Master thesis of Sustainable Business and Innovation

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Venture capital, Corporate venturing and Angels: the relation between different finance methods and the success of start- and scale-ups

Timo Warringa
Student number: 7066228

Supervisor
Maryse Chappin

Second reader
Giovanna Capponi

Department of Geosciences
Utrecht University
Utrecht, The Netherlands
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Preface

About one year ago (October, 2021), I started to think about my thesis topic and immediately knew that I would like to contribute to the field of business innovation. More specifically, I wanted to focus on smaller organizations (start- and scale-ups). The main reason for this is that I was told that nine out of ten startups did fail to become a successful business. While there are many great ideas within theses novel organizations, improving the success rate of them (and using the innovations) could lead to a significant contribution in solving current societal issues.

One significant barrier for start-and scale-ups is to attract investors, since investors try to be risk-averse and need reassurance to get a return on the investment. However, some authors suggested that more research should be done to investigate the effects of different kinds of investments. It was this moment that I created the topic for my thesis: I wanted to do more research into the question how different investment methods influenced the success of small organizations. There is so far, no research done on verifying current research that discusses the influence of capital on corporate success of start-and scale-ups.

I decided to look for an internship within an organization that could provide the information about different finance methods, as well as knowledge about start- and scale-ups. I'm very happy that a bank accepted me as an intern within the department of Business Innovation of the region of the Central-East Netherlands. Through this internship I could access several databases and assessment systems for start- and scale-ups, which helped me to develop my knowledge about these novel organizations. Since this research is guided by a bank, which led to providing much information on start- and scale-ups from a bank's perspective, the practical implications of this research are mainly focused on multilateral banks.

The research I performed was intense, since I had to create the whole dataset by myself through analyzing 360 companies (and much more that were excluded), which took me 10 weeks on itself. However, this helped me to get much knowledge about the entrepreneurial landscape of the Netherlands. I believe this research contributed to a field that is very important for the innovations we need to solve societal issues. Besides that, it helped me to gain extensive knowledge about novel organizations, which will contribute to my future career. Saying that, I would like to contribute even more within the field of business innovation and through this, help to solve the environmental crisis.

The first paragraph of the introduction therefore explains the wider context of the current need for accelerating innovations. This was decided upon because both social- and scientific relevance of current research stems from the urgency of solving the environmental crisis. While this research is not focused on reducing the negative effects of a changing climate, the findings could contribute to change corporate policies that possibly lead to indirect effects on creating a sustainable society.

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Timo Warringa
t.d.warringa@students.uu.nl

Abstract

Introduction/Theory: innovations developed by start- and scale-ups can contribute to overcome current societal issues, but most of them fail to reach the market due to lack of investments. While it is widely known that start- and scale-ups are in need of financial resources, the influence of different financing methods (venture-, corporate- and angel investors) on the potential success, is not identified so far. This research investigates the used type of financing method and compares it to the success of start- and scale-ups. For the theoretical framework, the resource-based view and the VRIN-model are used to develop an instrument to assess the success of a company.

Method: using the Techleap database, 360 start- and scale-ups were assessed. These start- and scale-ups all received funding and provided enough information. A start- and scale-up assessment method was created to generate a success score, that includes the resource-based view and the VRIN-model. After splitting the data into two datasets (one including startups, the other one including scale-ups), a logistic regression was performed. Besides this, three different robustness tests were performed.

Results: the findings show that corporate capital or the combination of corporate- and angel investors have a negative effect on the success of startups, compared to the use of merely venture capital. For scale-ups, the use of all three finance methods have a positive effect on the success of the business, compared to using only venture capital. However, the impact on the corporate success is considerably small. Besides the finance methods, the amount of employees working at the organization shows to have positive impact on the success of the business. Considering some additional control variables. startups profit mainly from sustainability, a CSR policy and a commercialized product, while participation in a contest and the CSR policy is positively related for scale-ups.

Discussion/Conclusion: while there is some relation between some of the finance methods and the success of the start- or scale-up, the impact is considerably small. The (additional) control variables have a positive relation to the success score as well. There are two main contributions of this research. First, it develops the start- and scale-up assessment method, which can be used by investors to estimate the expected success of an organization. Second, while there is already some research done on the relation between different finance methods and corporate success, this study provides empirical evidence that puts current research into perspective.

Keywords: startups, scale-ups, finance methods, corporate success, competitive position, venture capital, corporate venturing, angels, multilateral banks, sustainable innovation, resource-based view

1. Introduction

1.1 Innovations to overcome the climate crisis

Extreme weather caused by climate change and the related effects on human society are getting worse than was expected (IPCC, 2022). The consequences of the changing climate already impact both human beings and nature negatively and it is estimated that the current measures to decrease climate change are not enough to solve this crisis in time. While the current research is not focused on the climate crisis, it creates a fundamental driver for more research towards novel businesses, since their innovations could contribute to overcome the environmental issues. Although the report of the International Panel on Climate Change (IPCC) suggests that current innovation is not fast enough to develop solutions for climate change, this does not mean that society needs to stop developing new technologies and products. On the contrary, it urges inventors to develop solutions in an efficient manner to make sure that they can be implemented within a relatively short period of time. Innovations created by novel organizations, known as start- and scale-ups, could significantly contribute to developing products and technologies that are needed for solving the current climate crisis (Kovanov & Zozulov, 2018). Currently, there are no alternative innovations that can completely substitute polluting products, known as the adaptation gaps for sustainable development. As the report by the IPCC suggests, current insufficient financing is a key driver of adaptation gaps, leading to barriers for developing technologies and sustainable innovations. As suggested in the IPCC report (IPCC, 2022), mobilization of human resources and financial capital is key to close the adaptation gap, even if the benefits are not directly visible. Below, two arguments show the importance of focusing on accelerating innovations created by novel organizations to solve the environmental crisis.

First of all, governments take initiatives to act on the findings of the IPCC, since they find themselves in a position to coordinate the sustainable transition process of society. A cooperation of nearly 200 countries try to create a pact to reduce greenhouse-gasses with the intent to decrease climate change. The goal of this pact is to limit the global temperature rise to 1.5 °C, which is posed to be acceptable for reducing the negative effects caused by a changing climate. The actions that each government takes to fulfill this pact, were recently discussed in the COP26. However, as Masood & Tollefson (2021) found, the actions of all national governments are a step in the right direction but not sufficient to limit the temperature rise of the earth to 1.5 °C. In fact, the idea that it is possible to solve the climate crisis through merely political actions is far too simplistic, since every individual should contribute to a more sustainable society (Latour, 2017). To stimulate individuals to make significant impact on limiting the negative environmental consequences of their actions, Morton (2018) argues that the effects of climate change need to be experienced by individuals, before they take actions for a more sustainable lifestyle. Unfortunately, climate change is not experienced to be a direct threat for the life of human beings, since the time scope is too long and the problem is complex (Brügger et al., 2015; Frantz & Mayer, 2009; Latour, 2017). To summarize, political actions will not solve the environmental crisis, but taking all the individual actions of citizens will significantly contribute to this if they are provided with options that do not drastically change their life standard. Even more, as Brügger et al. (2015) suggest, individual acting on climate change is stimulated when people think that the measures are acceptable, feasible and effective. Developing sustainable innovations that fulfill these conditions would increase the level of acceptance and consequentially reduce the environmental impact of current society. Therefore, more focus is needed on stimulating the effective creation of innovations that are feasible and acceptable to implement.

Second, as described by Roberts (2008), two common measures to act on climate change are adaptation and mitigation. Adaptation is the shift towards new ways of living, that enables

society to renounce the previously used polluting technologies and standards of living while using the opportunities of a changing climate (e.g. the development of solar panels reflect the adaptation process, since it is an alternative technology to generate electricity). Mitigation is the process of reducing current polluting processes through actively promoting climate friendly living standards (e.g. stimulating individuals to stop eating food products with high environmental impact is a typical form of mitigation for stimulating a more sustainable society). Within the last ten years, governments paid little attention to adaptation compared to mitigation because this option is more accessible to directly reduce greenhouse-gasses. However, as described by Owen (2020), adaptation is necessary to reduce societal impact on the natural environment. Corporations have the potential to create a more sustainable world by creating innovations that help the adaptation process. Thus, since businesses are able to facilitate the adaptation process through developing innovations, more focus is needed to increase the success rate of them.

1.2 Financing innovations of novel organizations

Currently, the process of developing new technologies that contribute to the adaptation process are of high cost and mainly financed through using debt and equity capital (Keenan et al., 2019). As mentioned by the IPCC (2022), Roberts (2008) and Owen (2020), the financial aspects of developing new technologies that will help to overcome the climate crisis are one of the main barriers to create a sustainable society. Barua (2020) identified that the main gap for implementing the sustainable development goals (SDGs) as designed by the United Nations, is the lack of capital that is needed to fund the innovation process. Since developing new technologies is expensive and not proven to be successful, potential investors are cautious to fund them. Therefore, governments and organizations provide research grants to entrepreneurs who want to develop ventures with the intent to commercialize it (Zider, 1998). In general, funding is provided to start- and scale-ups that developed a business plan for products or services that are expected to compete with existing unsustainable products or businesses.

Based on the definition by Blank (2010), a start- or scale-up is a company, a partnership or temporary organization designed to search for a repeatable and scalable business model. Start- and scale-ups are assessed to be a significant driver for societal innovation, since these novel companies are able to create a product from scratch using contemporary knowledge (Spender et al., 2017). The funding of novel businesses is considered to be of high risk, but based on the innovative potential, there exists a considerable amount of interest for funding them. As addressed by Kratzer (2020), start- and scale-ups stimulate the sustainable development of society and are able to compete with existing businesses when their technology is able to disrupt the current market. Within the last decade, both politics and businesses realized that novel businesses have the capacity to create innovations that will help to solve the climate crisis, which stimulated the funding of these businesses even more.

1.3 The role of banks in overcoming the barriers for sustainable innovations

Taking social responsibility is currently a crucial aspect for doing business in a world that is experiencing the threats of a changing climate. This is also the case for banks, which are widely acknowledged to play a crucial role in the sustainable development of society (Zimmerman, 2019). Currently, multilateral development banks are organizations that, besides managing capital for either individual customers or firms, focus on financing developments that help to improve society (Faure et al., 2015). In fact, as Mendez & Houghton (2020) pose, banks are revealed to be 'norm entrepreneurs' on which the private sector relies in terms of creating a sustainable framework. This was already described by Volz (2017), who describes that it is a bank's responsibility to ensure that capital is allocated towards sustainable practices.

Overall, the banking sector finances a significant amount of businesses in order to stimulate innovation and sustainable development (Carè, 2018). For over a period of two decades, the corporate culture of banks changed towards critically assessing the environmental impact of their funding (Peeters, 2005). Since the banking sector detected the innovative potential of start- and scale-ups, more attention is given to funding novel businesses that contribute to solving the climate crisis. Considering the expertise of banks, as well as the immense amount of capital for funding innovations, it is essential to examine how banks can optimize their role for funding innovations that help society to become sustainable.

As identified by Kerr & Nanda (2015), banks played an active role in financing technological innovations, but the financing methods changed drastically. Although financing large firms is considered to be a safe investment, the attention to fund start- and scale-ups increased within the last two decades. Large corporations failed to radically change their business processes, since their core practices cannot be changed easily (Chandy & Tellis, 2000). The inability to react to the demand for a radical different product is also known as the incumbent curse. As the authors pose:

> *"incumbents in a particular product generation are so enamored with their success or so hampered by their bureaucracy that they fail to introduce the next generation of radically new products."* - Chandy & Tellis, 2000, p.2

Due to this incumbent curse of large corporations, start- and scale-ups have the advantage to create innovations more efficiently, since they are not bound to the extensive bureaucratic processes (Larson, 2000). Additionally, as described by Spender et al. (2017), start- and scale-ups play a key role in the innovation process of society. Banks identified this potential and consider them to be a significant player in creating innovations that can replace current polluting technologies. Since banks are financial experts, they established themselves to be a key player in fostering partnerships with novel businesses that are in need of financial resources. Besides this, as mentioned earlier, the main barrier for innovation is the lack of financing. To overcome this, banks could use their expertise to help novel organizations in funding their business.

In general, successful businesses are encouraged to take responsibility in creating a sustainable society. The occurrence of natural disasters caused by the changing climate, already caused a shift of organizations in taking social responsibility (Carbone et al., 2012). Banks take a serious role as a social responsible organization, since they do not only improve their own core business, but do also initiate projects that contribute to a society as a whole (Yeung, 2011). Since the United Nations designed the seventeen SDGs in 2015, banks altered their policies to reassure that their business practices are in line with these goals. Consequentially, besides directly initiating social projects, banks significantly increased their investments for innovations that help to solve the climate crisis. From this, a significant amount of financial resources is assigned to start- and scale-ups. However, although these novel businesses can disrupt current markets and introduce innovative technologies, many of these organizations fail to reach the market. This leads to a moral discrepancy, since banks consider these small businesses as an important driver for sustainable development, while at the same time the chances of successful implementing the innovation are considerably low. Creating a method in order to increase the success rate of start- and scale-ups could help to stimulate banks (and other investors) to fund them, while at the same time improving the success rate of those novel organizations.

1.4 Problem definition & research question

Both start- and scale-ups are in need to attract investors or partners, since they lack financial resources and do have a small network. However, since the product or service of these novel

organizations is commonly not proven to be successful, there exists low interest to invest in them. While larger corporations are offered an extensive amount of capital (even more than the demand), investors tend to assess start- and scale-ups to be of high-risk to invest in. Currently, nine out of ten startups fail to create a successful business due to inadequate management and lack of funding (Krishna et al., 2016). On the contrary, scale-ups have a much higher success rate compared to startups, but still many lack to create a product that reaches the market (Barquin et al., 2020). The aim of this research is to provide new insights on how to increase the success rate of novel businesses through evaluating the impact of different finance methods compared to the resources of the firm. Consequentially, this could lead to increasing the success rate of novel businesses.

      To overcome the lack of interest for investing in novel companies, banks are able to encourage other investors to provide funding and they can develop a network to connect possible investors with smaller organizations with the intend to stimulate innovation (Jeucken & Bouma, 1999; anonymous, personal communication, October 4th, 2022). Using their market-knowledge and through taking the role as a financial intermediary, banks help to identify potential profitable start- and scale-ups. Since banks possess the resources for creating a framework to identify the potential success of start- and scale-ups, they can help to stimulate other investors in providing capital to the expected successful novel businesses. Additionally, if banks are able to create a better assessment method, they can reduce the risk of the investment and advise novel businesses on what improvements they need to make. However, as argued by Zhang et al. (2019), financing methods influence the success of the innovation, but there is currently no empirical research that assesses the effects of using different types of capital. As the author describes, venture capital has a more positive impact on innovation, compared to corporate venturing. Additionally, it is expected that firms that use both venture capital investments, as well as additional financing methods, do have a higher rate of successful innovation, compared to firms that do not use these methods (Shinkle & Suchard, 2019). At last, as was researched by Angerer et al. (2017), firms that use crowdfunding have an increased chance on success since this method results in positive marketing effects. Generally, based on current academic literature, there are reasons to suspect that the type of finance methods impacts the success of a business differently.

      While there is some research on the influence of capital on the success of a business, there is currently no research verifying these ideas. Besides this, the academic literature generalizes the influence of different types of capital on businesses to the entire entrepreneurial landscape. Whether there is a relationship between the finance method and the success can help to give guidance on how to invest in a start- or scale-up. Therefore, research should be done on how such financing methods can increase the corporate success of smaller organizations. Based on this, the following research question will be answered: *in what way do financing methods influence the success of start- and scale-ups?*

Based on Lussier (1996), the research question considers the financing method while taking into account the resource-based view of the firm. This was decided upon because the resource based view of the firm is commonly used to assess the success of a business. This method focusses on the resources of the firm and uses them to measure the individual contribution to the business practice (Barney, 1995). However, through including the finance methods, it addresses the gap in the literature since there is no research on specific frameworks that include the type of capital, that investors can use to assess whether a start- or scale-up will be successful. Besides this, there is no concrete definition on how to assess each different resource of a business and the resource-based view lacks clear guidelines on how to generate a final result of the success of the firm. This research is therefore scientifically relevant, because it takes the

first step on creating a method that generate more concrete results to assess whether a start- or scale-up will be successful.

Within this research, a start- and scale-up assessment model (SSAM) is created to assess the success of a start- or scale-up and includes both the resources of the firm and the type of capital used to fund the business. This model enables possible investors to assess the expected success of the business they want to invest in. Hence, through this research, investors can improve the success of start- and scale-ups and consequentially stimulate the development of innovations. Consequentially, this research has societal relevance since increasing the success rate of innovations could lead to solving environmental issues. In contribution to this, through the use of the SSAM, banks can help to create an environment where innovations can be developed with the purpose to solve the problems that our society currently experiences. If it can be identified that certain financing methods lead to a higher rate of success for start- and scale-ups, banks can stimulate these methods and consequentially improve the innovative power of start- and scale-ups. Considering this, the social responsibility of banks is increased through up taking the role of a financial intermediary for stimulating innovative companies that consequentially leads to a more sustainable society.

2. Corporate guided research

Considering the influence of banks on the development of innovations that help to solve current societal issues, a bank provided the guidance needed in order to perform the research. The bank is a Dutch cooperative bank striving to 'create a better world together' and considers themselves as a responsible player in improving society (multilateral bank, 2022). Currently, the bank identified that the ecosystems for start- and scale-ups in the central-east region of the Netherlands lags behind in attracting novel businesses (anonymous, personal communication, February 2nd, 2022). Therefore, research is done to find new methods for attracting start- and scale-ups and generate a significant success rate. However, as was discussed with the bank, there is currently more guidance needed in order to increase the success of new companies in the region. Through improving the guidance of start- and scale-ups, more companies will be attracted since it creates higher trust in becoming successful. Considering the current financial barriers as discussed before, research is conducted on how the bank can improve their guidance of novel organizations. More specifically, through data-analysis it is assessed whether the different financing methods for start- and scale-ups in the Netherlands impact the success of these novel organizations. This helps the bank to create an attractive area for these organizations, but this research can also be applied in a wider region. Besides this, based on the findings, the bank can alternate their financing methods of small organizations in order to promote a higher rate of success and innovation.

2.1 Innovative power and the role of the bank on stimulating innovations
First of all, the definition of start- and scale-ups used by the bank needs clarification. The bank does not distinguish both type of organizations, but considers them as businesses that do not have a proven business model but have the potential and power to create (disrupting) innovations (anonymous, personal communication, October 4th 2022). The term 'innovative power' used by the bank should be defined, since it can be interpreted in several ways. As discussed with the bank, this term can be identified as "renewing certain business practices or products such that it gives the business a competitive advantage for future transitions as well as leading to attract human capital (knowledge) and partners that help to sustain the innovation" (anonymous, personal communication, February 2nd, 2022). This is in line with Barney's (1991)

theory on how a firm can create a sustained competitive advantage. As he states, a firm can create a sustained competitive advantage if a firm has heterogeneous and immobile resources and if it is able to make sure that the product or service is valuable, rare, inimitable and non-substitutable (known as the VRIN framework discussed before). Hence, attracting human capital (knowledge) that is rare (e.g. employees with a certain kind of expertise) or creating exclusive collaborations with new partners, can help to establish a sustained competitive advantage. To sum up, the innovative power of start- and scale-ups can be identified as a business practice that is able to create a sustainable competitive advantage.

Besides this, the role of the bank needs to be described, since this research should focus on the capacities of the bank in guiding the innovation process of the start- and scale-ups. The bank is different than other Dutch banks, since it is founded based on the collaboration of different groups and organizations. Within the last two decades, the role of banks changed drastically, due to the social responsibility of large corporations (Gangi et al., 2018). The role of the bank is not limited to providing loans and managing capital, but as the organization states, they want to 'grow a better world together'. This means that the organization also focusses on how their funding is spend in manners that help to improve society. Considering the scope of this research, the bank can help start- and scale-ups in giving advice on how to finance their business. Besides this, the bank can actively engage with partners in their network and propose valuable connections for new collaborations. The outcome of this study can help the bank to improve their role as financial intermediary and consequentially increase the success of start- and scale-ups. This contributes to the social responsibility of the bank, since improving the success of novel businesses and their innovations, helps to solve societal problems.

Additionally, an interview with a start- and scale-up banker was conducted to verify the literature and to assess how The bank contributes to the success of start- and scale-ups. It was found that The bank actively engages with start- and scale-ups through engaging with accelerator agencies that scout new talent. This is defined as a 'hot approach' since the agencies assess the start- or scale-up as high interest for the bank. On the contrary to this, novel organizations are also contacted through telephone, which is known as the 'cold approach' since it is unclear whether these companies want to engage with the bank. Most of the contacted companies have already a product or service within a higher TRL phase (normally at least TRL seven), which is in most cases a condition for the investments. However, if the product or service is assessed to be of high success in the future, some organizations with a TRL phase below seven are financed by the bank.

Overall it was found that the bank invest in novel organizations if it is assessed that the investment is of low-risk. The bank wants to avoid high-risk investments, since the goal of the bank is to get a return on their investments withing a scope of two years (sometimes three years if necessary). However, it was also answered that out of ten investments, about eight companies are expected to fail, one company will end in break-even and one company will be successful. This shows us that still a significant amount of start- and scale-ups are unable to become successful and that the assessment of the bank is not able to filter merely the organizations that will become a success. Therefore, more research could be done in order to improve this assessment. Currently, the assessment method only evaluates on five criteria and can be considered to be simplistic. Theses criteria are not described in this thesis, due to confidentiality.

At last, besides investing, the role of the bank towards the success of novel businesses is to support them with knowledge about financing methods and to provide a network that could help for the development of the organization. Currently, there is no incentive to offer any other

services, but the bank is certainly open to look into additional methods that contribute to the success of the start- and scale-ups.

2.2 Current funding methods identified by the bank

As described by Holt et al. (2020) several financing methods can be identified as can be seen in table 2. Current financing methods used by either start- and scale-ups or large corporations are loans provided by banks (either their own bank or other banks), their own company, leasing & factoring, family & friends, other companies, crowdfunding, Regional Development company Oost-NL, Participation company (including venture capital and private equity),

Table 1: funding methods of capital for startups, scale-ups and large corporations (region of central-east Netherlands) identified by Holt et al., 2020

Funding method	Category	Description	Example
Current bank	1	Organization that currently manages or provides capital of the company	A startup that uses Rabobank to manage the capital or to provide a loan
Other bank	1	Another bank that is able to provide a loan	A startup that is using Rabobank to manage their capital, while at the same time another bank (e.g. ABN Amro) does also provide a loan
Own company/current shareholders	2	The capital within the company is used to invest, or shareholders are willing to invest capital	The company's profit is invested in the company to improve the business practices
Leasing and factoring	1	Renting capital with the intend to increase the income	A startup 'buys' capital from another company and pays off the capital through higher income generated by investing this capital
Family & Friends, Business angels	3	Capital invested by persons, with the intend to develop a start- or scale-up. The investor also shares their knowledge and experience	Jeff Bezos investing in Domo, using his own capital (private investments)
Other companies	2	Another company investing in a start- or scale-up	Google investing in Jio Platforms, with the intend to start a partnership
Crowdfunding	3	Funding a project by raising money from a large number of people who each contribute a relatively small amount	Oculus Rift (VR-glasses) raised $250,000 to kickstart their project
Regional development company Oost-NL	2	Combination of governmental organizations and businesses with the intend to strengthen the regional economy	Oost NL funding Bussman Groep B.V. and becoming shareholder
Participation company	1	Every individual contributes based on their potential and actively engages with their environment	Aglaia Biomedical Ventures funding Somantix
Qredits	1	Financial intermediary representing several organizations	Qredits financing Custom Camp Hengelo
RVO	3	Governmental institution providing financing or subsidies	RVO subsidizing Scholt Energy Holding N.V. for Local Energy Hubs project
Other government funds	3	NA	NA
Subsidies	3	NA	NA

Qredits, RVO, Government funds and subsidies. Some of these methods specifically apply to the Netherlands or a specific region. Table 2 gives an overview of different funding methods currently identified by the bank. However, as proposed by van de Molengraft (Interview, Feb 1st, 2022) and Metelka (2014), funding is divided into three categories of smart capital: venture capital (1), corporate venturing (2) and (business) angels (3). Venture capitalists provide capital to start- or scale-ups that have been deemed to have high growth potential but with higher-risk. Corporate venturing are organizations that invest with the intend to start collaborations and expect a return on the investment (either in shares or equity). An angel investor is an individual/organization who provides their own capital for a start- or scale-up in exchange for shares or equity. Since crowdfunding follows the same concept as angel investing, it is assigned to this category. Considering the limitations of this research, as well as to be able to give concise results, the different funding methods will be categorized in these three categories. The funding methods in table 2 are categorized to these categories. These funding methods will be analyzed extensively in the thesis project.

3. Theory

This section explains the theory used to answer the research question. The first paragraph explains how a start- or scale-up is analyzed through the resource based view. Then the next sub-section describes how the VRIN framework and different resources can be used to assess the competitive position of an organization. Third, as this research focusses on the influence of different types of capital on corporate success, different funding methods are defined. At last, the influence of these different funding methods are evaluated to the success of the business.

3.1 The resource based view

The resources of a firm can be identified as the assets, capabilities, organizational processes, firm attributes, information and knowledge that enables the firm to conduct and improve their business practice (Barney, 1991). As described by Kamasak (2017) resources can be tangible (e.g. the stores, employees, turnover) or intangible (e.g. the knowledge, reputation, corporate culture). However, as the author describes, the intangible resources are superior since they are dynamic and can lead to a competitive advantage for a firm. Other companies cannot copy them easily, which makes them superior to the success of a company. Currently, the assessment of the success of start- and scale-ups is done based on their tangible resources, since this is verifiable (Kamasak, 2017). The theory of using the resources of a firm, to assess the potential success of it, was already developed by Barney (1991) and includes both tangible- and intangible resources. Based on Barney (1995) and De Bruin (2016), the resources of a firm exist

Financial Resources	Human Resources	Material Resources	Non-Material Resources
• Money • Shares • Bonds • Debentures	• People Skills • People Knowledge	• Raw Materials • Facilities • Machinery • Equipment	• Patents • Brand name • Intellectual property

Figure 1: Categories of firm resources (De Bruin, 2016)

of financial-, human-, material-, and non-material resources. Figure 1 gives an overview of the

different resources. Below, each type of firm resources is described in order to create a model to assess whether a business is expected to be successful or not.

The financial resources of a firm include every asset of monetary value and can be identified through taking together the money, shares, bonds and debentures (Barney, 1991). Since the financial resources of businesses are occasionally not publicly available, they can be indicated through evaluation of the market value and the annual report of the organization. The market value consists of the value of a company based to the stock market and is defined through taking the amount of shares and multiply it by the price of each share (Merz & Yashiv, 2007). However, novel businesses commonly do not have any shares to sell, since they are still developing and consequentially, selling shares is too risky in this phase. To generate capital, novel organizations commonly attract investors that assess their product or service to become a potential success. As described by Fuertes-Callén et al. (2020), attracting multiple investors, a growing profit and a substantial liquidity are key to the survival of start-ups. Additionally, it was found by Chandrasekharan (2012) and Delkhosh & Mousavi (2016) that proper financial management and financial expertise leads to a successful business.

Human resources are both tangible (number of employees, gender, inclusiveness, etc.) and intangible (skills, knowledge, personality, etc.) and are identified to be key to the success of the business and more significant compared to other resources of a firm (Galbreath, 2005). Unfortunately, it is difficult to map intangible human resources of a firm since it takes a considerable amount of time to explore them for each specific organization. Besides this, it is not possible to define the value of intangible human resources since this will be rather subjective. To be able to assess human resources and assess whether they are of high strength for a business, the skills and knowledge of employees should be assessed that is contributing to the business. This is the level of expertise of the employees expressed in e.g., their education, experience and consistency (Shanteau et al., 2002; Wright et al., 2001; Yang, 2010). Promoting these employees to be responsible, motivated and creative increases the chance of becoming a successful organization (Nobles, 2019). This is reflected through the social learning of employees (Meister & Willyerd, 2021). Besides this, training employees in soft-skills and educating them helps to improve the performance of a business (Ibrahim et al., 2017). Within the last decades, businesses try to promote the diversification of their employees, due to their social responsibility. Although Jayne & Dipboye (2004) found that diversification itself does not have a direct effect on the profit of a firm, they found that it promotes a better work environment.

Material resources consist of the raw materials, facilities, machines and equipment for running the business (Barney, 1995). These resources are more easily mapped, since they are tangible. However, whether a company is using the right machines is discussable, because using other material resources could help to improve the production process. Considering this, assessing the strength of the material resources is relatively arbitrary. Therefore, to give a concise estimate, resources are assessed to be of strength if they are constantly available to the organization because this makes the firm able to fulfill the production of the product or service. As proposed by Rzepka et al. (2003), many problems appear in the manufacturing process when the material resources are not constantly available. Additionally, as Richins & Dawson (1990) discussed, the material value of a product is related to both the costs of producing the product and the value customers give to this product. Browning (2003) found that this 'customer value' is the intrinsic value of a product or the change in the product value when it is substituted with a similar product from the competitor. Another significant attribute of the material resources of a firm, is the ability to change the product based on the needs or requirements of the customer.

This is described by Ottosson (2004) as the dynamic product development. Considering the current developments and requirements that forces companies to produce products that do not harm nature, businesses need to be able to produce or change products based on new regulations. At last, the product or service of a firm is able to obtain a competitive advantage, if the price of the product is lower compared to similar products in the market (Kuncoro & Suriani, 2018).

Non-material resources of a firm include the ownership of patents or intellectual property, but also the attitude of society towards the company reflected through the brand name (Chovanová et al., 2015). Creating a positive brand name is a necessary condition for a business to obtain a competitive advantage (Brown, 2016). This brand name includes for example the experienced quality of the company's product and the social responsibility of a business. As Mussa & Rosen (1978) showed, the perceived product quality by customers significantly impacts the success of the business. Related to this, businesses need to focus on maintaining a positive relationship with the customers, since this ensures that the product satisfaction is monitored (Hassan et al., 2015). Additionally, the manner of how the organization is structured is also a non-material resource. This is e.g., the firm's formal reporting structure, the formal and informal planning, controlling and coordinating systems and the informal relations between employees in the firm (Barney, 1991). At last, as described by Malkawi et al. (2018), intellectual capital like trademarks and patents are needed in order to create a competitive advantage for a firm.

3.2 Sustained competitive advantage as corporate success

The idea behind the resource based view of Barney (1991) is that firms owning the appropriate resources are able to obtain a sustained competitive advantage. Businesses thrive to create a competitive advantage towards their rivals, since they expect that this results in surviving. But a competitive advantage does not guarantee the future existence of a firm, since other businesses are able to disrupt the market. To increase the chances of a firm's survival, a sustainable competitive advantage in necessary. This sustained competitive advantage is necessary for a firm, since it gives an increased certainty of the endurance of the firm, compared to merely a competitive advantage. This sustained competitive advantage can be described as:

Figure 2: VRIO framework (De Bruin, 2016)

"A firm is said to have a sustained competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy" - Barney, 1991, p.102

In order to assess whether the resource of the organization contributes to the sustained competitive advantage of the firm, Barney (1991) describes that the product of a firm should be evaluated based on whether it is valuable, rare, imperfectly imitable and non-substitutable. This is also known as the VRIN model and currently sets the baseline for assessing whether a business is successful. This model is visualized in figure 2. As Barney (1995) describes, a resource is valuable if it is able to exploit opportunities and neutralize threats. It is rare if only a limited amount of businesses is able to obtain the resource, compared to the amount of firms in the market that are in need of the resource. At the same time, businesses can try to imitate the resource, which can lead to high competition. A resource should therefore be hard to imitate, mainly due to a high level of technological development and knowledge of the product. At last, the resource should be non-substitutable, otherwise the competitor is able to create an invention that makes the product of their rival useless.

To explain how this method is applied, let us take an energy company owning a new technique for generating sustainable energy. This new technology enables the company to increase the energy production of wind turbines by 15%, due to the optimization of the generators. The new technology is produced for the same costs and does not have any negative consequences. However, a significant investments was required to develop the invention, mainly used on hiring experts in the field. Currently, no other competitor in the wind-energy industry owns a technology that is able to optimize the generator of the turbines. The energy company was able to patent their invention and competitors are willing to buy it.

First of all, the resource is considered to be valuable if it is able to exploit the opportunities and/or neutralize threats. The new technology enables the energy firm to generate 15% more energy with the same amount of wind turbines (opportunity) which can substitute a part of the polluting generated energy (threats). Besides this, it is estimated that wind-energy is a necessary technology for power-generation in the future (Barthelmie & Pryor, 2021). Thus, there is reason to consider the new technology as a valuable resource. Additionally, the new generator is rare, since no other competitor provides this technology or similar innovations that increase the energy production of the generators of wind turbines. However, since generators are used throughout all industries, companies will probably invest in optimizing their generators as well. This leads to a possible imitation of the generator, since the optimization can be achieved merely through attracting experts in the field. At last, the invention will not be substituted easily, since society is dependent on energy produced through the use of generators.

In general, the VRIN framework (formerly known as VRIO) is commonly used as a method to assess the sustainable competitive advantage of a firm. It is however unclear how to assess to what extend the resources of the firm meet the VRIN-requirements. At the same time, it should be mentioned that, although the resources of a firm meets the requirements of a sustained competitive advantage, it does not guarantee that the firm keeps this position (Barney, 1991). Depending on societal or political changes and the technological inventions, a business can fail to adapt and consequentially loose their prominent position in the market. However, if a firm gets a sustainable competitive advantage, it is able to obtain an almost certain future existence if the business is managed and adapted correctly.

3.3 Using the VRIN and the resource based view to assess corporate success

To be able to assess whether a company is successful, the concept of corporate success needs to be defined in order to make an appropriate model for the assessment of a business. The core business of corporations is, besides delivering products or services that comply with the needs of their customers, innovating their business practices, such that the company can uphold or create a competitive position within the market (Barney, 1991). As described by Reid & Smith (2000), the activities and decisions performed by a business are merely focused on increasing the return on the investments and survival of the firm. Based on this, corporate success is defined as a way of doing business that ensures a higher return of investments and creates a sustainable competitive position in the market.

Additionally, the VRIN model as described in the previous section is able to assess the sustained competitive advantage, which is crucial for the success of a business. The model focusses on the level of the firm, and thus excludes the market-based view in which this firm operates. However, since this research explores the success of novel organizations in various markets, a firm-level perspective is considered appropriate. Besides this, models like five forces (Porter, 2008), the value chain (Porter, 2001) or a SWOT-analysis (Humphrey, 2005) fall short of being able to compare a firm's individual resources (CISA & CFE, 2012). The market based view is rather static, aiming at a monopolistic position and considers resources as homogeneous. Since start- and scale-ups focusses on taking the opportunities in new markets and through exploring new resources, the resource-based view gives a more appropriate assessment of their expected corporate success.

Combining both the VRIN model and the different resources as discussed before, a business is successful when it is able to create a sustainable competitive advantage and at the same time obtains the financial-, human-, material- and non-material resources as discussed in the first paragraph. The assessment method for identifying whether a firm meets these criteria is proposed in the methodology.

3.4 Defining start- and scale-ups

Nowadays, the term 'startup' is assumed to be a well-known term that does not need any more explanation and is assumed to be self-defined (Magalhaes, 2019). However, extensive research was done by Skala (2019) about different propositions for defining which company is defined as a startup. Overall, the author states that a startup is a widely used concept, while there are in fact three different novel organizations: beginning-, growing- and mature startups. The definition of the startup as proposed by Skala (2019) can be summarized as follows:

> "*The most important conclusion from this chapter's considerations is that the features defining a startup are different for projects in the initial stages of development and for mature organizations. Whereas at the beginning of functioning the key features of a startup are innovation, unknown demand, and limited internal resources, a startup at the advanced stage of its development is an enterprise that exploits market-disruptive situations, which allows it to achieve hyper-scalability and a high company valuation. The intermediate stage in the development of a startup is described by an above-average rate of growth of key company parameters: the number of customers (users) or the revenues. Many startups transform, over time, into other organizations: small or medium-sized companies, corporations, foundations, and so on.*" – Skala, 2019, p.33

After examination of academic literature considering the identification scale-ups, it can be concluded that there is no clear definition of these type of organizations. According to Monteiro (2019), who focused on defining the difference between scale-ups and high-growth firms

Table 2: definition of start- and scale-up (Autio, 2016)

	Startup	**Scale-up**
General	Innovation to solve client issues, business model, growth oriented	Proven innovation to solve client issues, business model, much attracted capital (at least €1M)
Age	Up to six years old	Up to 10 years old
Size	Maximum of 49 employees	At least 50 or more employees
Turnover	€2M (1-9 employees), €10M (10-49 employees)	A minimum of €50M

(HGFs), this is due to the fact that scale-ups are commonly confused with HGFs. However, although these types of firms have much in common, scale-ups can be defined as:

> *"As a result, a scale-up can be defined as an HGF whose accelerated cycle of growth and wealth creation is fundamentally based on the scalability of its business model. This does not mean that a scale-up company never has market power, e.g. through building a strong brand. The point to be emphasized is that the growth of the firm is based, essentially but not exclusively, on the scalability of its business model."* - Monteiro, 2019, p.8

The above definitions of novel businesses still lack specific guidelines on how to assess a company and identify whether it is a startup or possibly a scale-up. Therefore, a European report for the support in entrepreneurship (Autio, 2016) is used as a baseline for the criteria used to assess whether a novel business is a start- or scale-up. Here, startups are defined as firms up to six years old, with a maximum of 49 employees and a turnover or balance sheet of less than €10M (10-49 employees), or less than €2M (1-9 employees). Scaleups are defined as firms up to 10 years old, that have at least 50 employees and a turnover or balance sheet of €50M. Besides this, a scale-up should have attracted at least €1M in funding. Additionally, startups have a lower growth rate in both turnover and employees (maximum growth rate of 20% a year) compared to scale-ups (at least 20% growth rate per year). Combining all the research on novel organizations, table 1 gives an overview for the evaluation criteria that define whether a firm is categorized as a start- or scale-up.

3.5 The influence of capital on businesses

Several studies evaluate different factors that influence the success of a start- or scale-up (Bednár & Tarišková, 2017; Cantamessa et al., 2018; Krishna et al., 2016; Marmer, 2011; Van Gelderen et al., 2015), concluding that the lack of funding is one of the main reasons for a start- or scale-up to fail. As described in the introduction, the funding method impacts the expected success of start- and scale-ups, while at the same time, an extensive amount of other resources influence the progress of these businesses. Both start- and scale-ups, as well as large corporations, need to spend a significant amount of financial resources on innovating their business practices or with the intent to create new products or services. As described by Kahn et al. (2014), the financial dimension plays a key role in fostering these innovations. Considering the first twenty years after the second world war ended, governments and banks where the common investors to fund innovations through providing loans to companies that had proven to be successful (Ketkar & Ratha, 2008). These funds were mainly provided to low-risk companies, since the interests of both governments and banks consisted of creating a return on their investment.

However, within the last decades, start- and scale-ups attracted more attention for investments, since they have more potential to create innovative products and services (Weiblen & Chesbrough, 2015). Because large corporations are unable to change their business practices easily, start- and scale-ups are able to penetrate the market with new products. This is also known as the incumbent curse as described by Chandy & Tellis (2000). Novel companies attracted more attention, since they proved themselves to be successful in competing with larger organizations due to this incumbent curse. On the contrary, since start- and scale-ups are considered to be of high risk, many corporate and private investors hesitate to invest in them. Consequentially, different funding methods became more dominant for investing in novel businesses, such as crowdfunding (Stanko & Henard, 2016), private-investors (Fernholz, 2018; Maas et al., 2020) and company-to-company investments (Amess et al., 2015; Barrot, 2012).

These financing methods differentiate from government and bank investments, since the investments are not stimulated through merely the estimated success of the innovation. In fact, it was found that startups attract a significant amount of investment because they provide an experimentational environment that lead to novel business models (Bocken & Snihur, 2020). However, since start- and scale-ups need to prove their innovation to be successful, it could be researched whether such investments do also help start- and scale-ups to increase their innovative potentials. This is because alternative investment methods for innovation also lead to the exploration of innovative products and services. As described by Turan (2015), crowdfunding does have significant advantages for startups and impoverished nations. However, as the author describes, startups that are financed using crowdfunding are more likely to fail, since this method lacks any form of product assessment. Although the impact of some financing methods on corporate success is already studied, current academic research lacks an overall comparison of the success of different funding methods used by start- and scale-ups. Based on the beforementioned studies, there is reason to expect a relationship between the financing method and the success of a start- or scale-up, but have never been verified by quantitative research.

3.6 Three types of capital
In general, there are three types of capital used by firms to finance their business practices (Molengraft, personal communication, February 1st, 2022; Metelka, 2014). The first type is venture capital, which is described as:

> *"Venture money is not long-term money. The idea is to invest in a company's balance sheet and infrastructure until it reaches a sufficient size and credibility so that it can be sold to a corporation or so that the institutional public equity markets can step in and provide liquidity. In essence, the venture capitalist buys a stake in an entrepreneur's idea, nurtures it for a short period of time, and then exits with the help of an investment banker"* - Zider, 1998, p.132

As argued by Zhang et al. (2019), venture capital is considered to be high-risk but it enables companies to experiment with new techniques, which consequentially leads to new inventions. In contribution to this, companies that use debt financing are stimulated to focus on developing products that are proven to be successful, since they need to be able to guarantee the return of the investment. This results in higher success rates, but less disruptive innovations. However, venture capitalists provide novel organizations with capital that needs to be used for developing the business, while expecting a higher return on their investments within a few years. Governments and banks are both considered to be venture capitalists thriving to invest in novel businesses. Normally, venture capital is provided in the period when a company is

commercializing the innovation, since the investors want to avoid the risk that novel organizations fail (Zider, 1998). The investor expects between 25% and 35% return per year over the lifetime of the investment, increasing the rate of return based on the developments stage of the company. This type of capital includes a high form of monitoring by the investor, since the capitalist provider wants to reassure the return on their investments.

The second type of capital for innovation is corporate venturing. This basically includes the investments of a company in a novel organization with the intent to improve their own product or service (Narayanan et al., 2009). As described by Kuratko et al. (2009):

> *"an internal corporate venture was defined as an entrepreneurial initiative that originated within the corporate structure (or within an existing business of the corporation) and was intended from its inception as a new business for the corporation"*
> - Kuratko et al., 2009, p.460

In other words, large corporations that want to innovate their product or create a new revenue stream can choose to create or invest in small organizations that can help to sustain this innovation process. This finance method differs from venture capital, since the investor does not expect a return on their investment immediately. Additionally, there is a chance that the innovation fails to reach the market and investments are lost. However, this type of capital provides novel organizations an opportunity to collaborate with a larger company and being able to use their knowledge base.

The last financing method is angel investors, that in general includes any type of organization or individual that provides capital without expecting a return of the investment or personal interest in terms of using the innovation merely for the own benefits. As Prowse (1998) states:

> "*An angel is a provider of risk capital to small, private Firms. By risk capital I mean private equity capital (or near equity capital such as loans from investors that also have an equity position in the Firm). The provider is a wealthy individual, not an intermediary such as a Small Business Investment Company or a private equity limited partnership. Such individuals are in addition not the principal entrepreneur or in his immediate family.*" - Prowse, 1998, p.2

Based on this, an angel is a person or organization (not a corporation) that provides capital to a firm based on personal interest or without expecting high return of the investment. In addition to this, subsidies and funds from governmental organizations are considered to be angels, since they provide funding with (usually) lower interest.

3.7 The role of banks in stimulating the success of novel organizations

For this research, the influence of banks towards guiding innovations and the successful development of start- and scale-ups is evaluated. Due to the scope of this research, it was decided to get guidance from The bank, since this bank could provide substantial information on the finance process of start- and scale-ups. Because of this corporate guidance, the results of this research need to put into perspective from the view of a multilateral bank. Although there exists this limited scope, it was already discussed that banks play a key role for accelerating innovations that are developed by novel businesses. This was already confirmed by Johne & Harbone (1985), who already found that large commercial banks are able to accelerate the innovation process of firms. This in addition to core business of banks, which is to take deposits, grant loans and provide complementary services that are related to these financial services

(Yeung, 2011). However, the bank also needs to be responsible for their customers in a socially responsible manner. In other words, banks have the obligation to uptake a corporate social responsibility (CSR) role to their clients. In more detail, the dimensions of this CSR role were identified within four dimensions: human rights, the environment, fair operating practices and consumer issues (McIlroy, 2008).

Banks are currently considered to be financial intermediaries for our society, since they value the financial assets, manage financial risks and organize the payment system (Scholtens, 2009). These banking systems appear to be a significant factor for economic and sustainable development, which is becoming a well-established notion within the banking industry (Scholtens, 2006). Based on this, banks changed their finance policy that takes the social, ethical and environmental issues into account. For example, assessment methods for investing in novel organizations were changed in order to stimulate the financing of innovations that contribute to solving current societal issues. As Yip & Bocken (2017) found, this 'stewardship role' is expected by the customers of the bank and thus needs to be one of the major target points within the banking industry.

While there is an extensive amount of research done on the financial role of banks (Driga & Dura, 2014; Jeucken & Bouma, 2017; Keeton, 2001; Sylla, 1992), there is no literature concerned with the role that banks play in the success of start- and scale-ups. However, considering the social responsibility of banks as described before, a bank should contribute to the success of a novel organization since this is concerned with both the responsibility to develop solutions for the current climate crisis (the environment) as well as contributing to solving consumer issues.

4. Methodology

In this section, the methodology used to answer the research question is explained. The resource based view is used to assess the success score of a firm and this will be related to the finance method used by the company. For this, a quantitative research was conducted using a cross-sectional design, in order to reflect a substantial part of the start- and scale-up industry within the Netherlands. Through the use of a qualitative research method, it would not be possible to assess a considerable part of the entire entrepreneurial landscape of the Netherlands, due to the time-scope of this research. Consequentially, with this last approach, the findings of a possible relationship between the financing method and the success of a business could not be generalized to the overall start- and scale-up industry in the Netherlands.

4.1 Database and sampling method
For this research, it was expected that the data on the financing methods of start- and scale-ups would be provided by The bank. After consultation it was found that The bank could not deliver enough data, since it is bound to their internal databases that lacks information on the wider entrepreneurial landscape of start- and scale-ups. It is preferred that the data provided on a novel business reflects a period of at least 3 years, in order to track the progress of the business. Additionally, the dataset should meet the three criteria as described in the next paragraph, which are needed for a concise assessment of the organization. TechLeap, a governmental organization that mapped more than twelve thousand start- and scale-ups, was able to provide this data. The information within this database gives a snapshot of the entire start- and scale-up industry in the Netherlands. The data for each company in this dataset consisted of an overview of the funding methods, number of employees, the industry, growth, launch date, valuation,

status of the product and growth stage. While this data provided enough information to confirm the financing method, information about the firm's resources was also retrieved from the website of the organization or through LinkedIn. In the appendix you find an example of how the data is presented in Techleap.

For this quantitative study, a conditional population of start- and scale-ups was used in order to represent the current business landscape of novel organizations that already attracted funding. A total of 6625 start- and scale-ups, launched at 2017 or earlier, were identified in the database of Techleap. It was decided to select organizations that started at 2017 or earlier, since younger businesses did not provide enough confirmable information. Additionally, it was found that businesses that are older than the year of 2006 did not meet the criteria of a scale-up as described in the theory section. From the businesses of this sample, three main criteria were used for selection: the business should be located in the Netherlands, data should be available about the company (internally through their own website and external platforms) and the financing method should be present in the database of Techleap. Using merely these criteria reassured that the sample included a variety of start- and scale-ups with a random distribution of resources, while making sure that the business analysis could be conducted properly. However, the sampling method thus includes a selection bias, since only start- and scale-ups that received finance are selected. It is therefore expected that the success rate is much higher, since the lack of investments are one of the main barriers for corporate success (as discussed before). Notwithstanding, the selection of organizations that received funding is necessary to answer he research question of this research.

Regarding the validity of the results considering the industries, there is no clear information on the entire start- and scale-up population. Consequentially, it is unclear whether the sample reflects a similar division of the industries. For example, the healthcare, finance/fintech and bio-medics sector have a relatively low amount of observations and seems out of proportion compared to the Technology/ICT sector (this is merely speculation). Hence, there is a chance that some industries are underrepresented and therefore it is not possible to conclude that the success of a company is dependent on the industry.

Although the database included many businesses, only 881 businesses did meet the criteria. From these, merely 360 start- and scale-ups were identified to fulfill the criteria needed for the data analysis. The reason for this is that all information for the assessment had to be present, since one missing point of information would lead to an incomplete SSAM of the business. This results in a selection bias and possible effects on the outcome of the analysis. However, the relatively small sample is justified, because otherwise the sample would be based on guessed resources of a firm and consequentially lead to a subjective outcome (Markman et al., 2004). Additionally, some organizations provided outdated information and were not included in the sample. Each company was assessed using Techleap, the website of the company, the chamber of commerce and LinkedIn.

4.2 The development of the start- and scale-up assessment method (SSAM) for success
Based on the resource based view, a framework was created to assess if a business is successful. This Start- and Scale-up Assessment Method (SSAM) is used to gather data about a novel organization and assess whether it is successful or not. As can been seen in figure 3, the framework consists of the VRIN model combined with the four different resources as described in the theory section. This includes the financial-, human-, material-, and non-material resources. Each different resource is divided into four different conditions that were identified in the theory section. As was found and described in the theory section, necessary financial resources are a growing profit, the presence of multiple investors, financial expertise of employees and substantial liquidity. Human resources include the expertise of workers, a social
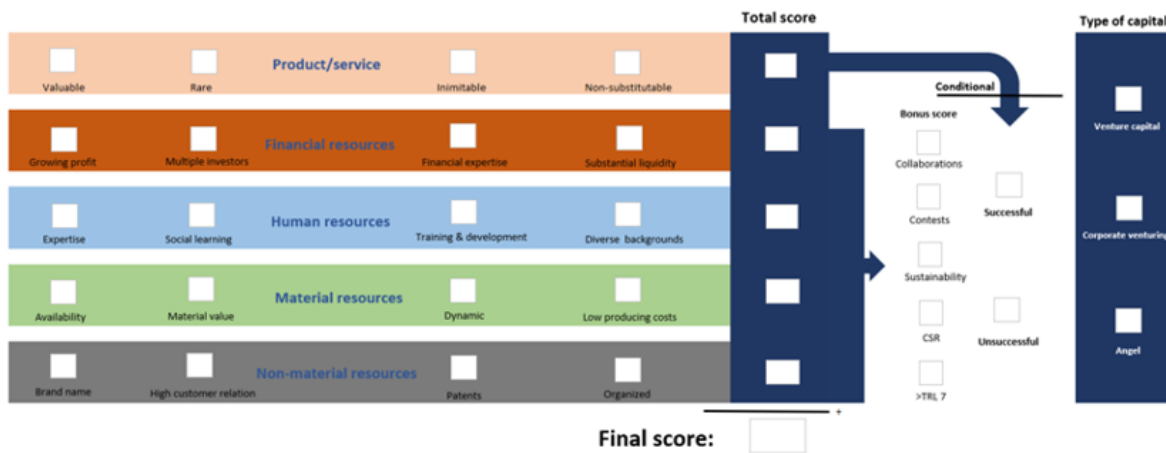
Figure 3: start- and scale-up assessment method for success

learning work environment, training & development and a diverse background of the employees. Material resources are evaluated based on the availability of material and product/service, the material value, the ability to change the product or service and whether the producing costs are low. At last, the non-material resources include the brand name of the company, the customer relation, the presence of patents and the organization structure.

The scoring method of these conditions is designed as follows: each condition is assigned with a score of whole numbers between one and including five, while a score of three is not allowed in order to prevent selecting the middle option each time. This was decided upon based on the scoring method that The bank uses to assess the potentials of start- and scale-ups that apply for financing. The total score is calculated through adding the scores of each section (maximum score of 20 points), followed by adding the total scores of these sections (maximum total score of 100 points). The VRIN section is a conditional full score for a successful company, since it guarantees a sustainable competitive advantage. Below, the workflow for analyzing each company in the sample is described.

The iterative process for assessing each company in the database was as follows: first, the general information of a company is noted down. The general information consists of the launch date (year), number of employees (size), the phase of the business (start- or scale-up) and the industry of the corporate practice (Markman et al., 2004; Ainuddin et al., 2007). It was decided to include a general industry category named 'other', dedicated to industries containing low observations. Whether the business is a start- or scale-up is based on the criteria as discussed in the theory section. However, it was found that some businesses do not meet all criteria. This is mainly concerned with the phase and size of the company. Several organizations did meet the criteria of being a startup, but were older than 6 years or had more than 50 employees. Similarly, many businesses were assessed to be a scale-up, but were older than 10 years. It was decided to use a less strict criteria for the time a company exists and the number of employees it has, since otherwise the company could not be assigned to any of the two groups. The size of the business and the turnover were decisive for categorizing the business, while the time of

Table 3: coding variables of general business information

	0	1	2	3	4	5
Size	1-10	11-50	51-200	>200		
Phase	Startup	Scale-up				
Industry	Technology/ICT	Healthcare	Bio medics	Other	Finance/Fintech	Industry

existence and development phase of the firm are less strict. The general variables can be found in table 3, as well as the corresponding values used for coding them in the dataset.

Second, it was assessed whether the product/service of a company is valuable, rare, inimitable and non-substitutable. Then the four different resources were assessed through scoring each four sub-categories of the resource. Based on this, the final score was calculated through adding the five scores of each category. After assessing the general resources of the firm, it was estimated whether the additional control variables are present within the business. At last, the financing method provided by Techleap was identified. However, many businesses use a combination of the different financing methods. It was therefore decided to note down whether the company uses one, two or three different financing methods to enable a more concise data analysis. For all companies, an additional motivation for each score was noted down in order to substantiate the findings. This was noted down in a separate file with the intention that the scores could be checked by others and to exclude ambiguity.

In the development of the SSAM, the validity was evaluated through comparing the assessment of The bank as found in the application 'innovatieleningen'. This application includes the evaluation of start- and scale-ups that requested the bank to finance their business. The SSAM was applied to 30 businesses that were assessed by The bank to be successful and the lowest score of the SSAM from these companies was used as the threshold value for identifying it as being a success. Based on this, the lowest score of the sample used for the robustness check was set to 74 points. Every company that was assessed with 74 points or higher was assigned to be successful, while a company with a lower score was assigned to be unsuccessful (thus a binary value). However, this resulted in assessing a company to be unsuccessful when it scored e.g. 73 points, while the difference between these two is relatively small. Therefore it was decided to include the actual score of the company within the data, in order to perform a more reliable data analysis. The binary score was merely used for a robustness test. Additionally, an ordinal score using the quartiles of the dataset was included to reduce complexity for the data visualization. The next paragraphs explain the scoring method for each sub-categories of the different resources.

4.2.1 VRIN framework

As discussed in the theory section, the VRIN framework as proposed by Barney (1991) is conditional for the success of a business, since it leads to a sustainable competitive advantage. However, as described by Bertheussen (2021) and Bowman & Ambrosini (2007), assessing whether the resources of a firm are valuable, rare, inimitable and non-substitutable is a current issue. This is due to the lack of clarity of the terms, and many studies (e.g. Carmeli, 2004; Talaja, 2012) assume that there is a general definition to assess whether a resource is valuable, rare, inimitable and non-substitutable. While this research is not focused on solving these ambiguities, the assessment of each criteria of the VRIN framework is described in order to create a concise and verifiable scoring method. For this, the insights as presented by Hinterhuber (2013) is used as a baseline for defining whether a resource meets the VRIN model. The author identified more specific guidelines on how to assess whether the resources of a firm meet the criteria of the VRIN framework. Below, each of the four criteria is described based on the findings of Hinterhuber (2013) and additional academic literature. The score for each criterium based on this analysis is presented in table 4.

The valuable resources of a firm is assumed to be the most difficult to identify, since there is no monetary clarification of the term 'valuable' (Bowman & Ambrosini, 2007). After conducting extensive research on the notion of valuable resources, the authors found that a valuable resource is defined as:

"We have elaborated on the notion of valuable resources specifying that value is relative and that we should be concerned with current value. We have explained that valuable resources can generate three types of competitive advantage: cost advantage, the ability to premium price, and volume-based advantage, and finally we have explained how unit margin can be used as measure of resource impact." - Bowman & Ambrosini, 2007, p.328

To summarize their findings, even though the term 'valuable' is widely used, it has a multitude of meanings and interpretations. However, in this research the findings as presented above are used to identify whether a resource (or product/service) is valuable. Based on this, a resource is highly valuable if it leads to reducing costs, enables the firm to ask a premium price for the product or service, if it enables the company to increase the amount of products they can produce and if it has a positive impact for the customer. Additionally, as Hinterhuber (2013) describes, the resource is valuable if it helps the firm to exploit an opportunity for the firm and neutralize threats.

The rareness of a resource is less ambiguous, since it can be defined as those that are limited in their availability to the firm and that are not distributed equally towards the current and future competition (Lockett et al., 2009). As Hinterhuber (2013) describes, the resource of the firm is rare if there is an imperfect competition because other firms are not able to obtain the resource. This is also what Newbert (2008) states:

"Instead, competitive advantage likely derives from the exploitation of resources and capabilities that are rare, or possessed by some number of firms in an industry that is small enough to prohibit perfect competition (Barney, 1991). Along this vein, it is important to note that because resources and capabilities must be exploited in combination, to the extent that rareness contributes to competitive advantage, it likely does so not at the level of individual resources and capabilities but rather at the level of resource-capability com binations. In support, Barney (1991) acknowledges that the criterion of rareness applies to 'resource bundles,' suggesting that if a particular bundle of resources (and capabilities) is common, then large numbers of firms will be able to implement the resulting strategy, thereby reducing the advantage to be gleaned from by each firm." - Newbert, 2008, p.748

The third condition for a business in order to create a sustainable competitive advantage is that the resource (or in this case the product/service) is inimitable. According to Hinterhuber (2013), if imitating the product leads to a cost disadvantage, the firm that produces the original product has an advantage over the competitor that tries to replicate it. Besides this, Markman et al. (2004) found that patents lead to inimitability. However, the SSAM already includes a separate criterium that assesses the patents of a firm. Therefore, to prevent that the score of an organization includes twice the score given for patents, the patent of a firm is not used as a criterium to assess the resources of a firm to be inimitable. Additionally, as Roos (2017) found, the inimitability of a resource has more to with the strategy of a firm. As she states:

"Inimitability can be achieved by a combination of: customisation through co-production; superior service experience; design-based innovation; art-based innovation; reverse-hermeneutics-based innovation; science and technology-based innovation, normally in combination with a global niche strategy" - Roos, 2017, p.5

Table 4: scoring method of vrin

	Score			
	1	**2**	**4**	**5**
Valuable	Does not reduce costs and does not enable firm to ask a premium price. Does not improve the production of the product and has no positive impact on the customer. Not able to exploit opportunities and neutralize threats	Meets one or two criteria as mentioned by Bowman & Ambrosini (2007) or Hinterhuber (2013)	Meets three or four criteria as mentioned by Bowman & Ambrosini (2007) or Hinterhuber (2013)	Does reduce costs and does enable firm to ask a premium price. Does improve the production of the product and has positive impact on the customer. Enables firm to exploit opportunities and neutralize threats
Rare	Equal distribution of the resource, firms have widely and easy access to it. Much competition since other firms are able to obtain the resource	Some competitors obtain the resource	Only a limited amount of other firms obtain the resource	The resource is merely owned by this company and no other companies have access to it
Inimitable	No high responsiveness or superior experience. There is no intrinsic/extrinsic value delivery. Low intellectual capital	High responsiveness OR superior experience. Some intrinsic/extrinsic value. Basic intellectual capital	High responsiveness and/or superior experience. High intrinsic/extrinsic value. Medium intellectual capital	High responsiveness and superior experience. High intrinsic/extrinsic value. High intellectual capital
Non-substitutable	Many alternatives with similar function, lower costs and higher quality	Some alternatives with a similar function, similar costs and quality	Maybe some alternatives but with higher costs and similar/lower quality	No alternatives with a similar function

In general, it was found that a high responsiveness, superior experience of the product/service and intrinsic or extrinsic value delivery leads to higher inimitability (Roos, 2017). These criteria are used to assess the inimitability of the product of the start- or scale-up. However, as the author argues, the intellectual capital is critical to the inimitability.

The last criteria that needs to be assessed is whether the product/service is non-substitutable. A product or service is substitutable if other competitors offer an alternative that fulfills the similar cause of the original product or service. This means that a product is substitutable if there are competitors within the market that provide this alternative product or service. Additionally, as Mussa & Rosen (1978) argue, consumers measure the quality of the product against the price of it. This means that when the price of an alternative product is higher but of the same quality, customers would likely not shift to the alternative option.

4.2.2 Financial resources

The financial resources include a growing profit, multiple investors, financial expertise and a substantial liquidity. The classification of the score is visualized in table 5. The growing profit is assessed through evaluating the annual report of the firm over a period of three years. As was researched by Davila et al. (2015) and Haltiwanger et al. (2015), start- and scale-ups gained on average about 13% revenue in the first year, followed by 7% increase in the second year and

Table 5: scoring method financial resources

	1	2	4	5
Growing profit	Negative or stable profit	Increase of max 13% in three years	Increase of 13%-25% in three years	Increase of more than 25% over three years
Multiple investors	No investor	1 investor	2 investors	3 or more investors
Financial expertise	No employees with financial expertise	Few employees with a basic financial expertise	Significant amount of employees with moderate financial expertise	Significant amount of employees with high financial expertise. Finance department of the business and CFO
Substantial liquidity	Negative liquidity	Neutral liquidity	Capital up to 25% above debts	Capital of more than 25% above debts

5% in the third year. Therefore, start- and scale-ups are assessed to have a high revenue when they score above a total revenue increase of 25% (cumulative growth over the first three years). To assess this, the annual reports for a period of the last three years, retrieved from the chamber of commerce (known as Kamer van Koophandel), were used to assess the revenue growth. Then, through the use of Techleap, investors of the start- or scale-up are mapped. On average, a start-up attracts 4.9 investors (Klabunde, 2016), but using a robustness test, it was identified that a start- or scale-up has a higher chance for success if at least three investors are attracted. The financial expertise of a firm is evaluated through indicating whether the employees have a financial- or economic background. Additionally, as described by Jiang et al. (2010), businesses with a chief financial officer (CFO) have higher chance in increasing the company's revenue. Additionally, the need for financial control within a firm is necessary to the success of the company (Deakins et al., 2002). At last, the liquidity of a business is calculated through the subtracting the debts from the current capital (assets) of the firm. The mean debt of novel businesses identified by Cole & Sokolyk (2012) is $101,395, while the mean of the current assets of these organizations is $125,983. Based on this research, novel companies have on average a minimum of 25% higher assets compared to their corporate debts. As Pisoni & Onetti (2018) describe, a negative liquidity is a significant reason for start- and scale-ups to terminate their business. Therefore a substantial liquidity is set to 25% of financial capital (in terms of current assets) above the debt of the organization.

4.2.3   Human Resources

Human resources of a firm is the most difficult category for assessment, since they cannot be observed physically and possibly interpreted subjectively (Yang, 2010). To reassure objectivity, the model evaluates human resources based on data that is measurable and identifiable. This data is retrieved from the website of the start- or scale-up and through LinkedIn. The scoring method can be found in table 6.

First, the expertise of a firm is measured based on whether the background and education of the employees is similar to the business practices. As described by Germain & Tejeda (2012), assessing the expertise of a firm's workers can be done through evaluating their field of education and training to the field of the business. Therefore, an ordinal scoring method is used where the highest score is assigned if all employees are educated in the field of the organizational practices. Then, to measure the social learning of an organization, it is evaluated whether it is mentioned that employees work together and if there is collaboration between multiple organizations and departments. Based on Higgins & Mirza (2012), the social learning

Table 6: scoring method human resources

	1	2	4	5
Expertise	No relation between employees' education and product/service	Small (up to 10% of employees) relation between education/experience and product/service	Medium to high (> 10% of the employees) relation between education/experience and product/service	All employees are educated and well experienced, while also having specific expertise in their own sub-area
Social learning	Minor collaboration between workers (product service is produced without collaborating)	Medium collaboration as standard business practice. Employees need to work together	High collaboration, employees are dependent on each other and work in teams	Business is based on working in teams and experiment on a daily basis (e.g. agile way of working)
Training & development	No course or training available	Course or training at the beginning of the career	Course or training at the beginning and throughout the career on one level	Elaborate courses and training throughout the career, on all levels
Diverse backgrounds	No criteria identified	One criteria of diversity in age, gender, ethnicity and education	Two criteria of diversity in age, gender, ethnicity and education	All criteria identified

is measured based on the dependency of a solitary decision process in a firm. In other words, if employees within a firm need to collaborate and are highly dependent on each other to create their final product or service, there is high social learning. Besides this, it is measured whether employees are educated or trained by the company, which reflects that the business stimulates personal development. Scoring this resource is done based on research done by Sal & Raja (2016), who found that an ongoing education program throughout the whole career helps to improve the productivity and performance of the business. The authors also found that different training methods lead to different results in effectiveness. Using this study, the score is assessed based on whether there is this ongoing education program using several methods as mentioned by the study (highest score), if there is a continuous training on one level or only at the beginning of the career (medium score) or no training at all (lowest score). At last, the extend to which the firm has a diverse background of their employees is measured. The score is based on the different diversity measurements (age, gender, ethnicity and education) as described by Triguero-Sánches et al. (2018). The other criteria for diversity are excluded, since they are not empirically observable.

4.2.4 Material resources

Material resources are physically measurable and therefore easier to identify. However, businesses try to prevent that rivals hurt their competitive position and therefore hide the information on e.g. the equipment used for the production process (Klasa et al., 2018). At the same time, it is possible to assess the material resources based on the product or service itself. First of all, the availability of the materials is assessed through evaluating the current accessibility to them. However, while Mancini et al. (2015) created a potential life cycle assessment to support the use of critical raw materials, the availability is merely based on the general need for different materials and an uncomplicated supply chain (Novak & Eppinger, 2001). De Leeuw et al. (2013) found eight drivers for supply chain complexity (uncertainty,

Table 7: scoring method material resources

	1	2	4	5
Availability	Materials are not available (multitude of identified drivers in the supply chain)	Materials are rare, hard to obtain, one or two drivers for a complex supply chain	Materials are not rare, easy to obtain. Only one driver for complex supply chain	Plenty of materials available, easy and low cost to obtain. No driver for complex supply chain
Material value	Low material value, short endurance	Medium-low material value, medium endurance	Medium-high material value, medium endurance	High material value, high endurance
Dynamic	Unable to change the material of the product and components	Difficult to change the material of the product, unable to change to configuration of components	Able to change the material and the configuration of the components	Easy to change the material of the product and configuration of the components, able to use sustainable resources
Low producing costs	High producing costs, basically through needs of much physical resources	Medium-high producing costs, some physical resources needed	Medium-low producing costs, maybe some physical resources needed, but mainly human resources	Low producing costs, human resources needed, product is a service

diversity, size, variability, structure, speed, lack of information synchronization and lack of cooperation). The products of the assessed start- and scale-ups are evaluated based on theses drivers. A strong availability score reflects a less complex supply chain, probably because the business is able to create the whole product without dependency on other firms. Then the material value of the product is evaluated through merely adding up the market value of the different raw materials used for the production. It was decided to not use the consumer price as a criteria to assess the value of the product, since Akcay (2011) found that there is only a small causality between the producer price and consumer price of a product. Therefore the perceived product quality (endurance) is used to assess whether the product is of high material value (Snoj et al. 2004). This is followed by an assessment on whether the company is able to change the product based on the demand of the customer or through new regulations. Based on Florén et al. (2013), it is necessary for a firm to be able to change the material used for the product, to anticipate on a change in customer's needs and governmental regulations. Helbig et al. (2016) evaluated the raw material vulnerability and these indicators are used to assess whether a company can easily change the product (price sensitivity, recyclability and alternative materials). At last, the score is assigned for the producing costs of the product. It is decided to include this as a material resource, since it is highly related to the other resources within this category. As described by Cooper & Kaplan (1988), the production costs of a firm consists of the costs for the need of physical resources and the costs for the production process. While the business creates a physical product, more costs are associated with the material resources, while a business providing a service has lower material costs. The scoring method for this section can be found in table 7.

4.2.5 Non-material resources

The non-material resources of the firm consist of every non-physical asset that creates value to the business, excluding human resources. A significant factor contributing to the success of a

Table 8: scoring method non-material resources

	1	2	4	5
Brand name	Negative publicity, including formal consequences	Some negative publicity, no further consequences	Positive news about the company	Positive news about the company, attracting new collaborations, projects for social responsibility
Customer relation	No customer relation, product and customer separate	Basic customer relations, only when necessary	Customers are approached to evaluate the product	Active approach to customers, monitoring their needs
Patents	No patents	One patent, high chance of replicability	Several patents, some chance of replicability	Several patents, low possibility of replication
Organized	No formal reporting structure or future planning	Basic reporting structure or future planning	Both formal reporting structure and future planning	Extensive formal reporting structure and future planning

business is the brand name of a company (Ataman & Ülengin, 2003). However, novel organizations commonly lack publicity because they rather focus on developing their product/service and do not have a large budget in order to create public awareness of the company. Therefore the brand name is evaluated based on the whether the company attracts negative attention due to failures (Simonson et al., 1994; Weinberger & Romeo, 1989). Additionally, the relation between the customer and the business is assessed through identifying the degree of cooperation between the business and the customer. As described by Chalmeta (2006), the customer relationship management (CRM) is of high dependence for a firm's success. Based on the author's description of the system to asses customer relations, it is evaluated whether the start- or scale-up actively approaches their customers and engages with them to assess their needs. Then the patents that the business got hold of will be identified, since this gives a significant advantage for the firm. However, as Pickering & Matthews (2000) describe, patents contribute to a firm's competitive advantage, Barney (1995) found that product imitation by competitors (which avoids the patent of a rival) is a threat to a company's success. Hence, besides the number of patents, the possibility of replicating the product is assessed. A higher score reflects the a lower chance to imitate the product, combined with a patent. At last, it is evaluated whether the business is organized and therefore optimally working in order to create the final product/service. More specifically, it is assessed whether there exists a formal reporting structure and a formal planning for future development. As Hannan et al. (2010) and Lee & Yeo (2016) found, the organizational reporting structure impacts the performance of the firm and the firm value. Through creating a reporting structure about the firm's performance (e.g. a budget or sustainability report), it is able to assess the improvements it should make in the future. Such guidelines and planning consequentially contributes to the corporate success. The scoring method for the non-material resources is summarized in table 8.

4.2.6 Additional control variables

The additional control variables score indicates additional features of a business that contributes to the possible success of the firm. Based on the accessible information and the measurability, it was decided to include the control variables as a binary score. Table 9 shows the scoring method for the additional control variables. First of all, if the business is collaborating with

Table 9: assessment of the additional control variables

	0	**1**
Collaboration	No collaboration	One or several collaborations, focused on both the product and projects outside the scope of business
Contests	No prices, no participation in contests	Participation in contest or did win prices, actively participating in contests
Sustainability	Nothing mentioned about sustainability, or merely sustainable energy used within the business	Efficient business process, sustainable resources for production process. Product is reusable and recyclable. Climate neutral production process
Corporate social responsibility	No social responsibility	Extensive social responsibility inside and outside the business, the firm is made to create a better world
TRL	TRL 1-6	TRL 7-9

several other organizations, it helps to divide the risk between several parties and therefore improving the identification of possible pitfalls of the new product or service. As described by Casals (2011) and Roja & Nastase (2013), SMEs that use collaboration methods are more successful compared to SMEs that are not collaborating with other firms. However, since firms need to compete with other firms to create a competitive advantage, there exists a discrepancy between acting as a collaborator and competitor (Dodgson, 2014). Second, if a novel organization attracts attention through participating in product contests, it creates a professional appearance to other firms, that consequentially helps accelerate the development of the business (Gaspar & Pinho, 2009; Hillert & Ungeheuer, 2021). Additionally, if a start- or scale-up is rewarded with a price for their invention, this significantly increases the success if the business (Dempwolf et al., 2014). Besides this, the product/service of the firm has to be created in a sustainable manner, since this reflects the awareness of the firm to produce their product without negative consequences on the climate. As was already found, in the long run, sustainability is necessary for the success of the business (Wilkinson et al., 2001; Doane & MacGillivray, 2001; Weidinger, 2014)). As already described by Kuckertz et al. (2019) and Kwon et al. (2020), especially startups profit from a sustainable business model, since this creates value to the firm. Related to this, if the firm participates in projects that supports their social responsibility (known as their CSR policy), it shows that it is able to actively engage with activities outside the scope of their own business process. Cho & Kim (2012) found that the public response on negative news about a company lacking of social responsibility, results in taking actions against the company and rejecting to buy the products of it. On top of this, Schönbrun et al. (2019) found that corporate social responsibility increases the financial success of a firm. At last, if a novel organization is able to show that their product is working, this increases the chance of successful entering the market. Through the use of the different Technology Readiness Levels (TRLs), the development phase of the product is assessed. As Mankins (2009) described, TRL seven is a significant development step in the process of the product, since it reflects the actual successful demonstration of a prototype. In other words, the TRL variable of the SSAM checks whether the company obtains a product that is demonstrated to work in the environment it is intended for.

4.3 Statistical analysis

A statistical analysis was done in R, in order to validate if the finance method significantly influences the success score of the start- or scale-up. In order to create insights into the difference between start- and scale-ups (as discussed in the theory section), the data was split into two different datasets. One dataset contained the startups and the other one contained the scale-ups. A linear regression model was used since this model fitted best with the data of the success score. For this model, the final score was used as dependent variable and compared to all combinations of the three finance methods (the independent variables). Venture capital was used as reference variable since this was observed to a higher extend. As control variables the size and industry were added (Markman et al., 2004; Ainuddin et al., 2007), as well as the additional control variables collaboration, contest, sustainability, CSR and TRL (as was discussed before). The phase variable was not used in the analysis, since this was already eliminated through splitting the dataset.

A total of five linear regression models were performed on both datasets, in order to assess how the independent variables lead to a different score of success. First, the success score was compared to merely the three different financing methods. The second model included the success score and the control variables, while excluding the financing methods. The third model combined the first two models. This was followed by a model including the control variables and additional control variables, while leaving out the financing methods. At last, a linear regression model was performed with the control- and additional control variables and included the three different financing methods.

A variance of inflation factor (VIF) was performed to measure whether the independent variables influence each other. The variance of inflation factor was found to be within the limits in all models (VIF = < 10 for all variables). Additionally, an ANOVA test was conducted to compare different models and see if the addition of variables was a sign contribution to the model. Three robustness tests were performed to substantiate the outcomes. This was done using the binary success score (using a logistic regression model) on both datasets of the start- and scale-ups, while adding another variable that evaluates the influence of the use of one, two or three finance methods. At last, in order to test whether the phase of the company impacts the success score, a linear regression model was performed with all the data combined.

5. Results

5.1 Descriptive analysis of the data

In order to enable other researchers to check whether the data represents the wider entrepreneurial landscape of start- and scale-ups, this paragraph gives an overview of the data that was collected in this research. A total of 360 companies were assessed using the SSAM, consisting of 160 startups and 200 scale-ups. The scores assessed by the SSAM varies between 36 and 91, with a median of 71.00 and a mean of 69.48, as can be found in table 10. Through performing a general data analysis, the success score was found to be normally distributed (Appendix A, B, C & D). Besides this, the skewness is -0.374, which reflects that the data is nearly symmetrical. The success score is however platykurtic, which reflects that there are quite long tails on both sides and most datapoints do deviate only slightly from the mean value.

Overall, the technology and ICT industry is highly represented in the sample with a total of 239 organizations (n = 107 for startups; n = 132 for scale-ups). After this, the industry sector is the largest group in the sample (n = 16 for startups; n = 27 for scale-ups), followed by healthcare (n = 11 for startups; n = 11 for scale-ups). Then this is followed by the bio-medics

Table 10: descriptive analysis of score

Minimum	1st quartile	Median	Mean	3rd quartile	Maximum
36.00	62.00	71.00	69.48	77.00	91.00

Table 11: number of the sampled companies for each industry (ordered from high to low observations)

	ICT/ Technology	Industry	Healthcare	Finance/ Fintech	Bio medics	Other
Number of firms	239	43	22	21	19	16

industry (n = 10 for startups; n = 9 for scale-ups), fintech (n = 8 for startups; n = 13 for scale-ups) and others (n = 9 for startups; n = 7 for scale-ups). This last industry includes construction, transportation and law companies. The represented industries are displayed in table 11.

Of all companies in the sample, most companies use only venture capital (n = 94) or angel investments (n = 81) to fund their business. This is followed by the combination of venture capital and angels (n = 62), venture and corporate investment (n = 52) and only corporate financing (n = 35). The use of all the financing methods (n = 22) and the combination of corporate and angel investment (n = 14) is only a minor group. The distribution of the use of capital within the sample is visualized in figure 4. To reduce complexity of the data and make it accessible to the bank, the scores were ordinally divided into quartiles. Figure 5 gives an (ordinal) overview of the different financing methods used by all organizations. The data shows that all finance methods are represented in each quartile and there are no major differences between them.

Considering the additional control variables, there are 37 companies (n = 24 for startups; n = 13 for scale-ups) that did not score an average of 16 points on the VRIN model. About half of the companies (n = 75 for startups; n = 111 for scale-ups) has collaborations with at least one partner, while 92 of them score at least 74 points and thus are considered to be relatively successful. Out of the 174 organizations that do not collaborate, a total of 51 scored at least 74 points. Some businesses participated in a contest or did win a contest (n = 145) and half of these businesses (n = 77) have a score that can be considered as successful. A total of 98 organizations create a sustainable product (n = 44 for startups; n = 54 for scale-ups). A smaller part of the sample (n = 27) explicitly stated the presence of a CSR policy (n = 9 for startups; n = 18 for scale-ups). A significant amount of companies (n = 163) currently developed their product/service towards a considerable higher TRL. About one third of these organizations are startups (n = 58) and half of them (n = 32) were assessed to be unsuccessful (leaving 28 startups with high TRL to be successful). Of the 105 scale-ups with this high TRL, 65 of them scores
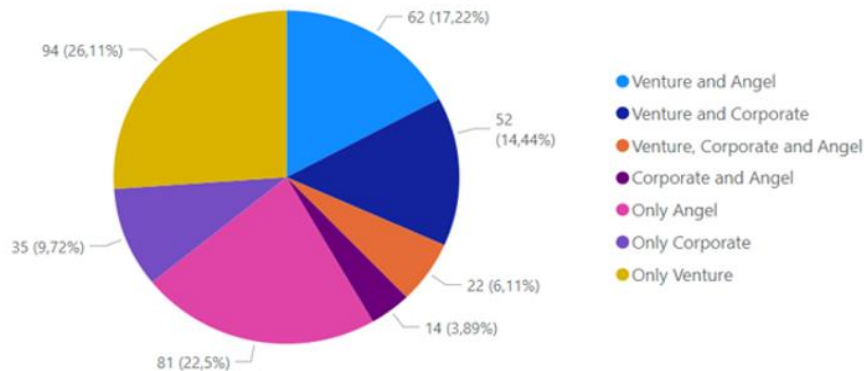

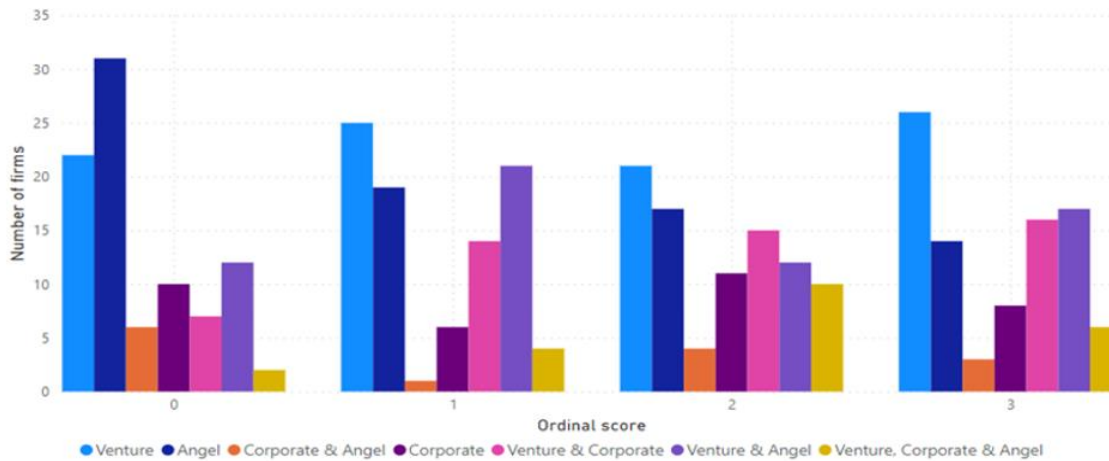**Figure 4:** distribution of finance methods in the sample

Figure 5: finance methods used for each of the quartiles

74 points or higher (leaving 40 of them to be unsuccessful). Table 12 gives an overview of the observed variables for both start- and scale-ups.

Out of the startups, 116 businesses were assessed with a score lower than 74, leaving 44 startups with a score of 74 or higher (a success rate of 27.5%). From all startups, 44 organizations used only venture capital as financing method, 15 were financed by merely another company and 54 use merely angel investments. The amount of startups using a combination of venture and corporate funding (n = 13), venture and angel (n = 27) or corporate and angel (n = 5) is rather small. Only 2 startups used a combination of all financing methods. Considering the size of the startups, about half of them have 1-10 employees (n = 78) and the other half (n = 77) run the business with 11-50 workers. Only five of the organizations in this sample have between 51 up to 200 employees.

There are a total of 100 scale-ups assessed with a score lower than 74 (and thus unsuccessful) and 100 scale-ups with a success score of 74 or above (a success rate of 50%). From those scale-ups, the use of merely venture capital is the largest group (n = 50), followed by the use of only angel investments (n = 27) and corporate venturing (n = 20). A significant amount of organizations use a combination of venture capital and corporate venturing (n = 39) or venture capital and angel investments (n = 35), while only 9 use both corporate investments and angel capital. However, the amount of startups using all financing methods is considerably higher (n = 20) compared to the startups. Taking into account the size of the company, 24 scale-ups have one up to ten employees, while the size of 11 up to 50 employees (n = 106) and 51 to 200 workers (n = 49) are represented to a higher extend. At last, there are 21 companies in this sample that employ more than 200 workers. Table 13 gives an overview of the finance methods used by the observed start- and scale-ups. Table 14 shows the amount of organizations observed for each size.

Table 12: descriptive data of the sample

	Start-ups	Scale-ups	Total
Successful (binary)	44	100	144
Low VRIN score	24	13	37
Collaboration	75	111	186
Contest	44	101	145
Sustainable product	44	54	98
CSR	9	18	27
High TRL	58	105	163

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Table 13: descriptive data of finance methods used by type of organization

	Venture	Corporate	Angel	Venture & Corporate	Venture & Angel	Corporate & Angel	Venture, Corporate & Angel
Startups	44	15	54	13	27	5	2
Scale-ups	50	20	27	39	35	9	20

Table 14: descriptive data on the number of employees (size)

	Size0	Size1	Size2	Size3
Startups	78	77	5	0
Scale-ups	24	106	49	21

5.2 Outcomes of the linear regression models

5.2.1 Startups

Regarding the startups, all linear regression models were found to be significant. However, only a few finance methods were found to be related to the success score of the organization, as well as some of the control variables. The different outcomes of the models can be explained by the impact of the (additional) control variables. Below, a more detailed description of the finance methods and (additional) control variables is given.

Considering the different finance methods, the outcome of the models show similar results. After performing the first linear regression model (R^2 = 0.068, f = 1.859), using merely the financing methods, corporate investments are found to be negatively related to the success score compared to using only venture capital (estimate = -6.024, p = 0.0567). For the corporate funding method, a significance level of 0.1 is used. The combination of corporate venturing and angel investments shows an even higher negative relation, compared to using merely venture capital (estimate = -10.291, p = 0.0394). In the third model (R^2 = 0.314, f = 5.132), taking a significance level of p = 0.1 for corporate venturing, financing through corporate investment (estimate = -5.129, p = 0.0732) and corporate & angels (estimate = -11.506, p = 0.0118) is negatively related to the success score, considering the reference category. Within the full model (R^2 = 0.449, f = 6.386), the use of corporate financing is significant again (estimate = -4.639, p = 0.0924) as well as the combination of corporate venturing and angel investments (estimate = -11.218, p = 0.0087).

Some of the control- and additional control variables are associated with the success score of a startup as well. The second model (R^2 = 0.258, f = 7.532) that included merely the control variables, shows that the size of the company is positively related to the success of a company. The score increased by 8.538 points for size1 (p = <0.001) and 19.957 points for size2 (p = <0.001), compared to size0. Size3 was not observed for any startup. When taking a significance level of p = 0.1, the healthcare industry shows a positive relation as well (estimate = 5.859 points, p = 0.0511), compared to the reference category (ICT/Technology industry). Within the third model, the size effects the success score again, leading to an increase of 7.838 points for size1 (p = <0.001) and 22.516 points for size2 (p = <0.001). Additionally, the healthcare- (estimate = 5.743, p = 0.0551) and construction industry (estimate = 4.487, p = 0.0738) are positively related to the success, compared to the ICT/Technology industry. The fourth analysis (R^2 = 0.401, f = 8.208) that included the control- and the additional control variables, showed again a high dependency of the size of the firm. Size1 shows an increase of 7.980 points (p = <0.001), while this is 17.538 points for size2 (p = <0.001), compared to size0. The healthcare industry leads to an impact of 5.856 points and when taking a significance level of p = 0.1, it is positively related compared to the Technology/ICT industry. Additionally,

Table 15: linear regression models startups

Linear regression models of success score of startups, financing methods and control variables

	Dependent variable:				
	Success score startups				
	(1)	(2)	(3)	(4)	(5)
Only corporate	-6.024*		-5.129*		-4.639*
	(3.138)		(2.843)		(2.737)
Only Angel	-1.572		-0.128		0.204
	(2.131)		(1.913)		(1.763)
Venture and Corporate	0.063		-0.861		-0.684
	(3.313)		(3.014)		(2.776)
Venture and Angel	0.983		0.638		0.121
	(2.566)		(2.288)		(2.109)
Corporate and Angel	-10.291**		-11.506**		-11.218***
	(4.953)		(4.513)		(4.213)
All three methods	9.909		7.625		7.802
	(7.588)		(6.732)		(6.171)
Size1		8.538****	7.838****	7.980****	7.105****
		(1.513)	(1.534)	(1.426)	(1.454)
Size2		19.957****	22.516****	17.538****	19.796****
		(4.386)	(4.389)	(4.072)	(4.055)
Industry (Healthcare)		5.859*	5.743*	5.856**	5.531**
		(2.981)	(2.971)	(2.795)	(2.795)
Industry (Bio-medics)		-2.234	-0.997	1.050	2.392
		(3.112)	(3.120)	(2.936)	(2.942)
Industry (Other)		-1.617	-0.351	-4.780	-3.730
		(3.454)	(3.476)	(3.256)	(3.267)
Industry (Finance/Fintech)		-0.112	-1.140	1.468	0.429
		(3.467)	(3.450)	(3.256)	(3.243)
Industry (Construction)		3.941	4.487*	-3.689	-2.365
		(2.524)	(2.492)	(2.695)	(2.675)
Collaboration				1.329	1.131
				(1.471)	(1.451)
Contest				3.142*	2.748
				(1.707)	(1.691)
Sustainability				5.425***	4.826***
				(1.811)	(1.819)
CSR				7.962**	6.990**
				(3.273)	(3.239)
TRL				4.010***	5.114***
				(1.508)	(1.535)
Constant	67.091****	60.665****	61.537****	56.766****	57.597****
	(1.582)	(1.197)	(1.699)	(1.371)	(1.797)
Observations	160	160	160	160	160
R^2	0.068	0.258	0.314	0.401	0.449
Adjusted R^2	0.031	0.223	0.253	0.352	0.379
Residual Std. Error	10.495 (df = 153)	9.398 (df = 152)	9.219 (df = 146)	8.582 (df = 147)	8.405 (df = 141)
F Statistic	1.859* (df = 6; 153)	7.532**** (df = 7; 152)	5.132**** (df = 13; 146)	8.208**** (df = 12; 147)	6.386**** (df = 18; 141)

Note: *p<0.1; **p<0.05; ***p<0.01

within this model, the additional control variables contest (estimate = 3.142, p = 0.0677), sustainability (estimate = 5.425, p = 0.0032), CSR (estimate = 7.962, p = 0.0162) and TRL (estimate = 4.010, p = 0.0087) were assessed to be positively related to the success score. For the contest variable, a significance level of p = 0.1 is used. Within the full model the size of the firm has still a high positive impact. The score increases with 7.105 points for Size1 (p = <0.001) and 19.797 points for size2 (p = <0.001), holding constant other variables. When taking

the significance level of p = 0.1, compared to the reference category, the healthcare industry contributes to a higher success score (estimate = 5.531, p = 0.0498). The additional control variables sustainability (estimate = 4.826 points, p = 0.0089), CSR (estimate = 6.990, p = 0.0326) and TRL (estimate = 5.114, p = 0.0011) were also found to be positively related to the success of a startup. The increase in R^2 score shows that the addition of the (additional) control variables explains the success to a higher extend, compared to using merely the finance methods.

5.2.2 Scale-ups

Regarding the scale-ups, all linear regression models were found to be significant, except the first model. However, only a few finance methods were found to be related to the success score of the organization, as well as some of the control variables. The different outcomes of the models can be explained through the impact of the additional control variables. Below, a more detailed description of the finance methods and (additional) control variables is given.

Considering the different finance methods, in the third model (R^2 = 0.397, f = 8.707), taking a significance level of p = 0.1, financing through combining venture capital and angel investment (estimate = 2.730, p = 0.0982) impacts the success score positively. Additionally, the use of all three finance methods (estimate = 3.902, p = 0.0454) is positively related to the success score, considering the reference category. Within the full model (R^2 = 0.455, f = 7.894), merely the use of all three finance methods (estimate = 3.905, p = 0.0416) shows to have a positive effect on the success of a scale-up.

Some of the control- and additional control variables significantly influence the success score of a startup as well. The second model (R^2 = 0.375, f = 7.153) that included merely the control variables shows that the size of the company is positively related to the success of a company. Compared to size0, the score increases with 11.107 points for size1 (p = <0.001), 17.174 points for size2 (p = <0.001) and 19.082 points for size3 (P = <0.001), compared to Size0. Within the third model, the size effects the success score again, leading to an increase of 11.023 points for size1 (p = <0.001) and 17.475 points for size2 (p = <0.001) and 19.966 points for size3 (p = <0.001), using Size0 as reference category. The industries showed no significant relation. The fourth analysis (R^2 = 0.434, f = 10.950) that included the control- and the additional control variables, showed again a high dependency of the size of the firm. Compared to Size0, Size1 (p = <0.001) shows an increase of 10.401 points, while this is 16.012 points for size2 (p = <0.001) and 15.781 points for size3 (p = <0.001). Additionally, within this model, the additional control variables contest (estimate = 3.358, p = 0.0021) and sustainability (estimate = 4.668, p = 0.0149) were assessed to be positively related to the success score. Within the full model the size of the firm has still a high positive impact. The score increases with 10.268 points for Size1 (p = <0.001), 16.026 points for size2 (p = <0.001) and 16.449 points for size3 (P = <0.001). The additional control variables contest (estimate = 3.218, p = 0.0032) and CSR (estimate = 4.376, p = 0.0232) were found to be positively related to the success of a scale-up. The industries have no relation with the success score. The increase in R^2 score shows that the addition of the (additional) control variables explains the success to a higher extend, compared to using merely the finance methods.

5.3 Robustness tests

A robustness test was conducted for the startups based on the binary success score (74 points or higher) that was identified through the corporate guided research. The outcome of this test can be found in appendix F. The models show that the finance methods are not related to the

Table 16: linear regression models scale-ups

Linear regression models of success score of scaleups, financing methods and control variables

	Dependent variable:				
	Success score scale-ups				
	(1)	(2)	(3)	(4)	(5)
Only corporate	1.640		0.105		0.537
	(2.340)		(2.006)		(1.985)
Only Angel	-3.816*		1.471		1.365
	(2.112)		(1.830)		(1.772)
Venture and Corporate	0.227		0.199		0.648
	(1.889)		(1.542)		(1.507)
Venture and Angel	0.997		2.730*		2.611
	(1.949)		(1.642)		(1.601)
Corporate and Angel	-0.149		-0.587		-1.670
	(3.202)		(2.790)		(2.714)
All three methods	1.740		3.902**		3.905**
	(2.340)		(1.937)		(1.903)
Size1		11.107****	11.023****	10.401****	10.268****
		(1.663)	(1.727)	(1.681)	(1.744)
Size2		17.174****	17.475****	16.012****	16.026****
		(1.836)	(1.906)	(1.944)	(2.000)
Size3		19.082****	19.966****	15.781****	16.449****
		(2.238)	(2.378)	(2.439)	(2.535)
Industry (Healthcare)		-0.658	-2.007	0.560	-0.498
		(2.253)	(2.376)	(2.242)	(2.348)
Industry (Bio-medics)		0.848	0.496	1.867	2.173
		(2.522)	(2.689)	(2.561)	(2.719)
Industry (Other)		2.602	3.019	4.197	4.165
		(2.654)	(2.762)	(2.620)	(2.705)
Industry (Finance/Fintech)		-1.073	-1.312	0.049	-0.280
		(2.116)	(2.164)	(2.102)	(2.148)
Industry (Construction)		-0.207	0.010	-1.432	-1.556
		(1.531)	(1.566)	(1.660)	(1.716)
Collaboration				0.691	0.702
				(1.071)	(1.078)
Contest				3.358***	3.218***
				(1.076)	(1.077)
Sustainability				0.688	0.985
				(1.358)	(1.383)
CSR				4.668**	4.376**
				(1.900)	(1.911)
TRL				0.295	0.911
				(1.132)	(1.187)
Constant	72.260****	60.189****	59.036****	58.269****	56.902****
	(1.251)	(1.545)	(1.913)	(1.615)	(1.969)
Observations	200	200	200	200	200
R^2	0.035	0.375	0.397	0.434	0.455
Adjusted R^2	0.005	0.349	0.352	0.394	0.397
Residual Std. Error	8.843 (df = 193)	7.153 (df = 191)	7.138 (df = 185)	6.901 (df = 186)	6.884 (df = 180)
F Statistic	1.160 (df = 6; 193)	14.330**** (df = 8; 191)	8.707**** (df = 14; 185)	10.950**** (df = 13; 186)	7.894**** (df = 19; 180)

Note: *p<0.1; **p<0.05; ***p<0.01

success of a business. However, while the use of corporate capital and angel investments is the only negative associated combination, it is not significant. Additionally, besides the size and healthcare industry, the financial/fintech industry is positively related to the success score within the robustness test. Regarding the additional control variables, the sustainability and

TRL are positively related, but the CSR policy has no impact (while this was found to impact the success score in the linear regression models).

For the scale-ups, a similar robustness test was performed and the outcome be found in appendix G. The models show that the use of three finance methods positively effects the success of the business (similar as the linear regression model). The combination of venture capital and angel investments does not show significance, while a positive relation was found in the linear regression model. The size is again highly related to the success of the scale-up, but size1 shows only a minimal relation in this test while there is a substantial higher relation in the models using linear regression. In addition to this, the other industries show a small positive effect. At last, from all the additional control variables, it shows that the participation in a contest effects the success score. The CSR policy does not show to be of significance to the success of the scale-up, while this was found in the linear regression model.

At last, a final robustness test was conducted using a linear regression model on the whole dataset (start- and scale-ups combined). The outcome shows similar results as found within the individual regression models. A positive relation was found for venture capital and angel investments, as well as the size of the company. In addition to this, the use of corporate & angels investments has a negative impact on the success score compared to the reference category, while using three methods show a positive result compared to merely venture capital. However, the phase (age variable) of the company was not found to be related to the success score.

6. Discussion

6.1 Literature and scientific implications

First of all, in this paragraph the findings of this research are summarized and compared to the academic literature. As was discussed in the introduction, academic literature (Angerer et al., 2017; Zhang et al., 2019, Shinkle & Suchard, 2019) suggests that the type of finance method used by start- and scale-ups, impacts the success of the business. This suggestion was tested through developing the SSAM, that combined the VRIN and resource-based view (Barney, 1995). Through the corporate guidance research and testing the robustness, this model was found to be a reliable method to assess the success of a start- or scale-up. Overall, the data analysis shows different outcomes for the use of different types of capital. However, the outcomes can only be applied to businesses that received finance and cannot be generalized to the entire entrepreneurial landscape of start- and scale-ups.

For startups, there is a negative relation between the use of corporate capital and the success, compared to using merely venture capital. Additionally, the combination of corporate capital and angel investments has an even higher negative relation compared to the reference category. However, considering the impact on the success score, the use of merely corporate investment has a considerable small negative effect to the success score of the business. It can therefore not be considered to be a significant factor for decreasing the success score of a startup. On the contrary, the combination of corporate capital and angel investments has a considerable negative impact. This is reflected through the increase of the R^2 score of the finance methods. Through this, the research on the negative impact of angel investors on the success of startups as conducted by Turan (2015) is verified.

For scale-ups, only the combination of all three finance methods lead to an increase of the success score of the organization, compared to using merely venture capital. Again, while there is a positive relation, the impact is considerably small and cannot be considered as significant factor for the final success. Through this, the findings of Zhang et al. (2019) have

been partially verified through the analysis. The authors state that corporate investments have negative effects on the business, while multiple finance methods increase the chance of success. The analysis in this research showed that the use of corporate investment have a slightly negative impact for startups, but is considerably low. Besides this, the use of a combination of all types of capital increases the success of a company, while using two types of investments is unsignificant.

Hence, the findings of the authors need to be put into perspective compared to the other variables that impact the success of a company. Consequentially, this leads to two scientific implications. First of all, although research suggests that venture capital has positive impact on the success of a business and angel investment leads to a decrease in success, this is only a minimum impact and cannot be considered as decisive for the success of companies that received funding. Second, the proposition that multiple finance methods lead to a higher chance of success is inaccurate. The use of the combination of all finance methods has a positive relation to the success of a scale-up, but it is unclear whether this is a necessary condition for the success. At last, the use of corporate capital has negative effects, but only significant when it is combined with angel investments. The claims proposed by (Angerer et al., 2017; Zhang et al., 2019; Shinkle & Suchard, 2019) thus need to be put into perspective, since this research shows that there is only a small negative relation for using merely corporate venturing, compared to venture capital. The use of corporate venturing and angel investments show to have a considerable high negative impact on the success on novel businesses.

As described by Ainuddin et al. (2007), the control variables (phase, size and industry) impact the success of a company, but this was not completely verified in this thesis. First, after examination, the analysis shows that there are only small differences between start- and scale-ups. Through applying a robustness test, it was found that there is no significant difference between start- and scale-ups, considering the effects of both finance methods and control variables. This could at least be considered remarkable since it was already discussed by Barquin et al. (2020) that scale-ups have a significant higher success rate and are thus more likely to create a thriving business. Besides this, research shows that the success rate of scale-ups is almost two times higher compared two the startups, as was discussed before. Considering this, there exists a conflict with the current academic literature, since this research shows that the phase is insignificant. However, as was discussed in the methodology, the assessment criteria to define the phase of the company are quite flexible, since it was otherwise impossible to define whether a company was a start- or scale-up. This leaded to an unclear segregation between start- and scale-ups, which explains the indifference between the two groups. This research showed that there is no clear assessment method to categorize a company as a start- or scale-up, while in academic literature it is assumed that this can be done (Autio, 2016). Consequentially, scientific research on start- and scale-ups needs to take into account that there is no clear distinguishment between the two types of companies. However, the size of the company (in terms of employees), is significant for the success of a business and thus in line with the claim of Ainuddin et al. (2007). Still, there is no academic literature that provides empirical evidence on how the industry of a firm impacts the success. Within this research, the healthcare industry was found to be positively related with the success score compared to the ICT/technology sector, but considering the minimal impact, this does not provide enough evidence to explain the influence of the industry.

The data shows that the four additional control variables (participation in a contest, obtaining a sustainable product, a CSR policy and a TRL of seven or higher) is positively associated with the success as well, but it has different impact for both start- and scale-ups.

For startups, the sustainability positively impacts the success, which can be explained since there is lots of interest in creating sustainable innovations (Kuckertz, 2019; Kwon, 2020). Much of the firm's value is created through adopting a sustainable business model. On top of this, there is reason to suspects that many investors seem to have higher interest in the firm if the product is in accordance with the SDGs as designed by the United Nations. However, while Wilkinson et al. (2001), Doane & MacGillivray (2001) and Weidinger (2014) state that the sustainability of a company leads to a competitive advantage, it only has a minor relation to the final success based on this research. Besides this, a CSR policy results in increasing the score, as was already claimed by (Schönbrun et al., 2019). From all additional control variables, the CSR policy has the highest positive relation for the startups. Thus, current academic literature on the positive aspects of CSR policies, as was discussed before, has been verified. At last, a high TRL positively impacts the success of the business, but only contributes to a small extend. Since startups are still developing the product or service, they significantly profit from a higher TRL. On the contrary, it was found that the TRL of a firm contributes to the success score, while Mankins (2009) argues that this is highly significant for it. Consequentially, the TRL level of startups needs to monitored, but is not decisive to the success of the novel organization.

For scale-ups, the participation in a contest shows a positive relation to the success of the business, but the impact is considerably small. The positive impact of the participation in a contests was already described by Gaspar & Pinho (2009), but this claim needs to be specified. As seen in the analysis, only larger firms profit from this contest participation, and thus scale-ups have higher benefits compared to startups. Also, startups do normally not have a product that has already reached the level of development in order to participate in contests. Besides, as Hillert & Ungeheuer (2021) described, the participation in contests results in an increased visibility to possible investors and leads to attracting more investors. Thus, the findings are partly in line with the academic research on the business advantage of contest participation, but only for scale-ups. In addition to this, obtaining a CSR policy results in a substantial impact for the success score. Based on Schönbrun et al. (2019), companies with a CSR policy financially profit from it. While there is a higher relation for startups, this claim need to be modified. Hence, the use of a CSR policy contribute to the success of an organization, but to a lower extend when the business reached the scale-up phase.

At last, collaboration was not found to be significant for both start- and scale-ups. Casals (2011) and Roja & Nastase (2013) claim that small firms profit from collaboration, but based on this research there is no evidence to confirm this. One explanation for this is that the authors focus on larger organizations, while start- or scale-up could experience disadvantages since larger firms deprive them from their new knowledge. But Dodgson (2014) argues that novel businesses could also contribute from collaboration, if the 'ties' between the organizations are strong. In this case, organization can transfer complex knowledge that could contribute to the innovation. However, for each firm, collaboration has different purposes and a positive impact at different times in the development of the business. Based on Dodgson (2014) collaboration both contributes and threatens the firm, since it needs to act as both a competitor and collaborator.

6.2 Practical implications

Based on the findings, this paragraph gives some insights to the banking sector on how to contribute to higher rates of successful development of start- and scale-ups. To start with a more general advice, there is reason to suggest that banks need to assess start- and scale-ups differently if they want to avoid high-risks. That all novel businesses are assumed to be of high-risk is in accordance with the findings of Kerr & Nanda (2015) since banks do not have distinct assessment methods for start- and scale-ups. However, the analysis shows that both types of

corporations react slightly different on the finance methods and (additional) control variables and thus need a relatively different approach in setting priority to certain variables. Overall, since a bank is a venture capital provider, they can consider to attract both corporate investors and angels for scale-ups, since this has a slightly positive impact compared to merely venture capital. For startups, providing venture capital has a similar relation on the success of a business, compared to combining this with both corporate investments and angels. Thus, there is no need for banks to control for other types of capital for startups. However, the type of funding is not decisive for the success of a novel organization and the assessment needs to be performed including all variables of the SSAM.

While venture capital provided by the bank has relatively similar effects when combined with other types of funding, one can argue that banks do not have to consider to attract other types of investors. This is similar to the findings of Zhang et al. 2019), who found that venture capital has positive effects on innovative businesses. However, the bank has to take an active role in connecting corporate investors and angels with smaller businesses, in order to attract capital for the business. As was discussed, the ability to attract investors is still one of the major barriers for small organizations to become successful and banks can facilitate the attraction of investors (Barua, 2019). Since this research lacks to investigate the height of the investment, attracting additional capital in combination with the bank's investment could possibly lead to an increase success of the start- or scale-up. This research found that using venture capital with other types of capital does not influence the success of the company to a high extend, but this does not mean that it is not in the interest of banks to withhold from interacting with novel organizations. Through guiding start- and scale-ups, the bank fulfills the role as norm entrepreneur, and possibly decreases the risk of their investment.

The analysis shows that, while the impact of the finance methods is relatively small, banks could reassure their investments to a higher extend when focusing on the size of the company. Based on the significant impact of the size of the firm on the estimated success, banks could stimulate the employee growth of the start- or scale-up. This is in line with current literature, that claims that the size of the company is contributing to a thriving business (Markman et al., 2004; Ainuddin et al., 2007). However, as found in the analysis, there is only a significant contribution to the success score when the business consists of at least ten employees. In regard to this, banks could merely check if the business hired a minimum amount of employees (around ten employees) but it cannot be said that more employees lead to higher success. In contribution to this, banks profit from including additional control variables in their assessment method for small organizations. For startups, banks need to check for sustainability, the presence of a CSR policy and a high TRL level. For scale-ups, there is the need to check for participation in contests and the CSR-policy. Based on this, banks could actively stimulate scale-ups to participate in contests, or organize them.

Even more, as was stated in the introduction, Zimmerman (2019) and Mendez & Houghton (2020) showed that banks have the role as norm entrepreneurs and are critical for the sustainable development of society. Through including more variables within the assessment of start- and scale-ups that check for social and environmental credibility, banks can improve their social responsibility. Although the analysis showed that the individual contribution of all additional control variables is considerably low, the collective sum of them could lead to a higher reassurance of success. In contribution to this, while it was found that banks value the TRL to a higher extend compared to the sustainability of a firm, the outcome of the analysis shows that there is no logical explanation on setting priority to the TRL. This conflicts with current academic literature (Mankins, 1995, 2009), since the TRL is assumed to give substantial information on the success of the business. The analysis shows that the impact of the TRL is not as significant as proposed in current academic research. Besides this, banks have the moral obligation to check or demand for sustainability and a CSR policy. All these recommendations

can be integrated through adopting the SSAM as an evaluation method. The bank could check the different resources as described in the SSAM more extensively in order to increase the success rate of the companies and consequentially decide whether it wants to invest in the business. Current assessment methods for start- and scale-ups lack to include all resources as used in the SSAM, as was found through interviewing a banker of The bank. Additionally, if the bank observes low scores for a specific resource (or a sub-category), it is in both their interest and moral obligation to inform the start- or scale-up about this fallacy. This is also a social moral obligation of the bank, since banks are a major player regarding sustainable innovation of society (Volz, 2017; Yip & Bocken, 2017).

6.3 Limitations and future research

At last, this paragraph shows the limitations of this thesis and based on this, gives recommendations for future research. To start, there are several methodological fallacies that need explanation in order to substantiate the findings of this research. First of all, a substantial group of the sample is assessed to be successful, which is much more than the actual success rate described within the academic literature. One reason for such high success rates is that only companies were assessed that existed for at least five years. This means that early startups were excluded from the sample, which could have lead to a much lower success rate of startups. Besides this, companies were selected that are financed and thus all start- and scale-ups that did not attract investors were excluded. As described in the theory, the main barrier for a successful organization is the lack of finance. Considering this, the success rate of the sample is explained since none of the businesses lack funding. However, the selection criteria is justified, since the goal of this research is to evaluate the effects of those companies that did receive external capital to fund their business.

There are also some shortcomings within this research. To start, the phase variable merely states whether the organization is a start- or scale-up, while the amount of years the business exists could have lead to other insights on whether the time of corporate existence influences the success. The analysis did not include the time of existence of the firm, which could have resulted in providing more insights towards the influence of this variable. Besides this, the start- and scale-up criteria as described in the theory section includes the turnover of the company and was not used as a separate variable. Including this as a separate variable could give more information on the relation between the success of the company and the size of the turnover. However, this would result in overlap with the other variables in the SSAM model and could result in unreliable outcomes. At last, the information provided by Techleap included the size of the investments, but this was not included in the data analysis. The size of the investment could lead to interesting insights, since it could create guidelines on how much capital needs to be attracted. In addition to this, the order of the used finance methods is not analyzed. This could have been included in the data analysis which gives more insights into the relation between the timing of the type of investment and the success of the company. For example, if companies attract angel investors in an early phase, it could lead to different success compared to when they use this finance method in a later phase. This could have given valuable recommendations for banks on when to invest in a start- or scale-up.

At last, within this research it was not taken into consideration that scale-ups have more time to attract investors, compared to startups. The period for attracting an investor is not measured and could possibly influence many other variables in the SSAM. For example, a company that receives investments within the early development phase, could create a successful product more easily compared to companies receiving this capital in a later phase. Related to this, a bias exists for successful companies, since there is much more interest in this organization and consequentially, more types of investors will be interested to finance it. The question then

remains whether the company is estimated to be successful and therefore attracts investors, or if it is successful because it was able to attract them. Unfortunately, the results cannot answer this question, since the data is a snapshot of the current situation of a company.

To create more reliable guidelines on how to increase the success of start- and scale-ups, while consequentially increasing the innovative power of them, there are some suggestions for future research. First of all, the impact of the order of the finance methods and the size of the funding needs further research. Second, to increase the generalizability, this research could be replicated with a larger sample of companies with a more equally divided representation of the industries. Third, more research should be done on the earlier phase of the startup. This research included only companies older than five years, while the first years of a startup could be much more crucial for the final success. Fourth, since collaboration was not found to be of significance for the success of a novel organization, while academic literature suggests that collaboration is positively impacts a business, more investigation is needed in order to identify the reason for this deviating result. At last, a similar study could be done using a longer time period for researching the success rate of the companies.

The estimated success of the start- and scale-ups would be more reliable if this success is measured again within a few years. Possibly, some of the successful companies fail to proceed their business. Evaluating these businesses could give valuable insights to the fallacies of the used SSAM. Related to this, this research was conducted using a quantitative approach. To create more reliable recommendations on how to finance novel organizations, more research should be done using a qualitative approach. Through this, new insights could be gathered on how small businesses internally deal with different types of investments.

7. Conclusion

This research examined the influence of three different finance methods (venture capital, corporate investments and angels) on the success of a start- or scale-up. More specifically, this was done in order to answer the following research question: *in what way do financing methods influence the success of start- and scale-ups?* The success of the companies was assessed through the use of the VRIN model and the resource based view. Using these methods, the SSAM was created in order to provide a framework that can be used to assess the success of start- and scale-ups. A total of 360 start- and scale-ups were assessed using this framework. The outcome of the study shows that there is a different relation between the finance methods and the success score for start- and scale-ups. To answer the research question, the use of corporate capital as well as the combination of corporate capital and angels has negative impact on the success of startups, compared to the use of merely venture capital. For scale-ups, the use of all three finance methods is positively related to the success score, compared to venture capital. In addition to this, the size of the company has a positive impact on both start- and scale-ups. Regarding the additional control variables, participation in a contest, a sustainable product or service, an integrated corporate social responsibility policy and a product within TRL seven or higher, is differently related to the success of a start- or scale-up. Startups profit from a sustainable business model, a CSR policy and a high TRL level, while scale-ups benefit from participation in contests as well as a CSR policy.

Since the findings of this research need to be interpreted from the perspective of the banking sector, there are some recommendations on how banks can improve their role for helping start- and scale-ups to become successful. Banks need to expand their assessment method by including the additional control variables. In order to improve the success of novel businesses, start- and scale-ups thus need to be stimulated to participate in contests, make their

product or service sustainable, create a CSR policy and need to develop towards TRL seven or higher. Besides this, banks can use their knowledge to help novel businesses in providing information on how to meet the criteria of the SSAM. Through this, the innovative power of start- and scale-ups will be increased and more technologies will reach the market. Consequentially, these innovations have the potential to contribute to a more sustainable society.

As was described in the introduction, there is a need to increase the success rate of start- and scale-ups since the current environmental crisis urges society to introduce sustainable alternatives within the upcoming years. The current sustainable developments are a step in the right direction, but as the IPCC states, the goal for reducing the CO_2-emissions as described in the Paris agreement will not be reached through current actions. Therefore, more focus is needed on finding new technologies and services that help society through the sustainable adaptation process. In order to do this, more action is needed to increase the success rate of start- and scale-ups. As argued, there is a moral obligation for banks to improve their role as norm entrepreneurs that help to increase the success of novel businesses. This research created a framework for banks that helps them to assess the success of start- and scale-ups. Through the use of this model and assessing start- and scale-ups in a slightly different manner, banks can improve their role for increasing the successful development of innovations by novel organizations.

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9. References

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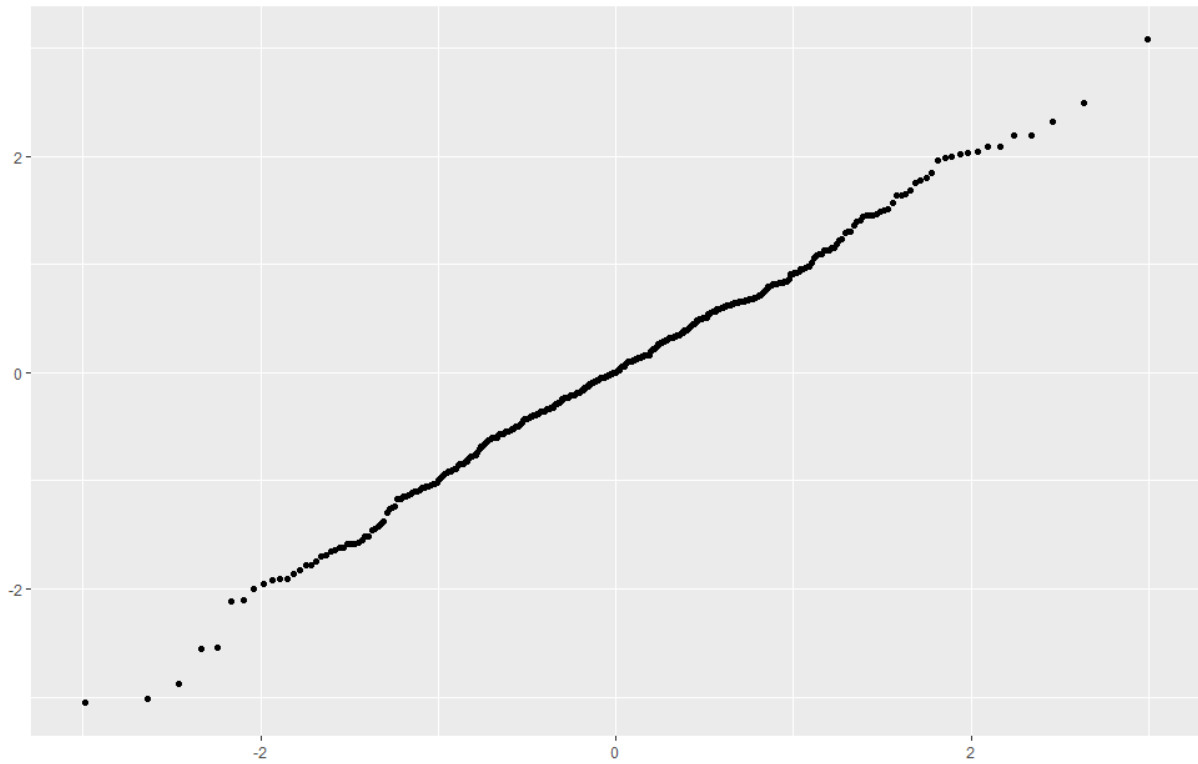
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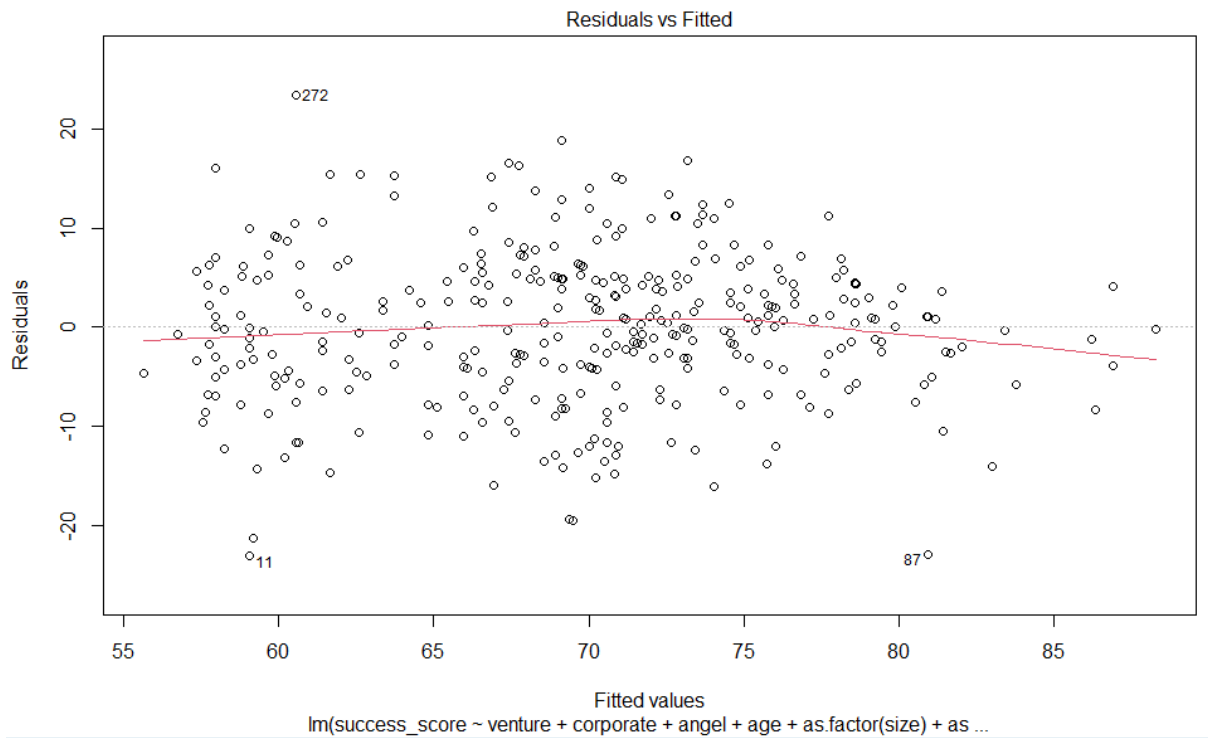
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10. Appendix

A. Normal distribution data

B. Residual vs Fitted

Residuals vs Fitted

lm(success_score ~ venture + corporate + angel + age + as.factor(size) + as ...

C. Normal distribution quantiles vs residual

Normal Q-Q

lm(success_score ~ venture + corporate + angel + age + as.factor(size) + as ...

D. Residuals vs Leverage

Residuals vs Leverage

lm(success_score ~ venture + corporate + angel + age + as.factor(size) + as ...
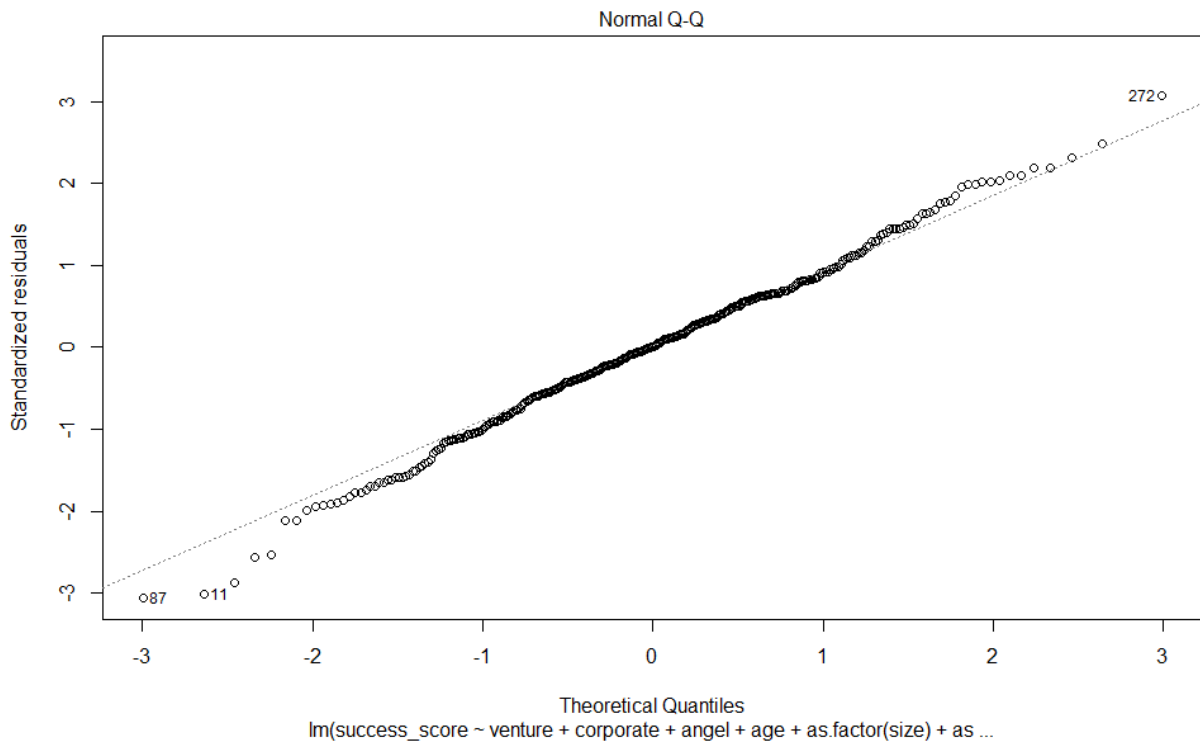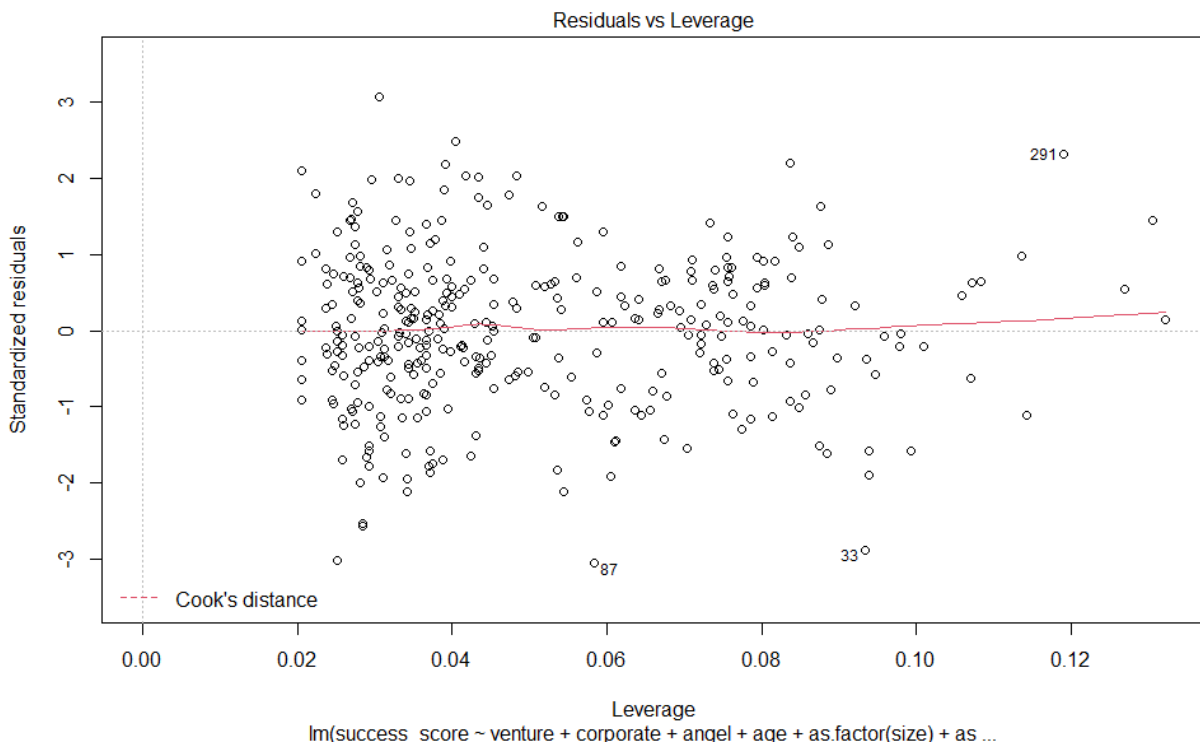
E. Techleap information

SOLHO ✓

SOLHO develops solar-based energy systems to power greenhouse farms

Launch date	**2017**
Employees	**5 people**

Delft South Holland (HQ) View more
http://www.solho.eu 🐦 in

| Overview | Similar companies | Analytics | Team (1) | Notes | Jobs (0) | Innovations (0) | Patents |

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SOLHO FUNDING   SOLHO INVESTORS

DATE	INVESTORS	AMOUNT	ROUND
-	Day One	N/A	- Not yet verified
Jun 2018	European Innovation Council	€50k	Grant
Jun 2019	N/A	€330k	Grant
Total Funding		**€380k**	

F. Logistic regression startups (robustness check)

Logistic regression models of binary success score, financing methods and control variables

	Dependent variable:					
	Binary success score startups					
	(1)	(2)	(3)	(4)	(5)	(6)
Only corporate	0.017		0.042			0.093
	(0.135)		(0.122)			(0.120)
Only Angel	0.009		0.087			0.105
	(0.092)		(0.082)			(0.077)
Venture and Corporate	0.058		0.052			0.083
	(0.143)		(0.129)			(0.121)
Venture and Angel	0.046		0.030			0.019
	(0.110)		(0.098)			(0.092)
Corporate and Angel	-0.050		-0.043			-0.003
	(0.213)		(0.193)			(0.184)
All three methods	0.250		0.184			0.217
	(0.327)		(0.288)			(0.270)
Two methods					-0.029	
					(0.067)	
Three methods					0.153	
					(0.265)	
Size1		0.318****	0.317****	0.292****	0.293****	0.297****
		(0.063)	(0.066)	(0.060)	(0.062)	(0.064)
Size2		0.910****	0.933****	0.795****	0.800****	0.812****
		(0.181)	(0.188)	(0.173)	(0.174)	(0.177)
Industry (Healthcare)		0.236*	0.258**	0.241**	0.243**	0.274**
		(0.123)	(0.127)	(0.118)	(0.119)	(0.122)
Industry (Bio-medics)		-0.204	-0.209	-0.063	-0.052	-0.074
		(0.129)	(0.133)	(0.124)	(0.126)	(0.129)
Industry (Other)		0.211	0.216	0.090	0.087	0.085
		(0.143)	(0.149)	(0.138)	(0.139)	(0.143)
Industry (Finance/Fintech)		0.222	0.226	0.303**	0.312**	0.321**
		(0.143)	(0.147)	(0.138)	(0.140)	(0.142)
Industry (Construction)		0.171	0.178*	-0.085	-0.080	-0.090
		(0.104)	(0.107)	(0.114)	(0.115)	(0.117)
Collaboration				0.099	0.097	0.100
				(0.062)	(0.063)	(0.063)
Contest				0.078	0.075	0.081
				(0.072)	(0.073)	(0.074)
Sustainability				0.223***	0.228***	0.238***
				(0.077)	(0.077)	(0.080)
CSR				0.163	0.168	0.177
				(0.139)	(0.140)	(0.142)
TRL				0.165**	0.165**	0.155**
				(0.064)	(0.064)	(0.067)
Constant	0.250****	0.045	-0.001	-0.119**	-0.114*	-0.182**
	(0.068)	(0.049)	(0.073)	(0.058)	(0.060)	(0.079)
Observations	160	160	160	160	160	160
Log Likelihood	-97.384	-72.617	-71.704	-59.438	-59.127	-57.859
Akaike Inf. Crit.	208.769	161.235	171.409	144.876	148.255	153.718

Note: *p<0.1; **p<0.05; ***p<0.01

G. Logistic regression scale-ups (robustness check)

Logistic regression models of success score of scaleups, financing methods and control variables

	Dependent variable:					
	Binary success score scale-ups					
	(1)	(2)	(3)	(4)	(5)	(6)
Only corporate	0.090		-0.053			-0.073
	(0.134)		(0.126)			(0.128)
Only Angel	-0.053		0.136			0.144
	(0.121)		(0.115)			(0.114)
Venture and Corporate	0.104		0.072			0.074
	(0.108)		(0.097)			(0.097)
Venture and Angel	0.026		0.142			0.138
	(0.111)		(0.103)			(0.103)
Corporate and Angel	-0.016		-0.043			-0.068
	(0.183)		(0.175)			(0.175)
All three methods	0.140		0.258**			0.271**
	(0.134)		(0.121)			(0.122)
Two methods					0.058	
					(0.069)	
Three methods					0.229**	
					(0.114)	
Size1		0.269**	0.278**	0.204*	0.176	0.200*
		(0.104)	(0.108)	(0.108)	(0.109)	(0.112)
Size2		0.635****	0.662****	0.533****	0.508****	0.538****
		(0.115)	(0.119)	(0.125)	(0.126)	(0.129)
Size3		0.722****	0.805****	0.564****	0.549****	0.632****
		(0.140)	(0.149)	(0.157)	(0.157)	(0.163)
Industry (Healthcare)		-0.183	-0.242	-0.145	-0.173	-0.187
		(0.141)	(0.149)	(0.145)	(0.146)	(0.151)
Industry (Bio-medics)		-0.033	-0.049	-0.021	-0.046	-0.017
		(0.158)	(0.169)	(0.165)	(0.165)	(0.175)
Industry (Other)		0.209	0.254	0.277	0.302*	0.309*
		(0.167)	(0.173)	(0.169)	(0.169)	(0.174)
Industry (Finance/Fintech)		-0.167	-0.168	-0.155	-0.144	-0.165
		(0.133)	(0.136)	(0.136)	(0.135)	(0.138)
Industry (Construction)		0.032	0.058	0.038	0.038	0.058
		(0.096)	(0.098)	(0.107)	(0.106)	(0.110)
Collaboration				0.050	0.048	0.047
				(0.069)	(0.069)	(0.069)
Contest				0.148**	0.140**	0.137**
				(0.069)	(0.069)	(0.069)
Sustainability				-0.088	-0.077	-0.078
				(0.088)	(0.087)	(0.089)
CSR				0.198	0.189	0.177
				(0.122)	(0.122)	(0.123)
TRL				0.044	0.073	0.101
				(0.073)	(0.074)	(0.076)
Constant	0.460****	0.136	0.039	0.085	0.050	-0.021
	(0.071)	(0.097)	(0.120)	(0.104)	(0.107)	(0.127)
Observations	200	200	200	200	200	200
Log Likelihood	-144.633	-120.076	-116.230	-115.587	-113.393	-111.262
Akaike Inf. Crit.	303.267	258.152	262.460	259.173	258.785	262.525

Note: *p<0.1; **p<0.05; ***p<0.01

H. Linear regression on all data

Linear regression models of success score of entire dataset, financing methods and control variables

	Dependent variable:					
	Success score entire dataset					
	(1)	(2)	(3)	(4)	(5)	(6)
Only corporate	-1.440 (1.988)		-2.364 (1.690)			-1.738 (1.642)
Only Angel	-3.347** (1.522)		0.677 (1.292)			1.040 (1.213)
Venture and Corporate	1.313 (1.735)		-0.868 (1.442)			-0.162 (1.370)
Venture and Angel	1.160 (1.643)		1.307 (1.359)			1.449 (1.284)
Corporate and Angel	-3.198 (2.877)		-3.988 (2.448)			-4.845** (2.305)
All three methods	4.432* (2.378)		3.381* (1.997)			4.054** (1.886)
Two methods					-0.005 (0.909)	
Three methods					3.810** (1.825)	
Age		0.493 (1.005)	0.266 (1.024)	0.115 (0.960)	-0.235 (0.976)	-0.136 (0.971)
Size1		9.445**** (1.082)	9.292**** (1.094)	8.915**** (1.051)	8.733**** (1.058)	8.587**** (1.063)
Size2		16.080**** (1.560)	16.449**** (1.578)	14.734**** (1.551)	14.672**** (1.556)	14.714**** (1.558)
Size3		18.216**** (2.162)	19.735**** (2.208)	13.364**** (2.206)	13.547**** (2.201)	14.686**** (2.223)
Industry (Healthcare)		2.447 (1.842)	1.890 (1.864)	3.541** (1.765)	3.469** (1.763)	3.069* (1.780)
Industry (Bio-medics)		-1.119 (1.978)	-0.689 (2.022)	0.888 (1.910)	0.809 (1.912)	1.648 (1.946)
Industry (Other)		0.391 (2.154)	1.178 (2.203)	0.182 (2.070)	0.268 (2.070)	0.571 (2.100)
Industry (Finance/Fintech)		-0.480 (1.898)	-0.906 (1.916)	0.895 (1.815)	1.098 (1.815)	0.393 (1.831)
Industry (Construction)		1.376 (1.376)	1.715 (1.377)	-2.386 (1.451)	-2.326 (1.446)	-2.096 (1.457)
Collaboration				1.099 (0.872)	1.020 (0.874)	1.084 (0.872)
Contest				3.279**** (0.932)	3.194**** (0.930)	3.136**** (0.926)
Sustainability				2.814** (1.107)	2.910*** (1.104)	2.792** (1.108)
CSR				5.643**** (1.696)	5.606*** (1.694)	5.328*** (1.688)
TRL				2.058** (0.917)	2.316** (0.922)	2.846*** (0.943)
Constant	69.840**** (1.036)	60.689**** (0.912)	60.637**** (1.200)	57.849**** (0.990)	57.825**** (1.010)	57.435**** (1.247)
Observations	360	360	360	360	360	360
R^2	0.045	0.361	0.381	0.442	0.449	0.464
Adjusted R^2	0.029	0.344	0.354	0.419	0.423	0.432
Residual Std. Error	10.042 (df = 353)	8.252 (df = 350)	8.189 (df = 344)	7.768 (df = 345)	7.739 (df = 343)	7.677 (df = 339)
F Statistic	2.781** (df = 6; 353)	21.928**** (df = 9; 350)	14.124**** (df = 15; 344)	19.482**** (df = 14; 345)	17.465**** (df = 16; 343)	14.677**** (df = 20; 339)

Note: *p<0.1; **p<0.05; ***p<0.01