach. It suggests that startups should prioritize internal funding sources, such as retained earnings and revenue, over external financing. At the heart of the theory is the proposition that companies should secure their control when designing their funding structure to reduce problems associated with moral hazard. (Hechavarría et al. 2016, 139.) Startups are often seen as having high information asymmetry compared to established companies. Pecking Order Theory acknowledges that startups may hesitate to waive off control due to concerns about revealing sensitive financial information. (Egle & Andries 2019, 442.) As said, giving off equity also decreases the founding team's control and possible monetary benefits, which is seen to increase agency problems. Regarding agency theory, the more control the founders have, the more effort they make, which is in the best interest of their company. Hence, retaining as much control over the founding team as possible is often in all shareholders' best interests, favouring the Pecking Order theory's approach. (Hechavarría et al. 2016, 139.)

In Pecking Order theory, the secondary option to internal funding is debt, which often includes lower costs of capital and does not require companies to reduce their autonomy. However, as noted before, debt financing is not always an option for startups due to the liability of newness and insufficient financial maturity. Startups can evidently raise their chances of getting into debt agreements earlier if they can show patents, covenants, or the same financial competence that is favourable when arguing valuations, but it is still not often enough. (Egle & Andries 2019, 441.) Young startups also need coaching, scouting, and networking help, which they may get from equity investors. Therefore, raising funding in exchange for equity is often the only way forward, but it can also be a favourable option in the early stages of a startup. Successful startups structure their funding to balance all their needs, which is why they tend to combine different funding options. (Bauer et al. 2023, 23.)

First, startups must assess what they need the most at the time. Young startups can waive more control as they possess at least a majority of it before raising funding. The larger a startup gets, it must get more protective of its position, which is why it should favour the approach of the Pecking Order theory more. Yet early-stage startups can also, for example, combine equity loans with smaller angel investments to fund their growth but retain significant control in the process. (Bauer et al. 2023, 23.) Successful startups succeed in planning their long-term growth by always having options available for the next rounds, which contributes positively to their funding structure.

To summarize the chapter, there are various actions and actors that can help startups to become successful. Regarding Lean Startup theory, startups should embrace customer orientation and adaptability to avoid building anything the market does not want. By utilizing MVPs and pivoting, startups can be more efficient in using scarce resources and find a lucrative business model with fewer risks. (Blank & Eckhardt 2023, 1564.; Shepherd & Gruber 2020, 978.) On the other hand, the Resource-based view proposes that startups should manage to identify and nurture their valuable resources and align them with their core competencies. Many features of a startup can appear as a valuable resource, which may open opportunities for competitive advantage. (Zahra 2021, 1845-1847.)

The chapter divided sources for valuable resources into four categories: founding team, company, market, and funding. The noticed potential valuable resources of a founding team were high education level, domain knowledge, managerial competence, and social skills. The uniting feature between the four is that all help founding teams solve problems and get their startups to move forward. Potential valuable resources found within the company are their innovation and employees. Innovation is often the fuse of startups, where prominent recruiting and training practices paired with a thriving company culture can create a workforce that can help strengthen that flame. (Zahra 2021, 1846.)

The market cannot necessarily be a valuable resource in itself, but it creates opportunities for the creation of such if startups can identify and leverage its characteristics (McDougall et al. 1992, 281.; Kask & Linton 2014, 515.). When it comes to funding, the capital resources of a startup are not often sufficient to become a valuable resource. However, the practices to acquire and use funding can be seen as such, as they may enable startups to pursue their strategy (Davila et al. 2003, 690.; Zahra 2021, 1845-1846.). Moreover, all valuable resources can help startups acquire funding as they increase trust and potential in the eyes of investors. The best case scenario is that startups could pick between investors, as they can also offer significant help to startups. Picking the right investor can also turn out to be a valuable resource in itself if a startup manages to pick its partners carefully. (Bauer et al. 2023, 23.)

A successful startup does not necessarily need all potential valuable resources presented, but it surely needs some of them to survive and grow. Building a startup is a tough initiative, and distinctive features are needed to overcome all the opposing challenges. (Bonaventura et al. 2020, 345.) In the next chapter, we discuss different designs of government grants and focus on how they have helped startups be agile and identify, nurture, and utilize valuable resources.

## 3.3 Ambitions of government grants and their impact on startups

### 3.3.1 Many government grants fail

In chapter two, we discussed why and how governments invest in startups, what government grants are, and how grants can help early-stage startups to survive and succeed. The supply of government grants has increased concurrently as the influence of startups has grown, but literature shows that many of these granting programs are underperforming to their promises. (Meuleman & Wouter 2012, 580.; Söderblom et al. 2015, 1501.; Lerner 2009, 20.) This section discusses how government grants are designed, why they are designed as such, and how different designs affect their efficiency in supporting early-stage startups. Previously, in this chapter, we have discussed the potential benefits startups performing in a supporting environment may bring to an economy and the resources startups need to become successful. This section wraps the chapter by exploring how past government grants have helped create a supporting environment that assists startups in nurturing and maintaining valuable resources. Further in the study, this groundwork helps us explore how the research group's grants are performing and why some grants perform better than others.

Literature has found various benefits in how grants help startups and, consequently, the granting party's economy, which create the main motives for granting. Grants can alleviate startups' solvency and liabilities of newness, which helps governments foster their human capital, innovation, and job creation. (Lerner 2009, 6.) However, Lerner found in his 2009 study that many grants fail to create significant benefits and end up causing more harm than good. A study by Keogh and Johnson in 2021 found that government funding was one of the main predictors of the failure of startups within their research group. (20.; 44.) Moreover, Ayoub et al. found that granted startups had a nearly three times lower return on capital than their counterparts who did not participate in the research granting program. (2017, 1100.)

This raises the question of why that is. Yet before going into reasons, the thought process of governments when designing grants must be better understood. Therefore, we utilize prestigious theories such as Keynesian Economic and Endogenous Growth theories to investigate how governments aim to maintain and foster economic growth. This gives us separate approaches to how early-stage startup grants can be used to foster the economy. To gain economic advantage, countries must produce more output per worker than others, which can be achieved if they attain high rates of investment in physical and human capital and use these inputs with high productivity. (Aghion & Howitt 1998, 11.) Both Keynesian and Endogenous Growth approaches provide tools for achieving these phenomena and, as such, are widely used as support when designing government decisions worldwide. Yet, the priorities of the theories are not fully aligned, which causes conflicts relevant to the design of government grants. (Dosi et al. 2010, 1749.)

### 3.3.2 Keynesian Economic theory’s take on government grants

In Keynesian economic theory, government spending is the main instrument for stimulating economic activity. The theory is based on the expectation that the total demand of an economy is the primary force of economic performance, particularly in the short run. It also expects that increasing government spending can increase national income and consumption more than the initial amount spent. This phenomenon is known as a multiplier effect, which governments aim to maximize with their spending. (Blinder 2008, 1.) As startup grants are set in the Keynesian framework, they can be seen as an instrument to create multiplier effects by boosting short-term employment and economic activity.

Startups are proven capable of such impacts, which is why they offer a legitimate instrument for the short-term alleviation of an economy (Galambos & Amatori 2016, 763.). Many grants have been built so that they focus on the activity of an economy rather than accelerate innovation. For example, various early-stage grants have been established to allow unemployed people to found a startup, which primary purpose has been to boost short-term employment. (Lerner 2009, 6.) Moreover, grants are often directed to industries with a high labour intensity or have been significantly impacted by economic downturns (Lerner 2009, 129.). Hence, grants can have a more immediate impact on economic activity or help the industries that need an uplift.

Early-stage grants often include restrictions for where the granted funds can be used, which also suits the Keynesian approach (Lerner 2009, 20.). Typical restrictions demand that the funds must be used to purchase domestic professional services, keeping the given funds within the same economy, increasing spending, and providing startups with valuable help (Lerner 2009, 184.). Another typical scheme is that the funds are given monthly to cover the livelihood of the entrepreneurs, which is meant to lower the threshold of establishing companies (Ayoub 2017, 1103.). Both examples' primary objective is to enhance economic activity before accelerating innovation. As both are also common, it is evident that the Keynesian approach is significant in the design of government grants.

### 3.3.3 Government grants based on the Endogenous Growth theory

The Endogenous growth theory has already been discussed when the potential impacts of startups on an economy were argued. However, it also offers a tremendous opposing approach to what governments aim to achieve with early-stage startup grants. Innovation is known to be one of the critical drivers of economic growth, which the theory also emphasizes (Lerner 2009, 58.; Aghion & Howitt 1998, 11.). For an economy to be an efficient innovation creator, it must invest in enhancing its human capital and knowledge resources, which nurture innovation and help utilize new solutions (Aghion & Howitt 1998, 354.). It is also evident that more innovations are brought into the market when the founding of a startup is made a more lucrative option (Lerner 2009, 58.).

Therefore, when early-stage startup grants are put into the Endogenous Growth framework, the main purpose of the grants is to make the founding environment more beneficial and supportive, which should lead to increased innovation and utilization of the solutions produced by innovation (Lerner 2009, 15.). By this, the grants should support long-term economic growth through technological advancement and increased productivity (Aghion & Howitt 1998, 11.). As grants following the Endogenous Growth approach aim to support innovativeness, they must narrow down their scope of potential grantees significantly. Startups are engines of innovation, but not all are capable of providing significant new solutions to the market, which is why they may not be potential enough to be supported by such grants. A study made by Scott in 2009 even argues, that most startups are closer to sole entrepreneurs than innovative companies, and are less efficient than incumbent companies' employees, which is why governments should significantly narrow their number of permitted grants. (142-145.)

Hence, early-stage startup grants with thorough application processes suit the scope of Endogenous Growth theory well. Grants can focus on supporting startups in industries with high potential for innovations and future business opportunities (Lerner 2009, 20.). By focusing on the most potential industries, the grants can be better suited for the industries' needs, which may be highly beneficial for the granted companies. Some grants only support startups engaged in potential research initiatives, and the given funds may also be restricted to be used in further research rather than in growing a business (Islam 2018, 36.). All these restrictions enhance the resource efficiency for innovation creation, which is well suited to the Endogenous Growth theory.

Various grants promote human capital and knowledge creation by providing the grantees access to other resources besides the given funds. Some grants provide professional help by themselves or via universities to tutor the startups through their early stages. (Butler et al. 2016, 297.) Grants have also created communities around the grantees, which gives startups the chance to learn and get moral support from each other. Moreover, grants may be heavily engaged with local startup ecosystems, granting grantees access to these beneficial communities (Roundy et al. 2018, 1.). By engaging startups with each other, grants increase spillovers, accelerate the learning curve of the grantees, and widen their networks, which all are also noticed as beneficial phenomena in the Endogenous Growth theory (Acs et al. 2009, 17.).

The objectives of grants more influenced by the thoughts of the Endogenous Growth theory include more risks than the ones of the Keynesian approach, as they offer aid for a narrower group of companies that are, on average, pursuing very knowledge-intensive challenges. Yet the long-term upside may also be higher when compared to Keynesian grants if the focus helps more novel initiatives to become successful, as these initiatives contribute significantly to knowledge creation and future business opportunities(Lerner 2009, 15.). From an economic point of view, the grants influenced by the Endogenous

Growth theory can also work as essential instruments in covering the risks of these initiatives, which makes innovative startups more lucrative investment prospects for other investors (Lerner 2009, 6.).

A prestigious economic theory, Market Failure theory, supports this approach. Market failure refers to a situation where the dynamics of a free market are not efficient, which leads to a net loss in social welfare. These situations call for government intervention to correct the inefficiencies, which should result in a net beneficial trade if the markets can be carried to an efficient state. (Toumanoff 1984, 529-530.) If the risks of investing in innovative projects are too high for other investors, the failure rate of startups would increase. Here, governments can take part of the risk to themselves by giving grants to potential companies, which helps their chances of getting additional funding in the future (Lerner 2009, 118.). Hence, governments tend to help the startups, that can significantly support the creation of knowledge and innovations, stay alive, which again is in line with the Endogenous Growth approach.

### 3.3.4 Navigating the conflicting ambitions of grant design

All presented features related to Keynesian and Endogenous Growth approaches can be found in early-stage startup grants discussed in previous literature. The approaches conflict with each other, which makes it evident that grants are used for different purposes and that it is tough to design a grant that could fulfil the objectives of both approaches. The main objective of Keynesian grants is short-term economic stimulation, whereas grants following the approach of Endogenous Growth aim to contribute to long-term economic growth. As governments' resources are scarce, if the government invests in either one of the objectives, the other one is often compromised.

The conflicts affect stakeholders in multiple ways. If grants are allocated to industries that need recovery measures and are distributed to a large pool of companies without thorough reviews, innovation efficiency tends to decrease (Lerner 2009, 129.). If startups are not supported with guidance, the survival rate of startups decreases, but the short-term effect on economic activity may not decrease (Fraser et al. 2015; Galambos & Amatori 2016, 763.). Moreover, if granted funds are not restricted to specific actions, the survival rate is likely to increase, but short-term economic activity may not fulfil the expectations (Lerner 2009, 20.). Hence, there is no one-size-fits-all solution in startup grant design, so literature argues for a balanced approach (Dosi et al. 2010, 1765.).

The scarce resources should be balanced between different grants based on the needs of an economy. Both approaches are significant, as short-term economic stimulation helps to maintain a stable base for growth, and long-term investments in innovation enhance continued economic advancement. To answer the question, which is ultimately the more beneficial approach is highly relative to society's economic situation and approach. (Dosi et al. 2010, 1765.) Moreover, the literature does not include a clear answer to the question. Next, best practices considering the design of early-stage startup grants are discussed. Best practices are qualified by the objectives of a process, which is why best practices between Keynesian and Endogenous Growth approaches may also be conflicted.

### 3.3.5 Best practices for government grants

As best practices are presented, the stand of a grant between the two approaches is presented. However, the main focus is to explore how the practices are helping grants support startups' capabilities to remain agile and nurture valuable resources. Most of the found best practices are non-financial but increase the efficiency of scarce resources. Increasing the size of a grant naturally adds to the benefits startups may get, but in this discussion, that is not a relevant benefit. However, the Endogenous Growth approach proposes that grants should be sized based on a discussion with potential grantees to find a grant size that suits their minimum needs. The number of accepted applicants should be decreased rather than the grant size if innovation efficiency is the main objective. All in all, all features of grants' design should be first discussed with potential grantees to avoid misfitting designs, which is one of the most common reasons why grants fail. (Lerner 2009, 112.)

Next, the potential status benefits of startup grants are discussed. A study made by Söderblom et al. in 2015 noticed that government grants' most significant impact may not even be the given money but rather the reputation benefits granted startups got in the eyes of potential employees and investors when they were accepted to a granting program. If the grant is complex to get and is otherwise seen as prestigious, it works as a certificate of quality for various stakeholders. Surprisingly, the size of the grant did not significantly affect the received reputation benefits, which highlights the importance of the grant's reputation. Naturally, the enhanced solvency of granted startups also increases the interest of stakeholders, but based on the study made by Söderblom et al., the reputation benefits are even superior. (1510.) Based on a study by Hottenrott et al. in 2018, reputation benefits also helped startups access bank loans. (804.)

The certification effect is also present in a study by Meuleman and Wouter in 2012, who argue that most of the benefits are caused by the application process, in which better companies get in and are thus more likely to succeed. Yet they also argue that the reputation of a grant has a certification effect on its grantees. (589.) As significant certification effects demand that grant programs have thorough application processes, the best practice is more relevant for grants following the Endogenous Growth approach. Yet, all grants can increase the effects of their services if they can grow their visibility or credibility.

A study by Krueger et al. in 2000 found another reputation-related benefit that increases the efficiency of startup grants. It proposes that if grants can enhance the public image of startup entrepreneurialism within society, they can motivate their grantees, lure more applicants, and ease the social environment around entrepreneurs. The study states that entrepreneurs are often an undervalued group within society, and by spreading the message about bettering this issue, they may increase the grant's reputation. (429.) This practice is more relevant for Keynesian grants due to its ambition to better the universal reputation of entrepreneurialism within a society, which indicates that no specific startups are favoured.

Next, we will discuss best practices presented in the literature for recognizing talent. These practices are generally more relevant for Endogenous Growth -sided grants, as they often focus more on thorough application processes than Keynesian grants (Meuleman & Wouter 2012, 589.). Lerner presented in his 2009 study that grants should demand startups to search for matching funding from an investor before receiving the grant. This appears to be an excellent method, as part of the due diligence process is externalized to other investors, who are often more efficient in recognizing talent than public organizations. (113.) To enhance the utilization of innovation, the bridge from academia to business should be built as efficiently as possible. A study by Ammon and Martin in 2001 argues that governments should create grants that incentivize students and graduates to found companies, as they form a significant channel that transforms research into economic benefit. (528-529.)

Ammon and Martin also propose that governments should allow all grantees access to the outputs of publicly funded research, whether skilled people, techniques or instrumentation, which would create spillovers and increase the probability that the executed research turns into economic return in the future (2001, 529.). All in all, grants should focus on providing their grantees with as many other resources besides the given funds as they can, which could be access to research, training for startup building, or professional tutoring. Startups need guidance on which grants can be provided to increase their efficiency. (Bauer et al. 2023, 23.)

As said, the efficiency of grants can increase if grantees can be brought into interaction with each other and the local ecosystem. Hence, the results of a study by Dubini 1989 are not a surprise. The study argues that local startup grants perform better than nationwide grants, as they can interact with their grantees more efficiently, engage them in the local ecosystem, and provide more flexibility due to their locality. (12.) This practice suits the Endogenous Growth approach but may also favour local economies trying to increase their regional economic activity. Lastly, the performance of grants should be actively monitored and developed based on the gathered data. (Lerner 2009, 133.) Again, this may suit the Endogenous Growth approach better, as monitoring is more relevant for long-term performance. However, monitoring is proposed in all circumstances.

How do different grants help early-stage startups with the needs presented in the last section then? First, grants that give startups the freedom to utilize the given funds without restrictions promote startups' chances to be agile and resourceful (Lerner 2009, 112.). Yet, grants with strings attached often guide startups to spend the grants on market research or innovation, which helps with customer orientation or innovativeness. No restrictions are ultimately the better option for startups, but both scenarios can help startups follow the Lean Startup methodology. (Lerner 2009, 20.) If grants come with guidance help, have ties to academia, or provide chances for interaction with a local ecosystem, they can help startups enhance their human capital and networks, which can both be crucial resources (Butler et al. 2016, 297.).

Especially grants following the Endogenous Growth approach may help startups pick the right markets by focusing their grants on industries with significant economic growth potential (Lerner 2009, 129.). Industry selections must also be argued to the grants' stakeholders, which can help startups learn about their potential markets. Grants also help startups maintain a sustainable funding structure and may provide certification benefits that help startups overcome their liabilities of newness. The given grants give legitimacy to startups and enhance their solvency, which increases their chances of getting further funding from investors. (Butler et al. 2016, 297.; Islam 2018, 35.)

Unfortunately, most grants fulfil only a few of the benefits mentioned (Lerner 2009, 20.). Moreover, many resources early-stage startups would need are not supported at all based on the grants found in the literature. First, the literature did not mention grants that directly help startups with resource protection. Patents and other intellectual property assets are issued by public institutions, which, at least in theory, indicates that government grants could have a significant influence in helping startups with intellectual property management. Grants can be used to file patents, but it seems that no support is given for these processes. Moreover, grants can be directed to innovation work, and ties to academia may provide some guidance and benefits on the innovation process. However, direct help for innovation was also nowhere to be found. On average, grants seem to also contribute very lightly to increasing founding team competence, helping with business model design, recruiting, or culture creation.

All in all, the Endogenous Growth approach is fundamentally more beneficial for startups, as it is primarily focused on supporting their long-term growth. In contrast, the ambition of the Keynesian approach is to increase short-term economic growth by increasing entrepreneurship. Hence, grants with more qualities from the Endogenous Growth approach seem to support startups better than their counterparts. (Aghion & Howitt 1998, 1.; Blinder 2008, 1.) However, society's economic situation and preferences determine which approach is embraced more in their early-stage startup granting activities (Dosi et al. 2010, 1765.). Both approaches can partly influence both, as Keynesian grants can benefit startups, and grantees of Endogenous Growth grants also cause economic activity. Yet if society's interest is to focus on long-term economic growth, the Endogenous Growth approach should be preferred. Using both is the proposed literature approach, but society's needs determine the balance between the two. (Dosi et al. 2010, 1765.)

In this section, we discussed how government grants are designed, why they are designed as such, and how different designs affect their efficiency in supporting early-stage startups. It appears that there is complexity in the ambitions of government grants, which causes many grants to be incapable of efficiently supporting startups, which still does not necessarily mean that a grant has failed. Many grants still fail, which is often caused by unvalidated design or poor due diligence processes. Going forward, we emphasize the benefits grants provide for startups instead of focusing on the total economic benefits they provide for societies.

# 4 Methodology and data collection

## 4.1 Research design

Only a few studies have taken a comprehensive look into the impacts of government grants on early-stage startups' performance in the past, and no studies have been made in the Nordic setting. Hence, the study has been built upon an extensive review of past literature, in which each study brings a piece to the whole that supports this study to base its empirical findings on academic knowledge. The critical methodology of the study is quantitative research, which, at its core, aims to find statistically significant relationships from the provided data. Quantitative research is grounded in positivism, which assumes that reality is objective and can be measured and quantified. Quantitative research includes numeric and statistical approaches, which affect the research design. As rigorous and systematic methodologies are used, quantitative research can produce generalizable findings, making the findings valuable. (Williams 2007, 66.) The quantitative approach selected for the study enables it to understand the phenomena at hand objectively, which could provide generalizable findings that may be reliably utilized in future grant design processes.

The quantitative analysis is divided into two sections. In the first section, the selected grants of each country are compared as groups to the country-specific control groups to investigate how the granted startups' performance differs from that of the non-granted startups. The discussion also interprets how the three countries have performed compared to each other. In the second section, the performance of all six grants is compared. Moreover, grants are grouped by unitive features such as grant size, regulation, application process, and mentoring, whose individual effects on the grants' performance are evaluated. With these steps, the study reveals how efficient grants have generally been in the three selected countries, which grants have performed the best, and what grant features correlate to higher efficiency within the selected regions. The statistical analyses use varied statistical analysis models, including tools such as ANOVA, Pearson's Chi-squared test, and the linear regression model.

Research types define the approach a study takes on the researched phenomena. Different research types can be evaluated in various ways, but for this study, a framework made by Neilimo and Näsi was utilized. In the framework, the spectrum of research types in accounting and finance is distributed into five classes based on whether the approaches are theoretical, empirical, descriptive, or normative (Figure 1). In the framework, this study belongs to the action-analytic class. The class is an interpretive approach that highlights the details of a subject in different contexts. In action-analytical research, empirical data is collected from several case studies and utilized to support the experimental approach to the studied phenomena. Due to its experimental nature, it is similar to the nomothetic approach. However, as studies included in the class also pursue conclusions, they are similar to the constructive research approach. (Neilimo & Näsi 1980) In this study, the qualities of various early-stage startup grants are explored to interpret what makes a grant efficient in supporting early-stage startups' performance, which makes the study well-fitting into the action-analytical class.

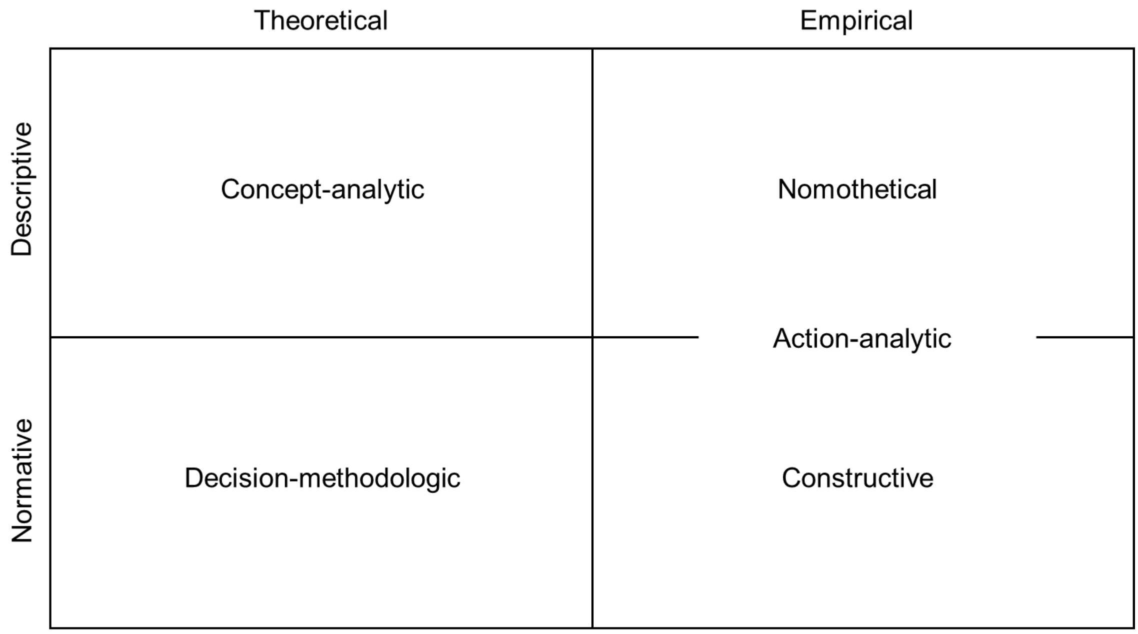


Figure 1 Framework of accounting research approaches (Adapted from Neilimo & Näsi 1980)

The study’s progression starts with the already discussed literature review that explains the key concepts and phenomena of the study, thus building the groundwork for the empirical chapters. The quantitative analysis then aims to distinguish whether the chosen grants have impacted the included companies and how specific grant features have affected the grants’ performance. Lastly, conclusions are drawn in the discussion with reflections on previous literature to answer the research questions.

## 4.2 Data collection methods

Three Nordic countries, Finland, Sweden, and Norway, and the various early-stage startup grants given in each country set the research context for this study. All data is collected from companies or grants acting within these countries. For the quantitative analyses, granted amounts and companies are collected per every grant and survival status, number of employees, and funding status per every included company. Grant-specific data points are collected to investigate the characteristics of each program, which supports the discussion on their effectiveness. Of company-specific data points, survival status is collected to study how grants have supported startups to stay alive, employee count is collected as the primary measure of growth, and rate of additional funding raised to investigate how the grants have helped companies to acquire funding.

The data is collected from three sources. Statistics of given grants are collected directly from the granting institutions. Data regarding the granted companies is collected from public registers (e.g. Kaupparekisteri) or from a platform named Dealroom (Dealroom). Public registers provide the most trustworthy data on companies' survival and employee count. On the other hand, Dealroom is a widely used platform for collecting funding-related information about startups, which makes it the best source to seek data considering funding status. The data is collected from three years, but the chosen years vary between data points.

The given grants must have been issued in 2018 or 2019, creating two separate classes of startups. The following lifespan of collected startups is three years after permitting a grant, so their survival status, employee count, and funding status are looked at from the data of either 2021 or 2022, three years from the issuing of a grant. The employee count is also gathered from the granting year to study how startups have grown from the permitting of each grant. The startups must be founded within three full years of being granted. Hence, all collected startups are founded between the years 2016 and 2019. Therefore, the average lifespan of the collected startups is four to five years.

The data collection timeline is established to get relevant data on the effects of the grants. The first five years are also the most crucial years for startup survival, which is also included in the timeline. (Pride 2018, 11.) Moreover, the timeline enables us to collect as up-to-date yet relevant data as possible on a continuously growing phenomenon (Finnish Venture Capital Association 2022 & Danske Growth 2022). Most of the grants' data storages also include information only from 2018 onwards. The separation to two years increases the amount of collected data, increasing the study's trustworthiness.

The grants included in the study are all from Finland, Sweden, or Norway. They are also controlled and funded by the countries' governments and are specified in supporting early-stage startups. The grants may or may not have application processes and may be focused on specific industries, but they must be available nationwide to all startups. The grant sizes and terms may also vary between grants. The grants must also meet the requirements of the study's timeline. As these standards are followed, two (2) grants were selected from Finland, one (1) from Sweden, and two (2) from Norway.

The collected companies must also fit the timeline restrictions and have a company profile in Dealroom. The industry of the collected companies is not relevant to this study, but they should all meet the critical characteristics of startups. Dealroom is a globally used platform meant to help with startup funding, which is why it is a good platform for collecting funding-related information. It also helps us separate innovative and growth-oriented companies from all granted entities. The number of startups collected per grant depends on the grant, but an average group size is 30-60 companies per year.

As all companies in the grant groups have received government grants, startups in three country-specific control groups have not. All three control groups consist of around 50 startups with accounts on Dealroom and share a similar lifespan to those in the grants' groups. All the same data points are collected of the control groups' companies as are collected of the granted startups. The control groups are utilized to investigate early-stage startup grants' general impact on startups within the chosen countries. All in all, data is collected of 678 companies, which is enough to provide trustworthy results on the efficiency of the grants. All quantitative data is collected in two cross-sectional data models. In cross-sectional studies, data is gathered from a diverse sample of subjects at a specific moment, and each subject is measured only once. Two models were collected as grants of 2018 and 2019 were studied.

A few exclusions have been made as the data model was built. As the startups are collected into the data model, all companies whose data is not correctly filed into public records are left out. Also, all companies that did not have a profile on Dealroom were left out. Moreover, all companies which were acquired during the research period were excluded. Varied specifications were also used in data collection. A failed company (did not survive) is a company that either filed for bankruptcy or did not have any revenue or other significant activity within the last year of the research period. Only private equity investments were filed as investments. Loans or other funding instruments were not included in the study. When the Swedish or Norwegian Kroners courses were converted to euros, 22.11.2023 courses were used.

The exclusions were made to ensure that every company's needed performance information was sufficiently acquired. Hence, the dataset flawlessly meets the definitions mentioned above, but the process may have still influenced the results' validity. Firstly, many granted companies did not have their financial information available on public records, which indicates that the operations of those companies had been shut down. Yet those companies could not have been included as no certain information was available. Therefore, the actual survival rate of the granted companies is expected to be slightly lower than that presented in the dataset. The relative number of eliminated companies was similar across all groups.

Secondly, not all granted companies had profiles on Dealroom, which caused the elimination of around 50 per cent of the granted companies. This was seen as the most effective way to separate startups from all granted companies and acquire information regarding startups' funding. However, it is worth noting that creating a profile on Dealroom is a sign of the companies' quality. Hence, it is expected that the companies included in the study possess, on average, a higher level of business knowledge when compared to all granted companies, which may have also affected the results. Other exclusions are not seen as impactful, considering the study's results. Moreover, all exclusions were seen as reasonable to ensure the uniform quality of the dataset.

## 4.3 Statistical analyses and research ethics

### 4.3.1 Statistical analyses

The collected data model consists of five groups of granted startups and three control groups of non-granted startups, which form the main data source for the statistical analyses. Before the analyses, all grants, their terms, and environments are briefly discussed, which sets the stage for the empirical phase of this study. Additional grant-specific statistics presented in the grant introductions may also be used to support the data model in the interpretations of the statistical analyses. All statistical analyses are performed with Rstudio, which is a widely used software for statistical analyses. The dependent variables studied are employee growth, survival rate (later funding), and funding rate (later funding). The independent, or explanatory, variables include grant, country, mentoring, regulation, grant size, and criteria & evaluation (aka. criteria).

Employee growth is calculated as a compound annual growth rate of companies' headcount three years after granting. The survival rate is the rate at which startups survived the three-year research period. In the data set, companies are deemed either alive (1) or dead (0). The funding rate is the rate at which startups receive private funding during the research period. In the data set, companies are deemed either funded (1) or not funded (0). These variables were selected as they best present the growth and success of startups. Many very potential startups may not pose significant revenue figures due to rigorous research investments, so it was not considered suitable for the study.

The explanatory variables are dummy coded as such: countries are coded from 1 to 3, and grants from 0 to 5 (0 = not granted). The other explanatory variables present grant features. They are coded based on the strength a feature presents in a grant. For example, grant size is coded from 0 to 5, with 0 being not granted and 5 being the most extensive grant. This coding scheme enables the study to inspect the effect different significant grant features have on startups at different levels of strength. Dummy coding is a widely used method when categorized variables are studied. (Mayhew et al. 2015, 170.) To explain the feature variables, mentoring illustrates the level of mentoring a grant includes; regulation illustrates the level of restrictions for the use of a grant; grant size illustrates the average monetary size of a grant, whereas criteria and evaluation illustrate the overall difficulty of an application process. Below in Table 2, a summary of all variables is presented.

Varied statistical analysis models are used in the statistical analyses. The analysis is divided into two phases, the first of which studies the overall performance of startups and countries. In the second phase, the impact of specific grant features is investigated. To start the first phase, Pearson's Chi-squared tests and ANOVA tests are used to assess the grants' impact on startups' performance. Pearson's Chi-squared test is a statistical method used to determine whether there is a significant association between two categorical variables. It calculates the difference between the observed frequencies and the frequencies that would be expected if the variables were independent. The test evaluates whether this difference is statistically significant or simply due to chance. Pearson's Chi-squared test is commonly used when dealing with categorical data and is especially useful in comparing proportions or frequencies across different groups. (Lydersen et al. 2019, 12.)

On the other hand, the ANOVA (Analysis of Variance) test is a statistical model used to compare means among two or more groups to determine whether there are statistically significant differences between them. The model divides the total variation of the data into different sources, such as variation between groups and variation within groups. It then compares the variability between groups to the variability within groups. Based on this comparison, it assesses whether any observed differences in means are likely to be genuine or simply due to random variation. ANOVA is also commonly used in statistical analyses, especially in research designs with more than two conditions. (Cuevas 2004, 111.)

| Grant | N valid | N missing | Mean | Median | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| Employee Growth | 678 | 0 | 0,10 | 0 | 0,58 | -0,86 | 2,55 |
| Survival | 678 | 0 | 0,79 | 1 | 0,41 | 0 | 1 |
| Funding | 678 | 0 | 0,50 | 1 | 0,50 | 0 | 1 |
| Grant | 678 | 0 | 2,39 | 3 | 1,82 | 0 | 5 |
| Country | 678 | 0 | 2,11 | 2 | 0,89 | 1 | 3 |
| Mentoring | 678 | 0 | 0,84 | 0 | 1,74 | 0 | 5 |
| Regulation | 678 | 0 | 1,70 | 1 | 1,58 | 0 | 5 |
| Grant Size | 678 | 0 | 2,15 | 2 | 1,59 | 0 | 5 |
| Criteria & Evaluation | 678 | 0 | 2,06 | 2 | 1,51 | 0 | 5 |

Table 2 Descriptive statistical analysis of all variables

After the first tests, the study investigates the impact of the Nordic countries on startups' performance. Moreover, the effect of interaction between countries and grants is analyzed. Here, the MANOVA test is first used to assess the overall effectiveness of countries. MANOVA, or Multivariate Analysis of Variance, is a statistical technique used to simultaneously analyze the relationship between multiple dependent variables and one or more independent variables. It is an extension of the ANOVA test, which is used to analyze differences in means across groups for a single dependent variable. (Emerson 2018, 125.) After MANOVA, three ANOVA tests are conducted to assess the impact of countries and the interaction between countries and grants on specific dependent variables. With these tests, the study provides insights into whether the grants have impacted the startups' performance and how significant the countries' effect is on the study's results.

In the second phase, regression models are utilized to investigate the impact various grant features have had on the performance of the grants. Regression analyses are statistical methods used to describe how one variable is related to another. When the dependent variable under investigation is a function of multiple independent variables, multivariate regression models can explain the effect of each independent variable on the variation in the dependent variable. Hence, the models are suitable for this research, where the effect of multiple grant features is investigated. First, a linear regression model is presented, which investigates the features' effect on employee growth. It aims to determine the strength and direction of the linear relationship between the variables by fitting a linear equation to the observed data points. (Wilson et al. 2015.) The formula of the model is showcased below:

$$Employee\ Growth = \beta_0 + \beta_1 \times Mentoring + \beta_2 \times Regulation + \beta_3 \times Grant\ Size + \beta_4 \times Criteria + \epsilon$$

Where Employee growth is the dependent variable, and $\beta_0$ is the intercept term, representing the baseline level of employee growth when all independent variables are zero. $\beta_1$ to $\beta_4$ are the coefficients that measure the change in employee growth for a one-unit change in the respective independent variables: Mentoring, Regulation, Grant Size, and Criteria. $\epsilon$ is the error term, accounting for the variability in employee growth not explained by the independent variables. From the equation, the following null and alternative hypotheses have been formulated for each independent variable included in the model:

$H_0$: $\beta_{1\text{-}4} = 0$. The coefficient of the variable is zero. The variable has no effect on employee growth.

$H_1$: $\beta_{1\text{-}4} \neq 0$. The coefficient of the variable is different from zero. The variable has an effect on employee growth.

As the other two dependent variables, survival and funding, are binary by nature, binary logistic regression models are used. It is a statistical technique used to model the relationship between one binary dependent variable and one or more independent variables. The model estimates the probability that the dependent variable is in a particular category based on the values of the independent variables. Binary logistic regression is commonly used to analyse the relationship between predictor variables and a binary outcome. (Lombardo et al. 2015, 1622.) With these models, the study aims to provide adequate results that tell whether certain grant features significantly impact grant performance, which has been studied very little in the past. The formula of both binary logistic regression models is showcased below:

$$Survival/Funding = 1 / (1 + e\hat{}-(\beta_0 + \beta_1 \times Mentoring + \beta_2 \times Regulation + \beta_3 \times Grant\ Size + \beta_4 \times Criteria))$$

Where Survival or Funding is the dependent variable, and $\beta_0$ is the intercept term, representing the baseline probability of survival or funding when all independent variables are zero. $\beta_1$ to $\beta_4$ are the coefficients that measure the change in the log-odds of survival or funding for a one-unit change in the respective independent variables: Mentoring, Regulation, Grant Size, and Criteria. *e* is the base of the natural logarithm. From the equation, the following null and alternative hypotheses have been formulated for each independent variable included in the model:

H0: $\beta_{1\text{-}4} = 0$. The coefficient of the variable is zero. The variable has no effect on the probability of dependent variable.

H1: $\beta_{1\text{-}4} \neq 0$. The coefficient of the variable is different from zero. The variable has an effect on the probability of dependent variable.

### 4.3.2 Assumptions and limitations

In the statistical analysis development process, some key assumptions were made. Firstly, the linear regression model assumes a linear relationship between the independent and dependent variables. Testing this was noticed as complicated due to the categorized character of the dataset. Moreover, In the execution of the linear regression model, independence of observations, normally distributed standardized residuals, homoscedasticity, and no multicollinearity were assumed and checked. Moreover, the linearity of the Logit and multicollinearity were assumed separately checked for binary logistic regression models. Independence of observations, normality, and Homoscedasticity were assumed for ANOVA and MANOVA tests, and Independence of observations for Pearson's Chi-squared tests.

All three regression models faced some problems with model quality. Multicollinearity issues were especially faced, which is the result of a fairly homogeneous group of government grants. As the study focused on Nordic government grants, the available selection of sufficiently issued grants was narrowed to only the selected five. Therefore, the grants' features and granted companies formed a too homogeneous group, which hinders the results' validity. The linear regression model also faced issues with autocorrelation, whereas the binary logistic regression model of Survival did not perfectly meet the assumption of the Logit's linearity. These model limitations affect the study's validity and generalizability, which will be considered in the subsequent chapters.

The issues that have already been discussed regarding data availability also set some limitations for the study's quality. Many companies' stories cannot have been assured, and exclusions must have been made. In future studies could be done with a longer research schedule for more precise results. The study's external validity may have also been impacted by the coronavirus crisis, which happened during the dataset's timeframe. The generalizability of the grants' performance may be limited due to the special times, as all companies were facing challenges during the study's timeframe. Naturally, the study's focus on the Nordic region also causes its own limitations. The results may not be generalizable across different regions, but the strength of the found impacts is expected to be altered rather than reversed.

### 4.3.3 Research ethics

This study is conducted with ethical considerations held in high regard. The research follows the ethical principles outlined in the Finnish National Board of Research Integrity guidelines for research in humanities and social and behavioural sciences (TENK 2023). Ethical considerations are of most significance for all academic research, and as it involves subjects related to people's livelihood, a particular focus is kept on the matter throughout the study. The anonymity and privacy of all companies included in the quantitative research groups had to be considered (Bryman & Bell, 2007). No company-specific details are presented in the study. All company-specific data except information considering the grants received are collected from public sources. All organizations issuing the included grants are public actors who gave consent to use their grants' data in the research. Anonymity and privacy of all granted companies were ensured to the granting organizations in advance. All collected data has been used and stored per the EU General Data Protection Regulation (GDPR, EU 679/2016).

# 5 Empirical analysis

In the empirical analysis, we present the statistical analyses included in the study. Discussions of the chapter are built around the collected quantitative data and organized to reflect the study's two research questions. All perspectives and insights found interesting for the understanding of government grants as an instrument to support startups' survival and growth are analyzed and discussed. First, the chosen markets and grants will be presented briefly. Then, the quantitative data is interpreted, and grants' general efficiency and uniting features are investigated. In chapter 6, Discussions, the empirical analysis together with the literature review are utilized to find results to the study's research questions.

## 5.1 Introduction of the chosen grants

### 5.1.1 The Path to Grant Selection

Finland, Sweden, and Norway were chosen as the focus countries of this study for multiple reasons. They are relatively similar economies, which all have managed to develop growing startup ecosystems in their respective countries (Danske Growth 2022). All three are also amongst the most transparent countries in the world, which was demanded for the data collection process of this study (Transparency International 2023). Sweden and Norway's economies are approximately twice the size of the economy of Finland, but as seen below (Table 3), Finland is investing relatively more into the growth of their innovative companies (World Bank).

However, in Sweden, the field of government grants is more scattered than in the other two. In Finland and Norway, almost all grants go through Business Finland and Innovation Norway, as in Sweden, there are also some other granting institutions such as Almi (Almi). However, Vinnova is Sweden's most significant granter of innovative companies (Vinnova). Five grants were chosen for the study, which is one short of the targeted six. The initial plan was to include two grants from each country, but unfortunately, we did not receive data from other institutions in Sweden, and the "Innovativa Startups" grant was the only eligible one due to the low quantity of given grants in all other options. All of the selected five focus on innovation and supporting startups. They also offered a sufficient number of companies, making them suitable for the study.

| Issuer | Grants given 2018-2019 | Euros granted 2018-2019 | Average grant size |
|---|---|---|---|
| Business Finland | 4010 | 335 917 362€ | 83 770€ |
| Vinnova Sweden | 1442 | 83 174 853€ | 57 680€ |
| Innovation Norway | 8107 | 486 370 630€ | 59 994€ |

Table 3 The chosen grant administrators in numbers

The initial plan was also only to pick grants that offer monetary help to companies. However, interestingly, Norway's "Mentortjenesten" grant, which offers solely mentoring services, showed quite interesting signs, which is why it was also included. Hence, four of the five offer funding, whereas one offers only professional guidance. Moreover, only the Finnish Research, Development and Piloting Grant (later R,D&P) is specified in funding clearly defined research and development projects. The other four are less focused on supporting specific projects and offer more general help to startups. Yet, all five pursue supporting only such companies with ambitions to become international and develop something new and innovative.

| Grant | Issuer | Grants given 2018-2019 | Euros granted 2018-2019 | Average grant size |
|---|---|---|---|---|
| Tempo funding | Business Finland | 680 | 34 108 753€ | 50 160€ |
| R,D&P funding | Business Finland | 162 | 32 358 248€ | 199 742€ |
| Innovativa Startups | Vinnova Sweden | 358 | 11 259 090€ | 31 450€ |
| Startup Grant | Innovation Norway | 1428 | 33 731 410€ | 23 621€ |
| Mentortjenesten | Innovation Norway | 368 | 1 472 294€ | 4 001€ |

Table 4 Overview of the studied government grants

### 5.1.2 Finland

At the start of the last decade, quickly after Nokia's glory days had ended, the Finnish startup scene started to grow rapidly (Finnish Startup Community). Since then, it has grown into a significant sector for the Finnish economy, employing over 25,000 people and creating around 4 per cent of Finland's yearly exports (Business Finland 2024; EK 2024). The number of Finnish startups has decreased from 2015 until today, but the volume of raised funding increased until 2023 (Business Finland 2023). In 2022, Finnish startups raised 1,8 billion euros, over seven times the total of 2015. Hence, the number of high-quality startups has kept increasing, which has also strengthened the startup field's economic significance during the last few years. (Finnish Venture Capital Association 2022b) However, based on a study made by Dealroom, Finland is still behind Sweden and Norway in "companies worth over one billion per capita" -statistics, so there is still work to do to catch the Nordic neighbours (Invest Estonia 2022).

Business Finland is the Finnish government's sole institution aiding domestic innovation and growth companies. Between 2018 and 2023, Business Finland has invested 1,2 billion euros to support Finnish companies. It operates varied support programs for companies aiming to enter new markets or create innovations. Of these programs, Tempo and R,D&P were selected as they are the most suitable, yet impactful, for startup companies. Lately, Business Finland has focused on supporting deep tech companies that base their innovations on the latest research. Such companies often possess precious resources due to their hardly imitable innovations and strong IP. This policy is seen to be the most likely to help Finland produce more successful companies, as it is aligned with Finland's strengths. (Business Finland 2024)

*Tempo funding*

Tempo grant is designed for startups under five years old, aiming to facilitate their international growth. The grant aims to support startups with innovative product or service ideas by providing funding for business development, customer testing, and market exploration. The grant offers a maximum of 60,000 euros, covering 75% of project costs up to 80,000 euros. Between 2018 and 2019, the average size was 50 159,93€ across the 680 grants issued. The grant can be issued only if a company qualifies through Business Finland's comprehensive business evaluation, focusing on the company's overall potential, growth plans, and team quality. To become eligible for the evaluation process, a company must have at least 30,000 euros in equity funding and at least a two-person team based in Finland. An applicant must also be classified as a small company and cannot have received the Tempo grant before. However, startups pivoting their business model may be eligible for a second grant. Despite the evaluation process and the eligibility rules, the grant is one of Finland's most widely available grants for startups. (Business Finland b)

The program doesn't necessarily focus on product development or research activities, but rather aims to help startups to find a product-market fit and build feasible growth strategies to help with internationalization. The grant may also be used to investigate future financing opportunities or to help acquire IP assets. The grant can be used to pay salaries, but only if the completed work is in line with the program's intentions. Hence, a startup cannot pay, for example, their developers' salaries with the grant. Still, Tempo funding is one of the most important startup aid assets in Finland. (Business Finland b) Between the years 2018 and 2019 the grant was Business Finland's third largest grant by total volume.

*Research, Development and Piloting -funding*

The Research, Development and Piloting program by Business Finland is designed to support small and medium-sized enterprises (SMEs) and midcap companies aiming for significant growth in export markets. The initiative offers either grants or loans for ambitious research and development projects that aim to create valuable resources for the grantees. In this study, only grants issued by the program are included. The funded projects should focus on acquiring new knowledge within an industry, which could lay the groundwork for future development. Moreover, Business Finland focuses on projects executed in collaboration with universities or research institutions. A key evaluation criterion for these projects is that they should have the potential to yield export revenues at least 20 times greater than the R&D investments. (Business Finland a)

There is no reported ceiling for the grant size, but the average amount between 2018 and 2019 was 199 742,27€. Startups can receive up to 50% funding for the approved costs of their research projects. As the grant is paid only after the project, the weight of the startups' own pockets actually determines the funding potential of the grant. To be eligible for the grant, companies must be classified as either SMEs or midcap companies.

Companies should also actively pursue significant international growth and the development of new innovative products. Additionally, they should aim to create new expertise that could emerge as a valuable resource. (Business Finland a)

The eligibility criteria are not as strict as with Tempo funding, but on the other hand, the evaluation process is at least as competitive. A 20-fold return is not an unheard-of demand for startups, but they still must be capable of convincing the evaluation team that the specific project has such potential. This is a significantly higher request than the Tempo funding demands. All applicants must also present a precise project funding plan, including an inspection of a startup's current solvency. However, the question is justified as the program's grant size is clearly the most significant part of the study.

Access to the grant is preserved for a small group of the most potential companies, many of which pursue solving ambitious science projects. The grants include more risk than loans, which is probably why grants cover only 15% of the program's total volume. Overall, R,D&P is part of Finland's strategic effort to boost innovation and global competitiveness among Finnish companies. (Business Finland a) The program's yearly total volume is over 50% of Business Finland's total efforts, making it the most significant funding initiative in Finland.

### 5.1.3 Sweden

The Swedish startup ecosystem is one of the strongest in Europe. In 2023, it placed 4th in VC investment raised, 3rd in deep tech investment and 2nd for Impact, all in the European context. The ecosystem’s journey is slightly longer than that of its little brother, but the growth has still been exponential. Since 2018, the ecosystem has doubled in size, currently holding a value of 239 billion euros. In 2023, despite the geopolitical challenges, it drew 4,7 billion euros in startup investments, which is 2,6 times the number of Finland in 2022. Sweden’s ecosystem is strong, encouraging and supporting former employees of successful unicorn companies to become founders of new startups. In 2023, Swedish startups created 138,000 jobs globally, 5,5 times the number in the Finnish scene. (Business Sweden 2024; Vinnova 2024)

As said, there are multiple granting institutions in Sweden, of which Vinnova is the most focused on startups and innovation. Vinnova is a government agency under the Ministry of Climate and Business that works as Sweden’s innovation authority. (Vinnova) The organization is a bit smaller than Business Finland or Innovation Norway, investing around 300 million yearly in research and innovation. It puts out around four to six times less than its counterparts in comparable investments.

Sweden is not as transparent in its research and innovation investments as Finland and Norway, both of which have figures available on their websites. Hence, the total scale is not known, but it is evident that they offer less monetary help for their early-stage startups than Finland and Norway. Their Innovativa Startups -grant was the only grant found eligible for the research, as the focus and volume of a grant were considered. The organization strongly focuses on sustainability and bases its work on the United Nations' Agenda 2030. Their 2023 summary highlighted that 74 per cent of the Swedish startup investments went to companies pursuing sustainable innovations. (Vinnova 2024)

*Innovativa Startups*

The Innovativa Startups program is a two-stage grant initiative aimed at nurturing innovative companies Sweden. The program supports startups showcasing high growth potential and interest towards sustainable business conduct. In the first stage of the program, eligible startups can apply for a grant of SEK 300,000, which is meant to be used in a project focusing on either prototyping, business model development, or IP protection. For stage one, eligible companies must be younger than five years old, have an annual turnover of less than two million kronor, and commit to aligning their business with the United Nations' Agenda 2030.  (Vinnova 2021a; Vinnova 2021b)

In stage two, startups that have already received stage one grant can apply for a second grant, which is 90 percent of the costs of the second project yet limiting to a maximum of SEK 900,000. For both application processes, the funded project must be thoroughly explained, but the funds can still be used without many restrictions. A grant can be used freely to pay salaries or finance materials and services. Hence, the policy regarding the use of the funds is more liberal than that of the Finnish counterparts. (Vinnova 2021a; Vinnova 2021b)

In both stages, the competition for the grants is tough. Fewer grants are given compared to Finland and Norway, even though Sweden is home to most startups in the Nordics. The stage one application process focuses on how the applicants have already engaged with their potential customers. By encouraging startups to interact closely with their target market, the program aims to cultivate a culture of responsiveness and adaptability. They also offer a tool to test customer reactions, which may be a valuable addition to the program. (Vinnova 2021a; Vinnova 2021b)

Moreover, Vinnova highlights that the funded projects should have innovative potential and demonstrate a commitment to addressing societal challenges and promoting diversity and inclusion. In stage two, the performance of the stage one project is the key point of evaluation. If a startup is able to present a potential follow-on project for the stage one project, highlight valuable lessons learned, and showcase concrete progress, it has an advantage in the stage two application process. (Vinnova 2021a; Vinnova 2021b)

With 358 grants issued between 2018 and 2019, Innovativa Startups is the most distributed funding of Vinnova, as the number of individual grants is discussed. Seventy-nine per cent of the 358 were stage one grants, which explains the average grant size of 31 449,97€ for the whole program. The program is Sweden's leading aid for startups, which aims to help the ecosystem arouse new, high-growth companies that can develop our societies. They also highlight that even if the projects do not lead to the results hoped for, the lessons learned by the individuals are also precious. (Vinnova 2021a; Vinnova 2021b)

### 5.1.4 Norway

The shape of the Norwegian economy differs significantly from Finland and Sweden due to their vast natural resources, which have brought them a lot of prosperity during the last decades. Yet, around the midway point of the last decade, Norway started to shift their focus towards technology and the startup scene. (Forbes 2018) Over the last five years, Norway's startup ecosystem has seen Europe's strongest growth in VC investments and now belongs to the top 10 European countries by VC investment (Oslo Business Region 2023).

Even though the scene is growing decisive regarding investment, the support systems and government policies may not yet be on the same level as in Finland or Sweden. The scene does not enjoy the same level of attention from politics, and the universities are not similarly active. (Forbes 2024) Information on the scene was also challenging to find, which is a vital sign of the lower level of attention compared to Finland and Sweden. The scene's size is quite close to the one in Finland. In a European VC funding per capita ranking, they are just behind Finland at 8th and Sweden at fourth. In 2022, they were also behind both counterparts in startups per capita, but they have produced slightly more billion-dollar companies than Finland. (Dealroom 2022; Invest Estonia 2022)

Innovation Norway is the Norwegian government's main institution for fostering innovation in Norway (Innovation Norway). In 2022, they issued NOK 7,1 billion in total investments, which totals around 600 million euros. They also highlight that in 2022, they invested NOK 1,5 billion in companies under three years old. (Innovation Norway 2023) Between the years 2018 and 2019 and in comparable investments to other included institutions, they invested 486 million euros in 8107 grants, which made it the most significant and also the most active funding institution of the study. Based on a 2022 study made by Economics Norway, startups that received funding from Innovation Norway grow their revenues 17,1 percent faster than companies that did not (Innovation Norway 2023).

The startup grant and Mentortjensten are Norway's two most significant grant programs for startups, but they still do not play a significant role in the big picture for Innovation Norway. Most of their efforts are focused on later-stage projects supporting established companies' research and innovation. Hence, their other programs were noticed ineligible for the study. They also hold a keen interest in sustainable development. In 2022, 68 per cent of their investments were spent on companies pursuing sustainable innovation. (Innovation Norway 2023)

*Startup grant*

Innovation Norway's "Oppstartstilskudd", or in English "Startup grant", is a two-stage program tailored for innovative companies younger than three years to support their initial market entry and product development. The initiative has many similarities to the Swedish Innovativa Startups program, as it is divided into two phases and presents a similar offering. Stage one of the program focuses on supporting market exploration and MVP development activities, emphasizing learning from customer feedback. The stage one grant is relatively small, offering companies a maximum of NOK 200,000, which could still not exceed 75% of the project costs. (Innovation Norway 2024a)

The stage one eligibility criteria require applicants to have conducted market analysis and already understand their potential customers. Companies must also have stated growth ambitions and sufficient capital and resources for project execution. Focus on sustainability is also appreciated. However, the eligibility criteria and the evaluation process are both relatively easy to pass through compared to previously discussed grants. (Innovation Norway 2024a) The eligibility criteria of the stage two grant do not differ significantly from stage one, and participating in stage one is not necessarily demanded. A startup must be further in its development than stage one as stage one focuses on market testing, and stage two aims to help companies kickstart their operations. (Innovation Norway 2024b)

In stage two, a startup can apply for a maximum amount of NOK 1 million, which can amount to a maximum of 50% of approved project costs. At both stages, the funds can be freely used to execute the funded project (Innovation Norway 2024b). With 1428 grants issued between 2018 and 2019, the program issued the most grants from the research group. The average grant size was 23,623 euros, which is on the lower end of the study's spectrum. Both of the grants seem easy to acquire, as the volume of single grants is significant for both grants, and Norway has the tiniest startups from all three countries included.

On the downside, the monetary value per grant is lower than that of its counterparts. However, the program is Norway's most important aid for early-stage companies. The program also has a third phase, which differs significantly from the previous two, does not include a sealing for funding, and is issued for a much smaller group of companies. Hence, it was not eligible for the study. However, it is worth mentioning that even if the monetary support is not as strong during the first steps, Innovation Norway makes a significant number of investments in later-stage startups. (Innovation Norway 2024c)

*Mentortjensten*

As said, the last grant differs slightly from the others. As all other options offer financial help, Innovation Norway’s Mentortjensten offers mentoring services for startups in need. Recognizing the importance of capital and expertise for the success of startups, Innovation Norway often offers the grant to be paired with their other grants. The program provides a mentor selected based on the company’s needs from their network of experienced professionals. The selected mentor will have one-to-one conversations with the startup’s CEO throughout 2 to 6 months and grant them access to their expertise and networks. (Innovation Norway 2024d)

The grant covers the costs associated with 30 hours of mentor guidance, which leads to an average grant size of 4000,80€. Hence, the grant value is significantly smaller when compared to the other grants, but the support comes in a different form and may be much appreciated by many startups. During 2018 and 2019, 368 companies went through the program, which aims to contribute to more good entrepreneurs in Norway. No actual eligibility criteria or application process exists for the grant, but the grant is focused on helping startups and is preferred to be paired with other grants. (Innovation Norway 2024d) The two other institutions did not offer such a service, which makes this a unique offering within the field. For Innovation Norway, the investment in the program is minimal when compared to its other programs, so it is interesting to see if its value is visible in the next phase of the study.

## 5.2 Quantitative analysis

The quantitative analysis is divided into three subchapters. Firstly, we delve into how granted companies have performed in general against the non-granted companies, where a Pearson's Chi-squared test and an ANOVA test are utilized to help the investigation. Then the countries' performances are compared, where MANOVA and ANOVA tests are used to understand the impact of grant- and country-effects on performance variables. In the second section, diagnostic tests are conducted to validate the analyses presented in the third phase, which includes regression models on all performance variables. Specifically, a linear regression analysis on employee growth and binary logistic regression analyses on survival and funding are explored. Overall, the analysis aims to provide insights into the performance of Nordic government grants and their impact on various startups' performance indicators.

### 5.2.1 Regional performance of government grants

The dataset of the study was a combination of five grants, which accumulates to three country groups. In addition, three control groups were included, representing the non-granted companies of each focus country. In Table 5, the performance indicators of each group are presented. The table showcases four performance indicators, three of which are dependent variables in the statistical analyses. The survival rate illustrates the share of startups that survived the three-year research period. The employee growth rate presents the average compound growth rate of the startups’ headcount. In contrast, the rate of funding raised presents the share of companies that acquired private equity funding during the research period. These three values showcase how different grant groups performed compared to each other and are used as the performance indicators of the statistical analyses. The "Employees 2018/2019" column is included to support the discussions around the grants' performance, illustrating the average condition of startups at the beginning of the research period.

The study included 678 companies, 530 of which were granted companies and 148 of which were non-granted companies. Approximately half of the test group had received private equity funding, and 79% had survived the three-year research period. On average, the companies were small but growing quickly. The Swedish grant group performed the best in survival- and funding raised rate, and the Norwegian grant group in employee growth rate. Yet, the companies included in the Finnish grant group were significantly larger by headcount than companies in all other groups, which makes their employee gr-

| Group | n | Survival rate | Employees 2018/2019 | Employee growth rate | Rate of funding raised |
|---|---|---|---|---|---|
| Total Research group | 678 | 78,9% | 2,4 | 28,3% | 50,4% |
| Total Grant group | 530 | 83,1% | 2,5 | 32,2% | 55,9% |
| Total Control group | 148 | 64,1% | 2,3 | 9,9% | 31,1% |
| Grant group Finland | 186 | 82,7% | 3,9 | 22,6% | 50,8% |
| Grant group Sweden | 81 | 84,0% | 1,9 | 41,1% | 66,7% |
| Grant group Norway | 263 | 82,5% | 1,6 | 43,4% | 55,9% |
| Control group Finland | 52 | 71,2% | 3,0 | -1,1% | 30,1% |
| Control group Sweden | 50 | 72,0% | 1,6 | 32,2% | 32,0% |
| Control group Norway | 49 | 46,9% | 2,1 | 2,2% | 28,6% |

Table 5 Performance indicators of studied markets

-owth rate even more impressive than the Norwegian figure. In total, the Swedish groups performed the best in both, granted and non-granted categories.

The first research question discussed whether government grants effectively support early-stage startups. The effectiveness was questioned by the literature review, where multiple negative findings of government grants' performance were presented. However, the research group supports the hypothesis, as granted companies performed better than non-granted companies in all markets and categories, indicating that grants have varied positive effects on startups' performance. An ANOVA test and a Pearson's Chi-squared test were used to verify the significance of this finding. The ANOVA test was conducted to investigate whether there are significant differences in employee growth between the granted and non-granted groups. The test's result $F(1, 676) = 39.83$, $p < 0.001$) indicates statistically significant differences in Employee growth between the granted and non-granted groups.

The mean square for the Grant variable (12.501) is significantly larger than the mean square for residuals (0.314), which suggests that the variability between the groups is significantly greater than the variability within the groups. On the other hand, the p-value quantifies the strength of evidence against a test's null hypothesis. A p-value of 0.05 or smaller is conventionally kept as an indicator that the observed data are unlikely to have occurred if the null hypothesis is true, suggesting statistical significance. Based on this test, it can be concluded that grants have a significant positive impact on startups' employee growth.

To explore the effect of granting status on categoric dependent variables "Survival" and "Funding", a Pearson's Chi-squared test was conducted (Table 7). For Survival, the Chi-squared statistic was 21.945 with 1 degree of freedom, resulting in a low p-value of

| | Df | Sum Sq | Mean Sq | f-value | p-value | a |
|---|---|---|---|---|---|---|
| Grant | 1 | 12.50 | 12.501 | 39.83 | 5.02e-10 | *** |
| Residuals | 676 | 212.2 | 0.314 | | | |

Table 6 ANOVA test for the effect of granting status on employee growth

a. Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

| DV | X_squared | df | p_value |
|---|---|---|---|
| Survival | 21.945 | 1 | 2.806e-06 |
| Funding | 27.409 | 1 | 1.647e-07 |

Table 7 Pearson's Chi-squared tests for the effect of granting status on survival and funding

2.806e-06. The result indicates strong evidence against the null hypothesis, suggesting a significant relationship between granting status and survival rates. Therefore, grants have a positive effect on startups' survivability. The Chi-squared statistic of funding was 27.409 with 1 degree of freedom, resulting in a p-value of 1.647e-07. The result indicates an even more significant association between granting status and whether a company has raised funding.

Thus, the grants had a significant positive effect on all performance indicators, which should be good news for all stakeholders. Granted companies had grown quicker, had survived more often, and had been better at raising funding than their non-granted counterparts, which indicates that government grants are indeed effective in supporting early-stage startups. As the performance of separate countries is explored more closely, one can see from Table 3 that Norway's grant groups did relatively the best against its control group. Norway's grant group beat its control group by 76% in survival rate by 95% in funding rate, and its employee growth was almost 19 times stronger. Finnish and Swedish grant groups also managed to reach at least two-digit percentages in all categories. Highlights of the two were that the Finnish grant group managed to get the control group's minus-sided employee growth to 22,6%, whereas the Swedish granted startups boasted a 108% raise in funding rate.

A MANOVA test was used to statistically analyse the role of the countries. It was selected to enable the exploration of granting statuses and country's combined effect on overall performance. In addition to the combined effect, the individual effect of country was also investigated. In MANOVA, the Pillai's trace statistic, along with the approximate F-value, provide the indication of the significance of a model. The Pillai's trace statistic measures the strength and direction of the relationship between the independent variable and the dependent variables (Pennsylvania state university 2023a). On the other hand, the appro-

| | Df | Pillai | approx F | num Df | den Df | p-value | a |
|---|---|---|---|---|---|---|---|
| Grant | 1 | 0.06779 | 16.290 | 3 | 672 | 3.136e-10 | *** |
| Country | 1 | 0.04480 | 10.5080 | 3 | 672 | 9.232e-07 | *** |
| Grant:Country | 1 | 0.01028 | 2.3273 | 3 | 672 | 0.07347 | . |
| Residuals | 674 | | | | | | |

Table 8 Multivariate Analysis of Variance (MANOVA) Results for Grant and Country Effects on Performance Variables

a. Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

-ximate F-value compares the observed variation between groups with the expected variation within groups, which tells the overall significance of the relationship between the independent variable and the dependent variables (Pennsylvania state university 2023b).

The MANOVA test's Pillai's trace statistic for country was 0.04480, meaning that the variable can explain approximately 4.48% of the variance in the dependent variables. With an approximate F-value of 10.5080 and a p-value of 3.136e-10, the test indicates that Country has a highly significant effect on startups' performance. However, as seen from table 8, Grant indicates an even higher significance, which is a valuable finding. The Grant:Country values indicate the interaction effect between the two independent variables. In other words, it tells whether the effect of granting status on performance variables differs across different countries. The interaction presented a Pillai's trace statistic of 0.01028 and an approximate F-value of 2.3273, indicating a minor difference in the effect of granting status on performance variables across different countries. Yet, with a p-value of 0.07347, the test did not reach a sufficient level of statistical significance. Thus, the test indicates that none of the countries runs significantly better granting programs than their counterparts.

As the Country's effect on overall performance was found to be significant, ANOVA tests for specific performance variables are now discussed. The significance of the following ANOVA tests is observed through the F-value and p-value. Similarly to approximate F-value, The F-value measures the ratio of the variance between groups to the variance within groups. A larger F-value suggests a higher likelihood that the observed differences

| | Df | Sum Sq | Mean Sq | f-value | p-value | a |
|---|---|---|---|---|---|---|
| Grant | 1 | 12.50 | 12.501 | 40.768 | 3.19e-10 | *** |
| Country | 1 | 5.25 | 5.249 | 17.119 | 3.95e-05 | *** |
| Grant:Country | 1 | 0.27 | 0.269 | 0.878 | 0.349 | |
| Residuals | 674 | 206.67 | 0.307 | | | |

Table 9 ANOVA Results for Employee Growth

a. Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

are not due to random chance. (Pennsylvania State University 2023b) Firstly, Country’s F-value of 17.119 and p-value of 3.95e-05 on Employee growth indicate that the Country in which companies are located has a significant effect on the growth of companies’ headcount (Table 9). As seen above, the interaction effect’s impact was noticed as not significant on Employee growth, which was also the case for Survival (table 10). however, Country presented an even stronger significance on Survival than Employee growth, with an F-value of 28.404 and a p-value of 1.34e-07. For Survival, the impact is also superior to Grant, which is not the case for the other two performance variables.

| | Df | Sum Sq | Mean Sq | f-value | p-value | a |
|---|---|---|---|---|---|---|
| Grant | 1 | 2.70 | 2.696 | 17.287 | 3.63e-05 | *** |
| Country | 1 | 4.43 | 4.430 | 28.404 | 1.34e-07 | *** |
| Grant:Country | 1 | 0.01 | 0.006 | 0.041 | 0.84 | |
| Residuals | 674 | 105.13 | 0.156 | | | |

Table 10 ANOVA Results for Survival

a. Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

| | Df | Sum Sq | Mean Sq | f-value | p-value | a |
|---|---|---|---|---|---|---|
| Grant | 1 | 5.70 | 5.702 | 23.984 | 1.22e-06 | *** |
| Country | 1 | 2.25 | 2.245 | 9.442 | 0.00221 | ** |
| Grant:Country | 1 | 1.29 | 1.287 | 5.413 | 0.02029 | * |
| Residuals | 674 | 160.25 | 0.283 | | | |

Table 11 ANOVA Results for Funding

a. Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lastly, the Country's F-value of 9.442 and p-value of 0.00221 indicate that the variable's effect on startups' chances of getting funded is lesser than its effect on the other two variables (Table 11). Yet, the effect is still significant, but substantially less than the effect of Grant on Funding. Interestingly, the interaction effect also presents some significance on Funding, which indicates that there is a minor difference in how different countries' grants help their startups get funded.

### 5.2.2 Diagnostic tests

Next adequate diagnostic tests for the dataset are presented, which validate the analyses' assumptions and strengthen the legitimacy of the following regression models. Six tests were done for the linear regression model on Employee growth, whereas two were made for the binary logistic regression models on Survival and Funding. Yet, only four and one will be presented next, as the VIF and Durbin-Watson tests will be presented in the next chapter within the models. Performing tests before conducting regression models is crucial, as the tests help ensure the reliability and validity of the regression analysis' results and provide valuable insights into the appropriateness of the chosen model. (Social Science Computing Cooperative 2023)

*Linear Regression analysis*

The reliability of linear regression analysis relies on a few key assumptions. Firstly, the expected value of the error term should be zero, which ensures that the model does not systematically underestimate or overestimate predictions. The variance of the error terms should be consistent to ensure a uniformity in prediction errors across different observations. The error terms should follow a normal distribution, which validates the confidence intervals and hypothesis tests. Additionally, all error terms should also be independent of each other. Testing these assumptions validates the trustworthiness of the analysis, as if the assumptions are not met, the results may be distorted. (Chatterjee & Simonoff 2012, 8-9.)

To begin the presentation of the conducted tests, the potential outliers in the data are first discussed. In a regression model, all observations should have a similar impact on the model for it to be reliable. If some observations significantly differ from their group, they should be removed from the data set, so that no observations influence the model too heavily. (Chatterjee & Simonoff 2012, 8-9.) In the context of the study, this demand is a bit tricky, as successful startup ecosystems are often assessed by their capability to create very successful companies, that naturally would be seen as outliers within the data set. As most startups either fail or stay relatively small, the assumption is paradoxical in this context. Startups can also shrink in size less than they can grow, which also made the defining of outliers difficult.

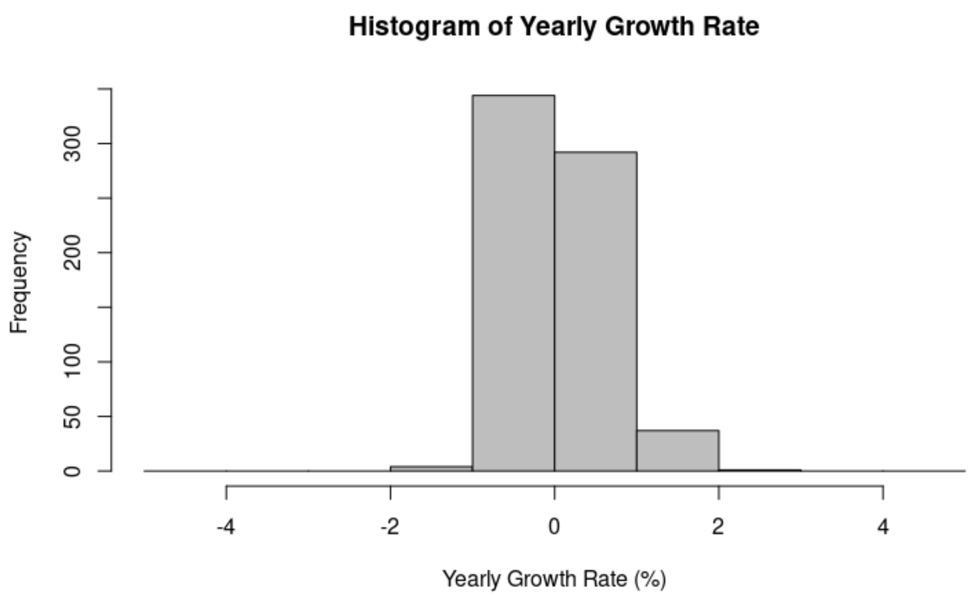


Figure 2 Histogram of the Frequency Distribution for the Employee Growth Variable

In this study, outliers are examined using frequency distribution histograms. In a such histogram, the data should cluster around a central value, showing a clear peak or peaks. There should also be minimal or no outliers, which are data points that fall far outside the expected range. As seen from figure 2, no very successful companies were found from the data set, and the distribution was relatively well balanced. Thus, no outliers were removed from the data set to ensure that all at least fairly significant success stories were also included, which supports the common perception of success for startup ecosystems. Moreover, Since the dataset of the study is rather large, the significance of moderate outliers is not emphasized.

To ensure that the Employee Growth -variable's error terms, or residuals, follow a normal distribution, the histogram of standardized residuals (figure 3) and the quantile plot indicating the distribution of residuals (figure 4) are examined. From figure 3 one can see that the shape of the histogram resembles a normal distribution fairly well, although slight differences are visible on the minus side and the peak of the distribution is somewhat higher than normal for the variable. In figure 4, a quantile plot presenting the normal probability of standardized residuals is presented. A quantile plot should ideally fall close to the line, indicating that the residuals are mostly normally distributed. As seen from figure 4, the points mostly align near the line and no significant curvature is observed, suggesting that the residuals are adequately following a normal distribution. Thus, the conditions of normality are met for Employee growth.

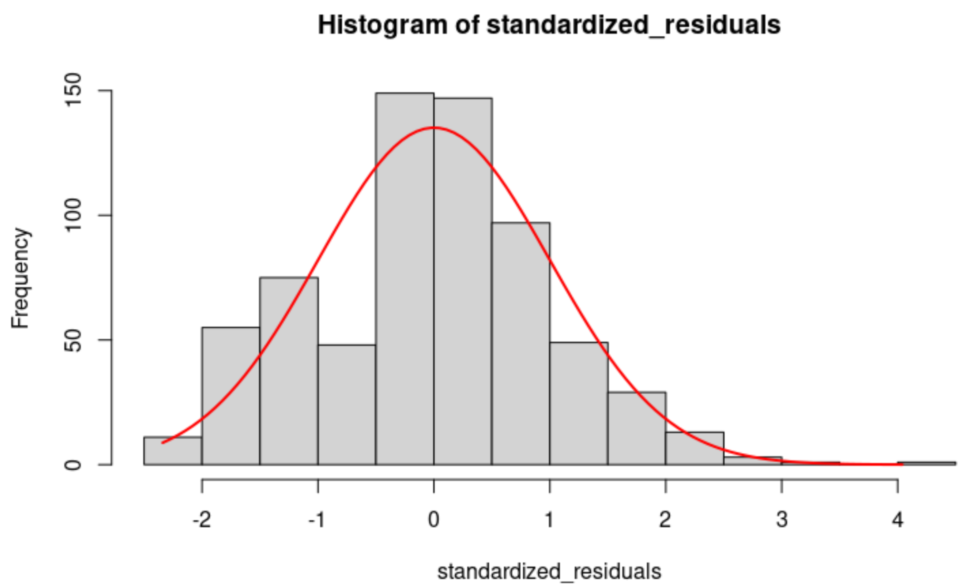


Figure 3 Histogram of Standardized Residuals for the Employee Growth Variable

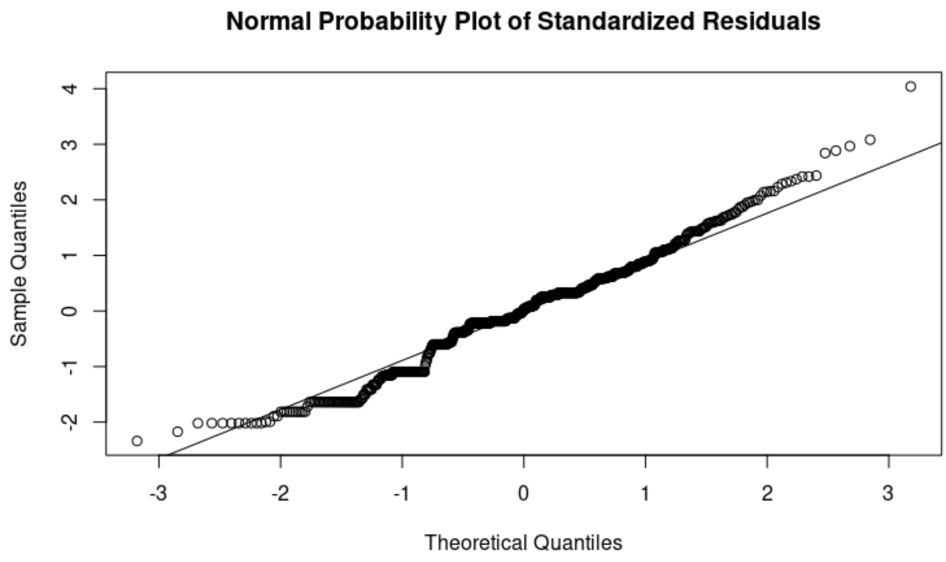


Figure 4 Quantile Plot of Standardized Residuals for the Employee Growth Variable

Homoscedasticity is a term used to describe the assumption of constant variance, whereas heteroscedasticity is used to portray a situation, where the variance of the error term is not constant. Heteroscedasticity can distort the model's results and lead to unreliable statistical conclusions, which is why it should be avoided when conducting regression analysis. (Chatterjee & Simonoff 2012, 8.) Scatterplots of standardized residuals are used to inspect the homoscedasticity of a variable. In figure 4, a scatterplot graph of Employee

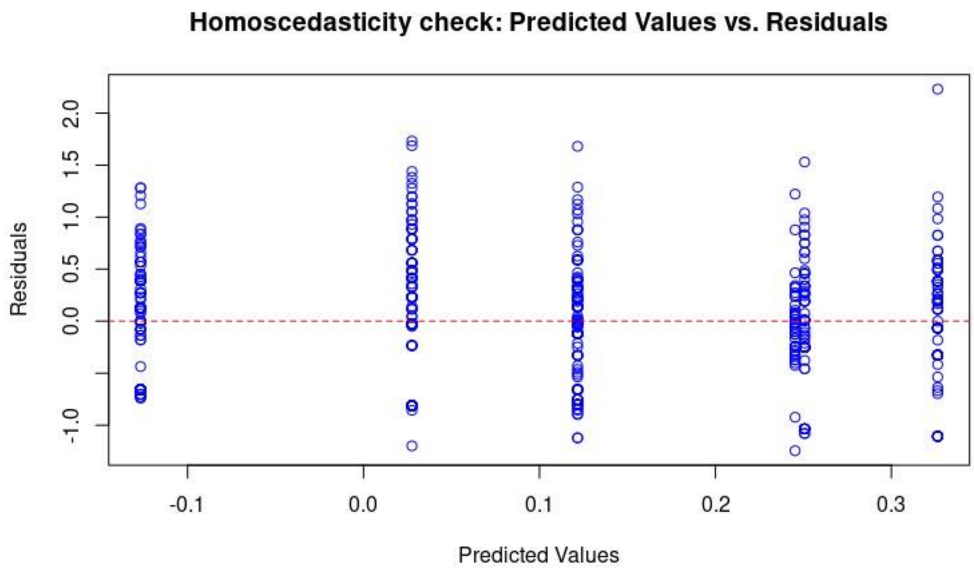


Figure 5 Scatterplot of Predicted Values and Residuals for the Employee Growth Variable

growth is presented. A scatterplot is homoscedastic when the spread of residuals is relatively consistent across the range of predicted values. Thus, if the points are consistently distributed above and below the X-axis, the graph suggests that the assumption of homoscedasticity is met.

From figure 5, one can see that the points form a fairly consistent pattern around the X-axis. This indicates that the spread of residuals remains relatively constant across the range of predicted values. No systematic change can be found in the spread of residuals, which implies that the variability of the residuals is consistent regardless of the predicted values. Significant heteroscedasticity is not observed, where the points would form, for example, converging or diverging patterns in the plot. Based on the figure 4, it can be assumed that the assumption of homoscedasticity is met for Employee growth.

*Binary logistic regression analyses*

Diagnostic tests play a crucial role also in ensuring the validity and reliability of binary logistic regression models. The tests are conducted to assess whether the assumptions underlying the regression analyses are met and whether the models adequately fit the data. For the analyses, Component + Residual Plots were conducted for both models to visually inspect the relationship between the independent variables and the log odds of the outcome. Component + Residual Plots combine the predicted probabilities and the residuals from the logistic regression models, which helps detecting non-linearity or systematic patterns.

In figure 6, the Component + Residual Plots of the Funding model are presented. Plots are done for four independent variables included, which all show consistent spread of residuals across different levels of predicted probabilities, suggesting homoscedasticity. The points form clear patterns, which may indicate that he relationship between the independent variables and the log odds of the outcome are not adequate. Yet, the patterns are due to the categorization of independent variables, which is difficultly avoided. Moreover, The Survival model's plots reveal significantly more inconsistent observations, with most falling below the horizontal line, which may indicate a violation of the linearity assumption (figure 7). This issue will be taken into consideration later in the analysis.

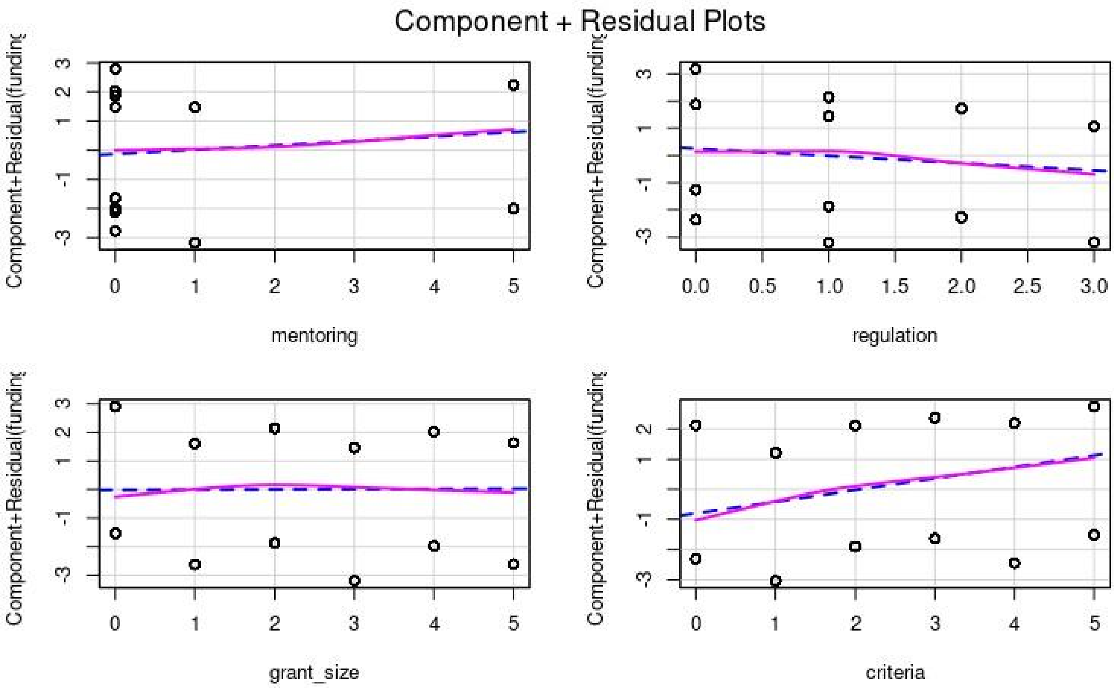


Figure 6 Component + Residual Plots for the Funding Variable

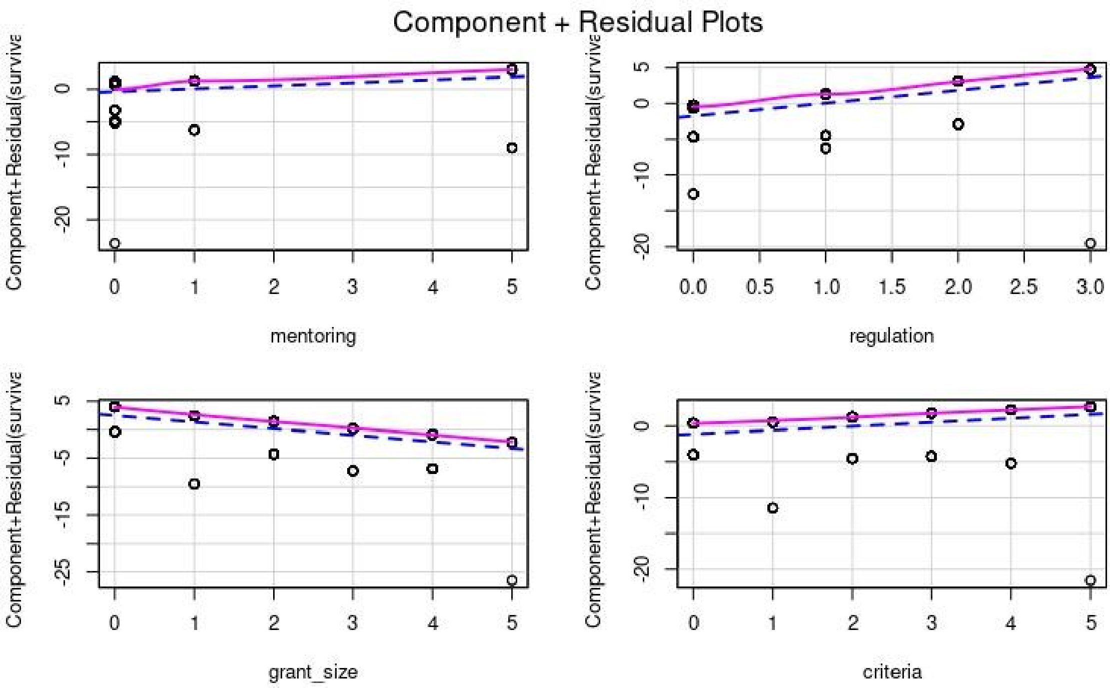


Figure 7 Component + Residual Plots for the Survival Variable

### 5.2.3 Uniting features of high-performance grants

In this section the three regression analyses conducted are discussed. Yet, before diving into the models, the performance indicators of individual grants are presented (table 10). The table follows Table 5, including data of the grants' performance indicators. Surprisingly, the best overall performer was the Norwegian Mentortjenesten, which offers solely mentoring services for startups and was the smallest grant by average monetary value. The Swedish Innovativa startups -program and the Finnish R,D&P funding also performed well. Especially the R,D&P funding's survival rate and employee growth rate are exceptional, when the initial size of the companies is taken into account. Yet, the funding was also easily the largest, which decreases the value of its results. In general, all grants did better than the total control group in every category, which again strengthens the indication that grants have a positive effect on startups.

| Grant | n | Survival rate | Employees 2018/2019 | Employee growth rate | Rate of funding raised |
|---|---|---|---|---|---|
| Tempo funding (FI) | 137 | 79,6% | 3,2 | 20,8% | 50,4% |
| R,D&P funding (FI) | 44 | 95,5% | 6,3 | 25,4% | 59,1% |
| Innovativa startups (SE) | 81 | 84,0% | 1,9 | 41,1% | 66,7% |
| Startup grant (NO) | 165 | 78,2% | 1,5 | 40,1% | 52,1% |
| Mentortjenesten (NO) | 98 | 90,7% | 1,8 | 47,7% | 62,2% |

Table 12 Performance indicators of studied government grants

*Employee growth*

A Linear regression analysis was conducted to investigate the impact of four independent variables, Mentoring, Regulation, Grant size, and Criteria & evaluation, on dependent variable Employee growth. Below in table 13, a summary of the model is presented. From the table, it can be observed that the coefficient of determination (R-squared) is 0.08213, indicating that approximately 8.21% of the variance in employee growth can be explained by the predictor variables in the model. However, it is common to use the adjusted coefficient of determination (Adjusted R Square), as the regular coefficient of determina-

| Model | R | R squared | Adjusted R squared | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| Employee Growth | 0.2866[a] | 0.0821 | 0.0767 | 0.5536 | 0.4644 |

Table 13 Summary of the regression model (Employee growth)

a. Predictors: (Intercept), Mentoring, Regulation, Grant Size, Criteria & Evaluation

-tion always increases when a new independent variable is added to the model, regardless of its relevance. (Wilson et al. 2015, 85.) The adjusted coefficient of determination in the model is 0.0767, meaning the model explains 7.7 percent of the variance in Employee growth.

The Durbin-Watson statistic of 0.4644119 indicates a positive autocorrelation in the model. According to Field (2009), the basic rule for Durbin-Watson is that values below 1 and above 3 are a concern. This result raises questions about the reliability of the model's precision of coefficient estimates and hypothesis testing. Positive autocorrelation suggests that consecutive error terms are positively correlated, which violates the assumption of independence of error terms in regression analysis. This finding decreases the validity of the model, which will be considered moving forward.

| Model | | Sum of squares | df | Mean Square | Pr(>F) | [b] |
|---|---|---|---|---|---|---|
| Employee Growth | Mentoring | 6.304 | 1 | 6.3037 | 20.5710 | *** |
| | Regulation | 6.795 | 1 | 6.7949 | 22.1737 | *** |
| | Grant Size | 1.970 | 1 | 1.9703 | 6.4298 | * |
| | C&E[a] | 3.385 | 1 | 3.3852 | 11.0471 | *** |
| | Residual | 206.233 | 673 | 0.3064 | | |

Table 14 ANOVA-table for linear regression model (Employee growth)

a. Criteria & Evaluation

b. Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

| Model | | Estimate | Std. Error | t-value | p-value | b | VIF |
|---|---|---|---|---|---|---|---|
| Employee Growth | (Intercept) | -0.18042 | 0.04550 | -3.965 | 8.13e-05 | *** | |
| | Mentoring | 0.73946 | 0.15839 | 4.669 | 3.66e-06 | *** | 6.8632 |
| | Regulation | 0.75506 | 0.30243 | 2.497 | 0.012775 | * | 127.3542 |
| | Grant size | -0.54779 | 0.21600 | -2.536 | 0.011433 | * | 261.7649 |
| | C&E[a] | 0.32090 | 0.09655 | 3.324 | 0.000936 | *** | 47.1305 |

Table 15 Regression table (Employee growth)

a. Criteria & Evaluation

b. Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

From table 15, it can be observed that the model is statistically highly significant, as the p-value is <0.001, which is generally used as the threshold for high statistical significance. Moreover, the ANOVA table (table 14) shows the analysis of variance for each predictor variable in the model. All predictors have significant effects on employee growth, as indicated by the low p-values ($p < 0.05$). Yet, the effect of grant size is only moderately significant, and also otherwise weaker than the effect of other predictors.

The Regression table (table 15) includes the Variance Inflation Factor (VIF) values, which allow the examination of the multicollinearity of the model. Multicollinearity refers to a situation where the explanatory variables are strongly correlated with each other (Chatterjee & Simonoff, 2012, 26). It was expected that there could be problems with multicollinearity as the studied grants’ features may also be correlated with each other. Reference values for VIF vary between studies. Reference values for VIF may vary depending on the study. In some studies, VIF values over 10 are considered problematic. In others, such as Daoud (2017), a threshold of five or more is used. Based on these thresholds, only the Mentoring variable could be seen as suitable. Especially Regulation and Grant size present strong multicollinearity, which again decreases the validity of the model. All in all, the low R-squared value of the model indicates that the predictors included explain only a small portion of the variance in employee growth. Yet, model suggests that Mentoring, Regulation, Grant size, and Criteria & Evaluation have a statistically significant influence on employee growth, but the results are weakened by autocorrelation and multicollinearity issues in the model.

*Survival*

Binary logistic regression tables were done for the dependent variables Survival and Funding. Table 16 includes the summary of the Survival's analysis, where the effect of all four predictor variables can be found. Firstly, the intercept is -0.7963 with a standard error of 0.1776 and a highly significant z-value (-4.484), indicating that the log-odds of Survival when all predictor variables are zero is significantly different from zero ($p < 0.001$). This implies that even in the absence of any of the predictor variables, there is still a statistically significant probability of survival, but the chance is relatively small.

Mentoring and Criteria & Evaluation indicate a significant positive effect on startups' survival, whereas grant size interestingly indicates a negative effect on the predictor variable. Moreover, Regulation suggests a weak positive effect on survival, but as the p-value is larger than 0.05, the null hypothesis cannot be invalidated. Again, the VIF values for each predictor variable are high, suggesting issues with multicollinearity. The values indicate that the variance of the estimated coefficients is inflated due to multicollinearity, which affects the validity of the regression model. This is again due to the correlation between grants' features, which is a difficult issue to solve. The component + residual plots also indicated violations of the linearity assumption, which further affects the model's validity. Hence, only weak signals of effect can be argued based on the model.

| Model | | Estimate | Std. Error | z-value | p-value | [b] | VIF |
|---|---|---|---|---|---|---|---|
| Survival | (Intercept) | -0.7963 | 0.1776 | -4.484 | 7.33e-06 | *** | |
| | Mentoring | 1.8526 | 0.5930 | 3.124 | 0.00178 | ** | 122.0604 |
| | Regulation | 2.0161 | 1.1182 | 1.803 | 0.07140 | . | 42.2044 |
| | Grant size | -1.6487 | 0.7967 | -2.070 | 0.03850 | * | 125.2093 |
| | C&E[a] | 1.0924 | 0.3576 | 3.054 | 0.00226 | ** | 44.8590 |

Table 16 Binary Logistic Regression table (Survival)

a. Criteria & Evaluation

b. Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

*Funding*

| Model | | Estimate | Std. Error | z-value | p-value | b | VIF |
|---|---|---|---|---|---|---|---|
| Funding | (Intercept) | 0.6131 | 0.1722 | 3.561 | 0.00037 | *** | |
| | Mentoring | 1.2849 | 0.7406 | 1.735 | 0.08274 | . | 4.1411 |
| | Regulation | -0.2127 | 1.3617 | -0.156 | 0.87587 | | 260.0132 |
| | Grant size | 0.0618 | 0.9695 | 0.064 | 0.94917 | | 6.9324 |
| | C&E[a] | 0.3316 | 0.4252 | 0.780 | 0.43547 | | 251.7786 |

Table 17 Binary Logistic Regression table (Funding)
a. Criteria & Evaluation
b. Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

In table 17, the binary logistic regression model of the Funding -variable is presented. The intercept is 0.6131 with a standard error of 0.1722. Furthermore, the intercept has a z-value of 3.561, indicating its statistical significance ($p < 0.001$). This suggests that when all predictor variables are zero, there is a statistically significant log-odds of funding being different from zero. This means that even when no predictor variables are influencing a company, there is still a significant probability of funding. None of the predictor variables showed statistically significant effect on Funding. Thus, any of the model’s the null hypotheses cannot be invalidated. Only mentoring showed a weak positive effect, but as the p-value is above 0.05, it cannot be deemed as statistically significant. Thus, the model indicates that the features of a grant do not have a significant impact on startups’ changes on getting funded.

This raises questions on the significance of the reputation benefits of grants, and whether those are constant between grants, even if one is tougher to acquire than the other. The VIF values of Regulation and Criteria & Evaluation are high, suggesting issues with multicollinearity. This affects the validity of the model, which will be taken into consideration moving forward. Next, we move onto the Discussion chapter, where the literature review will be combined with the results of the empirical analysis.

# 6 Discussion

The study's objectives were to investigate how the government grants of Nordic countries, more specifically Finland, Sweden, and Norway, support early-stage startups to succeed and why some grants perform better than others in helping startups and consequently creating more societal value. This chapter addresses these objectives by combining the key findings from the literature review and empirical analysis. All three focus countries offer government grants for their startups to stimulate innovation, encourage entrepreneurship, and enhance the competitiveness of the startup ecosystem. However, assessing the efficiency of these programs requires a comprehensive understanding of what is the objective of these grants and an analysis of factors influencing their performance.

## 6.1 Overall effects of the government grants

No previous research was conducted on the performance of Nordic government grants. Moreover, little literature on the topic was available overall, which also drew a quite negative picture of the efficiency of the grants. The leading narrative of the current literature stated that grants primarily alleviate startups' solvency and liabilities of newness, but if the support is insufficient or poorly designed, the results may be lesser than the initial investments (Islam 2018, 36.; Lerner 2009, 20.). Hence, the first research question of the study is a significant one. Five Nordic grants were included in the study, which all come from startup ecosystems that have seen strong growth in the last five years (Danske Growth 2022). All three countries have invested heavily in supporting their domestic scene, which made them suitable subjects for the study (Business Finland 2024; Vinnova 2024; Innovation Norway 2023). A total of 678 companies were included in the study, of which 530 were granted companies and 148 non-granted companies. On average, the granted companies performed better in all markets and in all performance variables, which were proven to be statistically significant findings. Granted, companies' headcount grew faster, they survived more often, and they received private funding more regularly. Hence, it can be stated that the Nordic grants had a significant positive impact on their domestic startups.

Even if the administrators would be happy with the found impacts regardless, the performance should be reviewed based on the ambitions of the grants. In the literature review, Keynesian Economic and Endogenous Growth theories were utilized to investigate the motives behind government grant designs. The Keynesian approach proposes that government spending is the main instrument for stimulating economic activity, for which grants can be seen as a legitimate instrument. When tight restrictions are in place to direct the given grants to domestic spending, or when grants are focused on industries of high labour intensity or economic downturn, the grants include Keynesian features. (Blinder 2008, 1.; Galambos & Amatori 2016, 763.) On the other hand, the Endogenous Growth approach favours designs supporting the longevity and growth of highly innovative startups (Aghion & Howitt 1998, 11.). Thus, grant designs, including thorough application processes, professional help, and spillover-fostering community support, can be seen to possess features of the Endogenous Growth approach.

The ambitions of the five studied grants all seem to lean more towards the Endogenous Growth approach. Mentortjensten was the only grant with tight restrictions on where the government's investment must be directed. However, as it offered significant mentoring benefits, it cannot be seen as a Keynesian grant. None of the grants had ambitions to direct companies to specific industries. Although the R,D&P grant guided companies towards academia, it still favours the Endogenous growth approach and promotes the innovativeness of startups. On the other hand, all grants included features favouring the Endogenous growth approach. It is evident that the main ambition of all grants was to support innovation and the performance of their domestic startups instead of boosting domestic spending. Moreover, the grants' designs align with the Market Failure theory. As all Nordic startup ecosystems are small, market failures may happen, which government grants can alleviate. (Toumanoff 1984, 529-530.) As these ambitions aim to secure a sufficient funding environment for startups, they also support the Endogenous growth approach. Therefore, the results indicate that the grants have made an impact that is in line with the grants' ambitions.

However, the magnitude of the created positive impacts may still be questioned. In total, Finland, Sweden, and Norway invested 113 million euros in the grants between 2018 and 2019, which helped 2996 companies. During the three-year research period, those companies employed approximately one person more per company than their non-granted counterparts and raised funding significantly more often. These impacts may cover most of the investment and begin the conversation about whether the investments were profitable, but are not alone sufficient to answer the question. In the literature review, the

Endogenous Growth theory was discussed, which states that human capital, knowledge capital, and innovation development are critical drivers of economic growth (Aghion & Howitt 1998, 1.). The success of startups accelerates all these drivers in society, significantly complicating the discussion of achieved benefits (Etzkowitz & Zhou 2017, 1.; Lerner 2009, 14.). Hence, the total benefits achieved by the grants cannot be revealed. However, due to the variety and significance of the potential benefits, it is evident that the results achieved have created an essential impact on their domestic ecosystems.

Still, whether government grants are the only driver behind the results achieved must be discussed. How much higher is the average quality of granted companies than that of non-granted companies, or is the impact directly caused by the provided benefits? If the granted companies go through an evaluation process and are as such deemed as potential by the society, they should perform better even without a grant. Applying for a grant can also be seen as a rational act by a startup, which supports the argument that the granted companies' initial quality is above the domestic average. Yet, The Triple Helix model proposes that innovation creation thrives the most in the intersections of societies' three helixes: industry, academia, and government (Etzkowitz & Zhou 2017, 1.). The literature proposes that startups lie deeply within an intersection of the sectors, which makes their environment optimal for innovation creation. Therefore, startups can heavily contribute to innovation creation, especially when the three helixes support the environment of the intersections. (Bonaventura et al. 2020, 345.; Cai & Etzkowitz 2020, 202.)

Government grants, in general, are instruments to support the intersections. Thus, the Nordic government grants also contribute to these ambitions. All five government grants made investments to ease the environment of their startups by offering funding or guidance. The R,D&P funding also influenced the intersection between academia and industry by forcing the involvement of universities in research projects. Hence, it is evident that the studied grants made the environment of their domestic startups more favourable. When the environment is favourable, and startups have a sufficient environment for thriving, they can significantly impact job creation, human capital creation, and spillover effects, all in addition to innovation and knowledge creation. (Aghion & Howitt 1998, 173.; Haltiwanger et al. 2013, 350.; Acs et all. 2009, 17.) The impacts may not have enabled a sufficient environment for all, but evidently for more companies. Therefore, both the results and the literature advocate that the grants have indeed been effective in supporting their domestic early-stage startups. Yet, further research could be done on the quality difference between companies accepted for government grants and non-granted companies to clarify the share of the grants' provided benefits on the total impacts created.

### 6.2 What makes an efficient government grant?

Despite the negative signals from previous literature, all grants performed better than the total control group in every performance category. Thus, no real failures were found, but the study still noticed differences between the grants' performances, and success-predicting indicators were found. Previous literature did not include a collective study investigating grant designs and features predicting higher performance, which motivated the second research question. The grant features were specified as independent variables to a series of regression analyses performed on all three performance indicators. Firstly, the analyses found that the grant size does not significantly affect startup performance. This builds upon previous literature, which has noticed reputation benefits impact startups' performance significantly (Söderblom et al. 2015, 1510.).

Ultimately, the finding increases the significance of all resources besides money. The value of mentoring services is especially highlighted. Even though only a weak statistical significance was proven, the impact of mentoring on startups' employee growth and survivability is an important and new finding. Mentortjensten does not provide any monetary help, which should be taken into account when its performance is discussed. It being the best-performing grant gives a strong signal that startups may benefit from mentoring services, even so much so that the benefits overcome the benefits of funding. Building a successful startup is a tough task, where guidance may very well help companies utilize and create valuable resources more efficiently than monetary help.

The study also noticed that the grants' reputation benefits did not differ significantly between grants, which indicates that investors may see startups as generally more competent if they have received government grants. This conflicts with previous literature, which suggests a strong positive correlation between the evaluation process and reputation benefits (Söderblom et al. 2015, 1510.). The fact that a startup had received a grant still had a significant positive impact on a startup's chances to acquire funding. The home country of a startup also had a significant impact on funding chances. This makes sense as the chances of acquiring funding are sensitive to changes in the funding environment. Moreover, the difference in how countries value government grants' reputation benefits showed a weak significance on funding chances. Surprisingly, stricter eligibility criteria and a more rigorous evaluation process showed a weak positive influence on startups' employee growth and survivability, likely due to the granted companies' higher quality.

The literature review discussed theories suggesting actions and resources startups should favour to become successful. The Lean Startup theory highlighted strong customer orientation and adaptability as the keys (Shepherd & Gruber 2020, 968.). In contrast, the Resource-based view proposed that startups should identify and nurture their valuable resources and align them with their core competencies (Zahra 2021, 1841). Varied potential valuable resources were discussed, which can emerge especially from a company's founding team or employees. A startup's market may also lay opportunities for creating such resources, whereas funding is not perhaps a valuable resource in itself, but crafty ways of acquiring and using it were seen as highly valuable. To better support startups, government grants should help startups achieve these actions and resources.

In general, the studied grants sufficiently helped startups to follow the principles of Lean Startup Theory. Most emphasized that the grant should be used for MVP testing or market research. The given funds also enabled startups to be agile as no critical restrictions were in place. (Shepherd & Gruber 2020, 978.) As valuable resources are discussed, many are not influenced by the grants. The Finnish R,D&P empowers startups' innovativeness, and multiple grants suggest that the grant could be used for IP protection. Moreover, the reputation benefits help startups argue for funding. However, only Mentortjensten can influence other potentially valuable resources through mentoring, again highlighting the value of the feature. (Zahra 2021, 1841) Mentoring can help startups to better use their funds, become better at recruiting talent, become more customer-oriented, or find suitable funding options. Thus, the potential benefits are comprehensive.

Moreover, no direct connections to the startup community were included in the programs, and only one was directly connected to academia. Based on the insights found in the literature, these could be suggested. Connection to a local community encourages networking, which may have varied impacts on startups' performance (Autio et al. 2017, 80-82.). On the other hand, connections to academia are shown to accelerate innovation (Ammon & Martin 2001, 528-529.). The total value of the Mentortjensten program was also significantly smaller than the value of the other programs. This indicates that including mentoring services does not come with a hefty price tag. The same should apply to connections to local communities and academia, which indicates that many new benefits could be added to granting programs with small investments. Connections to local networks or academia align with the propositions of the Triple Helix model, as they benefit the model's intersections, thus accelerating innovation development and the creation of societal benefits (Etzkowitz & Zhou 2017, 1.).

Therefore, the current findings suggest that grant administrators should consider including mentoring services in their grant portfolios and strengthening the bridges they enable to local communities and academia. They should also focus on building a rigorous evaluation process, even if it does not increase the received reputation benefits. Strict application processes should help grants' effect on nurturing market failures if they succeed in covering the risks of investing in the most innovative companies. Moreover, administrators should focus on building comprehensive instruments and not solely focus on grant size. The funding undeniably helps startups, but the study, together with previous literature, indicates that it is not the most effective tool to enhance the performance of startups (Söderblom et al. 2015, 1510.). A majority of the discussed grants only support a few of the startups' needs; they demand to become successful. If the ambition of a government is aligned with the Endogenous Growth approach, the design process should be based on a discussion with potential recipients and pursue aiding as many of the actions and resources suggested by the Lean Startup theory and Resource-based view as possible.

Furthermore, government grants, no matter how efficient, cannot alone create a successful startup scene. The statistical analyses indicate that the effect of a country on startup performance is statistically significant for all performance indicators. The country even had the most significant impact on startups' chances of survival, being greater than the effect of grants. The quality of support within the Triple Helix model determines how beneficial the overall environment is for startups, which is a country-level phenomenon. The quality and amount of startups is a by-product of education system, investment environment, legislation and much more. (Etzkowitz & Zhou 2017, 1.; Cai & Etzkowitz 2020, 202.) Thus, if a country wishes to build a more thriving startup ecosystem and consequently create endogenous growth within their society, the environment of startups must also be considered outside startup-specific initiatives.

# 7 Conclusions and evaluation of the study

## 7.1 Conclusions

To answer the first research question, the research investigated the effectiveness of government grants provided by Finland, Sweden, and Norway in supporting early-stage startups. The results demonstrated that, on average, granted companies showed significantly better performance across all measured variables, including headcount growth, survival rates, and the ability to secure private funding. These findings indicate that Nordic government grants have a substantial positive impact on their domestic startups. The ambitions of the current grant designs in the Nordic countries are effectively aligned with the Endogenous Growth theory, which emphasizes the importance of innovation creation as a driver of economic growth. As the grants succeed in improving the performance of their domestic startups, they indirectly create new jobs, create competitiveness in their respective markets, and foster the creation of innovation, knowledge capital, and human capital. These findings provide new information on the effectiveness of the Nordic government grants and bring positive signs of government grants' performance into the field's previously quite pessimistic literature.

The research also explored why some government grants perform better than others. The statistical analyses investigating the research question were compromised with autocorrelation and multicollinearity issues, which hindered the validity of the results. However, the analyses gave weak signals of varied government grant features significantly influencing startups' performance. Mentoring services, in particular, were found to be beneficial, highlighting the value of guidance in addition to funding. The study also found that grants with stricter eligibility criteria and more rigorous evaluation processes positively influence startups' headcount growth and survivability. Interestingly, the strictness of the evaluation process did not affect startups' reputation benefits, which conflicted with previous literature. As none of the grant features significantly influenced startups' ability to acquire funding, the study suggests that investors see relatively equal reputation benefits between all grants. Furthermore, the analyses indicated that grant size does not significantly affect startup performance, aligning with previous literature.

The research proposes that in future government grant designs, a more comprehensive approach could be applied. By aligning a grant design with the principles of Endogenous

Growth and Lean Startup theories, the grants can better support startups with their varied challenges. The designs should include both financial and non-financial resources, promote competitiveness, and build bridges with local startup communities and academia. Thus, startups may receive more versatile benefits, which all can significantly enhance their performance.

Future research should investigate the quality differences between granted and non-granted companies to better understand the specific impact of government grants on startup performance. Future studies should also focus on gathering a broader selection of grants to achieve a more heterogeneous research group. This could lead to more significant findings. Moreover, the precision of the results could also be enhanced by extending the research period. This would allow for a more accurate understanding of the startups' development. Comparative research across different regions and grant programs is also proposed to identify universally effective grant features.

## 7.2 Evaluation of the research

In the evaluation process of research, the concepts of validity and reliability are traditionally used. The validity of research refers to the extent to which the study accurately measures what it intends to measure and how well the findings can be generalized to the broader population or different contexts. (McKinnon 1988, 36.) The concept can be divided into internal and external validity, of which internal validity evaluates the extent to which the study design and conduct avoid biases, ensuring the results are attributable to the studied variables. On the other hand, external validity assesses the study findings' generalizability to other contexts or populations. Furthermore, reliability discusses the consistency and repeatability of the methods and findings used. (Yin 2018, 42-44.) The reliability of a study is influenced by all steps of the research process, including the research design, data collection, and analysis process. (McKinnon 1988, 36.)

The study's research design experienced a significant change during the research process, as the initial plan of conducting a multi-method research was discarded. The study's approach was changed to a quantitative study, as it was seen that the dataset could enable the research questions to be answered solely by quantitative analyses. The research design was eventually noticed as appropriate for addressing the research questions. The research design is not fully capable of providing insights on the grants' total impact on startups, as the initial quality of the included startups cannot be reliably assessed. However, it enabled a perspective sufficient for assessing whether the government grants had an impact and whether certain grant features influenced the startups' performance more than others. Therefore, the internal validity of the model could have been better, but it would have demanded more resources, and the research period should have been longer due to a more thorough assessment of the included startups.

The data collection process was challenged by many constraints caused by the demand for data sources. Eventually, all data points were acquired sufficiently, but the collection of startup grants could have been better. After reviewing all government grants in Finland, Sweden, and Norway, only the five grants included in the study were seen as sufficient. The chosen grants well represent the larger population of government grants, as many of them are somewhat typical instruments. Yet they formed a too homogenous group, which caused the statistical analyses to not fully meet their assumptions. 678 startups were included in the study, which was distributed between five grant groups and three control groups. The number of companies included was adequate to provide generalizable results. Yet the number of included grants could have still been higher, and the grants could have differed from each other more significantly, which would have enhanced the dataset's validity.

All data considering the grants was received directly from the grant administrators, whereas the startups' performance indicators were collected either from public records or the funding platform Dealroom. Dealroom was seen as the best source to acquire funding-related information about the startups, but the decision to utilize it narrowed the number of eligible startups significantly. Yet the process of acquiring funding is vital for almost all startups, so data on it was seen as highly significant for the study. Thus, the decision to use Dealroom was made. Numerous granted startups had also been erased from public records, indicating their operations had been shut down. These companies had to be removed from the dataset as their status could not have been confirmed.

Both data exclusions may have impacted the validity of the statistical analyses. Yet, both the validity and reliability of the study would have been hindered significantly if the exclusions were not made. The study's external validity may have also been impacted by the coronavirus crisis, which happened during the dataset's timeframe. The generalizability of the grants' performance may be limited due to the special times, as all companies were facing challenges during the study's timeframe. Overall, the data collection was still a rigorous process, which was clearly and extensively defined.

The statistical techniques and analyses used to interpret the data were selected based on the demands set by the dataset and the question at hand. The assumptions underlying the statistical methods were not fully met due to the dataset's issues, which weakened the significance of the perceived results. However, all issues have been considered in interpreting the results, which do not deny the issues or create any false bias. Still, the issues limit the importance of the findings, which must be taken into account if the results were to be used to guide any actions. Overall, the varied steps of the research are rigorously presented, which suggests sufficient reliability. Yet, the study's validity is compromised by issues in the dataset, which hinders the significance of the study's findings.

# 8 Summary

The startup ecosystems of the Nordic countries have been growing significantly during the last decade. As the global business environment is changing, the focus countries of the study, Finland, Sweden, and Norway, have all noticed a need to focus on knowledge-intensive industries thriving with innovation and research. Startups are focal engines in the midst of these industries, which are agile and ambitious companies constantly fighting serious adversities to become leaders in their respective fields. To alleviate these adversities, the Nordic countries have established government-run grant programs that offer either funding or mentoring services to their domestic startups.

No previous research on Nordic government grants had been done, and due to the remarkable significance of the growing startup ecosystems for the countries, the role of these grants as supportive instruments is relatively high. Moreover, the academic literature, in general, provides very little information on the effectiveness of government grants, and especially on what features make a government grant effective in supporting startups to survive and later prosper. These findings validated the need for this research. The objectives of this research were divided into two separate entities. Firstly, the study aimed to investigate how effective government grants are in supporting early-stage startups and consequently creating societal value in the Nordic countries. Secondly, it explored why some government grants perform better than others.

The study was conducted as a quantitative analysis supported by an extensive literature review. Five grants and 678 companies were included from Finland, Sweden, and Norway. Multiple statistical analysis methods were utilized, including linear and binary logistic regression analyses. The study found that the Nordic startup grants had a significant positive impact on their domestic startups. The effect was noticed as significant on all three performance indicators used: employee growth, survival rate, and funding rate. Furthermore, the study found no government grant features to significantly influence above-average performance. However, weak signals were found, implying that mentoring services and thorough application processes positively impact startup performance. Moreover, grant size was not found to significantly impact government grant performance. As the significance of the Nordic startup ecosystems has increased rapidly, further research is needed, where a more significant heterogeneity of studied grants is advised.

## References


Acs, Z. – Braunerhjelm, P. – Audretsch, D. – Carlsson, B. (2009) The Knowledge Spillover Theory of Entrepreneurship. *Small Business Economics*, Vol. 32 (1), 15–30.

Aghion, P. – Howitt, P. (1998) *Endogenous Growth Theory*. MIT Press, Cambridge, MA.

Agyare, D. – Hahn, D. – Minola, T. – Vismara, S. (2022) Non-Accounting Drivers of Start-up Valuation by Early-Stage Equity Investors: Literature Review and Future Research Agenda. *Developments in Entrepreneurial Finance and Technology*. Edward Elgar Publishing, Cheltenham.

Ahmed, H. – Aassouli, D. (2022) Entrepreneurial Finance, Agency Problems and Islamic Ethics: Complementarities and Constraints. *Venture capital (London),* Vol. 24 (1), 25–46.

Almi. <https://www.almi.se/en/>, Retrieved 30.4.2024.

Arli, D. – Lay, P. – Fandy, T. – Lin, Y. (2018) Exploring Consumers' Purchase Intention towards Green Products in an Emerging Market: The Role of Consumers' Perceived Readiness. International journal of consumer studies Vol. 42(4), 389–401.

Armitage, D. – de Loë, R. – Plummer, R. (2012) Environmental Governance and Its Implications for Conservation Practice. *Conservation letters*, Vol. 5 (4), 245–.

Audretsch, D. (2014) From the Entrepreneurial University to the University for the Entrepreneurial Society. *The Journal of technology transfer*, Vol. 39 (3), 313–321.

Autio, E. – Nambisan, S. – Thomas, L. – Wright, M. (2018) Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, Vol. 12, 72–95.

Ayoub, M. – Gottschalk, S. – Müller, B. (2017) Impact of Public Seed-Funding on Academic Spin-Offs. *The Journal of technology transfer*, Vol. 42 (5), 1100–1124.

Baldassarre, B. – Calabretta, G. – Bocken, N. – Jaskiewicz, T. (2017) Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design. *Journal of Cleaner Production*, Vol. 147, 175–186.

Bandera, C. – Thomas, E. (2019) The Role of Innovation Ecosystems and Social Capital in Startup Survival. *IEEE transactions on engineering management*, Vol. 66 (4), 542–551.

Bauer, D. – Junge, S. – Reif, T. (2023) May the resources be with you: a systematic review and framework of startup funding options. *Management Review Quarterly.*

Baum, J. – Silverman, B. (2004) Picking Winners or Building Them? Alliance, Intellectual, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups. *Journal of business venturing*, Vol. 19 (3), 411–436.

Bertoni, F. – Colombo, M. – Quas, A. (2019) The Role of Governmental Venture Capital in the Venture Capital Ecosystem: An Organizational Ecology Perspective. *Entrepreneurship theory and practice*, Vol. 43 (3), 611–628.

Blank, S. – Eckhardt, J. (2023) The Lean Startup as an Actionable Theory of Entrepreneurship. *Journal of management*. [Online]

Blinder A. (2008) Keynesian Economics. The concise Encyclopedia of Economics, Carmel, IN, USA.

Block, J. – Colombo, M. – Cumming, D. – Vismara, S. (2018) New Players in Entrepreneurial Finance and Why They Are There. *Small business economics*, Vol. 50 (2), 239–250.

Block, J. – Fisch, C. – Obschonka, M. – Sandner, P. (2019a) A personality perspective on business angel syndication. *Journal of Banking & Finance*, Vol. 100, 306–327.

Block, J. – Fisch, C. – Vismara, S. – Andres, R. (2019b) Private equity investment criteria: An experimental conjoint analysis of venture capital, business angels, and family offices. *Journal of Corporate Finance,* Vol. 58, 329–352.

Bonaventura, M. – Ciotti, V. – Panzarasa, P. – Liverani, S. – Lacasa, L. – Latora, V. (2020) Predicting success in the worldwide start-up network. *Scientific Reports*, Vol. 10 (1), 345–345.

Boudreau, K. – Lacetera, N. – Lakhani, K. (2011) Incentives and Problem Uncertainty in Innovation Contests: An Empirical Analysis. *Management science*, Vol. 57 (5), 843–863.

Broughman, B. – Fried, J. (2012) Do VCs Use inside Rounds to Dilute Founders? Some Evidence from Silicon Valley. Journal of corporate finance, Vol. 18(5), 1104–1120.

Bryman, A. – Bell, E. (2007) *Business Research Methods*. 2nd ed. Oxford University Press, Oxford.

Brynjolfsson, E. – Yu, H. – Duncan, S. (2011) Goodbye Pareto Principle, Hello Long Tail: The Effect of Search Costs on the Concentration of Product Sales. *Management science*, Vol. 57 (8), 1373–1386.

Busenitz, L. – Gómez, C. – Spencer, J. (2000) Country Institutional Profiles: Unlocking Entrepreneurial Phenomena. Academy of Management journal, Vol. 43(5), 994–1003.

Business Finland (2024) Suomessa on maailman paras startup- ja kasvuyritysekosysteemi. <https://www.businessfinland.fi/ajankohtaista/blogit/2024/suomessa-on-maailman-paras-startup--ja-kasvuyritysekosysteemi>, Retrieved 20.4.2024.

Business Finland (2023) Startup yritysten määrä laskussa – Pitääkö olla huolissaan? <https://www.businessfinland.fi/ajankohtaista/blogit/2023/startup-yritysten-maara-laskussa--pitaako-olla-huolissaan>, Retrieved 20.4.2024.

Business Finland. (a) Research, Development & Piloting. <https://www.businessfinland.fi/en/for-finnish-customers/services/funding/research-and-development/research-development-and-piloting>, Retrieved 20.4.2024.

Business Finland. (b) Tempo Funding. <https://www.businessfinland.fi/en/for-finnish-customers/services/funding/tempo-funding>, Retrieved 20.4.2024.

Business Sweden (2024) Swedish startups have doubled in value in the last five years, with impact taking center stage. <https://www.business-sweden.com/about-us/media/press-releases/press-releases/2024/swedish-startups-have-doubled-in-value-in-the-last-five-years-with-impact-taking-center-stage/>, Retrieved 20.4.2024.

Butler, I. – Galassi, G. – Ruffo, H. (2016) Public Funding for Startups in Argentina: An Impact Evaluation. *Small business economics*, Vol. 46 (2), 295–309.

Cai, Y. – Etzkowitz, H. (2021) Theorizing the Triple Helix model: Past, present, and future. *Triple Helix (Heidelberg)*, Vol. 7 (2–3), 189–226.

Caliendo, M. – Hogenacker, J. – Künn, S. – Wießner, F. (2015) Subsidized start-ups out of unemployment: a comparison to regular business start-ups. *Small Business Economics*, Vol. 45 (1), 165–190.

Chatterjee, S. – Simonoff, J. S. (2012) Handbook of regression analysis. John Wiley & Sons, Incorporated.

Chen, Q. – Ding, S. – Wu, Z. – Yang, F. (2016) Family Control, International Accounting Standards, and Access to Foreign Banks: Evidence from International Entrepreneurial Firms. *Journal of Small Business Management*, Vol. 54 (2), 598–621.

Chorn, S. – Siek, D. (2017) The Impact of Foreign Capital Inflow on Economic Growth in Developing Countries. *Journal of Finance and Economics*, Vol. 5 (3), 128-135.

Chung, H. – Chen, C. – Hsieh, T. (2007) First geographic expansion of startup firms: Initial size and entry timing effects. *Journal of Business Research*, 60(4), 388–395.

Churchill, N. – Lewis, V. (1983) The five stages of small business growth. *Harvard business review*, Vol. 61, 30-32. Harvard Business School Press, Boston.

Chua, J. – Chrisman, J. – Kellermanns, F. – Wu, Z. (2011) Family Involvement and New Venture Debt Financing. *Journal of business venturing*, Vol. 26 (4), 472–488.

Cockayne, D. (2019) What is a startup firm? A methodological and epistemological investigation into research objects in economic geography. University of Waterloo, Ontario, Canada.

Cuevas, A. – Febrero, M. – Fraiman, R. (2004) An anova test for functional data. *Computational Statistics & Data Analysis*, Vol 47, Issue 1, 111-122,

Cumming, D. – Deloof, M. – Manigart, S. – Wright, M. (2019) New directions in entrepreneurial finance. *Journal of Banking & Finance*, Vol. 100, 252–260.

Cumming, D. – Hervé, F. – Manthé, E. – Schwienbacher, A. (2022) Testing-the-Waters Policy With Hypothetical Investment: Evidence From Equity Crowdfunding. *Entrepreneurship Theory and Practice*, Vol. 46 (4), 1019–1053.

Danske Growth (2022) State of Impact Startups 2022. <https://danskebank.com/-/media/danske-bank-com/file-cloud/2022/9/state-of-impact-startups-2022.pdf?rev=d199e9914a234091add1520aa16a9db9>, retrieved 10.9.2023.

Daoud, J. I. (2017) Multicollinearity and Regression Analysis. *Journal of physics*, Vol. 949 (1), 12009-.

Davila, A. – Foster, G. – Gupta, M. (2003) Venture capital financing and the growth of startup firms. *Journal of Business Venturing*, Vol. 18 (6), 689-708.

De Rassenfosse, G. – Fischer, T. (2016) Venture Debt Financing: Determinants of the Lending Decision. *Strategic entrepreneurship journal,* Vol. 10 (3), 235–256.

Dealroom (2023) Reset expectations, but Nordic startup nations punch well above their weight. <https://dealroom.co/blog/nordic-startups-and-venture-capital-2022>, Retrieved 20.4.2024.

Dealroom. <https://dealroom.co/>, Retrieved 26.4.2024.

Decker, R. – Haltiwanger, J. – Jarmin, R. – Miranda, J. (2014) The Role of Entrepreneurship in US Job Creation and Economic Dynamism. *The Journal of Economic Perspectives*, Vol. 28 (3), 3–24.

Denis, D. (2004) Entrepreneurial Finance: An Overview of the Issues and Evidence. *Journal of corporate finance*, Vol. 10(2), 301–326.

Dittmann, I. Maug, E. Kemper, J. (2004) How Fundamental Are Fundamental Values? Valuation Methods and Their Impact on the Performance of German Venture Capitalists. *European financial management: the journal of the European Financial Management Association*, Vol. 10(4), 609–638.

Dobre, O. (2013) Employee motivation and organizational performance. *Review of Applied Socio- Economic Research*, Vol. 5 (1), 53-60.

Dosi, G. – Fagiolo, G. – Roventini, A. (2010) Schumpeter Meeting Keynes: A Policy-Friendly Model of Endogenous Growth and Business Cycles. *Journal of economic dynamics & control*, Vol. 34 (9), 1748–1767.

Drover, W. – Busenitz, L. – Matusik, S. – Townsend, D. – Anglin, A. – Dushnitsky, G. (2017) A Review and Road Map of Entrepreneurial Equity Financing Research: Venture Capital, Corporate Venture Capital, Angel Investment, Crowdfunding, and Accelerators. *Journal of Management*, Vol. 43 (6), 1820–1853.

Dubini, P. (1989) The influence of motivations and environment on business start-ups: Some hints for public policies. *Journal of Business Venturing*, Vol. 4 (1), 11-26.

Duhautois, R. – Redor, D. – Desiage, L. (2015) Long Term Effect of Public Subsidies on Start-up Survival and Economic Performance: An Empirical Study with French Data. *Revue d'économie industrielle*, Vol. 149, 11–41.

Duruflé, G. – Hellman, T. – Wilson, K. (2018) From Start-Up to Scale-Up: Examining Public Policies for the Financing of High-Growth Ventures. In: *Finance and Investment: The European Case*, ed. by C. Mayer et al, Oxford.

Dyllick, T. – Hockerts, K. (2002) Beyond the Business Case for Corporate Sustainability. *Business strategy and the environment*, Vol. 11 (2), 130–141.

Echambadi, R. – Bayus, B. – Agarwal, R. (2008) Entry Timing and the Survival of Startup and Incumbent Firms in New Industries.

EK (2024) Foreign Trade. <https://ek.fi/tutkittua-tietoa/tietoa-suomen-taloudesta/ulkomaankauppa/#:~:text=Tavaroiden%20ja%20palveluiden%20viennin%20arvo,my%C3%B6t%C3%A4%20per%C3%A4ti%2029%20%25%20vuonna%202022>, Retrieved 20.4.2024.

Emerson, R. (2018) MANOVA. Journal of visual impairment & blindness, Vol. 112(1), 125-.

Etzkowitz, H. – Chunyan, Z. (2017) *The Triple Helix: University-Industry-Government Innovation in Action*. Second edition. Routledge.

Field, A. (2009) Discovering statistics using SPSS (and sex and drugs and rock 'n' roll) (3rd ed.). SAGE. Los Angeles.

Finnish Startup Community. About us. <https://startupyhteiso.com/about-us/>, retrieved 20.4.2024.

Finnish Venture Capital Association (2023) Startup funding in Finland drops from record highs in the first half of the year. <https://paaomasijoittajat.fi/en/ajankohtaista/press-releases/26027/startup-funding-finland-h1-2023/>, retrieved 20.4.2024.

Finnish Venture Capital Association (2022) Finnish Startups and Venture Capital 2022. <https://paaomasijoittajat.fi/wp-content/uploads/Startup-funding-Finland-2022.pdf>, retrieved 10.9.2023.

Forbes (2024) Norwegian Startup Scene Petitions Against Exit Tax Towards Tech Sector. <https://www.forbes.com/sites/danieladelorenzo/2024/04/09/norwegian-startup-scene-petitions-against-exit-tax-towards-tech-sector/?sh=748faaa147cc>, Retrieved 20.4.2024.

Forbes (2018) Flourishing Among The Fjords: Norway's Dynamic Startup Scene. <https://www.forbes.com/sites/alisoncoleman/2018/10/05/flourishing-among-the-fjords-norways-dynamic-startup-scene/?sh=1ec29f5d5efb>, Retrieved 20.4.2024.

Fraser, S. – Bhaumik, S. – Wright, M. (2015) What Do We Know About Entrepreneurial Finance and Its Relationship with Growth?” *International small business journal*, Vol. 33 (1), 70–88.

Frid, C. (2014) Acquiring Financial Resources to Form New Ventures: The Impact of Personal Characteristics on Organizational Emergence. *Journal of small business and entrepreneurship*, Vol. 27 (3), 323–341.

Galambos, L. – Amatori, F. (2016) The Entrepreneurial Multiplier Effect. *Enterprise & society*, Vol. 17(4), 763–808.

Gans, J. – Stern, S. (2003) The Product Market and the Market for ‘Ideas’: Commercialization Strategies for Technology Entrepreneurs. *Research policy*, Vol. 32 (2), 333–350.

GDP per capita (current US$) (2022) World Bank. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>, Retrieved 30.4.2024.

Gloor, P. – Colladon, A. – Grippa, F. – Hadley, B. – Woerner, S. (2020) The Impact of Social Media Presence and Board Member Composition on New Venture Success: Evidences from VC-Backed U.S. Startups. *Technological forecasting & social change*, Vol. 157, 120098-.

Gras, D. – Nason, R. – Lerman, M. – Stellini, M. (2017) Going Offline: Broadening Crowdfunding Research Beyond the Online Context. *Venture capital (London)*, Vol. 19 (3), 217–237.

Grichnik, D. – Brinckmann, J. – Singh, L. – Manigart, S. (2014) Beyond environmental scarcity: Human and social capital as driving forces of bootstrapping activities. *Journal of Business Venturing*, *29* (2), 310–326.

Griva, A. – Kotsopoulos, D. – Kargiannaki, A. – Zamani, E. (2023) What do growing early-stage digital start-ups look like? A mixed-methods approach. *International journal of information management,* Vol. 69, 102427.

Guillaume, A. – Groh, A. (2012) Entrepreneurs’ Financing Choice Between Independent and Bank-Affiliated Venture Capital Firms. *Journal of corporate finance*, Vol. 18 (5), 1143–1167.

Hall, B. – Van Reenen, J. (2000) How Effective Are Fiscal Incentives for R&D? A Review of the Evidence. *Research policy*, Vol. 29 (4), 449–469.

Haltiwanger, J. – Jarmin, R. – Kulick, R. – Miranda, J. – Schoar, A. – Hurst, E. (2017) High-Growth Young Firms: Contribution to Job, Output, and Productivity

Growth. *National Bureau of Economic Research Studies in Income and Wealth*, Vol. 75, 52-62.

Haltiwanger, J. – Jarmin, R. – Miranda, J. (2013) WHO CREATES JOBS? SMALL VERSUS LARGE VERSUS YOUNG. *The review of economics and statistics*, Vol. 95 (2), 347–361.

Hechavarría, D. – Matthews, C. – Reynolds, P. (2016) Does Start-up Financing Influence Start-up Speed? Evidence from the Panel Study of Entrepreneurial Dynamics. *Small business economics*, Vol. 46 (1), 137–167.

Heikkilä, J. – Olhager, J. – Martinsuo, M. – Laine, T. – Suomala, P. – Johansson, M. – Ahvonen, P. (2017) Relocation of Nordic Manufacturing. University of Tampere, Tampere.

Hellmann, T. – Manju, P. (2002) Venture Capital and the Professionalization of Start-Up Firms: Empirical Evidence. *The Journal of finance (New York)*, Vol. 57 (1), 169–197.

Hellmann, T. – Schure, P. – Vo, D. (2021) Angels and Venture Capitalists: Substitutes or Complements? *Journal of financial economics*, Vol. 141 (2), 454–478.

Hornuf, L. – Klus, M. – Lohwasser, T. – Schwienbacher, A. (2021) How Do Banks Interact with Fintech Startups? *Small business economics*, Vol. 57 (3), 1505–1526.

Hottenrott, H. – Lins, E. – Lutz, E. (2018) Public Subsidies and New Ventures' Use of Bank Loans. *Economics of innovation and new technology*, Vol. 27 (8), 808–830.

Hyytinen, A. – Pajarinen, M. – Rouvinen, P. (2015) Does innovativeness reduce startup survival rates? *Journal of business venturing*, Vol. 30 (4), 564–581.

Innovation Norway (2024a) Start-up grant 1. <https://www.innovasjonnorge.no/tjeneste/oppstartstilskudd-1>, Retrieved 20.4.2024.

Innovation Norway (2024b) Start-up grant 2. <https://www.innovasjonnorge.no/tjeneste/oppstartstilskudd-2>, Retrieved 20.4.2024.

Innovation Norway (2024c) Start-up grant 3. <https://www.innovasjonnorge.no/tjeneste/oppstartstilskudd-3>, Retrieved 20.4.2024.

Innovation Norway (2024d) The mentoring service for entrepreneurs - we connect capital and expertise. <https://www.innovasjonnorge.no/tjeneste/mentortjenesten-for-grundere-vi-kobler-kapital-og-kompetanse>, Retrieved 20.4.2024.

Innovation Norway (2023) Results. <https://www.innovasjonnorge.no/artikkel/resultater>, Retrieved 20.4.2024.

Innovation Norway. Who we are. <https://en.innovasjonnorge.no/article/our-mission>, Retrieved 20.4.2024.

Intersoft Consulting. GDPR (EU) 679/2016 <https://gdpr-info.eu/>, retrieved 22.11.2023.

Invest Estonia (2022) Estonia leads Europe in startups, unicorns and investments per capita. <https://investinestonia.com/estonia-leads-europe-in-startups-unicorns-and-investments-per-capita/>, Retrieved 20.4.2024.

Isabelle, D. (2013) Key Factors Affecting a Technology Entrepreneur's Choice of Incubator or Accelerator. *Technology innovation management review*, Vol. 3 (2), 16–22.

Islam, M. – Adam, F. – Alfred, M. (2018) Signaling by early stage startups: US government research grants and venture capital funding. *Journal of business venturing*, Vol. 33 (1), 35–51.

Jay, E. – Johnson, A. (2006) Bootstrapping in Small Firms: An Empirical Analysis of Change over Time. *Journal of business venturing*, Vol. 21 (6), 851–865.

Jones, C. (1995) R & D-Based Models of Economic Growth. *The Journal of political economy*, Vol. 103 (4), 759–784.

Kaiser, M. – Berger, E. (2021) Trust in the Investor Relationship Marketing of Startups: A Systematic Literature Review and Research Agenda. *Management review quarterly*, Vol. 71(2), 491–517.

Kang, H. – Nanda, V. – Park, H. (2021) Technology Spillovers and Capital Gains in Corporate Venture Capital Investments: Evidence from the Biopharmaceutical Industry. *Venture capital (London)*, Vol. 23 (2), 129–155.

Kaplan, S. – Sensoy, B. – Strömberg, P. (2009) Should Investors Bet on the Jockey or the Horse? Evidence from the Evolution of Firms from Early Business Plans to Public Companies. *The Journal of finance (New York*), Vol. 64 (1), 75–115.

Keogh, D. – Johnson, D. (2021) Survival of the funded: Econometric analysis of startup longevity and success. *Journal of entrepreneurship, management and innovation*, Vol. 17 (4), 29–49.

Kerr, W. – Lerner, J. – Schoar, A. (2014) The Consequences of Entrepreneurial Finance: Evidence from Angel Financings. *The Review of financial studies*, Vol. 27 (1), 20–55.

Koskinen, H. (2021) Domesticating startup culture in Finland. *European Journal of Cultural and Political Sociology*, Vol. 8 (2), 175-196.

Kreutzer, I. (2018) An integrated and effective Nordic ecosystem for innovation and green growth. the Nordic Council of Ministers. <http://norden.diva-portal.org/smash/get/diva2:1258921/FULLTEXT01.pdf>, retrieved 10.9.2023.

Krueger, N. – Reilly, M. – Carsrud, A. (2000) Competing Models of Entrepreneurial Intentions. *Journal of business venturing*, Vol. 15 (5), 411–432.

Larson, A. (2000) Sustainable Innovation through an Entrepreneurship Lens. *Business strategy and the environment*, Vol. 9 (5), 304–317.

Lehnertz, N. – Plagmann, C. – Lutz, E. (2022) Why Deep Pockets Make Great Borrowers: An Empirical Analysis of Venture Loans. *Zeitschrift für Betriebswirtschaft,* Vol. 92 (9), 1431–1453.

Lerner, J. (2009) *Boulevard of Broken Dreams Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed and What to Do About It*. Princeton University Press, Princeton.

Leung, A. – Zhang, J. – Wong, P. – Foo, M. (2006) The use of networks in human resource acquisition for entrepreneurial firms: Multiple “fit” considerations. *Journal of Business Venturing*, Vol. 21 (5), 664–686.

Lombardo, L. – Cama, C, – Conoscenti, M. – Märker. E. (2015) Binary Logistic Regression versus Stochastic Gradient Boosted Decision Trees in Assessing Landslide Susceptibility for Multiple-Occurring Landslide Events: Application to the 2009 Storm Event in Messina (Sicily, Southern Italy). *Natural hazards (Dordrecht)*, Vol. 79(3), 1621–1648.

Lumpkin, G. – Dess, G. (1996) Clarifying the Entrepreneurial Orientation Construct and Linking It To Performance. *The Academy of Management review*, Vol. 21 (1), 135–172.

Lydersen, S. – Fagerland, M. – Laake, P. (2019) Pearson’s chi-squared test. *Tidsskrift for den Norske Lægeforening*, Vol. 139(12).

Markard, J. – Raven, R. – Truffer, B. (2012) Sustainability Transitions: An Emerging Field of Research and Its Prospects. *Research policy*, Vol. 41 (6), 955–967.

Mallaby, S. (2022) *The Power Law: Venture Capital and the Art of Disruption*. Allen Lane, London.

Mayhew, M. – Simonoff, J. (2015) Non-White, No More: Effect Coding as an Alternative to Dummy Coding With Implications for Higher Education Researchers. *Journal of college student development*, Vol. 56(2), 170–175.

McDougall, P. – Robinson, R. – DeNisi, A. (1992) Modeling New Venture Performance: An Analysis of New Venture Strategy, Industry Structure, and Venture Origin. *Journal of business venturing*, Vol. 7 (4), 267–289.

McKinnon, J. (1988) Reliability and validity in field research: Some strategies and tactics. *Accounting, Auditing & Accountability Journal*, Vol. 1 (1), 34–54.

Meuleman, M. – De Maeseneire, W. (2012) Do R&D subsidies affect SMEs' access to external financing? *Research Policy*, Vol. 41 (3), 580–591.

Milosevic, M. – Le Pendeven, B. – Fendt, J. (2020) Follow-on Financing through Syndication in the VC Industry - a Signaling Perspective of VC Human Capital and Fund Characteristics. *Venture capital (London)*, Vol. 22 (1), 35–69.

Miloud, T. – Aspelund, A. – Cabrol, M. (2012) Startup valuation by venture capitalists: an empirical study. *Venture capital (London)*. Vol. 14 (2-3), 151–174.

Mochkabadi, K. – Volkmann, C. (2020) Equity Crowdfunding: a Systematic Review of the Literature. *Small business economics*, Vol. 54 (1), 75–118.

Molnár, E. – Jáki, E. (2020) What qualities do government-owned venture capital investors seek in a new venture? A comparison of investment criteria across pre-seed, seed, and expansion stage startups. *Vezetéstudomány*. Vol. 51 (11), 64–76.

Moser, K. – Tumasjan, A. – Welpe, I. (2015) Small, but Attractive: The Effect of Employer Branding and Legitimacy on Startup Attractiveness. *Academy of Management Annual Meeting Proceedings*, Vol. 2015 (1), 10528–.

Murray, F. – Stern, S. – Campbell, G. – MacCormack, A. (2012) Grand Innovation Prizes: A theoretical, normative, and empirical evaluation. *Research Policy*, Vol. 41 (10), 1779–1792.

Nanda, R. – Rhodes-Kropf, M. (2013) Investment cycles and startup innovation. *Journal of financial economics*, Vol. 110 (2), 403–418.

Neilimo, K. – Näsi. J. (1980) Nomoteettinen Tutkimusote Ja Suomalainen Yrityksen Taloustiede: Tutkimus Positivismin Soveltamisesta. University of Tampere, Tampere.

Nordic Embassy. The Nordic Market. <https://nordic-embassy.com/nordic-market/>, retrieved 12.9.2023.

Nummela, N. – Saarenketo, S. – Loane, S. (2016) The dynamics of failure in international new ventures: A case study of Finnish and Irish software companies. *International small business journal,* Vol. 34 (1), 51–69.

Oslo Business Region (2024) Investment trend in Norway same as on European level: Big decline of investment in 2023. <https://oslobusinessregion.no/articles/investment-trend-in-norway-same-as-on-european-level-big-decline-of-investment-in-2023>, Retrieved 20.4.2024.

Passaro, R. – Quinto, I. – Thomas, A. (2017) Start-up Competitions as Learning Environment to Foster the Entrepreneurial Process. *International journal of entrepreneurial behaviour & research*, Vol. 23(3), 426–445.

Pennsylvania State University (2023a) Applied Multivariate Statistical Analysis. <https://online.stat.psu.edu/stat505/lesson/8/8.3>, Retrieved 30.4.2024.

Pennsylvania State University (2023a) Approximate F Tests. <https://online.stat.psu.edu/stat503/lesson/13/13.5>, Retrieved 30.4.2024.

Penrose, E. (2009) The theory of the growth of the firm. 4th edition. Oxford University Press, Oxford.

Picken, J. (2017) From Startup to Scalable Enterprise: Laying the Foundation. *Business horizons*, Vol. 60 (5), 587–595.

Pieroni, M. – McAloone, T. – Pigosso, D. (2019) Business Model Innovation for Circular Economy and Sustainability: A Review of Approaches. *Journal of cleaner production*, Vol. 215, 198–216.

Pride, J. (2018) Unicorn tears: why startups fail and how to avoid it. 1st edition. Victoria: Wiley, Melbourne.

Rocha, V. – Grilli, L. (2023) Early-stage start-up hiring: the interplay between start-ups' initial resources and innovation orientation. *Small business economics.* [Online]

Roundy, P. – Bradshaw, M. – Brockman, B. (2018) The Emergence of Entrepreneurial Ecosystems: A Complex Adaptive Systems Approach. *Journal of business research*, Vol. 86, 1–10.

Ruzzier, Ma – Ruzzier, Mi (2015) Startup Branding Funnel: A New Approach for Developing Startup Brands, Global Science and Technology Forum (GSTF), Proceedings of the 4th Annual International Conference on Enterprise Marketing and Globalization (EMG 2015), Singapore, 32-34.

Salter, A. – Martin, B. (2001) The Economic Benefits of Publicly Funded Basic Research: a Critical Review. *Research policy*, Vol. 30 (3), 509–532.

Sandberg, W. – Hofer, C. (1987) Improving New Venture Performance: The Role of Strategy, Industry Structure, and the Entrepreneur. *Journal of business venturing*, Vol. 2 (1), 5–28.

Schaberg, U. (2023) "IP Is Paramount:" The Significance of IP in Early-Stage Start-Up Investment Decisions. Springer, Cham.

Schoar, A. (2010) The Divide between Subsistence and Transformational Entrepreneurship. *Innovation policy and the economy*, Vol. 10 (1), 57–81.

Schäfer, S. – Henn, S. (2018) The Evolution of Entrepreneurial Ecosystems and the Critical Role of Migrants. A Phase-Model Based on a Study of IT Startups in the Greater Tel Aviv Area. *Cambridge journal of regions, economy and society*, Vol. 11(2), 317–333.

Sekliuckiene, J. – Vaitkiene, R. – Vainauskiene, V. (2018) Organisational Learning in Startup Development and International Growth. *Entrepreneurial Business and Economics Review*, Vol. 6 (4), 125–144.

Shepherd, D. – Douglas, E. – Shanley, M. (2000) New Venture Survival: Ignorance, External Shocks, and Risk Reduction Strategies. *Journal of business venturing*, Vol. 15(5), 393–410.

Shepherd, D. – Gruber, M. (2021) The Lean Startup Framework: Closing the Academic–Practitioner Divide. *Entrepreneurship theory and practice*, Vol. 45 (5), 967–998.

Siems, F. – Kraus S. – Pollok P. (2012) Entrepreneurial pricing: Characteristics and implications of pricing in SMEs and start-ups. *International Journal of Entrepreneurship and Small Business*, Vol 16 (4), 436 – 454.

Slávik, Š. (2019) The business model of start-up: Structure and consequences. *Administrative sciences*, Vol. 9 (3), 1–23.

Slávik, Š. – Bednar, R. – Misunova Hudakova, I. (2021) The Structure of the Start-Up Business Model-Qualitative Analysis. *Sustainability (Basel, Switzerland)*, Vol. 13 (15), 8386.

Social Science Computing Cooperative (2023) Regression Diagnostics with R. <https://sscc.wisc.edu/sscc/pubs/RegDiag-R/>, Retrieved 30.4.2024.

Stolz, L. Sternberg, R. (2022) Do the Winners Really Take It All? Exploring Entrepreneurial Learning in Start-Up Competitions. *Entrepreneurship Education and Pedagogy*, Vol. 5(4), 599–626.

Suomen Startup-yhteisö (2022) Startup-yhteisön jäsenyritykset kasvavat räjähdysmäisesti. <https://www.sttinfo.fi/tiedote/69938042/startup-yhteison-jasenyritykset-kasvavat-rajahdysmaisesti?publisherId=69818937>, retrieved 27.9.2023.

Söderblom, A. – Samuelsson, M. – Wiklund, J. – Sandberg, R. (2015) Inside the black box of outcome additionality: Effects of early-stage government subsidies on resource accumulation and new venture performance. *Research Policy*, Vol. 44 (8), 1501–1512.

TENK (2023) The Finnish Code of Conduct for Research Integrity and Procedures for Handling Alleged Violations of Research Integrity in Finland. <https://tenk.fi/sites/default/files/2023-05/RI_Guidelines_2023.pdf>, retrieved 12.9.2023.

The Nordic Council of Ministers (2021) The Nordic Region can and should play a leading role in Europe's digital development. <https://www.norden.org/en/news/nordic-region-can-and-should-play-leading-role-europes-digital-development>, retrieved 10.9.2023.

The Nordic Council of Ministers. Facts about the Nordic countries. <https://www.norden.org/en/information/facts-about-nordic-countries#:~:text=The%20Nordic%20Region%20consists%20of,each%20of%20its%20countries%20here.>, retrieved 12.9.2023.

Thies, F. – Huber, A. – Bock, C. – Benlian, A. – Kraus, S. (2019) Following the Crowd-Does Crowdfunding Affect Venture Capitalists' Selection of Entrepreneurial Ventures? *Journal of Small Business Management*, Vol. 57 (4), 1378–1398.

Todeschini, B. – Cortimiglia, M. – Callegaro-de-Menezes, D. – Ghezzi, A. (2017) Innovative and sustainable business models in the fashion industry: Entrepreneurial drivers, opportunities, and challenges. *Business Horizons*, Vol. 60 (6), 759–770.

Toumanoff, P. (1984) A Positive Analysis of the Theory of Market Failure. Kyklos (Basel), Vol. 37(4), 529–541.

Transparency International (2023) Corruption Perceptions Index. <https://www.transparency.org/en/cpi/2023>, Retrieved 30.4.2024.

Tuomi, J. – Sarajärvi, A. (2018) *Laadullinen tutkimus ja sisällönanalyysi*. Uudistettu laitos. Kustannusosakeyhtiö Tammi, Helsinki.

Udell, G. – Berger, N. (1998) The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle. *Journal of banking & finance*, Vol. 22 (6), 613–673.

Vaznyte, E. – Andries, P. (2019) Entrepreneurial Orientation and Start-Ups' External Financing. *Journal of business venturing*, Vol. 34(3), 439–458.

Van Rijnsoever, F. – Van Weele, M. – Eveleens, C. (2017) Network Brokers or Hit Makers? Analyzing the Influence of Incubation on Start-up Investments. *International entrepreneurship and management journal*, Vol. 13 (2), 605–629.

Vilkka, H. (2007) *Tutki ja mittaa: määrällisen tutkimuksen perusteet*. Tammi, Helsinki.

Vinnova (2024) Swedish startups attract investments. <https://www.vinnova.se/en/news/2024/03/swedish-startups-attract-investments/#:~:text=In%202023%2C%20Swedish%20startups%20drew,investments%20went%20to%20impact%20companies>, Retrieved 20.4.2024.

Vinnova (2021a) Innovative Startups stage 1 in spring 2021. <https://www.vinnova.se/e/innovativa-startups/innovativa-startups-steg-1-varen-2021/>, Retrieved 20.4.2024.

Vinnova (2021b) Innovative Startups stage 2 in spring 2021. <https://www.vinnova.se/e/innovativa-startups/innovativa-startups-steg-2-varen-2021/>, Retrieved 20.4.2024.

Vinnova. About us. <https://www.vinnova.se/en/about-us/>, Retrieved 20.4.2024.

Vogel, P. (2017) From Venture Idea to Venture Opportunity. *Entrepreneurship theory and practice*, Vol. 41 (6), 943–971.

Waleczek, P. – Zehren, T. – Flatten, T. (2018) Start-up Financing: How Founders Finance Their Ventures' Early Stage. *Managerial and decision economics*, Vol. 39 (5), 535–549.

Wallsten, S. (2000) The Effects of Government-Industry R&D Programs on Private R&D: The Case of the Small Business Innovation Research Program. *The Rand journal of economics*, Vol. 31 (1), 82–100.

Walthoff-Borm, X. – Schwienbacher, A. – Vanacker, T. (2018) Equity Crowdfunding: First Resort or Last Resort? *Journal of business venturing,* Vol. 33 (4), 513–533.

Williams, C. (2007) Research Methods. *Journal of Business & Economics Research*, Vol. 5 (3).

Wilson, J. H., Keating, B. P., & Beal, M. (2015). Regression analysis : Understandi ng and building business and economic models using excel, second edition. Business Expert Press.

Wernerfelt, B. (1984) A Resource-Based View of the Firm. *Strategic management journal*, Vol. 5 (2), 171–180.

Yin, R. K. (2018) Case study research and application: design and methods. 6th ed. Sage, Los Angeles.

Zahra, S. (2021) The Resource-Based View, Resourcefulness, and Resource Management in Startup Firms: A Proposed Research Agenda. *Journal of management*, Vol. 47 (7), 1841–1860.

Zider, B. (1998) How venture capital works. *Harvard business review*, Vol. 76, 131–139. United States: Harvard Business School Press.