

# **Venture capital decision-making and the effects of a founder's digital identity on resource acquisition**

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## **Dissertationsschrift**

Vorgelegt von

Walter Diegel, M. Sc.

Erstgutachter: Prof. Dr. Jörn H. Block  
Professur für Unternehmensführung  
Universität Trier

Zweitgutachter: Prof. Dr. Sven Heidenreich  
Professur für Technologie- und Innovationsmanagement  
Universität des Saarlandes

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## Preface

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## List of abbreviations

<b>CBC</b>	Choice-based conjoint
<b>CDI</b>	Categorical-dynamic index
<b>EEA</b>	European Economic Area
<b>GDP</b>	Gross Domestic Product
<b>IM</b>	Impression Management
<b>IPO</b>	Initial Public Offering
<b>LIWC</b>	Linguistic Inquiry and Word Count
<b>log</b>	logarithmized
<b>Max.</b>	maximum
<b>MBA</b>	Master of Business Administration
<b>Min.</b>	minimum
<b>N-Ach</b>	Need for achievement
<b>n.d.</b>	no date
<b>PhD</b>	Philosophiae Doctor
<b>RQ</b>	Research question
<b>Std.</b>	standard deviation

<b>UK</b>	United Kingdom
<b>US</b>	United States
<b>USPTO</b>	United States Patent and Trademark Office
<b>VCJ</b>	Venture Capital Journal
<b>WC</b>	word count
<b>Yrs.</b>	years

## Zusammenfassung

Der digitale Fortschritt der vergangenen Jahrzehnte beruht zu einem großen Teil auf der Innovationskraft junger aufstrebender Unternehmen. Während diese Unternehmen auf der einen Seite ihr hohes Maß an Innovativität eint, entsteht für diese zeitgleich auch ein hoher Bedarf an finanziellen Mitteln, um ihre geplanten Innovations- und Wachstumsziele auch in die Tat umsetzen zu können. Da diese Unternehmen häufig nur wenige bis keine Unternehmenswerte, Umsätze oder auch Profitabilität vorweisen können, gestaltet sich die Aufnahme von externem Kapital häufig schwierig bis unmöglich. Aus diesem Umstand entstand in der Mitte des zwanzigsten Jahrhunderts das Geschäftsmodell der Risikofinanzierung, des sogenannten „Venture Capitals“. Dabei investieren Risikokapitalgeber in aussichtsreiche junge Unternehmen, unterstützen diese in ihrem Wachstum und verkaufen nach einer festgelegten Dauer ihre Unternehmensanteile, im Idealfall zu einem Vielfachen ihres ursprünglichen Wertes. Zahlreiche junge Unternehmen bewerben sich um Investitionen dieser Risikokapitalgeber, doch nur eine sehr geringe Zahl erhält diese auch. Um die aussichtsreichsten Unternehmen zu identifizieren, sichten die Investoren die Bewerbungen anhand verschiedener Kriterien, wodurch bereits im ersten Schritt der Bewerbungsphase zahlreiche Unternehmen aus dem Kreis potenzieller Investmentobjekte ausscheiden. Die bisherige Forschung diskutiert, welche Kriterien Investoren zu einer Investition bewegen. Daran anschließend verfolgt diese Dissertation das Ziel, ein tiefergehendes Verständnis darüber zu erlangen, welche Faktoren die Entscheidungsfindung der Investoren beeinflussen. Dabei wird vor allem auch untersucht, wie sich persönliche Faktoren der Investoren, sowie auch der Unternehmensgründer, auf die Investitionsentscheidung auswirken. Er-

gänzt werden diese Untersuchungen zudem durch die Analyse der Wirkung des digitalen Auftretens von Unternehmensgründern auf die Entscheidungsfindung von Risikokapitalgebern. Des Weiteren verfolgt diese Dissertation als zweites Ziel einen Erkenntnisgewinn über die Auswirkungen einer erfolgreichen Investition auf den Unternehmensgründer. Insgesamt umfasst diese Dissertation vier Studien, die im Folgenden näher beschrieben werden.

In Kapitel 2 wird untersucht, inwiefern sich bestimmte Humankapitaleigenschaften des Investors auf dessen Entscheidungsverhalten auswirken. Mithilfe vorangegangener Interviews und Literaturrecherchen wurden insgesamt sieben Kriterien identifiziert, die Risikokapitalinvestoren in ihrer Entscheidungsfindung nutzen. Daraufhin nahmen 229 Investoren an einem Conjoint Experiment teil, mithilfe dessen gezeigt werden konnte, wie wichtig die jeweiligen Kriterien im Rahmen der Entscheidung sind. Von besonderem Interesse ist dabei, wie sich die Wichtigkeit der Kriterien in Abhängigkeit der Humankapitaleigenschaften der Investoren unterscheiden. Dabei kann gezeigt werden, dass sich die Wichtigkeit der Kriterien je nach Bildungshintergrund und Erfahrung der Investoren unterscheidet. So legen beispielsweise Investoren mit einem höheren Bildungsabschluss und Investoren mit unternehmerischer Erfahrung deutlich mehr Wert auf die internationale Skalierbarkeit der Unternehmen. Zudem unterscheidet sich die Wichtigkeit der Kriterien auch in Abhängigkeit der fachlichen Ausbildung. So legen etwa Investoren mit einer fachlichen Ausbildung in Naturwissenschaften einen deutlich stärkeren Fokus auf den Mehrwert des Produktes beziehungsweise der Dienstleistung. Zudem kann gezeigt werden, dass Investoren mit mehr Investitionserfahrung die Erfahrung des Managementteams wesentlich wichtiger einschätzen als Investoren mit geringerer Investitionserfahrung. Diese Ergebnisse ermöglichen es Unternehmensgründern ihre Bewerbungen um eine Risikokapitalfinanzierung zielgenauer auszurichten, etwa durch eine Analyse des beruflichen Hintergrunds der potentiellen Investoren und eine damit einhergehende Anpassung der Bewerbungsunterlagen, zum Beispiel durch eine stärkere Schwerpunktsetzung besonders relevanter Kriterien.

Die in Kapitel 3 vorgestellte Studie bedient sich der Daten des gleichen Conjoint Experiments aus Kapitel 2, legt hierbei allerdings einen Fokus auf den Unterschied zwischen Investoren aus den USA und Investoren aus Kontinentaleuropa. Dazu wurden Subsamples kreiert, in denen 128 Experimententeilnehmer in den USA angesiedelt sind und 302 in Kontinentaleuropa. Die Analyse der Daten zeigt, dass US-amerikanische Investoren, im Vergleich zu Investoren in Kontinentaleuropa, einen signifikant stärkeren Fokus auf das Umsatzwachstum der Unternehmen legen. Zudem legen kontinentaleuropäische Investoren einen deutlich stärkeren Fokus auf

die internationale Skalierbarkeit der Unternehmen. Um die Ergebnisse der Analyse besser interpretieren zu können, wurden diese im Anschluss mit vier amerikanischen und sieben europäischen Investoren diskutiert. Dabei bestätigen die europäischen Investoren die Wichtigkeit der hohen internationalen Skalierbarkeit aufgrund der teilweise geringen Größe europäischer Länder und dem damit zusammenhängenden Zwang, schnell international skalieren zu können, um so zufriedenstellende Wachstumsraten zu erreichen. Des Weiteren wurde der vergleichsweise geringere Fokus auf das Umsatzwachstum in Europa mit fehlenden Mitteln für eine schnelle Expansion begründet. Gleichzeitig wird der starke Fokus der US-amerikanischen Investoren auf Umsatzwachstum mit der höheren Tendenz zu einem Börsengang in den USA begründet, bei dem hohe Umsätze als Werttreiber dienen. Die Ergebnisse dieses Kapitels versetzen Unternehmensgründer in die Lage, ihre Bewerbung stärker an die wichtigsten Kriterien der potenziellen Investoren auszurichten, um so die Wahrscheinlichkeit einer erfolgreichen Investitionsentscheidung zu erhöhen. Des Weiteren bieten die Ergebnisse des Kapitels Investoren, die sich an grenzüberschreitenden syndizierten Investitionen beteiligen, die Möglichkeit, die Präferenzen der anderen Investoren besser zu verstehen und die Investitionskriterien besser auf potenzielle Partner abzustimmen.

Kapitel 4 untersucht ob bestimmte Charaktereigenschaften des sogenannten Schumpeterschen Entrepreneurs einen Einfluss auf die Wahrscheinlichkeit eines zweiten Risikokapitalinvestments haben. Dazu wurden von Gründern auf Twitter gepostete Nachrichten sowie Information von Investitionsrunden genutzt, die auf der Plattform Crunchbase zur Verfügung stehen. Insgesamt wurden mithilfe einer Textanalysesoftware mehr als zwei Millionen Tweets von 3313 Gründern analysiert. Die Ergebnisse der Studie deuten an, dass einige Eigenschaften, die typisch für Schumpetersche Gründer sind, die Chancen für eine weitere Investition erhöhen, während andere keine oder negative Auswirkungen haben. So erhöhen Gründer, die auf Twitter einen starken Optimismus sowie ihre unternehmerische Vision zur Schau stellen die Chancen auf eine zweite Risikokapitalfinanzierung, gleichzeitig werden diese aber durch ein zu starkes Streben nach Erfolg reduziert. Diese Ergebnisse haben eine hohe praktische Relevanz für Unternehmensgründer, die sich auf der Suche nach Risikokapital befinden. Diese können dadurch ihr virtuelles Auftreten („digital identity“) zielgerichteter steuern, um so die Wahrscheinlichkeit einer weiteren Investition zu erhöhen.

Abschließend wird in Kapitel 5 untersucht, wie sich die digitale Identität der Gründer verändert, nachdem diese eine erfolgreiche Risikokapitalinvestition erhalten haben. Dazu wurden sowohl Twitter-Daten als auch Crunchbase-Daten genutzt, die im Rahmen der Erstellung

der Studie in Kapitel 4 erhoben wurden. Mithilfe von Textanalyse und Paneldatenregressionen wurden die Tweets von 2094 Gründern vor und nach Erhalt der Investition untersucht. Dabei kann gezeigt werden, dass der Erhalt einer Risikokapitalinvestition das Selbstvertrauen, die positiven Emotionen, die Professionalisierung und die Führungsqualitäten der Gründer erhöhen. Gleichzeitig verringert sich allerdings die Authentizität der von den Gründern verfassten Nachrichten. Durch die Verwendung von Interaktionseffekten kann zudem gezeigt werden, dass die Steigerung des Selbstvertrauens positiv durch die Reputation des Investors moderiert wird, während die Höhe der Investition die Authentizität negativ moderiert. Investoren haben durch diese Erkenntnisse die Möglichkeit, den Weiterentwicklungsprozess der Gründer nach einer erfolgreichen Investition besser nachvollziehen zu können, wodurch sie in die Lage versetzt werden, die Aktivitäten ihrer Gründer auf Social Media Plattformen besser zu kontrollieren und im Bedarfsfall bei ihrer Anpassung zu unterstützen.

Die in den Kapiteln 2 bis 5 vorgestellten Studien dieser Dissertation tragen damit zu einem besseren Verständnis der Entscheidungsfindung im Venture Capital Prozess bei. Der bisherige Stand der Forschung wird um Erkenntnisse erweitert, die sowohl den Einfluss der Eigenschaften der Investoren als auch der Gründer betreffen. Zudem wird auch gezeigt, wie sich die Investition auf den Gründer selbst auswirken kann. Die Implikationen der Ergebnisse, sowie Limitationen und Möglichkeiten künftiger Forschung werden in Kapitel 6 näher beschrieben. Da die in dieser Dissertation verwendeten Methoden und Daten erst seit wenigen Jahren im Kontext der Venture Capital Forschung genutzt werden, beziehungsweise überhaupt verfügbar sind, bietet sie sich als eine Grundlage für weitere Forschung an.

# Chapter 1

## Introduction

*The introduction is separated into two sections: Section 1.1 describes the motivation of this thesis and its connection to related research. Section 1.2 outlines the studies that were conducted in this thesis and states the research question of each chapter.*

## 1.1 Motivation

In an increasingly digitalized world, in which product life cycles are becoming shorter and shorter and companies are outbidding each other more and more in the innovations they offer, young innovative companies have embarked on an unprecedented triumphant march in the last decades. For example, six of the ten most valuable companies in the world were founded in the last 30 years, two of them less than 20 years ago (Statista, 2021)<sup>1</sup>. These entrepreneurial activities can have strong economic implications. Research has shown that entrepreneurial activity has (inter alia) a significant positive effect on GDP growth, increase in employment rates and innovative output (e.g., Block et al., 2017; Van Praag and Versloot, 2007; Van Steel et al., 2005). Acknowledging the importance of innovative venture creation, policy makers around the world started to improve the conditions for entrepreneurs, for example by providing governmental funding opportunities or offering startups the opportunity to form innovation alliances with governmental institutions (e.g., Giraudo et al., 2019; Doblinger et al., 2019). Despite government efforts to improve the conditions for startups, one of the reasons that lead to failure or that may even hinder potential entrepreneurs to start a company is the lack of financial resources.

Most startups obtain their capital at the beginning mainly from the savings of the founders and their families and friends (Cotei and Farhat, 2017). However, startups, especially highly innovative startups, quickly reach their financial limits and are often forced to rely on external financiers (e.g., Freear and Wetzel, 1990; Audretsch and Lehmann, 2004). These startups may usually follow either a debt-based, or an equity-based funding. Due to asymmetric information, a high risk of failure, and comparably small assets, startups are often not able to obtain sufficient funding via debt-based instruments and therefore have to choose an equity-based funding approach (e.g., Cantamessa et al., 2018; Carpenter and Petersen, 2002). Besides the opportunity of an initial public offering (IPO), which is usually executed at later stages of the startups' life cycles, one of the most prominent types of equity-based funding is the acquisition of venture capital (VC).

VC firms act as intermediaries by raising funding from external investors, selecting promising startups in which they invest, increasing the company's value within the time in which they have invested through active support, and executing an exit after about two to seven years

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<sup>1</sup> These companies are (founding year in brackets): Amazon (1994), Tencent (1998), Alphabet (1998; previously known as Google), Alibaba Group (1999), Tesla (2003), and Meta Platforms (2004; previously known as Facebook).

(Cumming and Johan, 2008a; Gompers and Lerner, 2001; Gompers et al., 2020; Gorman and Sahlman, 1989). The startups' way to eventually be selected as a target investment by the VC firm starts in most cases via a formal proposal. Subsequently, the VC firm's decision process may be divided into three phases. First, a screening phase in which the VC investor pre-selects promising ventures, second an evaluation phase in which the VC investor performs intense due diligence to evaluate the ventures value, and finally the investment decision and contracting (Fried and Hisrich, 1994; Gompers et al., 2020). Whereas only about one to four percent of all proposals will finally receive a VC investment, the highest hurdle to overcome is the first screening in which about 80% of all proposals get rejected (Franke et al., 2004).

Although previous research is not clear on whether the success of VC firms is mainly due to a treatment effect (i.e., active management and support of portfolio companies) or a selection effect (i.e., accurate selection of promising companies), VC investors mainly attribute their success to their good selection skills (Bertoni et al., 2011; Croce et al., 2013; Gompers et al., 2020). A considerable amount of research dealing with the screening phase in the VC investment process mainly examines which criteria of the startups as well as founding teams are beneficial regarding the investment decision. For example, VC investors favor founders who have entrepreneurial experience and startups that are able to show a working prototype and good future prospects of the startups' industry growth and profitability (e.g., Hall and Hofer, 1993; Mac-Millan et al., 1987).

A major problem in examining the importance of different screening criteria is that investors use multiple criteria conjointly, making post hoc analyses with interviews or questionnaires prone to biases (Sharma, 2015). Whereas earlier research from the 1970s to early 1990s often relied on these qualitative methods (e.g., Wells, 1974; Tyebjee and Bruno, 1984; Hall and Hofer, 1993), making use of real-time methods such as conjoint analyses was proposed by Shepherd and Zacharakis (1999). This concluded a new stream of VC screening criteria research that attempts to uncover insights that are closer to real investment decisions (e.g., Shepherd et al., 2003; Franke et al., 2006; Hsu et al., 2014; Block et al., 2019). More recently, researchers have also started to incorporate data from social media platforms to better understand the screening process of VC investors, for example by analyzing the founders' digital identities on these platforms (e.g., Fisch and Block, 2021; Tumasjan et al., 2021).

This dissertation contributes to the understanding of VC investors' decision criteria with methods more closely related to real-world decisions and real-world data. Separated into two parts, the first half of this thesis utilizes data collected from a conjoint experiment to investigate

the importance of VC screening criteria. It shows different levels of importance depending on differing characteristics of the VC firm and the funded companies. The second half of this thesis utilizes an innovative text analysis approach, examining data from founders on Twitter. It shows the influence that entrepreneurs' digital identities have on the VC investment process and the degree to which these digital identities change after a successful VC acquisition.

## **1.2 Chapters and research questions**

This thesis is divided into two parts. The first part (chapters 2 and 3) investigates characteristics of the startups as well as the VC investors and their influence on the chances of a successful funding. Both chapters use data from a conjoint experiment that allows to assess the importance of certain traits of the potential portfolio company, depending on the investors' educational background and experience (chapter 2) and the investors' location (chapter 3). The second part (chapters 4 and 5) uses data from the personal Twitter accounts of founders and investment information from Crunchbase. This bears the ability to analyze the founders' digital identities and how they influence the chances of a second investment (chapter 4) and how the digital identity may change after a first successful investment (chapter 5). The following sections (1.2.1 to 1.2.4) summarize the four studies and outline the research questions (RQ) of each study.

### **1.2.1 Chapter 2: The role of the decision maker's education and experience in VC screening**

VC investors' process of making an investment decision has been researched extensively in the past decades and provides a good overview of the criteria that are used for the final decision (e.g., Fried and Hisrich, 1994). For example, the investors assess the ventures' management team, products and services, or the industry in which the company operates in (e.g., Gompers et al., 2020; Hoenig and Henkel, 2015; Hsu et al., 2014; Shepherd et al., 2003; Warnick et al., 2018). Although the criteria and their importance are known, we know little about how the characteristics of the VC investors may influence the ranking of these criteria when making their decision. VC investors may differ regarding their educational background and investment or entrepreneurial experience (Dimov and Shepherd, 2005). Chapter 2 addresses these differences and investigates how they affect the decision-making in the screening process. Hence, the chapter is guided by the following research question:

***RQ 1:** How and to what extent do VC investors' educational background, investment experience, and entrepreneurial experience affect the importance of decision criteria in the screening process.*

An experimental choice-based conjoint (CBC) analysis, which comprises seven screening criteria, combined with a questionnaire that captures the respondents personal background is conducted to answer this research question. The answers of 229 participating investors provide insights on how their education, entrepreneurial experience, and investment experience influence the importance they attribute to the screening criteria.

### **1.2.2 Chapter 3: Differences in screening criteria between US and European VC investors**

The United States (US) is regarded as the origin of VC investments and therefore it is considered to be the most mature VC market (Megginson, 2004). Although VC is now present in most parts of the world and the basic principles of VC investments remained the same then the original principles in the US, VC markets may differ substantially. For example, banks and governments are more often involved in VC funds in the European VC market, while in contrast, US funds heavily depend on pension funds (e.g., Gompers and Lerner, 2001; Megginson, 2004). Although previous research has shown that VC markets differ across countries, little is known about how and why investors located in different markets may attribute different levels of importance to screening criteria when making an investment decision. Chapter 3 addresses this gap with the following research question:

***RQ 2:** How, to what extent, and why does the importance attributed to screening criteria differ between VC investors located in the US and VC investors located in continental Europe?*

Using a sequential multimethod design, consisting of qualitative and quantitative research methods, chapter 3 attempts to answer this question. A conjoint experiment with 430 participating investors from the US and continental Europe is conducted to investigate if the importance attributed to several screening criteria differs, depending on the location of the investor. To interpret the results found in the conjoint experiment, and following the multimethod design, the differences are then discussed in interviews with four investors located in the US and seven investors located in continental Europe.

### 1.2.3 Chapter 4: Schumpeterian entrepreneurial impression and VC acquisition

One particular type of founder is known in the literature as the so-called "Schumpeterian founder". They are known for their visionary actions, creation of new markets, and destroying existing market equilibria (Schumpeter, 1934). To be able to establish their startups, which are often characterized by high risks and high financial demands, these founders need substantial external funding (e.g., Gompers and Lerner, 2001). Although VC firms tend to look out for highly innovative and visionary Schumpeterian entrepreneurs, not all traits of these entrepreneurs might fit well with the business model of the VC industry. This type of entrepreneurs, due to their high intrinsic motivation, might be less prone to follow the VCs demands. Prior research was not able to show if the traits that are characteristic for Schumpeterian entrepreneurs are actually honored by VC investors. Hence, chapter 4 addresses the following question:

***RQ 3:** Which characteristics of a Schumpeterian entrepreneur are beneficial and which characteristics are detrimental when applying for VC funding?*

To answer this research question, chapter 4 investigates the impression that Schumpeterian entrepreneurs display on social media and how particular Schumpeterian personality traits affect the chances for acquiring a second round of VC funding. The study utilizes written text from Twitter, created by 3,313 founders, computational text analyses, and information on VC investments from Crunchbase.

### 1.2.4 Chapter 5: How does entrepreneurial success change an entrepreneur's digital identity

Whereas chapters two to four investigate the selection criteria that VC investors apply when making their investment decision, chapter five investigates the impact of the investment on the founders' digital identities. Prior research has shown that the founders are aware of their role as entrepreneurs and that they try to align to this role (Cardon et al., 2009). This alignment is complex and evolves over time due to external factors (Wagenschwanz, 2001). The direction towards the founders' identities develop and which events cause these developments have received little attention in the literature. A cause that might trigger a development of the founders' identities might be a successful VC investment. Startups undergo substantial changes after the acquisition of VC, for example a faster professionalization and growth (e.g., Hellman and Puri, 2002; Davila et al., 2003). These changes might also affect the founders themselves. To detect changes in the founders' identities, recent research started to investigate the founders' digital

identities, that are displayed via social media (e.g., Fisch and Block, 2021). Chapter 5 attempts to answer the following research question:

***RQ 4: Does the successful acquisition of a VC investment change the founder's digital identity and if so, which factors influence the change?***

Chapter 5 uses data from Twitter and Crunchbase to answer this question. Tweets from 2,094 founders who have received VC were collected and divided into Tweets posted before the investment and after the investment. Combined with funding information from Crunchbase, e.g., funding amount, chapter 5 is able to detect changes in the entrepreneurs' digital identities by using computational text analysis and panel regressions.

## Chapter 2

### **The role of the decision maker's education and experience in VC screening**

*We assess whether and how VC investors' education and experience influence their screening decisions of potential investee candidates. Empirically, we perform an experimental choice-based conjoint (CBC) analysis with 229 individual VC investors. Our results highlight that the level and field of education, as well as the decision maker's investment and entrepreneurial experience, moderate the relative importance of different screening criteria. More specifically, we find that international scalability becomes more important for decision makers with higher education and those with entrepreneurial experience. Whereas decision makers with a background in natural science focus on the value-added of the product or service, engineers seem to value a break-even profitability and focus less on the management team. Investment experience, on the other hand, leads to a stronger focus on the management team. Our study contributes to the literature investigating the influence of human capital characteristics of the decision maker in venture financing. Practical implications exist for entrepreneurial ventures seeking financing and for risk capital investors making investments in such ventures.*

#### **This chapter is based on**

Moritz, A., Diegel, W., Block, J., and Fisch, C., (2022). VC investors' venture screening: the role of the decision maker's education and experience. *Journal of Business Economics*, 92(1), 27–63.

## 2.1 Introduction

Management research comprehensively documents that strategic decisions of companies are affected by the human capital of the individuals in charge (e.g., Datta and Iskandar-Datta, 2014; Hambrick et al., 1996; Hambrick and Mason, 1984; Wang et al., 2016a). Extending these arguments to the context of VC, prior studies argue that VC investors' experience and expertise influence their venture screening and evaluation processes (e.g., Dimov et al., 2007; Dimov and Shepherd, 2005; Franke et al., 2008; Shepherd et al., 2003).

A large number of studies identify important screening criteria of VC investors when assessing entrepreneurial ventures such as management team characteristics, product characteristics, as well as market and industry factors (e.g., Franke et al., 2008; Gompers et al., 2020; Hoenig and Henkel, 2015; Hsu et al., 2014; Shepherd et al., 2003; Warnick et al., 2018). However, little is known about how the importance of these criteria varies due to the individual characteristics of the decision maker, such as education and experience. Since the vast majority of venture proposals are rejected in the screening phase where a single decision maker typically screens the venture (e.g., Block et al., 2019; Gompers et al., 2020), an understanding of the importance of different screening criteria used, and, in particular, how and whether the importance is influenced by the decision maker's individual characteristics is crucial (e.g., Dimov and Shepherd, 2005).

We tap into this research gap by exploring how VC investor's education and experience influence the importance of different screening criteria. While prior research argues that education provides the knowledge base as well as analytical and problem-solving skills, experience enables decision makers to focus on key dimensions and ignore less important factors (Shepherd et al., 2003; Watson et al., 2003). For example, an education in business has been associated with risk-averse behavior and a stronger focus on financials (Carpenter et al., 2004; Slater and Dixon-Fowler, 2010). Besides, experience affects the ability to identify promising startups and detect opportunistic behavior (Dimov and Shepherd, 2005; Scarlata et al., 2016; Walske and Zacharakis, 2009; Zarutskie, 2010). However, it is an open question of how the education and experience of the individual VC decision maker affect the screening criteria to identify potential portfolio companies. Therefore, the following research question is at the core of our study: How and to what extent do VC investors' educational background, investment experience, and entrepreneurial experience affect the relative importance of decision criteria in the screening process.

Our study is exploratory because the effect of education and experience on the relative importance of different screening criteria is not easy to predict. We develop and conduct an experimental CBC analysis that uses seven screening criteria that are important in the screening phase of a potential VC investment (e.g., Block et al., 2019). Our sample comprises 229 individual VC investors. The results identify *revenue growth*, *value-added of the product or services*, *track record of the management team*, and *international scalability* as the most important screening criteria. *Profitability*, the *business model*, and the *current investors* of the firm seem to be of lower importance. However, our results highlight that the relative importance attributed to the different screening criteria is moderated by the decision maker's education and experience. Whereas the importance of international scalability increases with an increased level of education, the importance of current profitability decreases. Regarding the field of education, we find that decision makers with an engineering background prefer startups with break-even profitability and focus less on the management team, those with a natural science background are particularly interested in the value-added of the product or service and those with a business education seem to value the ease of international scalability less. Decision makers with a high degree of investment experience value the track record of the management team particularly high while decision makers with entrepreneurial experience put more weight on the international scalability of the business.

With these results, we contribute to the literature on how decision makers differ in their assessment of ventures (e.g., Franke et al., 2008; Shepherd et al., 2003). We show that the two individual human capital characteristics education and experience of the decision maker can explain some of these differences. More specifically, we add to prior research on experience in the VC context by showing that the prior investment and entrepreneurial experience of the decision maker affect the importance of different screening criteria (Franke et al., 2008; Scarlata et al., 2016; Shepherd et al., 2003; Walske and Zacharakis, 2009; Zarutskie, 2010). Furthermore, we connect the literature on the consequences of the field of education (Ghoshal, 2005; Hambrick and Mason, 1984; Slater and Dixon-Fowler, 2010) with the venture screening context. And third, we contribute to the literature on the screening criteria of risk capital investors (e.g., Gompers et al., 2020, Hoenig and Henkel, 2015; Hsu et al., 2014; Warnick et al., 2018) by investigating ventures in their growth and expansion stage where additional criteria become available.

Our study is also of practical relevance. Our results inform entrepreneurial ventures about which criteria matter for obtaining VC financing. In particular, revenue growth, value-added of

the product, and the management team seem to play an important role in this regard. VC investors can use these results to benchmark their screening criteria against the market. This study can also help them to identify potential biases regarding the screening criteria resulting from the education and experience of their decision makers.

## **2.2 Theoretical background**

### **2.2.1 Venture evaluation process and investor's screening criteria**

VC investors typically assess new venture proposals in a multistage evaluation process (Gompers et al., 2020; Tyebjee and Bruno, 1984). In the initial screening phase, investors (who could be a senior partner, a junior partner, an associate, or a junior analyst, depending on the size of the VC (Gompers et al., 2020)) aim to drastically reduce the number of proposals and focus only on those proposals which match the VC's broad screening criteria and preferences (Dimov et al., 2007; Franke et al., 2008). After overcoming this crucial hurdle, the investor typically invites the venture's management team for a personal meeting to present the investment opportunity to other members of the VC firm. If the members of the VC team are convinced after this meeting, the investment proposal will typically be evaluated by (other) partners of the VC firm before a formal process of due diligence is initiated (Petty and Gruber, 2011). If the venture passes this due diligence process, a decision to invest is made (Gompers et al., 2020).

While Petty and Gruber (2011) find that around 20% of the venture proposals make it through the screening phase, Gompers et al. (2020) state that around 99% of venture proposals are already rejected in this phase. At this stage, only one individual member of the firm usually screens the venture (Gompers et al., 2020) and relies on a relatively small set of decision criteria (Zacharakis and Meyer, 1998). These criteria change as the evaluation process progresses so that the decision criteria and their respective weight differ by evaluation stage (Gompers et al., 2020; Kollmann and Kuckertz, 2010; Petty and Gruber, 2011).

Numerous studies investigate the screening criteria of risk capital investors. We summarize the main findings of this research in Table 1. In summary, the most important screening criteria include the entrepreneur and the management team (e.g., Franke et al., 2006, 2008; Warnick et al., 2018), product and service offerings (e.g., Hoenig and Henkel, 2015; Tyebjee and Bruno, 1984), as well as the industry and market environment (e.g., Kollmann and Kuckertz, 2010; Bachher and Guild, 1996). Financial criteria, including venture performance

measures, have been found to only play a minor role in the screening decision (e.g., MacMillan, et al., 1987; Muzyka et al., 1996; Tyebjee and Bruno, 1984).

**Table 1.** Prior studies on risk capital investor's (screening) criteria.

<i>Study</i>	<b>Screening criteria</b>					
	<i>Entrepreneur/Management team</i>	<i>Product, services, and business model</i>	<i>Industry and market</i>	<i>Other investors</i>	<i>Profitability</i>	<i>Revenue</i>
Tyebjee and Bruno (1984)	x	x	x		x	
MacMillan, Siegel, and Subbanarasimha (1985)	x	x	x			
Knight (1986)	x	x	x			
Khan (1987)	x	x				
MacMillan, Zemann, and Subbanarasimha (1987)	x	x	x		x	x
Sandberg, Schweiger, and Hofer (1988)	x	x	x		x	x
Carter and Van Auken (1992)	x	x	x		x	
Riquelme and Rickards (1992)*	x	x	x			
Fried and Hisrich (1994)	x	x	x			
Knight (1994)	x	x	x			
Elango et al. (1995)	x	x	x			
Bachher and Guild (1996)	x	x	x		x	
Muzyka, Birley, and Leleux (1996)*	x	x	x		x	
Wright and Robbie (1996)	x	x	x		x	x
Boocock and Woods (1997)	x	x	x			
Karsai, Wright, and Filatotchev (1997)	x					
Zacharakis and Meyer (1998)	x	x	x			
Bliss (1999)	x		x			
Feeney, Haines, and Riding (1999)	x	x	x		x	
Shepherd (1999a)*	x	x	x			
Shepherd (1999b)*	x	x	x			
Shepherd, Ettenson, and Crouch (2000)*	x		x			
Shepherd, Zacharakis, and Baron (2003)*	x	x	x		x	
Mason and Stark (2004)	x	x	x			
Silva (2004)	x	x	x	x		
Franke et al. (2006)*	x					
Franke et al. (2008)*	x					
Kirsch, Goldfarb, and Gera (2009)	x					
Kollmann and Kuckertz (2010)	x	x	x			
Murnieks et al. (2011)*	x					
Petty and Gruber (2011)	x	x	x			
Hsu et al. (2014)*	x				x	
Chan and Park (2015)	x	x		x		
Hoenig and Henkel (2015)*	x	x				
Warnick et al. (2018)*	x					
Gompers et al. (2020)	x	x	x			
<b>Our study</b>	<b>x</b>	<b>x</b>	<b>x<sup>a</sup></b>	<b>x</b>	<b>x</b>	<b>x</b>

Notes: Studies marked with \* use conjoint analysis as a method. <sup>a</sup> = held constant in the conjoint analysis.

### **2.2.2 The influence of education and experience on venture capitalists' decision-making**

Prior research shows that decision makers' individual human capital characteristics, such as education and experience, directly affect their belief structures, attitudes, and, ultimately, their decisions (e.g., Becker, 1964; Hambrick and Mason, 1984). More specifically, research shows that education and experience are important to develop knowledge structures and rules which help individuals to make decisions and influence how they evaluate opportunities (Shane et al., 2003; Walsh, 1995; Wood and Williams, 2014). Prior research typically distinguishes between level and field of education as well as the amount and type of experience as determinants for decision-making.

#### **2.2.2.1 Education and venture capital decision-making**

The level of education typically refers to the attained level of *formal* education. The level of formal education is an indicator of an individual's cognitive abilities (e.g., Hambrick and Mason, 1984; Hitt and Tyler, 1991; Pelled, 1996; Wiersema and Bantel, 1992). Individuals are boundedly rational, and their ability to handle multiple and complex decision criteria is constrained by their cognitive abilities (March and Simon, 1958). Higher levels of education are also indicative of more abstract ways of thinking and problem-solving skills (Gibbons and Johnston, 1974; Wiersema and Bantel, 1992). Also, higher levels of education could result in more specialized and focused cognitive models (Hitt and Tyler, 1991). For example, individuals with a higher level of formal education have higher awareness and receptiveness for innovation (Bantel and Jackson, 1989; Hambrick and Mason, 1984; Wiersema and Bantel, 1992). Notably, this difference seems to be associated less with the specific knowledge or techniques learned during formal education than with a more general ability to confront complex situations.

Focusing on the field of education, individuals with different educational backgrounds develop different knowledge bases and have different skill sets (Gruber et al., 2013; Unger et al., 2011). Hence, the field of study chosen reflects the personality and shapes the perspectives of an individual (Wiersema and Bantel, 1992; Woolnough, 1994). The acquired knowledge can either be more general or more specific depending on the chosen subject (Dimov and Shepherd, 2005; Zarutskie, 2010). For example, specific education in business schools might result in less innovative and less risk-prone behavior (Ghoshal, 2005; Slater and Dixon-Fowler, 2010). The consequence is that decision makers with such an education try to avoid big losses or mistakes (Hambrick and Mason, 1984) and focus more strongly on financials and more specifically on profit maximization (Ghoshal, 2005; Slater and Dixon-Fowler, 2010). In the context of VC

research, having an MBA might harm fund performance (Zarutskie, 2010). On the other hand, having an engineering or natural sciences background has been argued to be more product-focused and task-related (Gruber et al., 2013; Hambrick and Mason, 1984; Wiersema and Bantel, 1992). Furthermore, a more general education, such as an education in humanities, results in a lower ability to detect specific risks but, at the same time, helps to facilitate the integration and accumulation of new knowledge (Dimov and Shepherd, 2005; Gimeno et al., 1997; Zarutskie, 2010). In summary, prior literature shows that both the level and field of education influence decision makers' cognitive abilities and knowledge structures and hence, influence their decision-making behavior.

### **2.2.2.2 Experience and venture capital decision-making**

A large amount of prior research investigates the influence of experience on decision-making behavior (e.g., Bonner, 1990; Gibbons and Waldman, 2004; Reuber, 1997). This research finds that experience shapes decision makers' risk-taking behavior by affecting their use of heuristics and mental shortcuts but also triggers biases such as overconfidence (Parhankangas and Hellström, 2007; Shepherd et al., 2003; Sitkin and Pablo, 1992). In particular, task-specific experience provides tacit knowledge, domain familiarity, and the skill-set to make evaluated decisions and achieve higher performance (Dimov and Shepherd, 2005; Gibbons and Waldman, 2004; McEnrue, 1988; Reuber, 1997).

In the context of VCs, investment experience helps investors to develop an accurate perception of risk, return, and investment opportunities (Dimov and Shepherd, 2005; Scarlata et al., 2016; Walske and Zacharakis, 2009; Zarutskie, 2010). With an increased investment experience, they become more secure in their ability to make decisions on portfolio companies (MacMillan et al., 1987; Shepherd et al., 2003). In this context, Franke et al. (2008) show that novice and experienced VC decision makers differ in their evaluation of ventures' team characteristics.

Task-specific experience in the context of VCs can also be related to a decision maker's experience as an entrepreneur. Prior research argues that entrepreneurial experience shapes an individual's cognitive models and opportunity recognition behavior (Baron and Ensley, 2006; Delmar and Shane, 2006). More specifically, prior entrepreneurial experience affects the evaluation of entrepreneurial opportunities such as newness or profitability (Baron and Ensley, 2006; Shane et al., 2003). Hence, VC decision makers with own entrepreneurial experience have been argued to evaluate startups differently than VC decision makers without this specific

experience (Zarutskie, 2010). Also, prior research shows that entrepreneurial experience affects the ability to identify promising startups (Walske and Zacharakis, 2009; Zarutskie, 2010) and to detect opportunistic behavior (Scarлата and Alemany, 2009; Walske and Zacharakis, 2009).

In summary, while education provides the knowledge base as well as analytical and problem-solving skills, task-specific experience enables decision makers to focus on key dimensions and ignore less important variables (Shepherd et al., 2003; Watson et al., 2003). By combining education and experience in their cognitive structure, decision makers create schemata that enable them to form an opinion (Franke et al., 2008; Matlin, 2005). Based on these results, we expect that decision makers' level and field of education as well as their investment and entrepreneurial experience shape their schemata and influence their evaluation of different screening criteria.

## **2.3 Method, data, and variables**

### **2.3.1 Identifying screening criteria through prior literature and expert interviews**

To identify a list of screening criteria used by VC investors, we first derived a list of possible criteria from prior research. We then conducted 19 expert interviews with risk capital investors from Europe and North America to identify their most relevant investment criteria. The interviews were transcribed and coded by two researchers to identify the most relevant criteria, which formed the basis of the conjoint study. We triangulated the findings from the interviews with archival data such as the investor's websites and with informal expert interviews.

Table 2 reports the most frequently mentioned criteria used by risk capital investors in their initial screening of ventures and their operationalization in our conjoint study. These criteria are (1) revenue growth, (2) profitability, (3) track record of management team, (4) current investors, (5) business model, (6) value-added of the product or service, and (7) international scalability.

**Table 2.** Attributes and levels of the conjoint analysis.

Attribute	Levels	Description
Revenue growth (4 levels – ordinal)	10% p.a.	Represents the venture's average yearly revenue growth rate over the last years.
	20% p.a.	
	50% p.a.	
	100% p.a.	
Profitability (3 levels – ordinal)	Not profitable	Describes the current profitability of the venture.
	Break-even	
	Profitable	
Track record of the management team (3 levels – ordinal)	No team member	Describes whether the management team has a relevant track record (e.g., industry experience or leadership experience).
	Some team members	
	All team members	
Current investors (3 levels – nominal)	No external investors	Describes the type of current investor, if any.
	External investors - unfamiliar to you	
	External investors - tier I	
Business model (4 levels – nominal)	Lock-in	Describes the key focus of the venture's business model:  - Lock-in: Business model that keeps customers attracted and "locked-in", having high switching costs for customers, which prevent them from changing to other providers.  - Innovation-centered: Business model that offers innovation in the form of new technology, products, or services.  - Low cost: Business model focusing on reducing costs for customers for already existing products or services.  - Complementary offering: Business model that bundles multiple goods or services to generate more value for customers.
	Innovation-centered	
	Low cost	
	Complementary offering	
Value-added of product or service (3 levels – ordinal)	Low	Describes the value-added for the customer through the product or service. Low value-added represents marginal improvement (e.g., in cost reduction or service quality), whereas high value-added represents significant improvements.
	Medium	
	High	
International scalability (3 levels – ordinal)	Easy	Describes the difficulty of scaling the venture internationally in terms of the time and investment needed.
	Moderate	
	Difficult	

### 2.3.2 Type of conjoint study and experimental design

To evaluate the importance attached to the different screening criteria, we conducted a quantitative conjoint study. Our experimental approach and the main dataset used are the same as described in Block et al. (2019) and Andres (2018). Yet, the research question, sample, and analysis of this study differ substantially.

We use a CBC analysis, in which the participants are presented with two ventures and are asked to select the one venture that better matches their investment preferences. We chose a CBC approach because market participants come to a discrete decision ("yes" or "no"; "go

further” or “reject”) within their actual screening activities to decide which ventures to investigate further and which to eliminate (Boocock and Woods, 1997; Fried and Hisrich, 1994; Tyebjee and Bruno, 1984).

To enable a holistic assessment of the proposed ventures by our respondents, our CBC presents all attributes from Table 2. Because the number of possible attribute combinations would create too many choice tasks that could not be handled by the participants, we use a reduced conjoint design (Chrzan and Orme 2000; Kuhfeld et al., 1994). The reduced conjoint design was used to create 800 different experimental designs, from which the participants had to complete 13 random choice tasks. For each task, participants must decide which of the alternative ventures presented they prefer. Additionally, each participant was asked to complete two fixed choice tasks. The two fixed tasks are identical for all participants and do not rely on an experimental design in order to test the retest reliability of participants.

Research indicates that participants in a conjoint experiment should not be exposed to more than 20 choice tasks (Johnson and Orme, 1996). A pretest with four researchers and four investors revealed that 13 random and 2 fixed choice tasks constitute an adequate length. The pre-testers also confirmed our selection of criteria and the particular scales to be an appropriate portrayal of screening decisions.

To avoid biases through order effects, which may occur in conjoint studies, we randomized the order of the choice tasks and the order of options within each task (i.e., the order of the attributes). Although the order of tasks and options is randomized between participants, it is consistent for each individual.

### **2.3.3 Choice tasks and survey on the characteristics of the decision maker**

The set of choice tasks presented to each respondent was prefaced by a short description, which clarified that every venture presented is supposed to match the investor's geographical, industrial, and investment size preferences. In this description, we also clarified that the target ventures are ventures in later stages. That is, the target ventures have passed the startup stage and are not yet in a maturity or bridge stage. Instead, the ventures are in a stage of early growth or expansion. We further clarified that the ventures already have market traction, a validated business model, multiple paying customers, growth in sales and customers, and multiple employees. Additionally, we described the ventures that participants could choose from as all being active in the same industry and as having the same level of revenues. This keeps the variables constant

across participants. The introductory slide is displayed in Figure A1 (Appendix). Then, participants were told that they would be confronted with two different ventures from which they should choose the one that best matches their investment preferences. The two ventures are described in terms of the identified screening criteria (“attributes”) and only differ from each other in the respective specification of these criteria (“attribute levels”).

We conducted a pretest with four investors and four scientists to check the face validity of the attributes and the attribute levels as well as the complexity of the choice task. Figure A2 (Appendix) shows an example of a choice task that the participants were confronted with.

After completing the choice tasks, participants were asked to complete a survey about the characteristics of the decision maker and the investment company. The survey, which is shown in Figure A3 (Appendix), collected detailed information on the level and field of education, entrepreneurial experience, and investment experience of the decision maker.

#### **2.3.4 Variables**

##### **2.3.4.1 Conjoint experiment variables**

To assess the attributes' importance, we construct a dummy variable for each attribute level that takes a value of “1” if the respective attribute level is shown as a characteristic of the particular venture. For example, if in a choice task a venture's profitability is stated to be “break-even”, the dummy variable “Profitability: break-even” takes a value of “1” while the other variables of this attribute (i.e., “Profitability: profitable” and “Profitability: not profitable”) both take a value of “0”.

Our dependent variable “preference of the decision maker” determines whether a venture was selected by the respondent or not. The variable takes a value of “1” if the investor prefers the shown venture and “0” if he chooses the alternative venture. This allows us to perform logistic regressions that assess whether certain attribute levels increase or decrease the probability that a venture is selected by an investor.

##### **2.3.4.2 Education, entrepreneurial experience, and investment experience variables**

To measure the level of education, participants indicated their highest formal educational degree. We constructed three dummy variables that represent each level of education: “Bachelor's degree”, “Master's degree or MBA”, and “PhD or doctoral degree”. Participants were further asked to indicate their main field of study, which we used to construct dummy variables to

distinguish the respondents' educational background. Hence, the variables "Business", "Natural science" and "Engineering" take a value of "1" if the respondent has been educated solely in the respective field and a "0" otherwise.

To capture the investors' entrepreneurial experience, we asked the participants if they have started their own company and, if yes, how many companies they have founded. We created two dummy variables with this information. The variable "Entrepreneur" takes a value of "1" if the investor started at least one company and "0" otherwise. The variable "Serial entrepreneur" takes a value of "1" if the investor stated to have founded more than one company and "0" if he/she has founded only one company or no company at all. Finally, we distinguish between experienced and inexperienced investors by asking how many years they have worked as investors. The variable "Investment experience high" takes a value of "1" if the investor stated to have worked as an investor for eight years or more, and "0" for less than eight years. Eight years is the median experience in our sample.

### **2.3.5 Sample**

We collected information on potential investors from Pitchbook at the beginning of 2016. Pitchbook is one of the most comprehensive VC databases and provided 15,600 addresses of individual decision makers who had invested in ventures in the growth or expansion stage at least once in the past. The participants were invited via email to participate in our conjoint experiment. We sent three reminders over five months and the data collection concluded at the end of 2016. We used a two-fold approach to ensure the participation of only those decision makers who have experience in growth venture financing. First, Pitchbook offers the ability to filter for investors that have done deals in certain stages. Hence, we only contacted decision makers that were involved in at least one venture financing deal in the last ten years since 2016 that was classified as series A, B, C, D, or expansion. Second, the invitation mail to our conjoint experiment asked decision makers to only participate if they have experience in later-stage venture financing. To make our understanding of the ventures as transparent as possible to respondents, we included an introductory slide outlining our understanding of later-stage ventures (Figure A1, Appendix).

In total, 749 individuals participated in our conjoint experiment accounting for 19,474 recorded decisions. Because the respondents were told that the presented ventures in the choice tasks match their usual geographical, industrial, and investment size preferences, the experi-

ment bears the danger that the investors evaluate the ventures differently, based on their industry focus. To decrease this problem, our analyses use a more homogeneous subsample. First, we only include investors that are exclusively active in IT-related industries such as “Software & services”, “IT infrastructure or systems”, or “E-Commerce”. Investors that invest, for example, in “Biotech” or “Consumer products” are excluded (N = 188). In addition, we exclude investors working for corporate venture capital funds, leveraged buyout funds, family offices, business angels, and debt funds (N = 160) because different types of investors follow distinctive investment strategies (Block et al., 2019). Furthermore, because we focus on investors that have experience in later stage investments, all investors that stated to exclusively invest in seed and/or early stages were excluded (N = 157). To ensure that the sample contains only investors with a formal education in a certain field, we excluded those participants whose highest educational degree is below a bachelor's degree (N = 3). In the last step, we dropped those investors whose field of education could not be identified clearly (N = 12). Our final sample consists of 229 investors and 5,954 decisions. On average, each choice task took the participants 21 seconds to complete.

Table 3 provides a descriptive overview of our sample. The majority of the participants are male (90%) and between 35 and 54 years old (53%). Regarding participants' level of formal education, 24% have a bachelor's degree, while 67% have a master's degree or an MBA. The remaining 8% hold a PhD or a doctoral degree. The majority of respondents has an educational background exclusively in business or economics (62%). 7% have a background exclusively in natural sciences and 9% exclusively in engineering. The remaining 22% received an education in multiple fields (e.g., in business/economics and engineering). The average investment experience is 11 years. Regarding the current position within the investment firm, most respondents in our sample are partners or CEOs (49%). About 17% are currently employed as directors or principals, 19% as analysts, and 15% as investment managers. 49% of the participants are working for independent VCs and 51% are working for growth equity funds. Concerning the geographical distribution of decision makers, the largest group indicated to have their headquarter in Europe (49%), followed by North America (29%). The remaining investors are headquartered in Asia (5%), South America (1%), Oceania or another region (15%).

**Table 3.** Descriptive overview of sample.

Variable	Percentages
<b>Demographic variables related to the decision maker</b>	
Male	90%
Age	
< 25 years	3%
25 – 35 years	33%
35 – 44 years	24%
45 – 54 years	29%
55 – 64 years	8%
> 64 years	3%
<b>Education and investment experience of the decision maker</b>	
Level of education (highest formal degree)	
Bachelor degree	24%
Master degree or MBA	67%
PhD or doctoral degree	8%
Field of education	
Business/economics	62%
Natural science	7%
Engineering	9%
Multiple fields of education	22%
Investment experience	Mean: 11 yrs.; Std. dev.: 8.0 yrs.; Min.:1 yr.; Max: 41 yrs.
Current position	
Partner / CEO	49%
Director / Principal	17%
Investment manager	15%
Analyst	19%
<b>Type of investor/investment company</b>	
Growth equity fund	51%
Venture capital (VC)	49%
<b>Location headquarter</b>	
Asia	5%
Europe	49%
North America	29%
South America	1%
Oceania and others	15%

Notes:  $N = 229$  decision makers.

We find no evidence of a late-response or non-response bias with regard to important descriptive variables (e.g., age, position in the firm). In addition, the two fixed tasks were used to test the retest reliability of participants' choices in the study. By assessing the ability of the 13 random choice tasks to predict the two fixed choice tasks, a proxy for this retest reliability can be estimated. This leads to a 79% accuracy rate, which is in line with prior studies (Shepherd, 1999b).

## **2.4 Results**

We analyze the importance of the screening criteria by employing a logit model. This approach allows us to initially assess the relative importance of all criteria and of several subsamples that display the importance of the criteria for certain groups such as investors with a bachelor's degree or with an education solely in engineering.

The screening decision made by participants (1 = chosen; 0 = not chosen) defines the dependent variable. We use different attribute levels as independent variables. Because our observations are hierarchically structured and nested within the individuals (multiple decisions are made by one individual, therefore the observations are not completely independent), we use multilevel regressions (Aguinis et al., 2013).

**Table 4.** Main effects: Full sample.

We use logistic regressions with the dependent variable "preference of the decision maker" which takes a value of "1" if the respective venture was selected by the investor and "0" if the venture was not selected.

Variables	Coef. (SE)
Profitability: break even	0.542 (0.864)***
Profitability: profitable	0.876 (0.103)***
<i>(reference group: not profitable)</i>	
Revenue growth: 20%	0.615 (0.094)***
Revenue growth: 50%	1.431 (0.107)***
Revenue growth: 100%	1.918 (0.113)***
<i>(reference group: 10%)</i>	
Management team: some team members	0.793 (0.090)***
Management team: all team members	1.125 (0.097)***
<i>(reference group: no team member)</i>	
Current investor: ext. investors - unfamiliar	0.082 (0.085)
Current investor: ext. investors - tier 1	0.485 (0.093)***
<i>(reference group: no external investor)</i>	
Business model: innovation-centered	0.565 (0.095)***
Business model: lock-in	0.661 (0.097)***
Business model: complementary	0.253 (0.096)***
<i>(reference group: low cost)</i>	
Value-added of product/service: medium	0.893 (0.086)***
Value-added of product/service: high	1.495 (0.102)***
<i>(reference group: low)</i>	
International scalability: moderate	0.554 (0.081)***
International scalability: easy	0.940 (0.090)***
<i>(reference group: difficult)</i>	
N (observations)	5,954
N (number of groups)	229

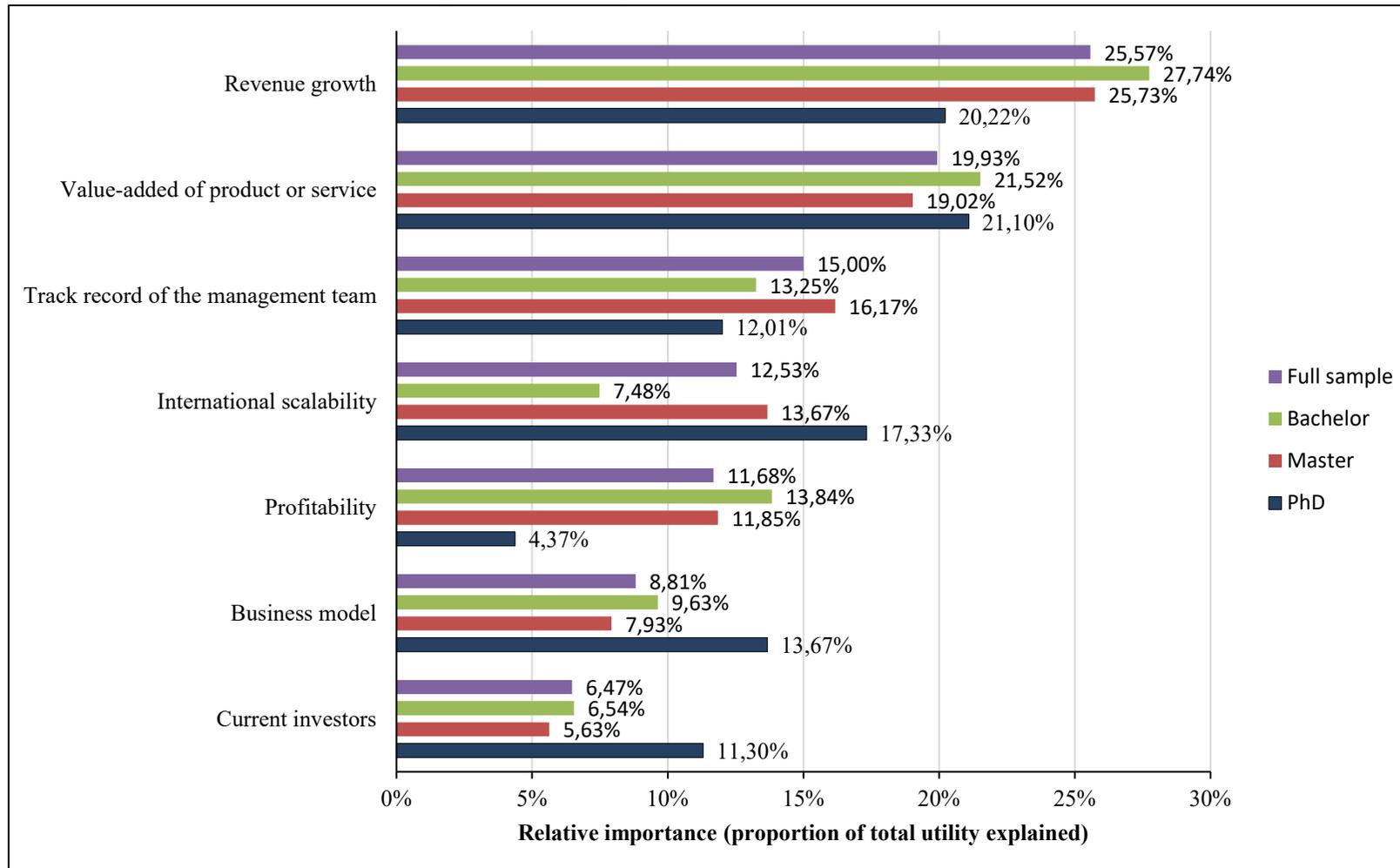
Notes: Standard errors (SE) are reported as robust standard errors that are clustered on the individual respondents' level. Significance levels are denoted by asterisks, \*\*\* 0.1%, \*\* 1%, and \* 5%.

The results in Table 4 show the main effects in the full sample. The model demonstrates that all attribute levels significantly influence the decision of the investor ( $p < 0.01$ ) except for the criterion *current investor: external investors - unfamiliar to you*. The log odds of 1.918 in

the full sample model indicate that *revenue growth* is the most important criterion for the overall sample, followed by the *value-added of the product or service* (log odds = 1.495), the *track record of the management team* (log odds= 1.125), the *international scalability* (log odds= 0.940), the *profitability* (log odds = 0.876), the *business model* (log odds = 0.661) and the *current investor* (log odds = 0.485). To investigate the influence of education and experience, the results of the subsamples are further described in section 2.4.1 and section 2.4.2.

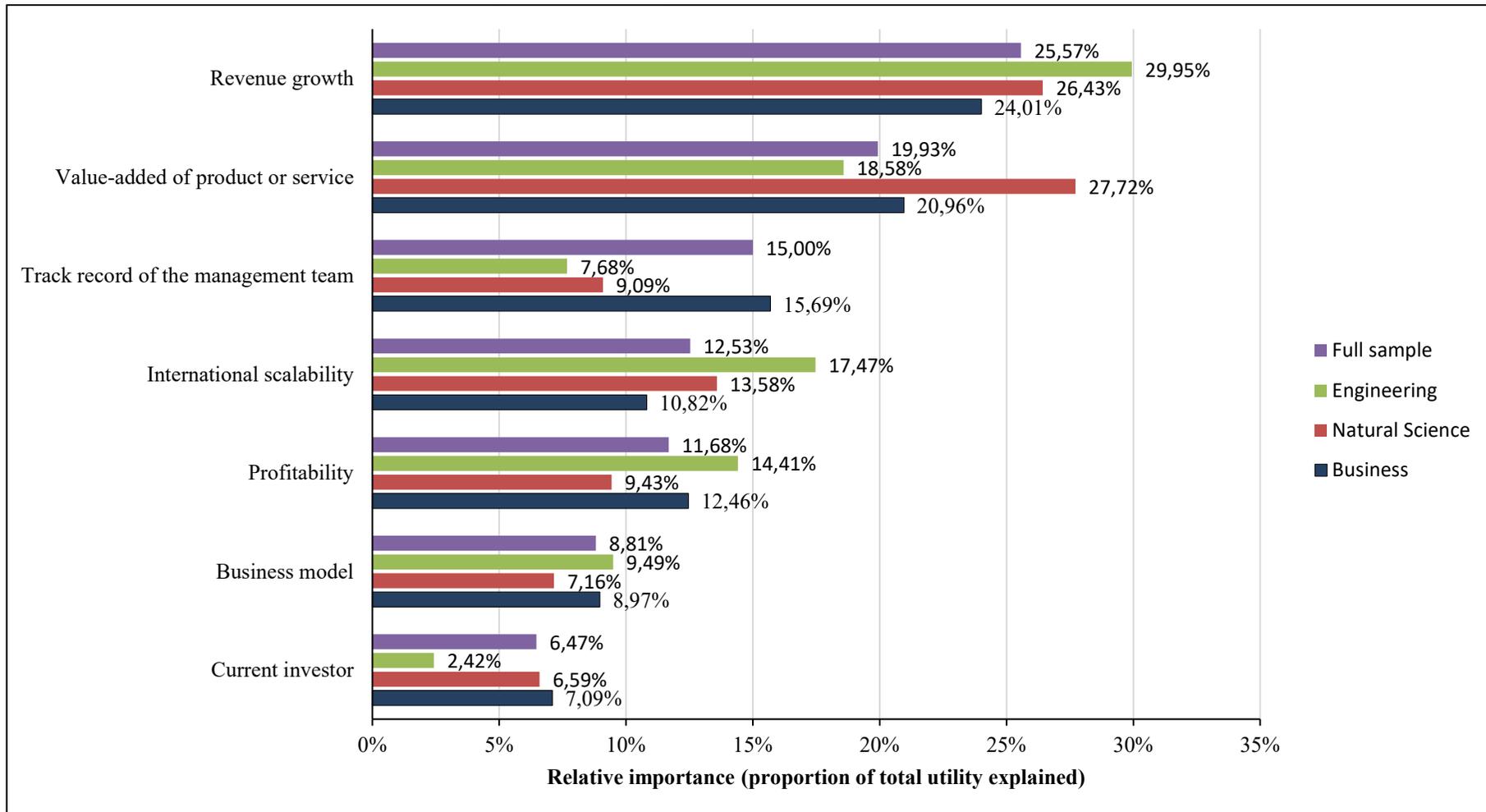
#### **2.4.1 Effects of investor education on selection criteria importance**

We split our full sample into six subsamples, distinguishing between the level of education (Bachelor, Master, PhD) and field of education (Business, Natural Science, Engineering). The full results for each model are displayed in the Appendix (Table A1). To facilitate interpretation, we calculate the relative importance of the different attributes for each subsample and introduce those in Figure 1 and Figure 2. Figure 1 shows the relative importance for each attribute separated into subsamples depending on the investors' level of education. Additionally, we incorporate the attributes' relative importance of the full sample for reference.

**Figure 1.** Relative importance of attributes: Level of education.

*Notes:* Calculated based on the coefficients of the main models (Table 4 and Table A1). Reading example: With a relative importance of 25.57%, the investors from the full sample consider *revenue growth* to be four times as important as the criterion *current investors* (relative importance: 6.47%). This value also signifies that the criterion *revenue growth* accounts for 25.57% of the decision maker's total utility.

The graphical illustration unveils certain patterns. First, an increasing level of education seems to decrease the importance of revenue growth and profitability. While investors with a bachelor's degree attribute more than a quarter of the explained utility to the venture's revenue growth (27.74%), the importance drops to 25.73% for investors with a master's degree and 20.22% for investors with a PhD. This effect seems to be even stronger for the venture's profitability. Investors holding a bachelor's degree attribute 13.84% of the explained utility to profitability. For investors holding a master's degree, the importance drops to 11.85%, and investors with a PhD attribute only 4.37% of the explained utility to profitability, making it their least important criterion. The opposite effect is found for the attribute international scalability, where a higher level of education seems to increase the importance. While investors holding a bachelor's degree attribute 7.48% of the relative importance to the international scalability, the importance almost doubles for investors with a master's degree (13.67%) and takes a value of 17.33% for investors with a PhD.

**Figure 2.** Relative importance of attributes: Field of education.

*Notes:* Calculated based on the coefficients of the main model (Table 4 and Table A1). Reading example: With a relative importance of 25.57%, the investors from the full sample consider *revenue growth* to be four times as important as the criterion *current investors* (relative importance: 6.47%). This value also signifies that the criterion *revenue growth* accounts for 25.57% of the decision maker's total utility.

Figure 2 shows the relative importance of the attributes while distinguishing between the investors' field of education. First, Figure 2 shows that the venture's revenue growth is the most important criterion for investors solely educated in engineering (29.95%) and investors solely educated in business (24.01%). With a relative importance of 27.72%, the value-added of the product or service is slightly more important than the revenue growth (26.43%) to investors solely educated in natural sciences. Notably, engineers (7.68%) and natural scientists (9.09%) rank the importance of the management team relatively low, compared to investors with a pure business background (15.69%). With a relative importance of 17.47%, engineers attribute more importance to a venture's capability to scale internationally, whereas the importance of international scalability is lower for natural scientists (13.58%) and investors with a background in business (10.82%). Additionally, we find that investors with a background in engineering attribute a very low importance to the current investors (2.42%), compared to natural scientists (6.59%) and investors with a business background (7.09%). Nevertheless, as shown in Table 4, the current investors do not seem to have a significant effect on the investors' decision.

To show that the differences we find in the main effects are robust and statistically significant, we then include interaction effects in our models. All attribute level dummies in Table 5 include interactions with the dummy variable indicated on top of the columns, comparing certain investors with the remaining sample.

Model (1) in Table 5 shows the difference between investors that hold a bachelor's degree and all other investors. In line with our main effects, we find that investors with a comparably low level of education attribute significantly less importance to an easy international scalability. While we cannot find significant differences in Model (2) (investors holding a master's degree), Model (3) shows that investors holding a PhD attribute significantly less importance to the profitability of the venture. Furthermore, the interaction models show that investors with a PhD attribute significantly more importance to innovation-centered business models compared to investors without a PhD.

**Table 5.** Interaction effects: Education.

We use logistic regressions with the dependent variable “preference of the decision maker” which takes a value of “1” if the respective venture was selected by the investor and “0” if the venture was not selected. We include interaction effects with dummy variables for each attribute, depending on the variable indicated on top of the columns. For example, in Model (1), each attribute level is interacted with the dummy variable “Bachelor”, which takes a value of “1”, if the investor holds a bachelor’s degree and “0”, vice versa.

Model	(1)	(2)	(3)	(4)	(5)	(6)
Sample	Bachelor vs. rest	Master vs. rest	PhD vs. rest	Business vs. rest	Natural Science vs. rest	Engineering vs. rest
Interactions	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef.
Profitability: break even	0.339 (0.179)*	-0.135 (0.166)	-0.427 (0.248)*	-0.101 (0.165)	-0.122 (0.293)	0.603 (0.213)***
Profitability: profitable (reference group: not profitable)	0.259 (0.249)	0.015 (0.215)	-0.696 (0.250)***	0.159 (0.206)	-0.028 (0.361)	-0.177 (0.382)
Revenue growth: 20%	-0.075 (0.196)	0.171 (0.174)	-0.318 (0.281)	0.019 (0.169)	-0.307 (0.358)	-0.446 (0.289)
Revenue growth: 50%	0.039 (0.248)	0.103 (0.213)	-0.333 (0.320)	-0.294 (0.201)	0.003 (0.421)	0.003 (0.333)
Revenue growth: 100% (reference group: 10%)	0.270 (0.246)	-0.072 (0.218)	-0.404 (0.368)	-0.320 (0.205)	0.531 (0.331)	0.424 (0.309)
Management team: some team members	-0.119 (0.183)	0.172 (0.176)	-0.212 (0.358)	0.157 (0.165)	-0.380 (0.205)*	-0.351 (0.241)
Management team: all team members (reference group: no team member)	-0.133 (0.166)	0.216 (0.170)	-0.282 (0.339)	0.124 (0.182)	-0.320 (0.372)	-0.638 (0.253)**
Current investor: external investors - unfamiliar	0.105 (0.169)	-0.186 (0.164)	0.216 (0.288)	0.040 (0.169)	-0.336 (0.374)	0.032 (0.346)
Current investor: external investors - tier 1 (reference group: no external investor)	0.044 (0.211)	-0.182 (0.185)	0.362 (0.289)	0.099 (0.174)	-0.113 (0.465)	-0.367 (0.271)
Business model: innovation-centered	-0.274 (0.212)	0.059 (0.186)	0.449 (0.212)**	0.022 (0.178)	-0.255 (0.486)	-0.265 (0.246)
Business model: lock-in	0.124 (0.240)	-0.215 (0.204)	0.332 (0.278)	0.012 (0.188)	-0.360 (0.417)	0.011 (0.267)
Business model: complementary (reference group: low cost)	0.033 (0.235)	-0.083 (0.204)	0.207 (0.252)	0.259 (0.202)	-0.628 (0.387)	-0.191 (0.295)
Value-added of product/service: medium	-0.092 (0.164)	0.079 (0.157)	0.057 (0.284)	0.331 (0.166)**	0.169 (0.390)	0.173 (0.280)
Value-added of product/service: high (reference group: low)	0.207 (0.215)	-0.281 (0.195)	0.275 (0.322)	0.194 (0.197)	1.118 (0.492)**	-0.082 (0.367)
International scalability: moderate	-0.233 (0.180)	0.052 (0.164)	0.477 (0.226)**	-0.429 (0.168)**	0.574 (0.376)	0.816 (0.237)***
International scalability: easy (reference group: difficult)	-0.464 (0.170)**	0.227 (0.174)	0.427 (0.302)	-0.350 (0.187)*	0.319 (0.305)	0.405 (0.293)
N (decisions)	5,954	5,954	5,954	5,954	5,954	5,954
N (decision makers)	229	229	229	229	229	229

Notes: Standard errors (SE) are reported as robust standard errors that are clustered on the individual respondents' level. Significance levels are denoted by asterisks, \*\*\* 0.1%, \*\* 1%, and \* 5%.

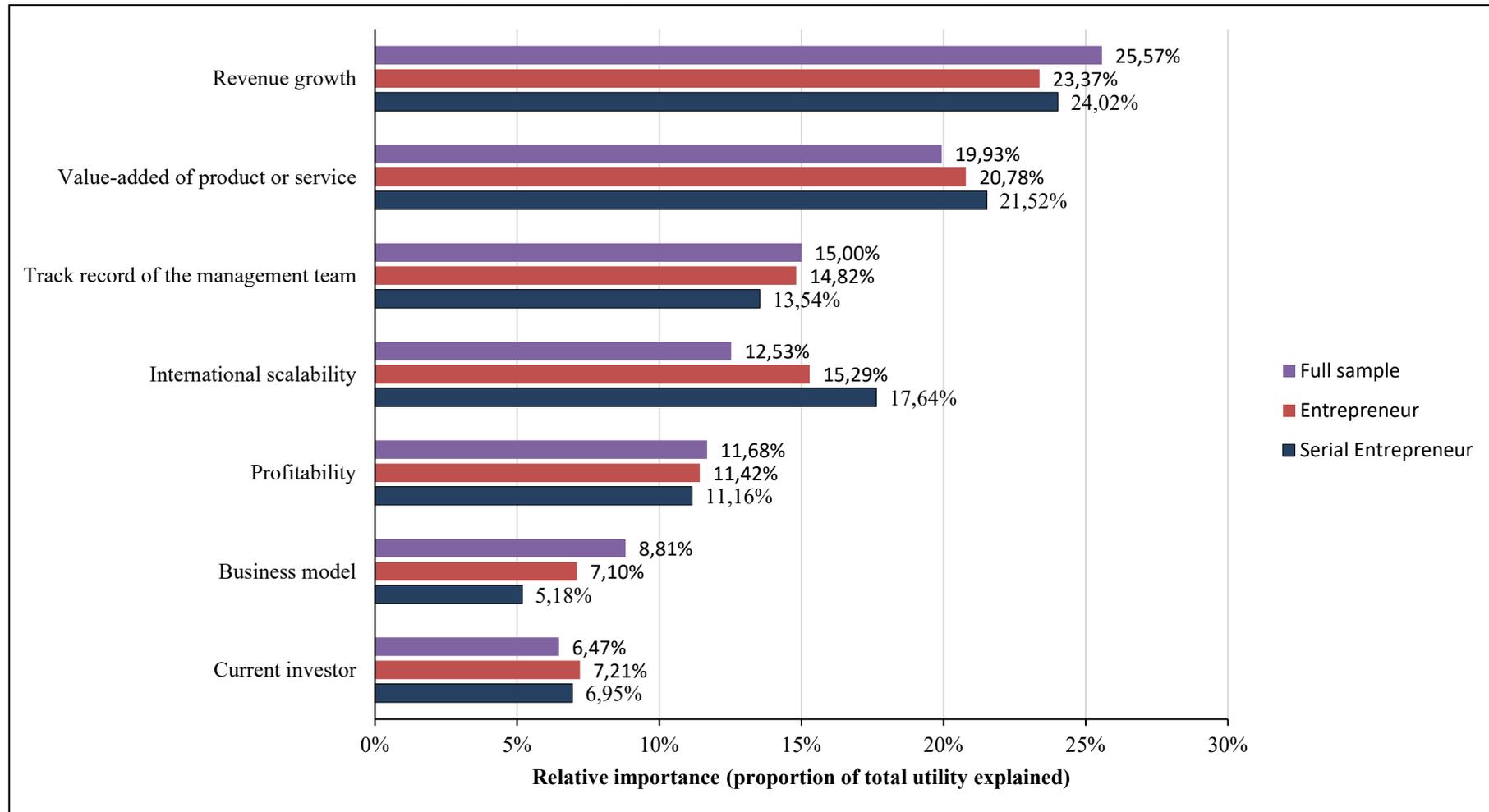
With regard to the field of education, we find that investors who have an education solely in business or economics attribute significantly less importance to the ease of the venture's international scalability. Furthermore, the interaction effects confirm that investors who have an education solely in natural sciences rate the value-added of the product or service significantly higher than all other investors. In addition, we find that investors who have solely been educated in engineering put a significantly lower importance on the track record of the venture's management team compared to all other investors. Additionally, investors with an engineering background put significantly more importance on the medium level of profitability, which is break-even, and not that much importance to the highest level of profitability.

#### **2.4.2 Effects of investor experience on selection criteria importance**

Similar to section 2.4.1, we calculate main effects with regard to the investors' experience for subsamples distinguishing between investors with entrepreneurial and investment experience. The results are shown in the appendix (Table A2). We illustrate the results in Figure 3 and Figure 4, which show the relative importance of the different attributes for the different types of experience.

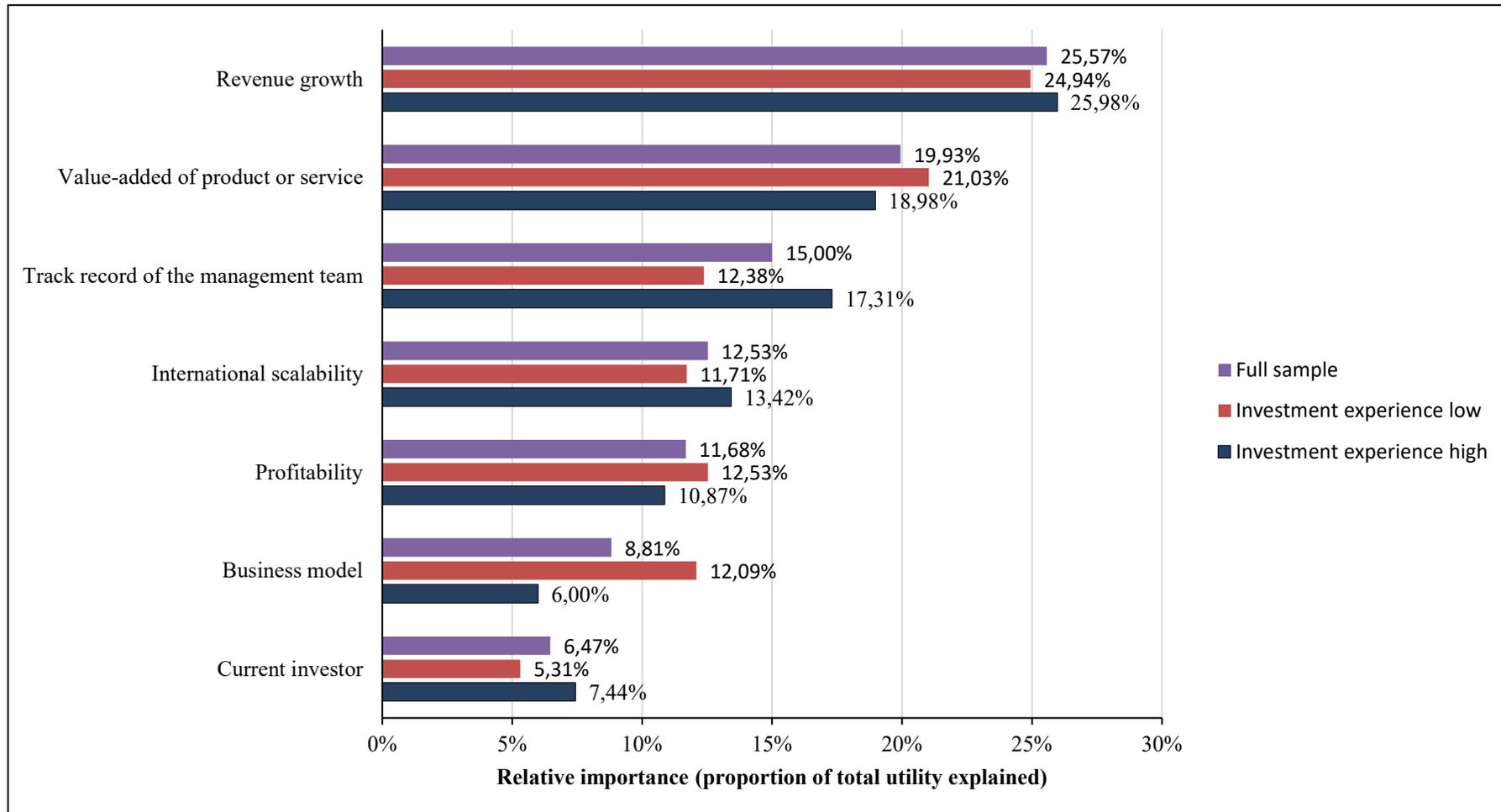
Figure 3 shows the relative importance of the venture's attributes with regard to the investors' entrepreneurial experience. While the relative importance for most attributes seems to be relatively similar to the full sample, we find that the value-added of the product or service (entrepreneur = 20.78%; serial entrepreneur = 21.52%) and the venture's international scalability (entrepreneur = 15.29%; serial entrepreneur = 17.64%) become more important with more entrepreneurial experience. Conversely, the importance of the management team (entrepreneur = 14.82%; serial entrepreneur = 13.54%) and the business model (entrepreneur = 7.10%; serial entrepreneur = 5.18%) decreases with increasing entrepreneurial experience.

Figure 3. Relative importance of attributes: Entrepreneurial experience.



Notes: Calculated based on the coefficients of the main model (Table 4 and Table A2). Reading example: With a relative importance of 25.57%, the investors from the full sample consider *revenue growth* to be four times as important as the criterion *current investors* (relative importance: 6.47%). This value also signifies that the criterion *revenue growth* accounts for 25.57% of the decision maker's total utility.

Figure 4 illustrates the relative importance and distinguishes investors with low (i.e., less than 8 years) and high (i.e., 8 or more years) levels of investment experience. It is noticeable that less experienced investors attribute more importance to the venture's value-added of the product or service (21.03%; investment experience high = 18.98%), profitability (12.53%; investment experience high = 10.87%), and business model (12.09%; investment experience high = 6.00%). On the other hand, investors with a high degree of investment experience put more importance on the management team (17.31%; investment experience low = 12.38%), the international scalability (13.42%; investment experience low = 11.71%), and the current investors (7.44%; investment experience low = 5.31%). The importance of revenue growth barely differs between less experienced (24.95%) and more experienced investors (25.98%).

**Figure 4.** Relative importance of attributes: Investment experience.

*Notes:* Calculated based on the coefficients of the main model (Table 4 and Table A2). Reading example: With a relative importance of 25.57%, the investors from the full sample consider *revenue growth* to be four times as important as the criterion *current investors* (relative importance: 6.47%). This value also signifies that the criterion *revenue growth* accounts for 25.57% of the decision maker's total utility.

To assess whether the differences we unveiled in the previous paragraphs are robust and statistically significant, we use interaction effects with dummy variables related to investor experience. The results are shown in Table 6. Model (1) focuses on entrepreneurial experience (i.e., whether the investor has founded at least one company or not). The significant positive effect for an easy international scalability highlights that investors with previous entrepreneurial experience put significantly more importance on the venture's internationalization possibilities than investors without entrepreneurial experience. Model (2) focuses on serial entrepreneurs. Here, we find that investors with more entrepreneurial experience attach even more importance to an easy international scalability of the venture compared to the rest of the sample. Finally, we interact the attribute levels with the dummy variable Investment experience. We find that more experienced investors are significantly less interested in innovation-centered and lock-in business models. However, more investment experience leads to a higher attribution of importance to the track record of the venture's management team.

**Table 6.** Interaction effects: Experience.

We use logistic regressions with the dependent variable "preference of the decision maker" which takes a value of "1" if the respective venture was selected by the investor and "0" if the venture was not selected. We include interaction effects with dummy variables for each attribute, depending on the variable indicated on top of the columns. For example, in Model (1), each attribute level is interacted with the dummy variable "Entrepreneur", which takes a value of "1", if the investor has started at least one company and "0", vice versa.

Model	(1)	(2)	(3)
Sample	Entrepreneur vs. rest	Serial Entrepreneur vs. rest	Investment experience high vs. rest
Interactions	Coef. (SE)	Coef. (SE)	Coef. (SE)
Profitability: break even	0.048 (0.159)	0.109 (0.190)	-0.293 (0.159)*
Profitability: profitable (reference group: not profitable)	-0.028 (0.192)	-0.029 (0.214)	-0.115 (0.195)
Revenue growth: 20%	-0.366 (0.164)**	-0.239 (0.187)	0.182 (0.169)
Revenue growth: 50%	-0.145 (0.188)	-0.374 (0.206)	0.115 (0.190)
Revenue growth: 100% (reference group: 10%)	-0.266 (0.197)	-0.111 (0.221)	0.071 (0.198)
Management team: some team members	0.038 (0.167)	0.006 (0.192)	0.217 (0.165)
Management team: all team members (reference group: no team member)	-0.001 (0.175)	-0.100 (0.210)	0.376 (0.173)**
Current investor: external investors - unfamiliar	-0.067 (0.159)	0.026 (0.198)	0.080 (0.163)
Current investor: external investors - tier 1 (reference group: no external investor)	0.123 (0.171)	0.107 (0.205)	0.184 (0.172)
Business model: innovation-centered	-0.092 (0.176)	-0.187 (0.193)	-0.317 (0.180)*
Business model: lock-in	-0.223 (0.183)	-0.306 (0.190)	-0.430 (0.184)**
Business model: complementary (reference group: low cost)	-0.159 (0.194)	-0.238 (0.221)	-0.188 (0.192)
Value-added of product/service: medium	0.094 (0.158)	0.005 (0.191)	-0.120 (0.155)
Value-added of product/service: high (reference group: low)	0.151 (0.188)	0.171 (0.252)	-0.164 (0.183)
International scalability: moderate	0.106 (0.159)	0.164 (0.177)	0.105 (0.160)
International scalability: easy (reference group: difficult)	0.428 (0.177)**	0.569 (0.205)**	0.141 (0.179)
N (decisions)	5,954	5,954	5,954
N (decision makers)	229	229	229

Notes: Standard errors (SE) are reported as robust standard errors that are clustered on the individual respondents' level. Significance levels are denoted by asterisks, \*\*\* 0.1%, \*\* 1%, and \* 5%.

## 2.5 Discussion and implications

We investigate the relative importance of different screening criteria of VC investors and how the value attributed to these criteria is influenced by their education and experience. Overall, we find that the most important screening criteria of VCs are *revenue growth*, *value-added of the product or service*, the *track record of the management team*, and *international scalability*. Criteria such as *profitability*, the *business model*, and *current investors* are of comparably lower

importance. However, the value attributed to these different criteria is influenced by the decision makers' level and field of education as well as their investment and entrepreneurial experience. This finding is in line with prior research which argues that education and experience develop an individual's knowledge structure and influence how they evaluate opportunities (Walsh, 1995; Wood and Williams, 2014).

### 2.5.1 Education

Our results highlight that the importance attributed to the international scalability of a venture's business and its current profitability depend on the *level of education* of a decision maker. Prior research finds that the international expansion for new ventures is an important step to exploit growth opportunities and with that, realize performance advantages and increase profitability (Fernhaber et al., 2014; Lu and Beamish, 2001; McDougall and Oviatt, 1996; Oviatt and McDougall, 2005). Our results suggest that a higher level of education increases the awareness of decision makers regarding international scalability as an indicator of the potential of a venture's business idea. Furthermore, the relative importance of profitability decreases with an increased level of education. This result indicates that decision makers with a higher level of education seem to emphasize the future potential of the venture instead of its current financial situation. Besides, decision makers with a higher level of education prefer innovation-centered business models. This is in line with prior research arguing that a higher level of education leads to higher awareness and receptiveness for innovation (Bantel and Jackson, 1989; Hambrick and Mason, 1984; Wiersema and Bantel, 1992).

Regarding the *field of education*, our results show that VC decision makers with different educational backgrounds seem to have a different perspective on the screening criteria. While our results confirm prior findings that decision makers with a natural science background are more focused on the product (Gruber et al., 2013; Hambrick and Mason, 1984), we show that this does not seem to be the case for engineers. Engineers seem to attach a higher value to ventures whose profitability already reached the break-even point. This could be understood as an indicator for initial market success, a competitive advantage, an effective management, and, eventually, firm survival (Davidsson et al., 2009; Delmar et al., 2013). In contrast to prior research, which argues that a business education results in a stronger focus on profit-maximization (Ghoshal, 2005; Slater and Dixon-Fowler, 2010), we could not find any evidence supporting this argument. This result might be related to the specifics of the VC industry, where one of the main tasks of a VC is to identify promising ventures which have a high future success

potential and that financials at this stage are of lower importance. However, in light of this, it is surprising that decision makers with a business education place comparably less value on the ease of the international scalability of the business model as a potential indicator for future growth opportunities of the venture (Lu and Beamish, 2001; McDougall and Oviatt, 1996). These results add to prior research investigating the consequences of different fields of education (Gruber et al., 2013; Slater and Dixon-Fowler, 2010; Wiersema and Bantel, 1992), specifically in the venture financing context (Dimov and Shepherd 2005; Zarutskie, 2010).

### 2.5.2 Experience

Furthermore, our study highlights that decision makers with prior *entrepreneurial experience* seem to put more weight on the international scalability of a business model. Prior research argued that experience as an entrepreneur affects the evaluation of entrepreneurial opportunities and increases the ability to detect promising ventures (Baron and Ensley, 2006; Dimov and Shepherd, 2005; Walske and Zacharakis, 2009; Zarutskie, 2010). Based on this argument, international scalability seems to indicate the future success potential of a venture (Fernhaber et al., 2014; Lu and Beamish, 2001; McDougall and Oviatt, 1996; Oviatt and McDougall, 2005). This argument is reinforced by our finding that more experienced entrepreneurs put even more weight on this criterion.

Decision makers with *prior investment experience* seem to focus strongly on the track record of the management team. This finding is particularly interesting in light of the ongoing jockey versus horse debate (Block et al., 2019; Kaplan et al., 2009; Macmillan et al., 1985; Mitteness et al., 2012). Prior research investigates which criteria are more important for private equity investors – the management team (jockey) or product- and market-related aspects (horse) – with conflicting results (Kaplan et al., 2009; Mitteness et al., 2012; Petty and Gruber, 2011). Mitteness et al. (2012) argue that these conflicting results may be a function of the stage of the funding process. Our study adds to this debate by showing that some of these differences might also be explained by the prior experience of the decision maker. Since task-specific experience has been found to help investors to develop an accurate perception of risk, return and investment opportunities (Dimov and Shepherd, 2005; Walske and Zacharakis, 2009; Zarutskie, 2010), it could be argued that experienced investors understand the track record of the management team as a positive indicator of a venture's success potential.

Overall, our study adds to prior research on the importance of the human capital characteristics education and experience on decision-making behavior (Hambrick and Mason, 1984;

Slater and Dixon-Fowler, 2010), particularly in the VC context (Franke et al., 2008; Shepherd et al., 2003; Watson et al., 2003). Furthermore, we contribute to the literature on the screening criteria of risk capital investors (for recent studies see Gompers et al., 2020, Hoenig and Henkel, 2015; Hsu et al., 2014; Warnick et al., 2018). This literature has thus far focused primarily on early-stage ventures. We extend this line of research by investigating ventures in their growth and expansion stage where additional criteria such as venture performance measures (i.e., profitability and revenue growth) become available.

### **2.5.3 Practical implications**

Our empirical insights are of particular importance for entrepreneurs seeking venture capital because they can provide guidance on the most relevant attributes risk capital investors are going to evaluate. Typically, the first screening requires only a few minutes, and only a small number of ventures pass this stage of evaluation (Gompers et al., 2020; Petty and Gruber, 2011). We find that investors seem to prefer ventures with high revenue growth, high value-added of the product or service, and those in which team members have a relevant management track record. Hence, ventures seeking financing should highlight these aspects in their investment application. However, ventures should be aware that the importance of different screening criteria depends on the decision maker's education and experience. Our results suggest that ventures should try to obtain information about the background of the VC decision makers before applying. This could help them to highlight the relevant criteria and make the application more target-oriented which could increase their chances of success of entering the next round in the VC process.

Also, risk capital investors can use these results to better understand their own investment decisions and benchmark them to the market. Furthermore, our results demonstrate that the human capital characteristics education and experience, affect their selection decision and hence, the selection of target ventures finally considered for investment. This information provides a deeper understanding of whether those making decisions for the investors act in line with the investors' overall investment philosophy and their business strategy.

## 2.6 Limitations, future research, and conclusion

### 2.6.1 Limitations and future research

This study is not without limitations, some of which relate to the conjoint approach used in our study. Early research on the assessment criteria of risk capital investors used mainly qualitative interviews and post hoc questionnaires (MacMillan et al., 1985; MacMillan et al., 1987; Tyebjee and Bruno 1984). This research was criticized for suffering from post hoc and self-report bias. Moreover, the respondents were typically asked to evaluate the respective criteria in isolation and were not forced to trade-off criteria against each other. The use of conjoint experiments has been advocated to overcome these shortcomings. However, the conjoint method also has its drawbacks. For example, it presents only hypothetical ventures to investors. Many other potential effects, such as the appearance of the business plan and the way the opportunity entered the deal flow of the investor are not measured. Relatedly, the conjoint method implicitly assumes that decision makers possess information on all different criteria assessed. In reality, however, not all of this information may be available for every venture that enters the screening process of investors.

Additionally, the seven criteria used in our conjoint study only represent a selection of criteria that is based on prior literature and interviews. We were not able to test the effects of various other decision criteria named in our interviews (e.g., intellectual property protection, competition in the market, or valuation of the venture). Also, our conjoint analysis implicitly assumes that decision makers apply a fully compensatory model when evaluating ventures (i.e., they weigh all seven possible criteria in their decision-making process). However, research by Maxwell et al. (2011) indicates that this may not always be the case: business angels use a short cut decision heuristic where less criteria are used and are only evaluated as to whether they are above a threshold value and use an “elimination-by-aspects” heuristic to trim the evaluation set to a more manageable size for further analysis. Finally, our CBC approach sometimes made it difficult for participants to choose between two ventures. As an alternative, we could have used a rating-based conjoint approach which allows participants to rate two ventures equally high.

Our study also has limitations with regard to the generalizability of the results. As we focus only on the screening phase, no direct conclusions about the criteria for final investment decisions can be made. Future research could investigate, how the influence of education and experience and thus, the focus on specific screening criteria, affects the final investment decision and ultimately the success of the venture. Related to this, prior research finds that decision

criteria vary depending on the stage within the VC evaluation process (Gompers et al., 2016; Petty and Gruber, 2011). We propose that some of these differences might be explained by the education and experience of the decision maker as different individual profiles are required in these different stages. Hence, future research should investigate the influence of human capital characteristics such as education and experience in the different stages on the VC evaluation process.

In addition, we only include two types of experience, namely investment and entrepreneurial experience, in our study. Other types of experience such as firm-specific or management experience could also affect the evaluation of different screening criteria. Furthermore, we do not ask about the quality of the decision maker's experience. It could be argued that failure experience in prior investment decisions or as an entrepreneur can have a very different effect on venture screening than success experience. Hence, we would recommend future studies to include additional types of experience as well as measures regarding the quality of the experience.

Our study also does not allow for conclusions about the quality of risk capital investors' screening. Consequently, the criteria used, and value-added services offered to the venture must be linked to the success of the venture (Guo and Jiang, 2013). More knowledge about this relationship would help to shed light on the question of whether performance is mainly driven by the selection process or by the investor's value-added services (Croce et al., 2013; Hellmann and Puri, 2002) and how this relationship differs by investment and/or venture stage. It could be argued that the effect of the value-added services is higher at early versus later stages of the venture cycle, as the path of the venture is easier to influence when the venture is still young and nascent. This implies that the venture selection process of VCs differs depending on the stage in the venture cycle the financing is provided. In this context, not only the human capital of the decision maker but also his/her social capital might play an important role in the decision-making process and the development of the ventures.

### **2.6.2 Conclusion**

We perform an experimental CBC analysis with 229 individual VC investors to assess whether and how VC investors' education and experience influence their screening decisions. Our results show that the level and field of education, as well as the decision maker's investment and entrepreneurial experience, indeed moderate the relative importance of different screening criteria. For example, we find that international scalability becomes more important for decision

makers with higher education and those with entrepreneurial experience. Additionally, decision makers with a background in natural science focus on the value-added of the product or service, engineers seem to value a break-even profitability and focus less on the management team. Investment experience, on the other hand, leads to a stronger focus on the management team. With these findings, our study contributes to the literature on how decision makers differ in their assessment of ventures, to the literature on the consequences of the field of education, and to the literature on the screening criteria of risk capital investors. Our results have practical implications for entrepreneurial ventures that seek financing and for risk capital investors.

## Chapter 3

### **Differences in screening criteria between US and European VC investors**

*Decision-making research in venture capital (VC) tends to study investors solely in particular countries or regions and lacks studies that directly compare the importance of screening criteria from different regions. We use a multimethod approach to investigate differences in the importance attributed to several screening criteria between United States (US) and European VC investors. First, we derive seven screening criteria by conducting interviews with 19 VC experts. We apply these criteria in a choice-based conjoint experiment with 430 participants. When screening for new investments, US investors attribute more importance to high revenue growth rates and less importance to the ease of international scalability compared with European investors. Subsequently, we discuss these findings with eleven VC investors from Europe and the US. European investors put a higher weight on international scalability due to the relatively small economic sizes of European countries. Hence, their business model should be easily internationally scalable. Differences in the importance of revenue growth are attributed among others to a more conservative approach by European investors and a stronger tendency of US investors to exit via IPOs.*

### 3.1 Introduction

The concept of VC originated in the United States (US), which is commonly considered the most mature VC market in the world (Megginson, 2004). The blueprint business model of VC investors contains the identification of promising ventures and the decision to invest in those ventures, continuous support of the ventures by their VC investors during the holding period, and subsequently VC investor exit via, for example, an initial public offering (IPO) or a trade sale (Gorman and Sahlman, 1989; Fried and Hisrich, 1994; Sørensen, M., 2007; Cumming and Johan, 2008a).

Regarded as a second mover in the history of VC, Europe may be considered the second most mature VC market in the world and started growing rapidly from the 1980s (Tyebjee and Vickery, 1988; Roure et al., 1990). While the basic principles of VC investing are the same in Europe, differences exist. For example, funding sources in the US heavily depend on pension funds (Gompers and Lerner, 2001; Megginson, 2004), but less liquid stock markets in Europe decrease the chances for IPOs (Black and Gilson, 1998) or lower the profitability of European VC funds (Hege et al., 2009).

While these differences were shown in previous research, we lack studies that directly compare the importance of screening criteria between VC investors across countries or regions. The screening process of a VC investor is a critical step for both the investor and the investee. On the one hand, the investor uses several decision criteria and attributes different levels of importance to them. On the other hand, the proposing company must meet those criteria that are considered the most important by the investor.

Our study is the first to investigate the differences in screening criteria in VC between US investors and European investors that uses original data on a large-scale experiment without replicating a previous study. We use a multimethod approach combining qualitative and quantitative research. First, we conduct initial interviews, followed by a conjoint experiment that uses criteria identified in the interviews, and then we confront experts with our findings.

Compared with US VC investors, our results suggest that easy international scalability is more important to European investors. Furthermore, we find that European VC investors attribute less importance to high revenue growth rates. The interviewed investors explain that international scalability is more important in Europe due to the comparatively small economic sizes of European countries and the necessity to internationalize when pursuing the goal of establishing a multibillion-dollar company. Regarding the differences in revenue growth, the experts

argue that European investors follow a risk-averse attitude and hence prefer a clear path towards profitability instead of excessively high revenue growth rates. Furthermore, the experts suggest that IPOs play a greater role in the US, driven by high revenue growth. Hence, US investors place more emphasis on high revenue growth rates compared with European investors.

Our research extends several research streams. First, we contribute to research concerning decision-making criteria and the importance that investors attribute to these criteria (Hall and Hofer, 1993; Gompers et al., 2020). Second, we contribute to international VC research that investigates differences between VC investors from different regions (Wright et al., 2005; Chemmanur et al., 2016). Enriching our findings by conducting further interviews with European and US investors that help us interpret our results, we can present indicators that might explain these differences.

We offer theoretical and practical implications. Observed from a theoretical perspective, we present distinct differences between US and European VC investors, which should be taken into account in future research. This plays a crucial role not only when investigating the behavior of investors isolated in their domestic region but also when research is conducted on VC syndication where investors from multiple regions are participating in a mutual deal. Additionally, our results may offer cues when investigating the adjustment of VC investor behavior and the use of screening criteria regarding cross-border VC investments. From a practitioner perspective, our results offer implications for investors and investees. If the investor is not aware of the selection criteria that he or she uses, his or her screening process might lead to making bad decisions, rejecting promising proposals and accepting proposals that are of mediocre or worse quality. If the proposing company is not aware of which criteria are important to a VC investor, it will not be able to increase its chances of receiving VC funding by focusing on those important criteria when developing its business or applying for VC funding. This problem is even more striking if a company wants to receive funding from foreign investors, as they might rank their decision criteria differently than local investors.

## **3.2 Theoretical background**

### **3.2.1 Differences between US and European VC**

Research on VC decision-making began with the early work of Wells (1974) and increased in popularity in the 1980s in the US (e.g., MacMillan et al., 1985; Hall and Hofer, 1993). The main focus of these studies was to investigate the criteria that are applied in the screening and

evaluation process to invest in new ventures. In the 1990s, research on VC decision-making became more international by investigating criteria in other countries and regions (Muzyka, 1996). Research focused first on the United Kingdom (UK) as VC funds that were based on the US model started to emerge in the UK (Manigart, 1994). Later, research interest in relatively young VC markets in continental Europe, including the recently liberalized Eastern European markets, started to increase (e.g., Karsai et al., 1998; Bliss, 1999).

Due to this development, it is not surprising that one of the first studies to investigate VC screening criteria outside the US was a survey about UK-based VC investors. Dixon (1991) has shown that the decision criteria of UK-based VC investors were similar to those of US-based VC investors (MacMillan et al., 1985; Dixon, 1991).

Although similarities were found between the US and UK, it needs to be considered that VC markets in the US and Europe, in particular continental Europe, may differ. These differences might affect the VC process described by Gompers and Lerner (2004) from fundraising, screening, and investment to exit strategies. Starting from a macroeconomic perspective, the US Gross Domestic Product (GDP) in 2018 accounted for \$20.89 trillion (Bureau of Economic Analysis, 2019), and the European Economic Area (EEA) GDP accounted for \$20.67 trillion (International Monetary Fund, n.d.). At first glance, the economic sizes of both regions are comparable, but it must be considered that Europe consists of multiple countries with very different levels of GDP and particularly GDP per capita. For example, GDP (in current prices) in Germany in 2018 accounted for \$3,948 billion, and GDP per capita was \$47,616 (World Bank, n.d., a). In contrast, GDP (in current prices) in Portugal in 2018 accounted for \$241 billion, and GDP per capita was \$23,403 (World Bank, n.d., b). Even though the European Union strives for a unified economic area that grants free trading and labor movement across all European countries, large differences between the EU-27 countries still exist (Bun and Klaassen, 2002; Berger and Nisch, 2008; Dane and Gift, 2014).

In addition to these economic differences, there are also differences in the legal framework. The legal framework in continental Europe (civil law) differs from the UK and US framework (common law). For example, investor protection rights are stronger in common law systems than in civil law systems (La Porta et al., 1998; Bruton et al., 2005). Furthermore, the legal structure of VC funds differs between continental European and US/UK VC funds. Whereas the most common organizational VC fund structures in the US and the UK are limited partnerships, VC funds in continental Europe tend to have different organizational structures with more banks being involved (Jeng and Wells, 2000).

These differences between the economies and, more specifically, the VC markets result in differences in the VC process. Following the VC cycle proposed by Gompers and Lerner (2004), we discuss in more detail prior research regarding aspects in which the VC process differs between US and European investors.

### *Fundraising*

Fundraising by a VC firm is the first crucial step in establishing a new VC fund. It may be influenced by the risk appetite of investors and by the market demand for VC (Gompers and Lerner, 1999; Félix et al., 2013). Furthermore, external factors such as capital gains tax rates and internal factors such as a VC firm's previous fund performance play a role in the success of raising a new VC fund. Regarding capital gains taxes, a lower rate could lead to an increase in VC fund commitments (Poterba, 1989; Gompers and Lerner, 1999). Furthermore, the probability of successful fundraising increases for VC firms with a successful track record (Cumming et al., 2005). While VC funds in the US are traditionally more often funded by institutions such as pension funds, VC funds raised in Europe depend more often on banks and governmental agencies (Gompers and Lerner, 2001; Bottazzi and Da Rin, 2002; Megginson, 2004; Bertoni et al. 2015). This difference might be explained by the different financial systems. Whereas the financial market system in the US is more market-centered and relies more strongly on stock markets and private investments, the financial system in Europe tends to be more bank-centered and relies more strongly on the support of the banking system (Demirguc-Kunt and Levine, 1999). These differences in funding sources can directly affect VC investors' selection and investment behavior. For example, VC funds that are mainly funded by banks tend to focus more on less risky later-stage investments, while corporate-backed funds tend to focus more on riskier early-stage investments (Mayer et al., 2005).

### *Screening and selection criteria*

Before a VC fund invests, it usually screens and evaluates numerous proposals prior to making an investment decision (Tyebjee and Bruno, 1984). Whereas the selection criteria used in this process have been investigated extensively in previous studies (e.g., Hall and Hofer, 1993; Fried and Hisrich, 1994), research about the differences of the selection criteria across regions has remained an under-researched topic. Most literature related to this topic is only able to either show the importance of the identified criteria isolated for one region or to compare the importance of certain criteria by replicating previous studies. For example, Muzyka et al. (1996) surveyed European VC investors, showing that they rank management-team criteria as the most important criterion and that across Europe, investors barely differ. An example of a replication

would be the study by Knight (1994), who replicated a study originally done by MacMillan et al. (1985) in the US. The author investigated the importance of several decision criteria in Canada, Europe, and the Asia Pacific region and subsequently compared the results of the two studies. The results show that while US and European investors seem to attribute similarly high importance to the characteristics of the entrepreneur, significant differences were found regarding the importance of financial characteristics as well as product and market characteristics. For example, whereas US investors attribute more weight to the required return, investment liquidity, and proprietary protection for the product, European investors place a greater value on the availability of a prototype.

#### *Investor involvement in the startup*

An essential part of a VC investor's work is the active support of his or her portfolio companies. VCs not only provide startups with financial support but also with value-added services such as strategy and management support, monitoring, providing access to the VC network, and helping to raise additional funds (Gorman and Sahlman, 1989; Sørensen, 2007). Although this active role is considered crucial in VC investments, European compared with US investors tend to take a less active role in their portfolio companies. For example, it was shown that European VCs make less use of convertible securities, tend to syndicate less often and have longer round durations, which are all linked to a less active role of the investor (Shepherd, 1999a).

#### *Exit opportunities*

VC investors can choose different exit strategies when divesting. The most common exit strategies are trade sales or IPOs, where IPOs are particularly regarded as a strong sign of success for new ventures (Gompers et al., 2010). Successful IPOs have a positive reputation effect for VC funds, signaling the capability to identify promising ventures and helping them to become successful (Gompers, 1996). However, Black and Gilson (1998) argue that IPOs require liquid stock markets, which are less common in Europe. Compared with the US, European VC investors are less likely to exit their investment by IPOs and are more likely to use trade sales (Schwienbacher, 2002).

Table 7 summarizes the differences between the European and US VC markets we identified in the previous paragraphs. Whereas the first row describes the differences of the general legal and economic framework, the following rows describe in more detail the differences in the VC cycle.

**Table 7.** Prior research on differences between European and US VC markets.

Market characteristics	United States	Continental Europe
Legal and economic framework	<ul style="list-style-type: none"> <li>- Legal system based on common law, stronger investor protection rights (La Porta et al., 1998; Bruton et al., 2005)</li> <li>- Funds structured as limited partnerships (Jeng and Wells, 2000)</li> <li>- One market with high consumer purchasing power (Bureau of Economic Analysis, 2019)</li> </ul>	<ul style="list-style-type: none"> <li>- Legal system based on civil law, with weaker investor protection rights (La Porta et al., 1998; Bruton et al., 2005)</li> <li>- Different fund structures with more bank involvement (Jeng and Wells, 2000)</li> <li>- Split-up market with differing consumer purchasing power across countries</li> </ul>
Fundraising	<ul style="list-style-type: none"> <li>- Market-centered financial system (Demirguc-Kunt and Levine, 1999)</li> <li>- Relatively low governmental involvement (Gompers and Lerner, 2001)</li> <li>- More involvement of pension funds (Gompers and Lerner, 2001)</li> </ul>	<ul style="list-style-type: none"> <li>- Mostly bank-centered financial systems (Demirguc-Kunt and Levine, 1999)</li> <li>- Relatively high governmental involvement (Megginson, 2004)</li> <li>- Funds are more often captive (Bertoni et al, 2015)</li> </ul>
Selection criteria	<ul style="list-style-type: none"> <li>- Investors attribute more importance to the financial characteristics of proposing ventures (Knight, 1994)</li> </ul>	<ul style="list-style-type: none"> <li>- Investors attribute more importance to the availability of a prototype (Knight, 1994)</li> </ul>
Investor involvement	<ul style="list-style-type: none"> <li>- Very active approach with high investor involvement (Schwienbacher, 2008)</li> </ul>	<ul style="list-style-type: none"> <li>- Less active approach with lower investor involvement (Schwienbacher, 2008)</li> </ul>
Exit opportunities	<ul style="list-style-type: none"> <li>- Very liquid market with higher chances to conduct successful IPOs (Black and Gilson, 1998)</li> </ul>	<ul style="list-style-type: none"> <li>- Less liquid markets with lower chances of successful IPOs (Black and Gilson, 1998)</li> </ul>

### 3.2.2 Venture evaluation process

Previous research has shown that VC investors mostly use a multistage evaluation process when deciding to invest in a company (Fried and Hisrich, 1994). To focus only on those proposals that match investor preferences, a large number of investment proposals is rejected in the very early stages of the evaluation process without further analysis, for example, due to a mismatch with the VC investor's industry focus or an unattractive business plan (Fried and Hisrich, 1994; Gompers et al., 2020). If the investment proposal overcomes this first hurdle, the VC investor analyses the proposal in more detail and, in case of a positive evaluation, invites the venture's management team for a personal meeting to present the investment opportunity. After that, the decision about whether to invest is made (Gompers et al., 2020). According to Gompers et al. (2020), 99% of venture proposals are rejected in the screening phase. In this first phase, the proposal evaluation typically depends on one individual member of the firm who screens the venture and who is able to make an assessment relying on a relatively small set of decision criteria (Zacharakis and Meyer, 1998). This changes in the next steps of the evaluation process, and it has been found that the decision criteria and their respective weights differ by evaluation stage (Kollmann and Kuckertz, 2010; Petty and Gruber, 2011; Gompers et al, 2020). Our study, and in particular our conjoint experiment, focuses on the early stages of the evaluation process, i.e., the initial screening phase (Hall and Hofer, 1993). As shown in the previous chapter, there

is a lack of research in this screening phase investigating the weighting differences of the screening criteria from VC investors across different regions.

### **3.3 Empirical analysis**

#### **3.3.1 Sequential multimethod design**

We use a sequential multimethod design and combine qualitative and quantitative research methods. Such multimethod designs are often used in management and entrepreneurship research, mainly for developmental and complementarity purposes (Greene et al., 1989; Molina-Azorín, 2011). First, we conducted exploratory expert interviews to identify relevant screening criteria. We then use the information obtained from the initial interviews to develop and conduct the conjoint experiment. Conclusively, we discuss our findings from the conjoint experiment with experts to achieve a deeper understanding of the results. This approach enables a close practice orientation of our experimental setting and the interpretation of our findings, which is essential for the validity of our study.

#### **3.3.2 Identifying screening criteria through prior literature and expert interviews**

Our study uses data from a conjoint experiment by Block et al. (2019). To identify investors' screening criteria, we first derived a list of possible criteria from previous research (e.g., Franke et al., 2008; Bernstein et al., 2017). We then conducted 19 expert interviews with VC investors from Europe and the US to identify the most relevant criteria.

This approach resulted in seven different criteria that were found to be crucial in the investors' initial screening process: (1) Revenue growth, (2) profitability, (3) track record of management team, (4) current investors, (5) business model, (6) value-added of the product/service, and (7) international scalability. Because the study in this chapter uses data from the same experiment that was presented in chapter 2, please refer to Table 2 (p. 17) for a detailed description of the criteria. Our interviewees confirmed that none of the attributes and attribute levels represent knock-out criteria.

#### **3.3.3 Conjoint experiment**

##### **3.3.3.1 Type of conjoint study and experimental design**

In the next step, we conducted a conjoint experiment, which later enabled us to assess the importance that investors attribute to the seven criteria identified in the previous step. Using a

conjoint experiment to evaluate the importance of screening criteria in a VC decision-making context was first suggested by Shepherd and Zacharakis (1999) and successfully applied multiple times in subsequent research (e.g., Shepherd et al., 2000; Franke et al., 2006; Warnick et al., 2018).

We used a CBC experiment in which participants are presented with two potential investee companies that differ in the seven attributes shown in Table 2. We chose this subform of a conjoint experiment because it forces investors to assess the potential investee holistically, which is in line with previous research (Bachher and Guild, 1996) and the actual decision-making of VCs (Levin et al., 1983; Louviere, 1988). The CBC is used with a reduced conjoint design (Kuhfeld et al., 1994; Chrzan and Orme, 2000) to reduce choice task complexity. As the number of levels across attributes is not equal, we use an asymmetric experimental design. The experimental design we applied is a balanced-overlapping approach with a fractional asymmetric design. This is a combination of an orthogonal design with minimal overlapping and a randomized design. The proposed design strategy is frequently used for CBC studies (Chrzan and Orme, 2000).

In total, we created 800 different experimental designs, in which each design comprises a unique combination of attribute levels. We created 13 random choice tasks and 2 fixed choice tasks that participants must complete from those 800 experimental designs. In each choice task, two alternative ventures were presented to the participant. For each of these tasks, participants have to decide which of the alternative ventures presented is more attractive to them, constituting a so-called “forced” experiment (Street and Burgess, 2007). Figure A2 (Appendix) illustrates an example of one of these choice tasks.

The two fixed tasks were presented to test the retest reliability of participants. These fixed tasks are identical for all participants and are not part of an experimental design. We tested the retest reliability by measuring the ability of the individual estimated utilities from the random tasks to predict the decisions of the two fixed tasks. Using these estimated utilities, we were able to predict 79% of the fixed task choices correctly. This accuracy rate is slightly above the accuracy rate of prior studies (e.g., Shepherd, 1999b). As we are not able to show external validity with our results, it is noteworthy that prior research was able to show that estimated behavior in conjoint experiments correlates strongly with the real behavior of people (Levin et al., 1983; Louviere, 1988).

### 3.3.3.2 Sample

Our sample is based on data provided by Pitchbook, a platform that comprises, for example, data on VC transactions as well as further information on VC funds and investors. Data from Pitchbook are frequently used in research revolving around entrepreneurial finance (e.g., Paglia and Harjoto, 2014; Brown, et al., 2015). At the beginning of 2016, we created our sample of 15,600 investors. To ensure that only VC investors who have acted as decision-makers in an investment participate in our study, we used a filter to draw the information of those investors who have reported having done at least one financing deal between 2006 and 2016. We used this contact information to invite investors via email to participate in our experiment.

In contrast to Block et al. (2019), we have drawn a subsample of the full dataset that includes responses from the US and continental Europe. We decided to exclude responses from the UK due to its closer relatedness to the US VC market.<sup>2</sup> In total, we received 150 responses from investors located in the US and 335 responses from investors located in continental Europe. Participants who stated to invest as a business angel (N = 10), to work for a corporate venture capital fund (= 42 participants) or to work for other types of investors (N = 3) were excluded from the sample. Hence, our final sample of investors from the United States and continental Europe consists of 430 participants and 11,180 decisions.<sup>3</sup> On average, the participants needed 21 seconds to complete a choice task, which is in line with other research (Johnson and Orme, 1996).

Table 8 provides a descriptive overview of our sample. Regarding both regions, the majority of respondents were male (89.30%) and between 25 and 54 years old (83.49%). The vast majority of respondents had an academic education (99.53%). Regarding the field of education, the majority of respondents have a business or economic background (81.86%). The mean investment experience of the investors is 11.26 years, ranging from 1 year of experience to 41 years of experience with a standard deviation of 8.20 years. The sample consists mainly of investors who work for VC funds (48.14%) or growth equity funds (27.67%).

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<sup>2</sup> Section 3.3.3.4 provides further analyses, which also considers responses from the UK.

<sup>3</sup> The investors in our sample are located in the following countries: 128 in the USA, 9 in Austria, 20 in Belgium, 3 in Bulgaria, 3 in Czech Republic, 10 in Denmark, 3 in Finland, 25 in France, 105 in Germany, 2 in Greece, 6 in Hungary, 43 in Italy, 1 in Lithuania, 12 in Luxembourg, 21 in the Netherlands, 8 in Norway, 3 in Poland, 2 in Portugal, 5 in Spain, 14 in Sweden and 7 in Switzerland.

**Table 8.** Descriptive statistics.

The final column reports the difference between the mean values along with the significance of a t-test for investment experience and z-tests for proportions for all other variables. Significant values indicate statistically significant differences. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Variable	Overall	United States	Continental Europe	US vs. Continental Europe
<b>Demographic variables related to the decision maker</b>				
Male	89.03%	89.84%	89.07%	-0.008
Age				
< 25 years	2.09%	4.69%	0.99%	-0.037*
25 – 34 years	29.77%	37.50%	26.49%	-0.110***
35 – 44 years	25.58%	15.63%	29.80%	0.142***
45 – 54 years	28.14%	21.09%	31.13%	0.100***
55 – 64 years	9.77%	9.38%	9.93%	0.006
> 64 years	4.65%	11.72%	1.66%	-0.101***
<b>Education and investment experience of the decision maker</b>				
Level of education (highest formal degree)				
High school degree or equivalent	0.47%	0.78%	0.33%	-0.005
Bachelor's degree	17.44%	36.72%	9.27%	-0.274***
Master's degree including MBA	69.77%	52.34%	77.15%	0.248***
PhD or doctoral degree	12.33%	10.16%	13.25%	0.031
Field of education (multiple choice possible)				
Law	7.21%	8.59%	6.62%	-0.020
Business/economics	81.86%	76.56%	84.11%	0.075***
Natural sciences	8.14%	7.81%	8.28%	0.005
Engineering	20.70%	21.09%	20.53%	-0.006
Investment experience	Mean: 11.26 yrs.; Std. dev.: 8.20 yrs.; Min.: 1 yr.; Max: 41 yrs.	Mean: 11.79 yrs.; Std. dev.: 9.92 yrs.; Min.: 1 yrs.; Max: 41 yrs.	Mean: 11.04 yrs.; Std. dev.: 7.34 yrs.; Min.: 1 yrs.; Max: 40 yrs.	-0.749***
<b>Type of investor/investment company</b>				
Debt fund	1.40%	0.78%	1.66%	0.009
Growth equity fund	27.67%	37.50%	23.51%	-0.140***
Leveraged buyout fund	13.72%	7.03%	16.56%	0.095***
Family office	9.07%	7.81%	9.6%	0.018
Venture capital (VC)	48.14%	46.88%	48.68%	0.018
N	430	128	302	430

Several differences between investors from the US and continental Europe emerge. For example, investors older than 64 years (11.72%) and younger than 35 years (42.19%) are overrepresented in the US compared with continental Europe (1.66% and 27.48%, respectively), whereas investors between 35 and 44 years (15.63%) and between 45 and 54 (21.09%)

are underrepresented in the US compared with continental Europe (29.80% and 31.13%, respectively). As shown in Table 8, using z-tests for proportions, we show that these differences are statistically significant. Regarding the level of education, less continental European investors hold a bachelor's degree (9.27%), while more hold a master's degree or MBA (77.15%) compared with US investors (36.72% and 52.34%, respectively). These differences are statistically significant. The fields of education in continental Europe and the US seem to follow a similar distribution, except for investors with an education in business or economics, which are significantly more often represented in continental Europe (continental Europe: 84.11%; US: 76.56%). The investment experience of US investors (mean: 11.79 years) is significantly higher than that of European investors (mean: 11.04 years), although the standard deviation for US investors (9.92 years) is higher than that for European investors (7.34 years). Regarding the type of investment companies, the proportion of European growth equity funds (23.51%) in our sample is significantly lower (US: 37.50%), while the proportion of European leveraged buyout funds (16.56%) is significantly higher (US: 7.03%).

### 3.3.3.3 Results

#### *The importance of screening criteria*

To examine how much importance the investors assign to each of the criteria when making their decision, we use a multilevel logit model, where the dependent variable is the investors' decision, coded one if the investor selects the respective venture, and zero otherwise. The ventures' attribute levels, which are coded as dummy variables, are used as independent variables. Aguinis et al. (2013) suggest the use of multilevel (hierarchical) regressions if the observations are nested and if effects on multiple levels (particularly across levels) are evaluated at the same time. We applied the suggested approach in our study as the decisions (level one) are nested within the individuals (level two).

**Table 9.** Main effects model.

Regression type: multilevel logistic regression with random intercepts and random slopes.  
 Dependent variable: preference of decision-maker.

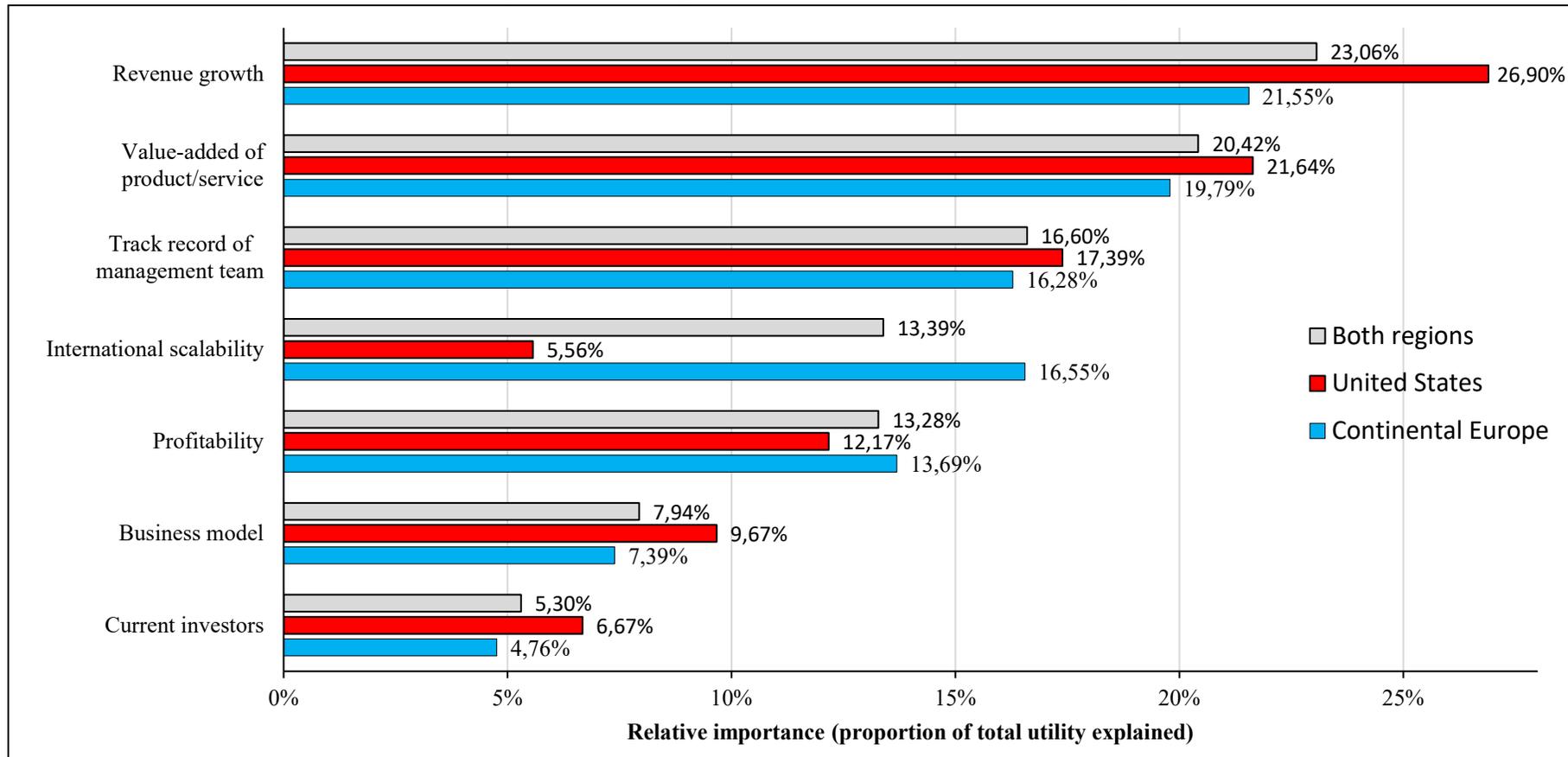
Attributes and levels	Log-odds Both regions	Log-odds US	Log-odds Europe
Profitability: break-even	0.574 (0.061)***	0.505 (0.100)***	0.605 (0.076)***
Profitability: profitable (reference group: not profitable)	0.945 (0.074)***	0.881 (0.122)***	0.977 (0.091)***
Revenue growth: 20%	0.594 (0.065)***	0.566 (0.127)***	0.613 (0.077)***
Revenue growth: 50%	1.164 (0.077)***	1.474 (0.150)***	1.045 (0.089)***
Revenue growth: 100% (reference group: 10%)	1.640 (0.082)***	1.947 (0.155)***	1.539 (0.098)***
Management team: some team members	0.868 (0.062)***	0.850 (0.115)***	0.883 (0.073)***
Management team: all team members (reference group: no team member)	1.181 (0.073)***	1.259 (0.131)***	1.162 (0.088)***
Current investor: ext. investors - unfamiliar to you	0.056 (0.060)	-0.071 (0.112)	0.107 (0.072)
Current investor: ext. investors - tier 1 (reference group: no external investor)	0.377 (0.068)***	0.483 (0.139)***	0.340 (0.078)***
Business model: innovation-centered	0.518 (0.071)***	0.522 (0.123)***	0.527 (0.088)***
Business model: lock-in	0.565 (0.071)***	0.700 (0.142)***	0.519 (0.082)***
Business model: complementary offering (reference group: low cost)	0.254 (0.068)***	0.293 (0.124)**	0.252 (0.083)**
Value-added: medium	0.887 (0.064)***	0.914 (0.117)***	0.873 (0.078)***
Value-added: high (reference group: low)	1.453 (0.072)***	1.567 (0.128)***	1.413 (0.088)***
Int. scalability: moderate	0.563 (0.060)***	0.269 (0.100)***	0.686 (0.074)***
Int. scalability: easy (reference group: difficult)	0.953 (0.067)***	0.403 (0.105)***	1.182 (0.082)***
N (decisions)	11,180	3,328	7,852
N (decision-makers)	430	128	302

Notes: Estimated with robust standard errors clustered at the level of the decision-maker in parentheses.

\* < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

Table 9 shows the results of this model, separated into results for both regions, investors located in the US and continental Europe. Except for the variable *current investor: ext. investors unfamiliar*, all attribute levels show significant effects on the investors' decision. The displayed log-odds indicate how strongly the presence of a certain attribute level increases the probability of a venture to be chosen by an investor.

Figure 5. Relative importance of attributes: US and Continental Europe



Notes: Calculated based on the coefficients of the main model (Table 9). Reading example: With a relative importance of 23.06%, the investors from both regions consider *revenue growth* to be more than four times as important as the criterion *current investors* (relative importance: 5.30%). This value also signifies that the criterion *revenue growth* accounts for 23.06% of the decision maker's total utility.

The relative importance of each attribute is displayed in Figure 5. It is based on the coefficients of the main model (Table 9) and shows how important an attribute is relative to the other attributes when an investor makes the decision. Regarding both regions, *revenue growth* (23.06%) is the most important attribute for investors when deciding which venture is more attractive to them. It is approximately four times as important as the *current investors* (5.30%) of the venture, which is the least important attribute. The relative importance of *revenue growth* is followed by the *value-added of the product/service* (20.42%), the *track record of the management team* (16.60%), the venture's *international scalability* (13.39%), *profitability* (13.28%), and the *business model* (7.94%). Figure 5 also provides the relative importance of each attribute separated into the investors' personal office location. Most notably, although being the most important criterion for investors from both regions, *revenue growth* is more important to US investors (26.90%) than to continental European investors (21.55%). Another distinct difference between both regions relates to *international scalability*. While it is ranked as the third most important attribute for investors located in continental Europe (16.55%), the relative importance of a venture's *international scalability* drops to 5.56% for US investors, turning into the least important criterion in our study for investors located in the US.

#### *Examination of differences between US and European investors*

As we were able to show that the relative importance of the ventures' attributes differs between continental European and US investors, we investigate these differences further by adding interaction terms in our model to show if these differences between investors from both regions are significant. Table 5 shows the results of these multilevel logit models with interaction effects, where we have added the dummy variable *US* as an independent variable, taking a value of "1" if the investor is located in the US or "0" if the investor is located in continental Europe.

**Table 10.** Model with interaction effects.

Regression type: multilevel logistic regression with random intercepts and random slopes.  
Dependent variable: preference of decision-maker.

Attributes and levels	Log-odds
Profitability: break even * US	-0.076 (0.126)
Profitability: profitable * US (reference group: not profitable)	-0.070 (0.152)
Revenue growth: 20% * US	-0.018 (0.136)
Revenue growth: 50% * US	0.465 (0.159)***
Revenue growth: 100% * US (reference group: 10%)	0.449 (0.163)***
Management team: some team members * US	-0.005 (0.125)
Management team: all team members * US (reference group: no team member)	0.126 (0.146)
Current investor: ext. investors - unfamiliar to you * US	-0.160 (0.126)
Current investor: ext. investors - tier 1 * US (reference group: no external investor)	0.165 (0.146)
Business model: innovation-centered * US	0.024 (0.146)
Business model: lock-in * US	0.211 (0.156)
Business model: complementary offering * US (reference group: low cost)	0.068 (0.150)
Value-added: medium * US	0.067 (0.127)
Value-added: high * US (reference group: low)	0.185 (0.139)
Int. scalability: moderate * US	-0.395 (0.121)***
Int. scalability: easy * US (reference group: difficult)	-0.753 (0.127)***
N (decisions)	11,180
N (decision-makers)	430

Notes: Estimated with robust standard errors clustered at the level of the decision-maker in parentheses.

\* < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

The results indicate that US and continental European investors significantly differ regarding the importance they assign to the criteria *revenue growth* and *international scalability*, while all other criteria do not differ significantly. Although the probability of choosing the venture increases with a higher level of *revenue growth* for investors from both regions, this effect is significantly stronger for investors located in the US. This is shown with the positive coefficients of the interaction terms for *revenue growth: 50%* and *revenue growth: 100%*, which are

both significant. Additionally, while of interest to investors from both regions, the probability of choosing the shown venture increases the easier the *international scalability* is, this effect is significantly weaker for US investors than for European investors, which is shown by the highly significant negative coefficients of the interaction terms for *international scalability: moderate* and *international scalability: easy*.

#### 3.3.3.4 Further analysis and robustness check

Due to its economic and legal proximity to the US and the fact that it was one of the first countries where VC was introduced after its initial start in the US, we decided to exclude respondents from the UK in our sample. To address this issue, we conducted multiple tests where we compared the differences between investors located in the UK and continental Europe as well as the UK and US. Furthermore, we added the UK to our continental European sample and conducted a multilevel regression with interaction effects to confirm whether our findings also hold for the whole continent, including the UK.

As shown in Table 11, comparing the importance of the selection criteria between investors located in the UK and the US, the importance of the criterion *international scalability* is significantly lower for US investors, but the effect size gets smaller compared with our initial sample. Regarding the importance of *revenue growth*, investors from the UK differ only in the smaller level of *revenue growth: 50%*. This finding shows that compared to continental European VC investors, the different importance of screening criteria for UK investors is slightly closer to the degree of importance that US investors attribute to the selection criteria. Comparing UK investors with continental European investors, no significant differences could be found, suggesting that they are closer to their continental counterparts than to their US counterparts. Adding UK investors to our continental European sample and comparing it with US investors, we find similar differences as in the model without UK investors. However, the differences are slightly smaller.

Furthermore, Table A3 (Appendix) provides results of a model with interaction effects with a sample that includes exclusively responses from investors of Venture Capital Funds (= 207 participants) and Growth Equity Funds (= 119 participants). The findings from Table 10 are robust for this subsample as well.

**Table 11.** Model with interaction effects.

Regression type: multilevel logistic regression with random intercepts and random slopes.

Dependent variable: preference of decision maker. Moderator variable: (1) = US (variable takes "1" if the investor is located in the US) / (2) = UK (variable takes "1" if investor is located in the UK) / (3) = US (variable takes "1" if investor is located in the US).

Attributes and levels	UK vs US (1)	UK vs EU (2)	UK+EU vs US (3)
Profitability: break even * Moderator variable (MV)	-0.176 (0.177)	0.102 (0.162)	-0.097 (0.121)
Profitability: profitable * MV (reference group: not profitable)	-0.258 (0.214)	0.190 (0.196)	-0.109 (0.147)
Revenue growth: 20% * MV	0.168 (0.179)	-0.187 (0.153)	0.024 (0.132)
Revenue growth: 50% * MV	0.468 (0.195)**	-0.006 (0.163)	0.465 (0.153)***
Revenue growth: 100% * MV (reference group: 10%)	0.264 (0.201)	0.183 (0.171)	0.412 (0.156)***
Management team: some team members * MV	0.014 (0.172)	-0.020 (0.153)	0.000 (0.121)
Management team: all team members * MV (reference group: no team member)	0.075 (0.181)	0.052 (0.159)	0.114 (0.139)
Cur. investor: ext. investor - unfamiliar to you * MV	0.046 (0.163)	-0.206 (0.142)	-0.113 (0.122)
Current investor: ext. investors - tier 1 * MV (reference group: no external investor)	0.061 (0.191)	0.103 (0.160)	0.144 (0.142)
Business model: innovation-centered * MV	0.119 (0.184)	-0.096 (0.163)	0.044 (0.140)
Business model: lock-in * MV	0.205 (0.186)	0.005 (0.152)	0.212 (0.150)
Business model: complementary offering * MV (reference group: low cost)	0.074 (0.193)	-0.007 (0.167)	0.069 (0.145)
Value-added: medium * MV	0.134 (0.173)	-0.067 (0.158)	0.081 (0.122)
Value-added: high * MV (reference group: low)	0.155 (0.185)	0.028 (0.170)	0.176 (0.133)
Int. scalability: moderate * MV	-0.504 (0.155)***	0.114 (0.143)	-0.423 (0.115)***
Int. scalability: easy * MV (reference group: difficult)	-0.520 (0.170)***	-0.231 (0.159)	-0.702 (0.121)***
N (decisions)	5,694	10,218	13,546
N (decision makers)	219	393	521

Notes: Estimated with robust standard errors clustered at the level of the decision-maker in parentheses.

\* &lt; 0.10, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01.

## 3.4 Discussion

### 3.4.1 Summary of main findings

Our study is the first to directly compare the importance of VC selection criteria between the US and Europe by utilizing a quasi-experimental design. Our results show that US and European investors differ regarding the decision criteria of international scalability and revenue growth. Whereas international scalability is the third most important criterion for European investors, it is ranked as the least important criterion by US investors. While it is comprehensible that European investors attribute so much importance to the company's international scalability, as it is particularly important for those residing in smaller economies to achieve sustainable growth (McNaughton, 2001), it is rather surprising that US investors pay so little attention to the aspect of internationalization. In particular, when considering the interest of VC investors in the growth of their portfolio companies to divest their shares profitably after a few years and the potential that internationalization offers young ventures in terms of growth, this strong difference becomes even more striking (Lu and Beamish, 2006).

Our study also shows that US and European investors differ in the evaluation of a company's revenue growth. While revenue growth is ranked as the most important criterion for investors from both regions, US investors attribute significantly more importance to it. Against the background of the aforementioned interest by VC investors in selling their portfolio companies profitably after a certain time, a difference in the evaluation of this criterion is unexpected (Hall and Hofer, 1993). The difference might be explained by certain aspects of the differing US and European markets, such as investor experience or risk attitude (Murray and Marriott, 1998). However, from a theoretical perspective, finding clear and unambiguous explanations for these results is challenging, which is why we wanted to obtain the perspective of practitioners to find meaningful explanations for our findings.

### 3.4.2 Interpretation of findings using interviews with VC investors

After the conjoint experiment, we conducted eleven interviews with VC investors to interpret our findings regarding the differences between US and European investors in the relative importance attributed to international scalability and revenue growth. Four of the interviewed VC experts are located in the US, and seven are located in Europe.

First, the interviews confirmed our finding that European investors attribute comparably more importance to easy international scalability than US investors. Most prominently, all

seven investors we interviewed from Europe highlighted that they would not be able to grow large companies in Europe without internationally scalable business models, as the single markets in Europe are too small. One European investor summed this up by stating that “if you want to create a billion-dollar company you have to be international. Domestic billion-dollar companies are extremely rare.” The investors from Europe pointed out that investing in a company that could only become a domestic champion would only be interesting if the domestic economy is large enough. In contrast, all US investors we interviewed agreed that easy international scalability is not of utmost importance to them and is merely considered an advantage. One US investor summarized it by saying, “Our hope is that it is a product that does relate to customers outside the US, but we are more than sufficiently focused on the US from our go-to-market perspective. We don’t think deeply about internationalization.” Furthermore, European investors highlighted the importance of a business model that can easily be scaled internationally due to the different cultures, languages, and regulations between European countries. As one European investor stated, “If you want to take Europe by storm with something you have to take into account the various specifics of the different countries, different languages, different preferences.” The US investors in our interviews argued that there is no need at all for them to look for international opportunities “[...] the US business is big enough. We believe that there is enough opportunity here in the US to build a multibillion-dollar public company if you sell it [the product] just in the US alone.”

Our findings regarding the differences in the importance of revenue growth were also confirmed by our interview partners. While investors from both regions agreed that revenue growth is an important screening criterion, several differences became evident between US and European investors in the interviews. Although the European investors explained that revenue growth is important, they argued that growth should be evaluated in comparison with other criteria such as profitability: “[...] we tend to be careful. If our revenue growth is super high but then we don’t see a clear path to profitability, we would prefer to have a path to profitability rather than super high growth rates.” The risk-averse attitude of European investors regarding high revenue growth rates is also attributed to the different development stages of the European and the US capital market and particularly the VC market. A European investor raised an argument concerning supply-side finance problems in Europe. The investor argued that the scarcity of scale-up funding makes it difficult for companies in Europe to finance their growth: “If the company has a high growth rate, they also have a high cash burn rate. So [in the US] there is also availability of growth capital to keep those companies moving in and growing at that pace.”

The different development stages of the VC markets were also considered by another European VC investor who pointed out that the European VC market is “[...] not a mature market. [...] Since there are fewer VCs than you have in the States and less track records from previous funds, I would suggest that any investor is more risk-averse in Europe. You want to make pretty sure that you’re going to be able to have great returns and not risk so much.” In line with this, a US investor stated, “I think it [the US] is a more mature venture capital market and ecosystem. In addition, I think that the revenue growth rate is a major factor in how companies are valued and how companies and when companies are acquired.”

A final argument concerns differences in IPOs as an exit strategy. US investors seem to have an IPO as a possible exit strategy in their mind already at the screening stage, considering that high revenue growth may lead to higher IPO valuations, which is in line with prior research (Bayar and Chemmanur, 2012). “I mean like you're sort of forecasting how large a company can be. So, if you are investing in a company and it blends 1 million in revenues and you are thinking this is going to be a public company in the United States, it is going to be 200 or 300 million of annualized revenues [...]. It's better for that to be five years in the future than 30 years, right? So, the faster you grow and the more valuable, the higher multiple, and the sooner it gets large.” In line with this argument, one of the European investors suggested that the lower importance of high revenue growth in Europe compared with the US could be connected to the lower relevance of IPOs in Europe: “The European capital market isn’t as developed as the US capital market, which makes IPOs more restrictive and trade sales relatively more important in Europe. With trade sales being more important, aspects other than revenue growth are likely important. In conclusion, due to the strong IPO market in the US, revenue growth is more important to US investors.”

Table 12 provides a summary of the experts’ interpretations. It is separated into the two main findings and the interpretations of the experts from each region.

**Table 12.** Summary of empirical findings and experts' interpretations.

Main findings	Interpretation of US investors	Interpretation of European investors
<i>International scalability</i> more important to European investors	<ul style="list-style-type: none"> <li>- International scalability not mandatory due to sufficient size of US market</li> <li>- No big cultural or legal differences within the US</li> </ul>	<ul style="list-style-type: none"> <li>- Single European countries are relatively small, making an international scalable business model mandatory</li> <li>- Big cultural and regulatory differences make a business model that can easily be scaled internationally crucial</li> </ul>
<i>Revenue growth</i> more important to US investors	<ul style="list-style-type: none"> <li>- Capital market in the US is well-stocked and provides rapidly growing companies with sufficient funding</li> <li>- Higher risk-affinity that favors very high growth rates</li> <li>- More liquid capital market that increases the chances for successful exits via IPO, where revenue growth acts as a value driver</li> </ul>	<ul style="list-style-type: none"> <li>- Fast growth is accompanied by high requirements for additional growth capital, which is very scarce in Europe</li> <li>- Lower attitude towards higher risks that may come with high growth rates</li> <li>- Exits via IPOs play a smaller role in Europe, making high revenue growth as a value driver less important</li> </ul>

### 3.4.3 Implications

Our paper offers several implications for theory and practice. From a theoretical perspective, our findings extend research about the importance of screening criteria in VC decision-making by incorporating a component of international comparison (e.g., Hall and Hofer, 1993; Franke et al., 2008; Petty and Gruber, 2011). Second, our study contributes to research investigating syndication deals with investors from different countries (e.g., Nahata et al., 2014; Dai and Nahata, 2016; Liu and Maula, 2016) and the adjustment of screening criteria when making cross-border investments (e.g., Wright et al., 2005; Dai et al., 2012). We find that the relative importance of screening criteria may vary across different VC markets. Therefore, findings that are drawn from samples solely investigating one particular region or country should only be generalized very carefully.

From a practical perspective, our study may assist VC investors as well as startups looking for VC. We show that the importance attributed to screening criteria depends on the investors' location and should be taken into account by startups. Hence, startups may try to emphasize the screening criteria that are important for VC investors depending on their location. For example, our research indicates that European startups should highlight the internationalization capabilities of their business model. When applying for funding from US investors, startups should especially try to focus on high revenue growth rates. Our paper may also assist VC investors looking for syndicated deals with foreign investors, helping them to better understand each other's preferences and targets and to better match their screening criteria. For example, US investors investing in the European market should focus more strongly on the internationalization capabilities of the potential investee and lower the relative importance of the startup revenue growth rates.

#### 3.4.4 Limitations and avenues for future research

Previous research on the importance of screening criteria in a VC context has been criticized as suffering from post hoc and self-report bias, as early research mainly depended on qualitative interviews and post hoc questionnaires (Tyebjee and Bruno, 1984; MacMillan et al., 1985; Shepherd and Zacharakis, 1999). To prevent this kind of bias, we followed the approach by Shepherd and Zacharakis (1999) and made use of a conjoint experiment. Although conjoint experiments can overcome these biases and are closer to actual decision-making situations, they still have certain limitations. First, our experiment implicitly assumes that the investor knows all seven screening criteria that we have used in our experiment. Typically, this is not the case in a real decision-making scenario, where probably not all information is available. Furthermore, we have limited the number of screening criteria to keep the complexity of the experiment at a level that allowed the participants to cope with it. As a result, not all criteria that we had identified in our initial interviews (e.g., intellectual property protection, competition in the market) could be included in our experiment, and we focused on the seven criteria mentioned to be the most important. Another limitation is related to the diversity within the European VC market. Although previous research has found that the behavior of European investors barely differs (Muzyka et al., 1996), we are not able to control whether certain country-specific characteristics, such as its economic size, have an impact on individuals' decision-making behavior. Nevertheless, adopting a multimethod design allowed us to retrieve further information directly from practitioners and experts across Europe, offering us diverse perspectives from different countries.

Our study offers several avenues for future research. First, our study suggests the relevance of a deeper look into regional differences regarding the importance of different screening criteria. In particular, the research of screening criteria in Asian VC markets could offer fruitful new insights, and the importance of the criteria could deviate significantly from those of European and US investors (Lockett and Wright, 2002). Second, our findings suggest that research on international VC, in particular research that investigates VC syndication of investors from different regions, could provide interesting insights into the success factors of international syndications. For example, it could be investigated whether foreign lead investors in a syndicated deal are prone to stress certain aspects of the invested company according to the criteria they typically highlight in investments in their domestic markets. It could also be possible that investors from foreign markets adapt the screening behavior of domestic investors when executing cross-border investments to profit from the experience that domestic investors have (Mäkelä

and Maula, 2008). As our study mainly relies on VC markets, it could be worth investigating whether these regional differences also exist for other financing instruments, such as venture debt or investments by business angel.

## Chapter 4

# Schumpeterian entrepreneurial impression and VC acquisition

*Adopting an impression management perspective, we examine the effect of a Schumpeterian entrepreneurial impression on a venture's ability to VC funding. Because the VC industry celebrates innovative and visionary entrepreneurship, we posit that a founder's impression of being a Schumpeterian-type entrepreneur influences the venture's chances of receiving VC funding. A quantitative analysis of the language used by 3,313 founders in more than 2 million Twitter messages, however, provides a mixed picture. While some dimensions of Schumpeterian entrepreneurship increase the chances of resource acquisition (entrepreneurial vision and optimism), other dimensions seem to have no (e.g., uncertainty avoidance and rationality) or even a decreasing effect (achievement motivation). The negative effects can be explained through the particularities of the VC business model, which is not in line with Schumpeterian entrepreneurship in all respects. Our study contributes to impression management research as well as to research about Schumpeterian entrepreneurship and the link of entrepreneurial narratives to entrepreneurial finance.*

## 4.1 Introduction

Joseph A. Schumpeter describes the entrepreneur as a change agent who brings innovation into the market. More specifically, Schumpeter describes entrepreneurs as visionaries that discover and exploit rare innovative and disruptive opportunities. Therefore, entrepreneurs create new markets and destroy existing market equilibria (Schumpeter, 1934). Today, this Schumpeterian view of entrepreneurship is very popular in the media and in hot spots of entrepreneurship and innovation around the world.<sup>4</sup> For example, Silicon Valley's entrepreneurship, with disruptive superstar entrepreneurs such as Steve Jobs (Apple), Elon Musk (PayPal, SpaceX, and Tesla), Larry Page (Google), and Mark Zuckerberg (Facebook), is referred to as Schumpeterian entrepreneurship (e.g., Thiel and Masters, 2014).

Such entrepreneurs, however, cannot act alone but need external resources to exploit the opportunities they identify. Most importantly, these entrepreneurs need substantial external funding to build and scale their ventures from small entities to large enterprises. This external funding often comes from VC firms, which, as equity funders, are able and willing to bear the considerable risks and uncertainties involved in the entrepreneurship and innovation process (e.g., Gompers and Lerner, 2001). Indeed, prior research shows that successful resource acquisition from such funders is one of the most crucial activities of entrepreneurs during the creation of new ventures (e.g., Ko and McKelvie, 2018; Stuart and Sorenson, 2007).

At first sight, the Schumpeterian type of entrepreneur seems to be very popular among venture funders and in an entrepreneurial finance context. Leading VC firms such as Kleiner Perkins or Sequoia Capital celebrate the Schumpeterian image of entrepreneurship and see themselves as trustful partners at eye level, helping innovative entrepreneurs turn their visions into reality<sup>5</sup>. On closer inspection, however, Schumpeterian entrepreneurs may also have characteristics and personality traits that may not fit well with the business model of the VC industry. For example, Schumpeter describes entrepreneurs as being intrinsically motivated with a

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<sup>4</sup> Our study refers to Schumpeter's entrepreneur-centered view of the innovation and growth process described in Schumpeter (1934), referred to as Schumpeter Mark I (e.g., Malerba and Orsenigo, 1996). In Schumpeter Mark II, Schumpeter changes his mind and argues that entrepreneurs are of low importance to innovation and growth, which are carried out by large firms (Schumpeter, 1942).

<sup>5</sup> For example, Sequoia Capital states on its website that "[...] we're seeking exceptional founders with a unique insight focused on a market poised for large growth. We're more interested in what might be possible than in a working product or existing customers" (see <https://www.sequoiacap.com/article/sequoia-and-seed-investing/>, accessed 7th February 2022).

strong need for achievement (Schumpeter, 1934). This aspect of Schumpeterian entrepreneurship could be contrary to the financial interests and control considerations of VC firms since the founders in VC-backed companies are typically incentivized by financial rewards. Founders with high intrinsic motivation may be less prone to follow the VCs designated direction, complicating the goal alignment of entrepreneurs and investors. Hence, it remains an open question whether VC firms favor Schumpeterian-type entrepreneurs and which aspects of Schumpeterian entrepreneurship they value.

Founders can actively manage their image and impressions towards potential funders and other stakeholders. Through the use of social media tools such as Twitter, founders can create an impression that matches the expectations of potential funders. However, to date, our understanding of how founders' impressions influence their resource acquisition ability is limited. In particular, we lack knowledge about what types of founder impressions are helpful in resource acquisition. Combining an impression management lens (Bolino et al., 2008; Goffman, 1959) with Schumpeter's theory of entrepreneurship (Schumpeter, 1934), our study investigates the effects of founders' social media impressions on resource acquisition from VC firms. We hypothesize that some aspects of Schumpeterian entrepreneurship (e.g., entrepreneurial vision and optimism, uncertainty tolerance, rationality, and confidence) have positive effects, whereas others (e.g., self-centrism, achievement motive, power motive) have negative effects.

To assess our hypotheses, we draw on a computerized text analysis of entrepreneurs' language use on Twitter. Our quantitative analysis of more than 2 million Twitter messages from 3,313 entrepreneurs provides a mixed picture. While some dimensions of Schumpeterian entrepreneurship increase the chances of resource acquisition (e.g., entrepreneurial vision and optimism) from VC firms, other dimensions seem to have no (e.g., uncertainty tolerance or rationality) or even decreasing (e.g., achievement motive) effects. The negative effects can be explained through the particularities of the VC business model.

With these results, our study makes several contributions to the general management and entrepreneurship literature. Specifically, we contribute to research on Schumpeterian entrepreneurship (e.g., Block et al., 2017; Henrekson and Sanandaji, 2020) and on how it is perceived in an entrepreneurial finance context. We show that – in contrast to popular wisdom and the self-image of venture capitalists – Schumpeterian entrepreneurship is not unequivocally welcomed by VC firms. Our study provides nuanced insights and shows which dimensions of Schumpeterian entrepreneurship are in line with the expectations of VC firms and which are not. In this way, our study also contributes to the literature on the entrepreneur-related funding

criteria of VC firms, an established research stream in entrepreneurial finance (e.g., Block et al., 2019; Franke et al., 2008).

Second, we contribute to impression management research (e.g., Bolino et al., 2008; Goffman, 1959). We show that impressions can have strong effects on the resource acquisition of entrepreneurial ventures. This resource acquisition lens, however, is not entirely new to impression management research (e.g., Parhankangas and Ehrlich, 2014). Our study goes beyond prior work and shows that undirected and non-purposeful communication via social media can have strong effects. To date, impression management research on resource acquisition has mostly dealt with impressions delivered through directed and/or purposeful communication through investment proposals (e.g., Parhankangas and Ehrlich, 2014), word-of-mouth communication (Berger, 2014), and entrepreneurial pitches (Parhankangas and Renko, 2017). We also show that impression spillovers from the entrepreneur to the venture level exist and that the Schumpeterian founder impression influences venture funding. With this result, we also contribute to research on how (entrepreneurial) narratives can help ventures acquire resources (e.g., Martens et al., 2007; Nielsen and Binder, 2021).

Third, we contribute to research on entrepreneurs' use of social media, in particular of Twitter (e.g., Fisch and Block, 2021; Fischer and Reuber, 2011; Smith et al., 2017). Our study shows that entrepreneurs can use Twitter to build a digital identity that influences their ability to acquire funding. In this way, our study shows that using Twitter as a tool has the potential to go beyond information acquisition (Fischer and Reuber, 2011), product and venture marketing (Fischer and Reuber, 2014; Kozinets et al., 2010), generating web traffic (Winkler et al., 2020), and building (digital) social capital (Smith et al., 2017). The platform can also be used to attract entrepreneurial finance from professional investors such as VC firms. Prior entrepreneurial finance research has analyzed the effects of Twitter and social media on crowdfunding success (Sahaym et al., 2019). Our study follows Tumasjan et al. (2021) and extends this line of research to professional investors.

## **4.2 Theoretical background**

### **4.2.1 Schumpeterian entrepreneurship and its role in the economy**

In Schumpeter's (1934) theory of economic development, economic dynamism and growth are characterized by a constant birth and death of firms. Entrepreneurs play a central role in this process by engaging in 'creative destruction.' That is, entrepreneurs search for and identify new

economic opportunities with high disruptive potential. Such opportunities are innovative and involve the “carrying out of new combinations” (Schumpeter 1934, p. 66).<sup>6</sup> By exploiting these opportunities, entrepreneurs bring innovation into the market and destroy existing market equilibria. Consequently, incumbent firms are forced to leave the market, and the entrepreneur gains a temporary monopoly, which is highly profitable. The entrepreneur’s temporary monopoly persists until imitators arrive and challenge the entrepreneur and their firm. Schumpeter explains that the market then finds a new equilibrium in which the entrepreneur and his or her skills as an innovator and change agent are no longer needed. Managers take over, who are more experienced and better trained in running routine tasks and at leading large organizations than entrepreneurs.

In summary, Schumpeter sees entrepreneurship as a temporary function responsible for bringing innovation into the market. However, individuals who possess the skills of carrying out this function are rare and “a special type” (Schumpeter 1934, p. 81). Schumpeter clearly distinguishes entrepreneurs from managers who do not possess these innovating skills but who are good at running established firms with established and proven methods. Schumpeter also distinguishes entrepreneurs from self-employed individuals who run and own a business but do not engage in the “carrying out of new combinations” (Schumpeter 1934, p. 75). Schumpeter also distinguishes entrepreneurs from shareholders, who “per se [...] are never entrepreneurs, but merely capitalists, who in consideration of their submitting to certain risks participate in profits” (Schumpeter 1934, p. 75). Nevertheless, entrepreneurs may be shareholders or capitalists because they can also be inventors. This, however, is not a necessary condition caused by the function of entrepreneurship. Instead, it is rather a coincidence. Additionally, Schumpeter clearly distinguishes between invention (i.e., the discovery of new knowledge) and innovation (i.e., the introduction of new applications resulting from new knowledge into the market). While innovation is associated with entrepreneurship, invention is not.

Schumpeter’s view of entrepreneurship is popular in the literature on innovative entrepreneurship and in debates on entrepreneurship policy (e.g., Block et al., 2017; Estrin et al., 2020). This literature argues and empirically documents that the benefits of entrepreneurship, such as economic development and job growth, are not generated by all types of new ventures but only by a small number of young and innovative high-growth ventures (e.g., Aldrich and

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<sup>6</sup> Schumpeter defines innovation in a broad sense that comprises, among others, product, process, and organizational innovation.

Ruef, 2018; Henrekson and Johansson, 2010), many of which are backed by VC (e.g., Kortum and Lerner, 2000; Lerner and Nanda, 2020). To illustrate, less than 0.5% of all new ventures in the US receive VC funding, while more than 50% of IPOs are VC backed (Aldrich and Ruef, 2018; Kaplan and Lerner, 2010). Henrekson and Sanandaji (2020) conclude from this stylized fact that quantity-based measures of entrepreneurship that capture all types of ventures and small businesses should not be the focus of policymakers. Instead, policymakers should focus on the type of entrepreneurship that is primarily represented by founders with Schumpeterian qualities. Even though many Schumpeterian-type new and innovative ventures fail, the overwhelming majority of ventures with great societal and economic impact are from this category.

#### **4.2.2 Impression management**

We combine the theory of the Schumpeterian entrepreneur with the concept of impression management (IM). The conception of IM goes back to Goffman (1959), who first explained that individuals act differently in social interactions depending on whom they interact with and on the goal they pursue in their interactions. Through IM, people seek to influence the image that others have of them to reach specific goals (Bolino and Turnley, 1999; Bozeman and Kacmar, 1997; Goffman, 1959). Generally, IM strives to build images with positive values and to avoid images that are negatively valued. These images are constructed, among others, through the use of verbal statements (Ellis et al., 2002; Goffman, 1959). IM is frequently used as a conceptual lens in prior management research, distinguishing IM at the individual or organizational level (Bolino et al., 2008). At the individual level, IM is used for example in general evaluations (e.g., performance in a new job; Huang et al., 2013) or in selection processes (e.g., in the hiring process; Roulin et al., 2015). At the organizational level, IM may be used to restore legitimacy after disputable decisions (Elsbach, 1994) or to acquire new customers (Schneiderjans et al., 2013).

Conceptually, the process of IM comprises two closely intertwined components, impression motivation and impression construction (Leary and Kowalski, 1990). Impression motivation refers to an individual's motivation to create a certain image of the self to increase the probability of a desirable outcome (e.g., Leary and Kowalski, 1990; Schlenker, 1980). The desirable outcome is situational and can, for example, include a positive response in a job interview (Stevens and Kristof, 1995) or a high rating on a supervisor's performance assessment of an employee (Wayne and Kacmar, 1991). Depending on the impression motivation, individuals then use impression construction to create the desired image that could increase the probability

of the desired outcome. To achieve this aim, several strategies can be used to shift the image that another person has of the individual in a certain direction (Jones and Pittman, 1982). Displaying an impression that authentically matches the favored view of the target audience will subsequently increase the chances for the intended positive outcome (Grandey et al., 2005; Roulin et al., 2014; Turnley and Bolino, 2001).

IM can play an important role in the acquisition of venture funding. IM is a powerful tool in situations of high uncertainty where individuals act as agents and seek support from powerful principals (e.g., Carter, 2006; Rindova and Fombrun, 1999; Schlenker, 1980). This happens when founders seek funding from VC firms, and prior research shows that founder (team) impressions impact VC evaluations (e.g., Franke et al., 2008; Hsu, 2007; Zhang, 2011). Accordingly, founders have a strong motivation to use IM tactics to construct favorable impressions that increase their chances of securing venture funding. Using an IM lens, Parhankangas and Ehrlich (2014) investigated investment proposals submitted to a business angel network. The authors' results show evidence for a wide range of inverted U-shaped effects. Investment proposals characterized by moderate levels of positive language use, innovation promotion, and blasting of competition had the highest likelihood of securing funding. Furthermore, using an algorithm-based assessment of crowdfunding videos, Korzynski et al. (2021) found that IM tactics, particularly exemplification and self-presentation, may positively influence the success of a crowdfunding campaign.

### 4.3 Hypotheses

We now develop hypotheses regarding how a Schumpeterian founder impression influences a venture's ability to acquire resources from VC firms. Our arguments build on Schumpeter's work on the theory of economic development (Schumpeter, 1934), in which he details the role, function, leadership, personality, and motivation of entrepreneurs. We combine these aspects with research on the expectations and inner workings of VC firms (e.g., Hellmann and Puri, 2002; Parhankangas and Landström, 2006) and argue that an impression is successful when the created or delivered impression matches the expectation of the receiver (e.g., Gardner and Avolio, 1998; Leary and Kowalski, 1990). Hence, our general view is that founders who can create and deliver an impression that matches VC firms' expectations will find it easier to acquire resources from them. Where possible, we cite the original statements made by Joseph

Schumpeter. We divide our hypotheses into three main traits of the Schumpeterian entrepreneur: the characteristics of the entrepreneur being a change agent, the entrepreneur's leadership behavior, and the entrepreneurs' motivation (e.g., Cantner et al., 2017; Ripsas, 1998).

#### 4.3.1 Founder impressions displaying Schumpeterian change agent characteristics

To be a successful innovator or change agent, entrepreneurial vision, optimism, and uncertainty tolerance are needed according to Schumpeter. Below, we formulate hypotheses on how a founder impression displaying these entrepreneurial characteristics influences resource acquisition from VC firms.

##### *Entrepreneurial vision*

Innovation, in particular radical and disruptive innovation, entails a high degree of novelty. Schumpeter describes innovative entrepreneurs as visionaries who can identify upcoming future products and markets with economic potential before others perceive these markets. Such entrepreneurs are rare, and VC firms look for such rare cases of visionary entrepreneurship (e.g., Galbraith et al., 2014; Sudek, 2006). For example, Sequoia Capital was among the initial financiers of Airbnb. On its website, Sequoia Capital celebrates the founders of Airbnb as follows: "two designers [...] and an engineer [that] came together [...] to start a rudimentary website listing 'AirBeds and Breakfast.' While their product was novel, what really mattered at that time was their vision. They had the imagination to envision how hosts and guests who had never met could build trust, and how travelers could one day prefer the sense of belonging that accompanies staying in a 'stranger's' home."<sup>7</sup> This statement illustrates that VC firms often hope to find such visionary entrepreneurs and partner with them. The firms' business models are centered around those rare cases of visionary entrepreneurship in which innovative products, services, or business models disrupt and transform entire industries and markets. Such market disruptions can lead to highly profitable (temporary) monopoly situations and substantial innovation rents, which are what VC firms look for. This notion is also reflected in the well-documented high-risk, high-reward way in which VCs pursue their investments (e.g., Block et al., 2019; Cochrane, 2005). Thus, we posit the following:

**H1a:** *A founder impression displaying a strong degree of entrepreneurial vision has a positive effect on resource acquisition from a VC firm.*

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<sup>7</sup> See <https://www.sequoiacap.com/article/brian-chesky-airbnb-spotlight/> (accessed 7th February 2022).

### *Optimism*

Entrepreneurs tend to be more optimistic than the general population (e.g., Åstebro et al., 2007). Entrepreneurial optimism is the extent to which an entrepreneur holds favorable expectations of a venture's future. Throughout the entrepreneurial journey, entrepreneurs have to overcome many obstacles and uncertainties (Ayala and Manzano, 2014; Kollmann et al., 2017). Being optimistic and having favorable expectations about a venture's future are important and necessary conditions for persevering in such challenging situations. The number of obstacles and uncertainties to overcome is even greater for innovative entrepreneurship than for less innovative and non-disruptive entrepreneurship (e.g., Baum and Silverman, 2004). Schumpeter posits that by introducing innovation into the market, the entrepreneur must not only overcome technical challenges but also “the reaction of the social environment against one who wishes to do something new” (Schumpeter, 1934, p. 86). Such a reaction can manifest in legal or political barriers but also in outright opposition or direct attacks.

VC firms know from their experiences of past investments that successful innovation is rare and that many entrepreneurs fail on the way to entrepreneurial success (Tian and Wang, 2014). Such firms have seen many entrepreneurs fail with their innovative ideas and learned that entrepreneurial optimism is needed to overcome difficult and challenging situations in a hostile environment. Hence, we posit the following:

**H1b:** *A founder impression displaying a strong degree of entrepreneurial optimism has a positive effect on resource acquisition from a VC firm.*

### *Uncertainty tolerance*

Schumpeter describes entrepreneurship and the entrepreneurial function of introducing innovation into the market as involving a situation of uncertainty. Applying new combinations means stepping “outside the boundary of routines” (Schumpeter 1934, p. 84) where “many things must remain uncertain, still others are only ascertainable within wide limits, some can perhaps only be “guessed” (Schumpeter, 1934, p. 85). Entrepreneurs have to deal with this uncertainty with their experience, intuition, and thoughtful planning. Once this uncertainty goes away, the importance of entrepreneurs diminishes, and they are longer needed and can be replaced by managers.

VC firms aim to invest in such uncertain opportunities with high growth and profitability potential (e.g., Cochrane, 2005; Hsu et al., 2014; Mason and Stark, 2004). Hence, such firms

also seek entrepreneurs who are accustomed to such high levels of uncertainty and can make entrepreneurial decisions in such situations. Prior research describes this characteristic as uncertainty tolerance (Knight, 2006) and finds that entrepreneurs are more willing to accept uncertainty (Holm et al., 2013) and losses (Koudstaal et al., 2016) in business contexts. The following hypothesis should apply:

**H1c:** *A founder impression displaying a strong degree of uncertainty tolerance has a positive effect on resource acquisition from a VC firm.*

### 4.3.2 Founder impressions displaying Schumpeterian leadership behaviors

This section develops three hypotheses of how a founder impression displaying Schumpeterian leadership behavior influences the chances of resource acquisition from VC firms.

#### *Rationality*

In contrast to conventional wisdom, Schumpeter does not understand leadership as a skill or trait that characterizes how leaders inspire followers to achieve common goals. Instead, Schumpeter describes leadership as behavior that captures how entrepreneurs fulfill their functions as entrepreneurs. For Schumpeter, successful leadership requires keenness and vigor but also a “certain narrowness which seizes the immediate chance and nothing else” (Schumpeter 1934, p. 89). The entrepreneur does not lead from his or her personality and not by “convincing people of the desirability of carrying out his plan or by creating confidence in his leading in the manner of a political leader” (Schumpeter, 1934, p. 89). Instead, Schumpeterian entrepreneurs lead by channeling means of production into the right channels. For this purpose, the entrepreneur has to convince his or her banker, which Schumpeter refers to as the only person the entrepreneur “has to convince or to impress” (Schumpeter 1934, p. 89).

Schumpeter also stresses the aspect of rationality in how entrepreneurs fulfill their function of introducing innovation into the market. For Schumpeter, entrepreneurs can indeed be called “the most rational and the most egoistical of all” (Schumpeter 1934, p. 89). This rationality is needed to develop and pursue a plan to fulfill the entrepreneurial function. Hence, rational planning and conduct are more important for entrepreneurs than for managers of established businesses, who can rely on established routines. Interestingly, Schumpeter deviates in this regard from recent entrepreneurship research on the topic of effectuation, which suggests

that planning is difficult in uncertain entrepreneurial environments (e.g., Brinckmann et al., 2010; Sarasvathy, 2001).

How do VC firms value this aspect of rationality? A look at the website of leading VC firm Sequoia Capital suggests, contrary to the recent research on effectuation and in line with Schumpeter, that founders need to be rational. In summarizing what they search for when engaging with promising entrepreneurs, the company lists among others clarity of purpose (i.e., being able to “summarize the company’s business on the back of a business card”), (customer) focus (i.e., having a “simple product with a singular value proposition”), and frugality (i.e., the ability to “spend only on the priorities and maximize profitability”).<sup>8</sup>

To summarize, we posit that VC firms value focus, clarity, and compelling logic from an interesting business opportunity. This conclusion fits well with Schumpeter’s idea of the rational and highly focused entrepreneur. The discrepancy in the value attached to formal planning can be explained by the fact that Schumpeter saw banks as primary providers of entrepreneurial funding. At that time, the VC market had not existed, and banks indeed prioritized formal planning (e.g., Mason and Stark, 2004). The following hypothesis should apply:

**H2a:** *A founder impression displaying a strong degree of rationality has a positive effect on resource acquisition from a VC firm.*

### *Confidence*

A clear, simple, and logical concept is not enough to succeed as a Schumpeterian entrepreneur. One also needs to implement this concept in practice against strong social and cultural resistance and against potential competitors, some of whom are powerful incumbents. This pursuit requires strong confidence in one’s own skills. Schumpeterian entrepreneurs are confident and believe that they possess these skills (Kirzner, 1999). Prior entrepreneurship research investigates the role of founder confidence to a great extent. Empirical studies show that founders have generally more confidence in their skills than other individuals (e.g., Koellinger et al., 2007). This greater confidence can explain the decision made to start a venture in situations of high risk and uncertainty and low prospects of success (Cassar, 2010). However, this aspect of

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<sup>8</sup> See <https://www.sequoiacap.com/article/elements-of-enduring-companies> (accessed 7th February 2022).

founder personality is controversial. When high confidence turns into overconfidence, venture performance may suffer (e.g., Invernizzi et al., 2017).

However, how do VC firms value founder confidence? We shall argue that for them, the positive aspects of founder confidence outweigh the negative ones. Regarding the positive aspects, such firms certainly share Schumpeter's view that a high level of founder confidence is needed to master the challenging task of innovative and disruptive entrepreneurship. The negative aspects, however, do not matter as much to these firms, as they are prepared for this situation. First, most VC firms have a diversified portfolio of investments (Norton and Tenenbaum, 1993), which they syndicate with other investors (Manigart et al., 2006). Second, VC firms actively control and manage the risks associated with their investments. To this end, such firms monitor their founders intensively (Bernstein et al., 2016) and stage their investments based on venture progress (Hsu, 2010). If investments made do not perform according to their expectations, they either stop funding them or replace founders (Ewens and Marx, 2018). This line of argument brings us to the following hypothesis:

**H2b:** *A founder impression displaying a strong degree of confidence has a positive effect on resource acquisition from a VC firm.*

### *Self-centrism*

While self-confidence is a necessary and important trait for Schumpeterian entrepreneurs, it can also have negative consequences. Such negative consequences include overconfidence and relate to self-centrism and the entrepreneur's ability to cooperate. According to Schumpeter (1934, p. 91), "the typical entrepreneur is more self-centered than other types, because he relies less than they do on tradition and connection and because his characteristic task [...] consist precisely in breaking up old, and creating new, tradition." Schumpeter sees entrepreneurs as lone heroes and outsiders who go against the social and cultural norms of their times.

This self-centered image is at odds with the VC industry for at least two reasons. First, many ventures, including innovative and successful ventures, start as team ventures (Patzelt et al., 2021). Hence, the reality does not fit Schumpeter's description of the entrepreneur as a lone ranger. Second, VC firms aim to cooperate with the entrepreneur. Such firms not only invest in ventures as financial investors but also aim to contribute to the development of their portfolio startups through management support (e.g., Schefczyk and Gerpott, 2001; Stuart and Sorenson, 2007) and network access (Ter Wal et al., 2016). Prior research shows that this active approach

as investor indeed helps ventures grow, professionalize, and commercialize their innovation (Hellmann and Puri, 2002; Samila and Sorenson, 2010). Such cooperation between investors and entrepreneurs becomes more difficult if not impossible when the entrepreneur is self-centered and does not value or accept external advice and network access. We posit that VC firms will try to avoid investments in such self-centered entrepreneurs and propose the following hypothesis:

**H2c:** *A founder impression displaying a strong degree of self-centrism has a negative effect on resource acquisition from a VC firm.*

### 4.3.3 Founder impressions displaying Schumpeterian motivations

Schumpeterian entrepreneurs have distinct motives. Entrepreneurs are not primarily motivated by great financial rewards. Financial rewards are “a secondary consideration [...], mainly valued as an index of success and as a symptom of victory” (Schumpeter, 1934, p. 93). Empirical entrepreneurship research supports this view and shows that nonfinancial motivations matter in the decision to start a venture (Carter et al., 2003). As important nonfinancial motivations, Schumpeter refers to the power motive and the achievement motive (Schumpeter, 1934, p. 93). We will now develop hypotheses for these two motives.

#### *Power Motive*

Following Schumpeter, entrepreneurship is not a profession nor do entrepreneurs form a social class in itself. Entrepreneurship is a function, and one can only be an entrepreneur when one “carries out new combinations” (Schumpeter, 1934, p. 78.) By doing so, however, entrepreneurs can experience success and benefit socially, which is an important motive in their pursuit of entrepreneurship. Following Schumpeter (1934, p. 93), “[...] there is the dream and will to found a private kingdom. [...] what may be attained by industrial or commercial success is still the nearest approach to medieval lordship possible to modern man.” Schumpeter goes on to argue that this motive is particularly strong for “people who have no other chance of achieving social distinction. The sensation of power and independence loses nothing by the fact that both are largely illusions” (Schumpeter, 1934, p. 93).

VC firms, however, are skeptical about this entrepreneurial motive. Such firms are active investors and want to control the firm, particularly when things do not go well (e.g., Bernstein

et al., 2019). They negotiate hard with the entrepreneur about the venture's ownership and control rights (e.g., Hellmann, 1998; Kaplan and Strömberg, 2003) and reserve the right to replace the entrepreneur when the success of their investment is at stake (Ewens and Marx, 2018). Prior research shows that founder control over decision-making can have negative effects on venture valuation, particularly in later stages (Wasserman, 2017). Summarizing these arguments, we posit that VC firms are skeptical about entrepreneurs displaying a strong degree of power motivation. The following hypothesis should apply:

**H3a:** *A founder impression displaying a strong degree of power motivation has a negative effect on resource acquisition from a VC firm.*

#### *Achievement motive*

Prior research shows that entrepreneurs are characterized by a strong achievement motivation and a great need for achievement, which describes an individual's desire or need for significant accomplishments (N-Ach) (e.g., Collins et al., 2004; McClelland, 1965). People high in N-Ach have a deep desire to accomplish something difficult that others have failed to accomplish in the past. Elon Musk is an example of an entrepreneur driven by this desire. With Tesla, Musk is obsessed with showing to the world (and the established car industry) that electric vehicles are a viable alternative to conventional cars using fossil fuels; with SpaceX, he wants to show that rockets can be recycled, and his ultimate dream is to fly to Mars. Musk's motto is that everything that makes sense and is physically possible can and should be done (Junod, 2012). People with a strong achievement motivation have an internal drive for action and are intrinsically motivated. For these individuals, the achievement of difficult goals is more important than material or financial rewards (e.g., Jayawarna et al., 2013; Wach et al., 2016).

This achievement motivation is in line with Schumpeter's view of entrepreneurship. Schumpeter writes that entrepreneurs "[...] succeed for the sake, not of the fruits of success, but of success itself" (Schumpeter, 1934, p. 93). However, founders with a strong achievement motivation can pose a challenge to VC firms. Founders in VC-backed firms typically receive a high share of incentive pay based on stocks, stock options, or discretionary bonuses. The payoff is very skewed, and the average salary is below the market (Hall and Woodward, 2010). If the founder, however, has a strong achievement motivation, such financial incentives may not have strong effects. Such a founder is intrinsically motivated. He does not work more towards the VC goals of the VC firm, and goal alignment may be difficult to establish. Wasserman (2006)

shows that founders experience a founder discount and earn significantly less than non-founders working in new ventures. From the above arguments, we posit the following:

**H3b:** *A founder impression displaying a strong achievement motivation has a negative effect on resource acquisition from a VC firm.*

## 4.4 Data and variables

### 4.4.1 Data

#### *Founder and financing data*

We use Crunchbase ([www.crunchbase.com](http://www.crunchbase.com)) to construct our sample of entrepreneurs. Specifically, we identify individuals who have founded at least one venture that received funding at least once. Crunchbase is a database that provides detailed information on ventures, funding rounds, and founders. Importantly, Crunchbase includes information on individuals' Twitter accounts, which enables a link between venture information and founders' private Twitter accounts. Crunchbase data are provided by community contributors, public sources, and other data providers. These data are validated by machine learning algorithms and data analysts (Crunchbase, 2019). Due to its recency and broad coverage, Crunchbase is frequently used in recent management and entrepreneurship research (e.g., Fisch and Block, 2021; Ter Wal et al., 2016).

In constructing our sample, we first excluded ventures that were founded before 2006, which is the founding year of Twitter. Hence, no Twitter information is available from before 2006. Second, only ventures that received at least one round of funding between January 1st, 2006 and December 3rd, 2019 qualified for our sample. Third, we matched these venture data with their respective founders and excluded all founders for which we could not identify a Twitter account in Crunchbase. Finally, we excluded funding rounds that exceeded the early stage (e.g., Series C and D) or that could not be identified as early-stage rounds unambiguously.

This approach produced an initial sample of 13,834 founders who founded 15,397 ventures. Furthermore, we did not consider founders whose Twitter accounts were not accessible either due to their privacy settings or due to inactivity (i.e., no Tweets were posted, or the account was closed). Hence, 654 founders that founded 695 ventures were excluded.

We extended our founder-venture data with individual-level data from Twitter, which we used to operationalize our independent variables. Using Twitter's API from November 2019 to December 2019, we retrieved a total of approximately 8 million Tweets. In this study, we only consider Tweets that were posted after the date of the first funding round and, when a venture received a second round of funding, before the second funding round. This approach led to the exclusion of 6,009 founders with 6,492 ventures, resulting in a sample of 7,171 founders, 8,210 ventures and more than 4 million Tweets.

To keep the sample as homogenous as possible, we only consider individuals and ventures located in the US.<sup>9</sup> To obtain reliable results from the text analysis software Linguistic Inquiry and Word Count (LIWC), we excluded all cases for which the founder tweeted less than 50 words in the examined period (i.e., all Tweets that were posted from the date of the first funding round to the date of the second funding or, in case that no second funding occurred, to the last recorded Tweet), resulting in a final sample of 3,586 ventures founded by 3,313 individuals. Because our sample is based on the founder level, a specific founder/venture can be included in our sample with multiple ventures, and our final sample includes 3,704 observations. Note that we uploaded all data and analyses presented in this chapter anonymously to the OSF (see [https://osf.io/2mcpd/?view\\_only=e803fd68b72f4a4184ac162cc7b9ff37](https://osf.io/2mcpd/?view_only=e803fd68b72f4a4184ac162cc7b9ff37)).

#### *Data on founder impressions (independent variables)*

With the rapid spread of social media platforms, IM is also applied to the impressions that individuals create of themselves in a digital environment (e.g., Rosenberg and Egbert, 2011; Walther, 2007). These relatively new modes of communication enable entrepreneurs to address a large audience of stakeholders (e.g., Fischer and Reuber, 2014; Fisch and Block, 2021), which may encourage founders and organizations to use IM tactics on social media channels to achieve certain goals. For example, entrepreneurs may use social media to present their companies favorably, stressing positive aspects and not mentioning negative developments (Yang and Liu, 2017). These digital IM tactics on social media can have measurable effects on real-world outcomes such as improved financial performance (Schniederjans et al., 2013).

Our data on founder impressions are obtained via a computerized text analysis of each founder's Tweets. We use LIWC with its most recent dictionaries (LIWC2015). LIWC enables

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<sup>9</sup> This approach is also used because our language analysis software is only able to process English language.

researchers to count and categorize words in texts in a meaningful way. LIWC is the prime tool for computerized language analysis. Numerous studies in psychology use LIWC (e.g., Boyd et al., 2019; Tausczik and Pennebaker, 2010). Inspired by research in psychology, management research uses LIWC to document an association between language and important strategic outcomes. For example, Zavyalova et al. (2012) measure the extent to which media coverage on a firm is positive or negative and assess which strategies firms can use to alter these media perceptions. Nadkarni and Chen (2014) use LIWC to assess CEOs' temporal focus (e.g., past, present, or future) in shareholder letters, CEO interviews, speeches, and press releases. The authors find that CEOs' temporal focus shapes the speed of firms' new product introductions. Similarly, Gamache et al. (2015) analyze letters to shareholders to assess CEOs' regulatory focus, which they associate with firms' acquisition activities. Furthermore, Crilly et al. (2016) use LIWC to show that the language in company reports with respect to their sustainable practices differs, depending on if they actually undertake these practices or if they only state their commitments in their reports.

Technically, LIWC calculates 93 variables separated into linguistic and psychological variables. The linguistic variables allow for general descriptions of the analyzed text (e.g., words per sentence), of standard linguistic dimensions (e.g., personal pronouns and adverbs), and of punctuation counts (e.g., commas and question marks). The psychological variables refer to word categories that correspond to psychological constructs. These variables include summary variables (e.g., authenticity and analytical thinking) and psychological processes (e.g., affective processes and time orientation).

To determine which words are counted in which category, LIWC uses a dictionary of approximately 6,400 words. Except for the summary variables, all psychological variables are measured in percentages. If the analysis of a text shows a "positive emotion" value of 5.4, this means that 5.4% of the words in this text are part of the category "positive emotion." The category "positive emotion" includes words such as "awesome," "cheer," and "nice." In contrast to the other psychological variables, summary variables (i.e., analytical thinking, clout, authenticity, and emotional tone) are based on standardized scores from large comparison samples and therefore do not indicate percentages (e.g., Pennebaker et al., 2015a). We conduct z-transformations for the LIWC variables to simplify the interpretation of the regression results.

We apply LIWC to text retrieved from Twitter. Twitter is a social media platform that allows users to send short messages, so-called Tweets, to a broad public audience (e.g., Fischer and Reuber, 2011). In recent years, entrepreneurs have increasingly used social media platforms

to interact with their stakeholders (e.g., Fischer and Reuber, 2011; Smith et al., 2017). To obtain meaningful results from LIWC, we cleaned the Twitter data by excluding links, hashtags, and nametags (Fisch and Block, 2021). We analyzed each entrepreneur's Tweets in LIWC, yielding a LIWC score for all Tweets created between second and first rounds of funding, or when a venture did not receive a second round of funding, between the first round of funding and last recorded Tweet. To avoid a potential bias, we do not consider Tweets created before the first funding round or after the second funding round.

#### 4.4.2 Variables

##### *Dependent variable*

Our dependent variable captures whether a venture received a second round of funding. The ability to attract follow-on financing is a variable frequently used in prior research to capture venture success (e.g., Ter Wal et al., 2016). We create a dummy variable that measures whether a venture was able to acquire a second round of funding (= 1) or not (= 0). Crunchbase data on funding rounds were used to determine on what date the first and (when applicable) second rounds of funding were announced.

While all ventures of the sample were able to collect at least one round of VC funding, only 45% acquired a second funding round. Focusing on firms that received initial VC financing ensures that all ventures passed a certain quality check (e.g., an investor's due diligence process) and are thus more comparable (e.g., Fried and Hisrich, 1994; Gompers et al., 2020).

##### *Independent variables: LIWC*

We measure founder impression by applying LIWC to the founder's Tweets. We use the following LIWC variables to capture our hypothesized effects.

**Entrepreneurial vision.** Previous research shows that CEOs of more visionary ventures tend to use a language style that is more future oriented (e.g., Yadav et al., 2007). Hence, we approximate the entrepreneurial vision using the LIWC variable "focus future" (H1a). The corresponding dictionary includes 97 words with a forward-looking orientation (e.g., "may," "will," and "soon").

**Optimism.** Positive emotions may be directly linked to increased personal well-being and more optimistic expectations of future outcomes (e.g., Peters et al., 2010; Salovey et al., 2000). We approximate the founders' optimism using LIWC variable "positive emotion" (H1b), which is related to optimistic thinking and a positive attitude (e.g., Bono and Illies, 2006; Cohen

et al., 2008). It comprises in total 620 words linked to positive emotions, such as “love,” “nice,” and “optimism.”

**Uncertainty tolerance.** Speculative and uncertain language expresses risk (Yang et al., 2012). LIWC variable “risk” refers to dangers and things that individuals try to avoid and includes 103 words such as “danger,” “doubt,” and “fail” (Pennebaker et al., 2015a). To measure to what degree a person avoids using risk-related language, we reversed the variable to capture uncertainty tolerance (H1c). In this case, high values indicate that a person does use less risk-related language and therefore shows a higher level of uncertainty tolerance.

**Rationality.** We use LIWC summary variable “analytic” to measure the degree to which a founder exhibits rationality (H2a). The variable describes the intensity of a person’s use of logical and hierarchical thinking patterns and is based on the categorical-dynamic index (CDI). The CDI represents the use of eight categories of function words (e.g., articles and prepositions) (Pennebaker et al., 2015b). Higher CDI scores (i.e., higher values for analytics) reflect a more formal and structured language style, while lower scores reflect a more dynamic and narrative language style. Hence, founders with higher values can be considered to be more rational.

**Confidence.** We approximate the degree of confidence using LIWC summary variable “clout” (H2b). Clout seeks to capture confidence in an entrepreneur’s language. The variable is based on a meta-analysis of how people of different (social) ranks differ in their language style. The meta-analysis shows that people in higher ranks of a social hierarchy and who are therefore perceived as having more clout are less prone to use the word “I.” Instead, they make significantly more frequent use of the first-person plural (“we”) and of second-person pronouns (“you”; Kacewicz et al., 2014).

**Self-centrism.** A frequent use of first-person singular words is linked to self-focus and self-centrism (Pennebaker et al., 2003). Hence, we use LIWC variable “I” to measure self-centrism (H2c), which includes 24 first-person singular words. In addition to words such as “I” or “mine,” the category also includes abbreviations such as “idk,” which is short for “I don’t know.”

**Power motive.** LIWC variable “power” allows the measurement of a person’s need for power (Pennebaker et al., 2015a). Therefore, we approximate founders’ power motives using the “power” variable (H3a), which includes 518 words, such as “superior” and “bully.”

**Achievement motive.** Similarly, the variable “achievement” measures an individual’s striving for achievement (Pennebaker et al., 2015a). We approximate founders’ achievement

motives using LIWC variable “achievement” (H3b), which includes 213 words that refer to achievements or success, such as “success,” “win,” and “better.”

#### *Control Variables*

We construct a variety of control variables to account for confounding factors. These variables capture founder characteristics, characteristics of founders’ use of Twitter, venture characteristics, and funding characteristics.

**Authentic.** Honest and authentic IM is easier to detect by the receiver (Roulin et al., 2015). Hence, we incorporate the founder’s authenticity into our models by using LIWC summary variable Authenticity. The variable describes how authentic or honest persons are in the language they use. The variable is based on Newman et al. (2003), who use several samples of written and spoken text in which one group of participants had to lie intentionally, and the other group had to tell the truth to determine authenticity of language.

**Number of words on Twitter (log.).** This variable captures the logarithmized number of words LIWC was able to analyze for each founder. Thus, the variable tracks the Twitter usage intensity of the respective founder in the considered period (e.g., Fisch and Block, 2021). To use LIWC effectively, we decided to remove observations that included less than 50 words. Because the number of words used ranges from 50 to 79,017, we logarithmized the word count.

**Female.** Previous research shows that the chances of acquiring VC are lower for women than for men (e.g., Brush et al., 2018; Greene et al., 2001). Thus, we add a gender dummy variable that takes a value of “1” if the founder is male and “0” if the founder is female. Gender information is provided by Crunchbase.

**Patent applications (log.).** Patents can serve as signals of quality and can reduce asymmetric information in the venture capital context (Conti et al., 2013). We include the number of patents that a venture has filed before the second funding round. In case involving no second round of funding, we include the number of patents before the last Tweet in our sample. We collected patent data from the API of the United States Patent and Trademark Office (USPTO). The downloaded patent data were matched with the ventures included in our dataset. Only patents filed before the second funding round (or, for cases involving no second funding round, before the last recorded Tweet) were counted. The number of patents was logarithmized.

**Funding amount (log.).** We use the funding amount of the first funding round to control for startups’ initial quality (Shane and Stuart, 2002; Ter Wal et al., 2016;). The funding amount ranges from \$1,000 to \$251,000,000, hence, we logarithmized the variable.

**Number of investors (log.).** Investors decide to invest with other VCs for risk sharing, to use knowledge from other sources (i.e., other investors) or to achieve more funding (e.g., Manigart et al., 2006). Therefore, the number of investors involved in the first funding round bears several implications that might affect the probability of a second funding round. The number of investors ranges from 1 to 94 investors. Due to a relatively high skewness of 6.22, we logarithmize the variable.

**Investor reputation.** Prestigious VC investors may act as a signal of quality when investing in a venture (Pollock et al., 2010). Crunchbase offers a list of all investors that participated in a deal. To identify which of these investors may be classified as top tier investors, we used the “Venture Capital Journal Top 50.”<sup>10</sup> The ranking includes the largest VC firms and is based on the direct investment capital firms raised from January 1st, 2015 to June 30th, 2020. The variable “Tier1Investor” is coded as a dummy variable taking a value of “1” if at least one of the investors of the first round can be found in the “Venture Capital Journal Top 50” and “0” otherwise.

**Headquarter: San Francisco Bay Area/Boston/New York/Other.** The region in which a venture is headquartered may influence its funding chances. In certain regions, local VC firms are densely connected, and technology clusters offer greater investment opportunities and higher chances for growth (Gompers et al., 2020; Guzman and Stern, 2015). The most renowned VC clusters are found in the San Francisco Bay Area, Boston, and New York (Powell et al., 2002). To take these effects into account, we added four regional dummy variables (San Francisco, Boston, New York, and Other) that take a value of “1” if the venture is headquartered in the respective region and “0” otherwise.

**Number of founders.** Regarding the ability to acquire VC funding, the founder team of a venture plays an important role, especially in early stages (e.g., Franke et al., 2008). A larger number of founders is associated with a larger network that founders can rely on to grow their business, which further increases a new venture’s chances of success (e.g., Brüderl and Preisendörfer, 1998; Ughetto, 2016).

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<sup>10</sup> “Venture Capital Journal” is a magazine published monthly covering topics such as the venture capital market and investment strategies. For further details on the list, please visit <https://www.venturecapitaljournal.com/the-vcj-50-venture-capitals-heavy-hitters/> (accessed 07th February 2022).

**Number of industries.** Being active in multiple industries (e.g., through diversification) has several implications for ventures. For example, such diversification can increase coordination costs and create growth opportunities (Rawley, 2010; Stern and Henderson, 2004). With a list of 47 different industry groups, Crunchbase offers detailed information on the industries in which a venture is active. To create the “Number of industries” variable, we counted the number of these industries for each venture in our sample.

**Industry, founding year and year of first funding dummies.** Depending on the venture’s industry, the amount of required capital varies. For example, ventures active in technology-driven industries require more venture capital. We aggregated Crunchbase’s 47 groups to 22 industry groups. We created dummy variables for all of these industries, taking a value of “1” if the venture is active in the respective industry and “0” otherwise. To rule out any year-specific effects, for example, financial crises or cyclical movements of the economy (e.g., Block and Sandner, 2009; Gompers et al., 2008), we include a set of dummy variables that capture the venture’s founding year as well as the year in which the venture received its first round of funding. All variables and their data sources are summarized in Table 13.

**Table 13.** Definition of variables.

Variable	Definition	Database
<i>Dependent variable</i>		
Second round of funding	Dummy variable that captures if a venture has (= 1) or has not received a second round of funding (= 0).	Crunchbase
<i>Independent variables</i>		
Entrepreneurial vision	Metric-scaled variable that measures the percentage of future-focused words within the analyzed Tweets, such as “may,” “will,” and “soon.” May range from 0 to 100.	LIWC (Twitter)
Optimism	Metric-scaled variable that measures the percentage of words that display positive emotions within the analyzed Tweets, such as “love,” “nice,” and “optimism.” This variable covers a list of 620 words. May range from 0 to 100.	LIWC (Twitter)
Uncertainty tolerance	Metric-scaled variable that measures the percentage of words related to risk within the analyzed Tweets, such as “danger,” “doubt,” and “fail.” This variable covers a list of 103 words. May range from 0 to 100.	LIWC (Twitter)
Rationality	Metric-scaled variable that measures the degree of rationality and logical thinking exhibited within the analyzed Tweets based on the categorical-dynamic index (Pennebaker et al., 2014). May range from 0 to 100.	LIWC (Twitter)
Confidence	Metric-scaled variable that measures the degree of confidence exhibited by the analyzed Tweets based on a meta-analysis by Kacewicz et al., 2014. May range from 0 to 100.	LIWC (Twitter)
Self-centrism	Metric-scaled variable that measures the percentage of first-person singular words within the analyzed Tweets, such as “I” and “mine.” This variable covers a list of 24 words. May range from 0 to 100.	LIWC (Twitter)
Power motive	Metric-scaled variable that measures the percentage of words related to the need for power within the analyzed Tweets, such as “superior,” “bully,” and “power.” This variable covers a list of 518 words. May range from 0 to 100.	LIWC (Twitter)
Achievement motive	Metric-scaled variable that measures the percentage of words related to the display of achievements within the analyzed Tweets, such as “success,” “win,” and “better.” May range from 0 to 100.	LIWC (Twitter)
<i>Control variables</i>		
Authentic	Metric-scaled variable that measures the authenticity of the analyzed Tweets based on a study by Newman et al., 2003. May range from 0 to 100.	LIWC (Twitter)
Number of words on Twitter (log.)	Metric-scaled variable that counts the number of words tweeted for each observation within the respective period of time, i.e., between the first and second rounds of funding or between first round of funding and the last recorded Tweet. The variable was logarithmized.	LIWC (Twitter)
Female	Dummy variable that captures whether the founder is male (= 1) or female (= 0).	Crunchbase
Patent applications (log.)	Metric-scaled variable that counts the total number of patents filed by the respective venture until the announcement date of the second funding round or the date of the last recorded Tweet (in cases involving no second round of funding). The variable was logarithmized.	USPTO
Funding amount (log.)	Metric-scaled variable that captures the amount of money raised in the first funding round in US dollars. The variable was logarithmized.	Crunchbase
Number of investors (log.)	Metric-scaled variable that captures the number of investors involved in the first funding round. The variable was logarithmized.	Crunchbase
Investor reputation	Dummy variable that captures whether a reputable investor ranked in the top 50 list of the Venture Capital Journal was among the investors (= 1) or if no reputable investors were among the investors in the first funding round (= 0).	Crunchbase/VCJ
Headquarter dummies	Set of four dummy variables that capture the location of the venture’s headquarters. Dummies (a) San Francisco Bay Area, (b) Boston, (c), New York, and (d) Other.	Crunchbase
Number of founders	Metric-scaled variable that captures the number of founders.	Crunchbase
Number of industries	Metric-scaled variable that captures the number of industries that the venture is active in.	Crunchbase
Industry dummies	Set of 22 dummy variables that capture the industries the venture is active in. Dummies (a) Software, (b) Sustainability, (c) Biotech, (d) Science and Engineering, (e) Government and Military, (f) Financial Services, (g) Hardware, (h) Manufacturing, (i) Healthcare, (j) Consumer, (k) Lifestyle, (l) Media, (m) Services, (n) Data Analysis, (o) Sales, (p) Agriculture, (q) Consumer Electronics, (r) Transportation, (s) Education, (t) Gaming, (u) Privacy, and (v) Platforms.	Crunchbase
Foundation year dummies	Set of 14 dummy variables that capture the foundation year of the venture, from 2006 to 2019.	Crunchbase
First funding round year dummies	Set of 14 dummy variables that capture the first funding round year of the venture, from 2006 to 2019.	Crunchbase

## 4.5 Results

### 4.5.1 Descriptive statistics

Table 14 presents descriptive statistics for our sample. Approximately 45% of the ventures in our sample (1,610 of 3,586) received a round of second funding between January 2006 and December 2019. The average time elapsed between the first and second round of funding is 532 days.

The average number of words used in all observations is 5,926 (log. = 7.37), ranging from a minimum of 50 (log. = 3.91) to a maximum of 79,017 (log. = 11.28). A total of 88% of the sampled founders are male. The majority of ventures in our sample did not file any patents before the second round of funding (83.77%). On average, the ventures filed 0.63 patents (log. = 0.20) with a maximum of 87 patents (log. = 4.48). The average funding amount in the first round is 3,952,323 US dollars (log. = 13.89), ranging from 1,000 US dollars to 251,000,000 US dollars (log. = 19.34). Reputable investors (i.e., investors listed on the VCJ Top 50) participated in approximately 16% of the first-round investments, while the total number of investors in the first round has a mean of 3.72 investors (log. = 0.92), ranging from a minimum of 1 investor (log. = 0) to a maximum of 94 investors (log. = 4.54). The ventures in our sample were on average founded by 2.12 founders, ranging from 1 founder to a maximum of 9 founders. From a possible pool of 47 different industries, the average venture is active in 3.77 different industries, ranging from a minimum of 1 industry to a maximum of 11 industries. Because our sample is based in the US, we differentiate between four regions of the US. Thirty-nine percent of the companies are headquartered in the San Francisco Bay Area, 6% are headquartered in the Greater Boston area, and 15% are headquartered in New York. The remaining 40% are headquartered in other regions.

**Table 14.** Descriptive statistics of variables.

This table presents means, standard deviations, minimum values, and maximum values for the variables used in our analyses. A total of 3,713 observations were obtained from 3,319 founders who have founded 3,595 ventures.

Variable	Mean	SD	Min.	Median	Max.	n	Data source
<i>Dependent variable</i>							
Second round of funding	0.45	0.50	0	0.00	1	3,704	Crunchbase
<i>Independent variables: LIWC variables</i>							
H1a: Entrepreneurial vision	1.18	0.65	0.00	1.16	6.90	3,704	LIWC (Twitter)
H1b: Optimism	5.93	2.41	0.00	5.52	23.75	3,704	LIWC (Twitter)
H1c: Uncertainty tolerance	99.51	0.49	94.00	99.58	100	3,704	LIWC (Twitter)
H2a: Rationality	81.12	14.09	1.00	84.43	99.00	3,704	LIWC (Twitter)
H2b: Confidence	72.46	13.50	1.13	73.19	99.00	3,704	LIWC (Twitter)
H2c: Self-centrism	2.42	1.59	0.00	2.24	17.21	3,704	LIWC (Twitter)
H3a: Power motive	2.60	1.11	0.00	2.49	10.88	3,704	LIWC (Twitter)
H3b: Achievement motive	2.37	1.14	0.00	2.20	14.35	3,704	LIWC (Twitter)
<i>Control variables</i>							
Authentic	40.48	18.29	1.00	39.79	99.00	3,704	LIWC (Twitter)
Number of words on Twitter (log.)	7.37	1.75	3.91	7.36	11.28	3,704	LIWC (Twitter)
Female	0.89	0.32	0	1	1	3,704	Crunchbase
Patent applications (log.)	0.20	0.54	0	0	4.48	3,586	USPTO
Funding amount (log.)	13.89	1.82	6.91	14.22	19.34	3,586	Crunchbase
Investor reputation	0.16	0.36	0	0	1	3,586	Crunchbase/VCJ
Number of investors (log.)	0.92	0.85	0	0.69	4.54	3,586	Crunchbase
HQ: San Francisco	0.39	0.49	0	0	1	3,586	Crunchbase
HQ: Boston	0.06	0.25	0	0	1	3,586	Crunchbase
HQ: New York	0.15	0.36	0	0	1	3,586	Crunchbase
HQ: Other region	0.40	0.49	0	0	1	3,586	Crunchbase
Number of founders	2.12	1.03	1	2	9	3,586	Crunchbase
Number of industries	3.77	1.80	1	4	11	3,586	Crunchbase

#### 4.5.2 Main results: Logistic regression analysis

We use a logistic regression analysis to test our hypotheses. Table 15 shows the results of these regressions. We use the dummy variable “Second Funding” as the dependent variable to capture if a second funding round occurred. Because the summary LIWC variables and the other LICW variables are not equally scaled, we transformed these variables into z-scores to facilitate the interpretation of the regression results. Because some founders appear multiple times in our sample (i.e., founded multiple ventures), we clustered the standard errors on the founder level in all models.

Model 1 in Table 15 shows the findings without the independent variables, including only control variables. We find that “Authentic,” “Funding amount (log.),” “Investor reputation,” “Number of investors (log.),” and “Number of founders (log.)” have a significantly positive effect on the probability of a second funding round. In contrast, “Number of words on Twitter (log.)” has a significantly negative effect on the probability of receiving a second round of funding.

Our first set of hypotheses focuses on the founder as a change agent, which we operationalize via the variables “Entrepreneurial vision” (H1a), “Optimism” (H1b), and “Uncertainty tolerance” (H1c). In model 2, we find support for H1a and H1b. A stronger use of future-oriented language has a significant positive effect on the probability of receiving a second round of funding. This result indicates that founders who display their entrepreneurial vision have higher chances of receiving additional funding (H1a). Expressing optimism also significantly positively influences the probability of a second round of funding (H1b). Although the coefficient of “uncertainty tolerance” is positive, the effect is small in size and not significant. Hence, we find no support for H1c.

Model 3 tests our second set of hypotheses and assesses whether the displayed leadership behavior affects the probability of a second funding round (H2a-c). The independent variables used in this model are “Rationality,” “Confidence,” and “Self-centrism.” For H2a, we expected the expression of a higher degree of rationality to positively influence the chances of a second funding, which is not supported by our model. Regarding the displayed degree of confidence, we find a significantly positive effect on the probability of a second round of funding. This result supports our hypothesis that VCs prefer to invest in founders who show high degrees of confidence (H2b). Although it seems that confident founders are better at acquiring additional funding, we hypothesize that the display of self-centered behavior diminishes the probability

of acquiring further funding (H2c). While the coefficient of “Self-centrism” is negative, the effect is not significant. Hence, H2c is not supported

Model 4 includes the independent variables “Power motive” and “Achievement motive.” We test whether the displayed motivation of a founder might influence the probability of acquiring further funding (H3a-b). Although model 4 does not show any significant effects regarding the entrepreneur’s motivation, our full model 5 shows a strong significant negative effect of the achievement motive.

Model 5 includes all independent variables. While the effects for “Entrepreneurial vision” and “Optimism” hold, that for “Confidence” is no longer supported. Simultaneously, the effect size of the “Achievement motive” increases and becomes significant at the 1% level.

**Table 15.** Logistic regressions.

This table shows the results of our main analysis. We perform a logistic regression with the dependent variable *second round of funding* (dummy).

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Variables</b>	<i>Logit (SE)</i>	<i>Logit (SE)</i>	<i>Logit SE</i>	<i>Logit SE</i>	<i>Logit SE</i>
<b>H1: Change agent</b>					
<b>H1a:</b> Entrepr. vision		0.101 (0.043)**			0.109 (0.043)**
<b>H1b:</b> Optimism		0.131 (0.042)***			0.149 (0.046)***
<b>H1c:</b> Unc. tolerance		0.020 (0.041)			0.004 (0.043)
<b>H2: Leadership behavior</b>					
<b>H2a:</b> Rationality			0.049 (0.056)		0.092 (0.058)
<b>H2b:</b> Confidence			0.122 (0.046)***		0.070 (0.050)
<b>H2c:</b> Self-centrism			-0.075 (0.062)		-0.102 (0.064)
<b>H3: Motivation</b>					
<b>H3a:</b> Power motive				0.022 (0.045)	0.007 (0.046)
<b>H3b:</b> Achiev. motive				-0.075 (0.046)	-0.155 (0.049)***
<b>Control variables</b>					
Authentic	0.113 (0.042)***	0.119 (0.043)***	0.194 (0.048)***	0.106 (0.042)**	0.187 (0.050)***
Number of words on Twitter (log.)	-0.490 (0.026)***	-0.483 (0.026)***	-0.48 (0.027)***	-0.494 (0.026)***	-0.477 (0.027)***
Female	0.013 (0.128)	0.069 (0.130)	0.049 (0.130)	0.015 (0.128)	0.084 (0.132)
Patent applications (log.)	-0.109 (0.077)	-0.111 (0.078)	-0.124 (0.078)	-0.109 (0.077)	-0.13 (0.078)*
Funding amount (log.)	0.184 (0.027)***	0.183 (0.027)***	0.175 (0.027)***	0.188 (0.027)***	0.181 (0.027)***
Investor reputation	0.233 (0.116)**	0.225 (0.117)*	0.244 (0.117)**	0.237 (0.116)**	0.241 (0.117)**
Number of investors (log.)	0.282 (0.053)***	0.267 (0.053)***	0.285 (0.053)***	0.279 (0.053)***	0.269 (0.053)***
HQ: San Francisco	-0.114 (0.092)	-0.090 (0.092)	-0.095 (0.092)	-0.119 (0.092)	-0.086 (0.093)
HQ: Boston	0.103 (0.169)	0.092 (0.169)	0.114 (0.167)	0.108 (0.168)	0.109 (0.167)
HQ: New York	-0.103 (0.120)	-0.086 (0.120)	-0.102 (0.120)	-0.113 (0.120)	-0.117 (0.120)
Number of founders	0.176 (0.038)***	0.182 (0.038)***	0.183 (0.038)***	0.175 (0.038)***	0.184 (0.039)***
Number of industries	0.003 (0.051)	-0.002 (0.051)	0.002 (0.051)	0.003 (0.051)	-0.004 (0.051)
Industry dummies	included	included	included	included	included
Founding year dummies	included	included	included	included	included
First funding year dum- mies	included	included	included	included	included
Observations (clusters)	3,704 (3,313)	3,704 (3,313)	3,704 (3,313)	3,704 (3,313)	3,704 (3,313)
Pseudo-R <sup>2</sup>	0.225	0.229	0.229	0.226	0.234

*Note:* All LIWC variables are standardized. The reference category for the ventures' headquarter (HQ) dummies is "HQ: Other." Dummy variables "foundation year," "year of first funding," and "industries" are included in the model but not displayed for the sake of brevity. Logits are reported with robust standard errors (SE) clustered by founders. Significance levels are denoted by asterisks, \*\*\* 1%, \*\* 5%, and \* 10% (p -values are two-tailed).

### 4.5.3 Robustness check: Survival time analysis

Because a second funding round could potentially occur after our sampling period, the dependent variable used in our logit models is right-censored. To account for this feature and to assess the robustness of our main findings, we use a survival time analysis. We are not able to use a standard Cox model because our sample does not meet the necessary proportionality assumption. Instead, we conduct piecewise exponential survival analyses. Piecewise exponential survival analysis enables us to estimate timing effects and offers the ability to address both censoring and truncation issues (Ter Wal et al., 2016). Similar to our models shown in Table 15, we transformed the LIWC variables into z-scores to facilitate the interpretation of the results.

Table 16 shows the results of our survival time analyses, where the dependent variable is the time to the occurrence of a second funding round. The robustness checks support the findings in the logit models. Model 2 in Table 16 shows that displaying “Entrepreneurial vision” (H1a) and “Optimism” (H1b) significantly reduces the time to a second funding round. Similar to the logit model, we find no significant effect for the display of “Uncertainty tolerance” (H1c).

In line with logit Model 3 (Table 15), the survival analysis Model 3 (Table 16) shows that “Confidence” (H2b) significantly decreases the time to a second funding round. Furthermore, Model 3 in Table 16 shows that the display of “Rationality” significantly decreases the time to a second funding.

In contrast to our fourth logit model (Table 15), we find support for H3b in Model 4 of our survival analyses, showing that the display of an “Achievement motive” may increase the time to a second round of funding significantly.

Model 5 incorporates all independent variables from all three sets of hypotheses. While the display of “Entrepreneurial vision” (H1a), “Optimism” (H1b), and “Rationality” (H2a) significantly decrease the time to a second round of funding, the display of “Self-centrism” (H2c) and of an “Achievement motive” (H3b) increase the time to a second round of funding. Regarding H2b (“Confidence”), the significance of the effects changes in the full model, becoming insignificant.

**Table 16.** Piecewise exponential survival analyses.

This table shows the results of our piecewise exponential survival analyses. The dependent variable is the time to the occurrence of a second funding round.

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Variables</b>	<i>Coefficient (SE)</i>				
<b>H1: Change agent</b>					
<b>H1a:</b> Entrepr. vision		-0.049 (0.022)**			-0.056 (0.023)**
<b>H1b:</b> Optimism		-0.112 (0.025)***			-0.126 (0.027)***
<b>H1c:</b> Unc. tolerance		-0.023 (0.024)			-0.009 (0.023)
<b>H2: Leadership behavior</b>					
<b>H2a:</b> Rationality			-0.065 (0.035)*		-0.100 (0.036)***
<b>H2b:</b> Confidence			-0.085 (0.030)***		-0.036 (0.032)
<b>H2c:</b> Self-centrism			0.041 (0.037)		0.07 (0.038)*
<b>H3: Motivation</b>					
<b>H3a:</b> Power motive				-0.001 (0.024)	0.011 (0.026)
<b>H3b:</b> Achiev. motive				0.054 (0.026)**	0.116 (0.029)***
<b>Control variables</b>					
Authentic	-0.065 (0.025)***	-0.075 (0.026)***	-0.116 (0.028)***	-0.06 (0.025)**	-0.114 (0.028)***
Number of words on Twitter (log.)	0.353 (0.015)***	0.347 (0.015)***	0.345 (0.015)***	0.354 (0.015)***	0.341 (0.015)***
Female	0.002 (0.088)	-0.058 (0.089)	-0.019 (0.088)	-0.000 (0.088)	-0.063 (0.090)
Patent applications (log.)	0.088 (0.044)**	0.094 (0.045)**	0.100 (0.045)**	0.084 (0.044)*	0.100 (0.045)**
Funding amount (log.)	-0.085 (0.019)***	-0.083 (0.019)***	-0.077 (0.018)***	-0.089 (0.019)***	-0.08 (0.018)***
Investor reputation	-0.127 (0.068)*	-0.122 (0.068)*	-0.134 (0.068)*	-0.127 (0.068)*	-0.128 (0.068)*
Number of investors (log.)	-0.165 (0.032)***	-0.154 (0.032)***	-0.173 (0.032)***	-0.162 (0.032)***	-0.163 (0.032)***
HQ: San Francisco	0.041 (0.059)	0.007 (0.060)	0.030 (0.059)	0.043 (0.059)	0.006 (0.060)
HQ: Boston	-0.123 (0.105)	-0.133 (0.105)	-0.137 (0.105)	-0.135 (0.105)	-0.165 (0.104)
HQ: New York	-0.024 (0.078)	-0.037 (0.078)	-0.019 (0.078)	-0.019 (0.078)	-0.016 (0.077)
Number of founders	-0.117 (0.022)***	-0.121 (0.022)***	-0.116 (0.028)***	-0.116 (0.022)***	-0.121 (0.023)***
Number of industries	-0.020 (0.034)	-0.021 (0.033)	0.345 (0.015)***	-0.021 (0.034)	-0.026 (0.033)
Industry dummies	included	included	included	included	included
Founding year dummies	included	included	included	included	included
First funding year dum- mies	included	included	included	included	included
Observations (clusters)	9,257 (3,313)	9,257 (3,313)	9,257 (3,313)	9,257 (3,313)	9,257 (3,313)

*Note:* To perform the regressions, the time to the second event (in days; the second event is described either as the occurrence of a second funding round or the last recorded Tweet) was split into four quantiles (Q1 = 0-365 days; Q2 = 366-729; Q3 = 730-1552; Q4 = 1552.5 or more). Depending on the time to the second event, additional observations were created that differ regarding the quantile dummy variable. For example, if a second funding occurred after 500 days (i.e., during the second quantile), an additional observation was created. For this observation, the dummy variable “Q1” takes a value of “1,” while all other quantile dummy variables take a value of “0” as well as the variable that indicates the occurrence of a second funding round. For the original observation, the quantile dummy variable for Q2 takes a value of “1” as well as the variable for the occurrence of a second funding round. All other quantile dummy variables take a value of “0.” The effects are reported with robust standard errors (SEs) clustered by founders. All LIWC variables are standardized. The reference category for the ventures’ headquarter (HQ) dummies is “HQ: Other.” Dummy variables “foundation year,” “year of first funding,” “industries” and “quantiles” are included in the model but not displayed for the sake of brevity. Significance levels are denoted by asterisks, \*\*\* 1%, \*\* 5%, and \* 10%.

## **4.6 Discussion**

### **4.6.1 Summary of main results**

We adopt an impression management perspective to examine the effect of a Schumpeterian entrepreneurial impression on a venture's ability to acquire a second round of VC funding. Our results support several of our hypotheses, and we find that some dimensions of Schumpeterian entrepreneurship increase the chances of resource acquisition. However, other predictions are not supported, which indicates that VCs have mixed feelings about Schumpeterian entrepreneurship. For example, we find that VCs seem to value Schumpeterian entrepreneurship with regard to an entrepreneur's vision and optimism, while they hold negative views about a high need for achievement. Thus, the self-image of VCs and their funding behavior seem to deviate in this regard, which we attribute to the fact that the business model of VCs does not correspond well with some aspects of Schumpeterian entrepreneurship. Specifically, Schumpeterian entrepreneurs with a strong need for achievement are difficult to monitor and incentivize in a way that aligns the interests and goals of the VC and entrepreneur. VCs often use monetary incentives to motivate entrepreneurs to work in their direction. This incentive or bonding mechanism may have less appeal for entrepreneurs motivated by a strong need for achievement.

Additionally, we did not find a positive effect for high levels of uncertainty tolerance and self-confidence. An explanation for this non-finding could be related to the heterogeneity among VC firms and their decision makers. Prior research shows that VCs pursue different portfolio strategies and vary in their funding criteria by evaluation stages and their funding cycle (e.g., Kollmann and Kuckertz, 2010; Petty and Gruber, 2011). Our study is not able to capture these heterogeneities.

### **4.6.2 Limitations and outlook**

Our study comes with some limitations. For example, Schumpeter (1934) outlines further dimensions that we cannot capture with our research design. These dimensions include creativity, which could be captured with experimental approaches. Second, we assume that the founders in our sample are at least aware that potential investors also consult founders' private Twitter accounts to gather information. To use IM effectively, entrepreneurs would have to know this and deliberately steer the impression they leave online. Even though we cannot verify whether the respective founder actually engages in IM, this assumption is based on the observation that

VC investors do indeed use any available source of information when making their investment decisions (e.g., Block et al., 2014; Tumasjan et al., 2021). Third, we cannot rule out the possibility that Twitter accounts may be used by several people or be professionally managed. It may be particularly challenging to distinguish between what a founder has posted online personally and what someone else has posted in his or her name. Especially in cases where the founder is closely bound to the venture, it may be difficult to disentangle the effects of organizational or individual IM. Future research could analyze both private and business Twitter accounts and compare the impressions made through these accounts.

Our study shows that Schumpeterian founder impressions have both positive and negative effects on resource acquisition from VC firms. Future research could analyze the effects of Schumpeterian founder impressions with other types of funders or more fully explore heterogeneity within the group of VCs. We would expect, for example, the negative effect of the achievement motive to disappear or even become positive with business angels, who often have been successful entrepreneurs themselves and therefore should have a good understanding of entrepreneurial motivation. A similar argument can be made about VC decision makers and their professional and human capital backgrounds, which have been shown to impact their decision-making (e.g., Franke et al., 2008; Shepherd et al., 2003). Another promising area of future research would involve the investigation of the role of Schumpeterian founder impressions in a non-US cultural and historical context, in which a different entrepreneurial image and view of entrepreneurship prevail (Pahnke and Welter, 2019). Another avenue would be to look at other types of founder identities or impressions such as missionaries or communitarians (Fauchart and Gruber, 2011). Our study shows that founder impressions matter for resource acquisition. It remains undetermined, however, whether founder impressions also matter for entrepreneurial success. Future research could also estimate the effects of founder impressions on entrepreneurial success measures such as firm survival, profitability, or product success. Research on founder impressions could also be combined with an organizational imprinting perspective (Marquis and Tilcsik, 2013). Does a Schumpeterian founder's impression imprint a venture's DNA and history, and can we still observe Schumpeterian behavior long after a founder has left a firm (Sinha et al., 2020)? Our approach of using Twitter data to measure founder impressions makes it possible to analyze such intriguing questions.

## Chapter 5

# How does entrepreneurial success change an entrepreneur's digital identity

*We explore whether and how an entrepreneur's digital identity changes after a successful VC funding round. Our sample comprises Twitter messages from 2,094 entrepreneurs who received a successful funding round. We apply a language-based text analysis tool to gain insights into the entrepreneurs' digital identities before and after the funding round. Our panel regressions show that entrepreneurs increasingly use language indicative of a) higher self-confidence and positive emotions, b) increased professionalization and leadership, and c) lower authenticity after a successful funding round. At the same time, we find only limited evidence that VC backing can negatively affect entrepreneurs. Additionally, the presence of a reputable investor positively moderates the effects of successful funding on several language indicators, while the amount of money raised negatively moderates the authenticity that entrepreneurs display after funding.*

## 5.1 Introduction

Research into entrepreneurial finance has comprehensively assessed the selection process of VC (e.g., Block et al., 2019; Gompers et al., 2020). Knowing how VC investors select portfolio ventures helps entrepreneurial ventures access needed external financing. An equally extensive research stream has focused on the consequences of VC investment for portfolio ventures (e.g., Chemmanur et al., 2011; Sørensen, 2007). This research documents the profound impact that VC backing can have on the performance and prospects of portfolio ventures, which is important for understanding the VC sector's economic significance.

While the antecedents of VC investors' decisions and the consequences for portfolio firms are well explored, we know little about the individual consequences of VC backing for the entrepreneur (i.e., the founder of the portfolio firm). Entrepreneurship research typically portrays entrepreneurs as individuals in search of personal autonomy who try to fulfill their visions and personal goals by establishing their own ventures (e.g., Lumpkin et al., 2009; Witt, 2007). The successful acquisition of VC funding is a critical step in the lifecycle of entrepreneurial ventures and, thus, in the pursuit of entrepreneurs' goals. Therefore, VC backing may have a profound effect on the individual entrepreneur, a question which remains largely unexplored.

We address this research gap and assess whether and how founders' digital identities change in response to the successful acquisition of VC funding. While the majority of studies on founder identities focus on qualitative methods such as interviews (e.g., Fauchart and Gruber, 2011; Powell and Baker, 2017; York et al., 2016), our study examines the evolution of entrepreneurs' digital identities quantitatively by using archival data from Twitter and Crunchbase. We apply a language-based text analysis tool to explore entrepreneurs' digital identities before and after the funding round. Our panel regressions show that entrepreneurs increasingly use language indicative of a) higher self-confidence and positive emotions, b) increased professionalization and leadership, and c) lower authenticity after a successful funding round. At the same time, we find only limited evidence that VC backing can negatively affect entrepreneurs. Additionally, the presence of a reputable investor positively moderates the effect of successful funding on several language indicators, while the amount of money raised negatively moderates the authenticity that entrepreneurs display after funding.

We mainly contribute to recent entrepreneurship research concerning digital identities. In general, this research is based on findings in psychology that show that the ways in which someone interacts on social media platforms (e.g., Facebook, Twitter) is a reliable reflection of

the user's offline personality (e.g., Chen et al. 2017; Gosling et al., 2011). The connection between digital identities and offline personalities has been extensively researched in psychology (e.g., Krämer and Winter, 2008; Mehdizadeh, 2010). In this vein, our research is closely related to that of Fisch and Block (2021), who show that the impact of entrepreneurial failure on entrepreneurs is reflected in their behavior on Twitter. Furthermore, our research is related to studies showing that the use of social media by entrepreneurs is an effective tool for opportunity recognition (e.g., Barnes and Mattson, 2016; Mumi, 2020), marketing campaigns (e.g., Kudeshia et al., 2016; Shih et al., 2014), business networking (e.g., Fischer and Reuber, 2014; Quinton and Wilson, 2016), and resource acquisition (e.g., Mumi et al., 2019; Yang and Berger, 2017). We add to this research by showing that receiving VC funding is an event that can trigger changes in entrepreneurs' digital identities. These changes are mainly positive. An additional contribution of this research is that we examine the evolution of entrepreneurs' digital identities quantitatively by using archival data from Twitter and Crunchbase. We analyze Tweets posted on Twitter from 2,094 founders and investigate whether their digital identities change after successful VC investment. Furthermore, we test whether the effects of funding on digital identities are moderated by the investor's reputation and the amount of money raised.

In addition to this main contribution, our findings contribute to research concerning VC. While this research has predominantly focused on business-related factors thus far, we add insights into the personal consequences that entrepreneurs face after receiving VC investments. These insights enable a more comprehensive understanding of the consequences of VC investments in a broader context.

## **5.2 Prior research**

### **5.2.1 Research concerning the consequences of VC investments for the founder**

Prior research concerning entrepreneurial finance has offered direct and indirect evidence concerning the effects that VC investments can have on the entrepreneurs of funded portfolio ventures. We use these insights to identify areas in which digital identity changes could be reflected.

In summary, prior research has shown that VC backing has four main consequences for the founder, which can have both positive and negative connotations: (a) increased self-confidence and positive emotions, (b) a higher degree of professionalism and leadership, (c) a loss of control and additional pressure from shareholders, and (d) an increased desire for authenticity.

**Self-confidence and positive emotions.** The acquisition of VC is a momentous step in a startup's life cycle and can be interpreted as a positive event because the vast majority of VC applications are rejected (e.g., Block et al. 2019; Gompers et al., 2020). Research concerning entrepreneurs' motivation shows that entrepreneurs possess a higher need for achievement than the average population and that they strive for greater recognition for their achievements (e.g., Carraher et al., 2010; Wu and Dagher, 2007). Receiving an investment serves as a signal to distinguish better-quality startups from lower-quality startups, thus confirming the founders' achievements. Indeed, multiple studies have documented that VC funding is a credible signal for the labor market, helping startups attract significantly more employees (e.g., Davila et al., 2003; Engel, 2004). Furthermore, VC also serves as a signal for future investments. For example, founders who have attracted VC can raise more investor attention and money in subsequent IPOs. This claim is especially true for ventures that are backed by highly reputable VC firms (e.g., Chang, 2004; Chemmanur et al., 2018). Again, this fact indicates that receiving VC investments is a generally positive event that may satisfy the founder's need for achievement.

Additionally, founders can increase their network and entrepreneurial reputation, especially if highly reputable VC firms invest in their ventures (e.g., Ferrary and Granovetter, 2009; Hsu, 2004). Research shows that larger networks, increased self-confidence, and a better reputation may positively influence the founder's chances of acquiring more VC and founding subsequent startups (e.g., Hayward et al., 2010; Mohr et al., 2014; Payne et al., 2009; Zhang, 2011). In summary, these insights suggest that successful VC acquisition could trigger changes in an entrepreneur's digital identity that reflect higher self-confidence and positive emotions.

**Professionalization and leadership.** Moreover, VC backing could lead to a professionalization of the entrepreneur in terms of their external image and internal leadership qualities. For example, prior research has documented the fact that founders who acquire VC are quicker to employ a vice president for marketing and sales, ensuring a more professional approach to external communication and further professionalizing their leadership behavior (Hellmann and Puri, 2002). The willingness of the founder to adapt to necessary changes in leadership is also important if they want to remain in control as the CEO and avoid being replaced by another CEO (e.g., White et al., 2007). This increased degree of professionalization could be reflected in entrepreneurs' digital identity after receiving VC backing.

**Loss of control, pressure, and negative emotions.** Being forced to adhere to VC investors' requirements is a potential downside of receiving VC financing. In contrast to debt-based financial instruments (e.g., loans), VC financing is equity-based and always involves a loss of

equity to the investor. Thus, VC investments can lead to a partial or even complete loss of control by the entrepreneur. VC investment contracts often contain clauses that severely limit the control rights of founders if the company is not able to reach certain milestones (e.g., Kaplan and Strömberg, 2003). One of the most drastic consequences for the founder is replacement by an external manager if the venture performs poorly. This situation may increase pressure on the founder to perform well and meet investors' requirements (e.g., Bruton et al., 2005; Pollock et al., 2009).

Additionally, prior research has suggested that entrepreneurs may be pressured by investors to make important decisions in favor of investors, for example, regarding faster internationalization (Mäkelä and Maula, 2008) or accelerating innovation processes (Hellmann and Puri, 2000). This self-imposed third-party control by the VC investor contradicts one of the most important goals of founders, which is the pursuit of entrepreneurial autonomy (Lumpkin et al., 2009). In summary, this situation indicates that successful acquisition could trigger negative changes in an entrepreneur's digital identity that reflect higher pressure or a loss of control.

**Authenticity.** Due to the salient position of the founder with respect to their ventures, they have an important role in creating and signaling legitimacy (Beckman and Burton, 2008). With the use of storytelling, they tend to position themselves as legitimate entrepreneurs and make use of different frameworks and settings, depending on the person with whom they interact (e.g., Fisher et al., 2017; Middleton, 2013). Increasing media attention may cause the founder to receive even more attention, which makes legitimacy even more important. In particular, young companies that engage in intense communication activities can attract higher degrees of media attention. In this case, the founders' and top management teams' human capital catalyzes the attracted attention even further (Petkova et al., 2013). This situation increases the startup's chances of acquiring further financial resources and reduces the risks of underpricing in IPOs (e.g., Petkova et al., 2013; Pollock and Rindova, 2003). The authenticity of a founder may also change throughout the evolution process of the venture. O'Neil et al. (2020) show that founders align their personal identities with their identities as founders, desiring others to view themselves and their actions as authentic. This factor is of particular interest in the context of social ventures. For example, Block et al. (2021) showed that the most important criterion in alternative financing (e.g., impact investors) is the authenticity of the founding team. This increased pursuit of authenticity could be reflected in entrepreneurs' digital identities after receiving VC backing. The direction of the effect is ambiguous.

### 5.2.2 Moderating factors

We identify two moderating factors that could influence the degree to which VC backing affects entrepreneurs' digital identities.

**Backing by reputable investors.** First, the reputation of the VC firm plays an important role regarding the added value that the investor may provide (e.g., Pratch, 2005). VC reputation is an important characteristic in the VC industry, in which firms must constantly deal with information asymmetries (e.g., Cumming and Johan, 2008b; Lerner, 1994). High reputation has beneficial effects for the VC firm and its portfolio ventures. Prior research has found that companies that have attracted investments from reputable VC investors exhibit higher performance, faster access to public markets, and higher asset productivity (e.g., Krishnan et al., 2011; Nahata, 2008). Furthermore, VC firms with a good reputation find it easier to engage in syndication (e.g., Lockett and Wright, 2001). Reputation is so important to VC firms that nascent VC firms tend to stimulate their portfolio ventures to go public earlier than more experienced firms to increase their reputation and gain legitimacy (e.g., Gompers, 1996). Simultaneously, entrepreneurs are willing to give their shares to reputable VC firms at a lower price (Hsu, 2004).

Given the importance of reputation in the VC industry, it is likely that receiving funding from reputable investors moderates the digital identity changes triggered by receiving an investment. For example, self-confidence and positive emotions could be higher for entrepreneurs who receive backing from reputable investors than for entrepreneurs who receive funding from less reputable investors.

**Investment amount.** Second, the investment amount may determine the growth possibilities of ventures (Mason and Harrison, 2002). The amount of money that entrepreneurs acquire from VC investors may influence their business strategies. For example, an oversupply of financial resources can lead to inefficient decisions that delay innovation (Hirukawa and Ueda, 2011). While George (2005) demonstrated empirically that an excess of resources lowers the performance of the company, Mason and Harrison (2002) found that larger investments offer greater opportunities to stage the investment. This tactic reduces the investor's risk if the venture does not perform well by cutting off the supply at an early stage. However, if the venture performs well, the investor may increase the investment at later stages. Nevertheless, prior research has also been able to show that higher amounts of funding offer the ability for faster venture growth. Higher funding increases the signaling effect of the investment, which, for example, positively influences the number of employees (Davila et al., 2003).

Because receiving larger investments is generally a positive event for the venture, we assume that the amount raised could moderate the digital identity changes in response to receiving VC funding. Again, self-confidence and positive emotions or displayed professionalization could increase more strongly for entrepreneurs who receive higher VC investments.

### 5.3 Data, method, and variables<sup>11</sup>

#### 5.3.1 Sample and data sources

To investigate changes in entrepreneurs' digital identities after receiving VC funding, we first collected data on entrepreneurs with at least one successful funding round from the database Crunchbase. Crunchbase provides data on ventures, entrepreneurs, funding rounds, and investors. Furthermore, it provides the Twitter account information of founders. Information on Crunchbase is provided by external contributors, public sources, and other data providers. Crunchbase uses machine learning algorithms that validate data accuracy and identify deviations, which alerts a team of data analysts who additionally validate the data (Crunchbase, 2019). Offering a broad variety of information concerning entrepreneurial finance, data from Crunchbase have been used frequently in recent management and entrepreneurship research (e.g., Fisch and Block, 2021; Dalle and Menon, 2017; Ter Wal et al., 2016). We collected data from ventures that were founded from 2006 onward, which is the year when Twitter was founded. Additionally, we only consider ventures that received at least one round of funding between January 1, 2006, and December 3, 2019. Since our analyses rely on data from Twitter, we omitted all founders from our sample who did not provide their Twitter account on Crunchbase. Additionally, we excluded all ventures that had passed the early stage according to the stage classification in Crunchbase.

Initially, we created a sample of 13,834 founders who founded 15,397 ventures. We excluded 654 founders who founded 695 companies concerning whom we were not able to collect any Twitter data, either due to inactivity or inaccessibility. Using Twitter's API, we then collected more than 8 million Tweets posted by the entrepreneurs in the sample between January 1, 2006, and December 3, 2019. Because we intended to examine the identity change that occurs after a successful funding rounding, we were interested in the Tweets that were posted before and after the first successful funding that each venture received. Hence, we excluded 4,428

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<sup>11</sup> The data and do files used to produce the main analyses can be accessed at: [https://osf.io/kj8w6/?view\\_only=e80e09b2fab94f0987f8a714a96e49d2](https://osf.io/kj8w6/?view_only=e80e09b2fab94f0987f8a714a96e49d2).

founders who had a) no Tweets posted before their first funding or b) no Tweets posted after their first funding. To avoid any overlaying effects from funding rounds other than the first, we only considered Tweets made from before the first round of funding until the second round of funding.

Because our tool for language analysis (LIWC) is only able to process English, we omitted all non-US founders, leading to a US sample of 3,621 founders and 4,012 companies. To further ensure that only the effects of one funding round were measured, we excluded all entrepreneurs who had founded multiple companies. This step led to a sample of 3,216 founders and 3,199 companies.

We matched the sample with further financial information from Crunchbase. In 242 cases, the information was insufficient, for example, due to missing investor data. Hence, we omitted these cases from the sample. We then manually checked the data for further inconsistencies, that is, non-US headquarters or funding types that were out of scope (e.g., crowdfunding). This step led to a sample of 2,333 US founders and 2,327 companies. Because the recommended minimum number of words that can be processed meaningfully by LIWC is 50, we eventually excluded all observations in which we retrieved less than 50 words before the funding or after the funding. Our final sample included 2,094 founders and 2,088 companies.

### **5.3.2 Text analysis with Linguistic Inquiry and Word Count (LIWC)**

LIWC is a software that enables researchers to analyze great amounts of text efficiently and has been used in recent entrepreneurship research (e.g., Fisch and Block, 2021). Originally developed by James Pennebaker and Martha Francis to analyze essays that were written for a health study, the fields of application for LIWC quickly expanded (Tausczik and Pennebaker, 2010). LIWC is a closed-dictionary software that counts words that are part of a certain dictionary and calculates the share of all words from a given text in these dictionaries. Based on this approach, LIWC calculates values for 93 variables and allows researchers to measure certain linguistic and psychological dimensions of the given text. We used the most recent version in our study, LIWC2015, which offers five additional summary variables. These variables are derived from studies conducted by Pennebaker and his colleagues and, unlike the other variables, do not represent shares but rather percentiles based on standardized scores (Pennebaker et al., 2015a).

### 5.3.4 Method

To test whether the founders' digital identities change after the successful acquisition of VC funding, we use random effects panel regressions with LIWC variables as dependent variables. Using a panel estimator enables us to assess the changes in the entrepreneurs' digital identities that occur over time (i.e., before vs. after receiving VC funding). We use a random-effects estimator because we utilize time-invariant moderators that would have to be omitted in a fixed-effects model.

The variable of interest is a dummy variable which indicates the occurrence of the funding round. In our moderation analysis, this dummy is interacted with a dummy variable which assesses if the founder is backed by reputable investors and with a variable that measures the amount of money raised. We account for heterogeneity at the entrepreneur level by incorporating several control variables.

### 5.3.3 Variables

#### 5.3.3.1 Variables that capture the entrepreneur's digital identity

We used several LIWC variables to investigate changes in founders' digital identities after receiving VC funding. These variables served as our dependent variables. LIWC creates a total of 93 variables that measure linguistic dimensions, psychological processes, and other language characteristics. We used a selection of these variables to explore the constructs described in section 5.2.

**Self-confidence and positive emotions.** To capture a change in self-confidence and positive emotions, we used four LIWC variables that are connected to these factors. Self-confidence was measured by the variables *clout* and *power*. First, *clout* allows for measurement of how high individual see themselves ranked in terms of a social hierarchy. Because *clout* is one of LIWC's summary variables, it does not count the share of certain words in a given text but instead uses percentiles based on standardized scores found in previous research by LIWC's authors (Pennebaker et al., 2015a). The higher the measurement of *clout*, the higher an individual ranks himself in social hierarchies and the more that person expresses self-confidence (Kacewicz et al., 2014). Second, *power* measures the extent to which an individual displays a need for power, using words such as "superior" or "bully". Prior research has documented the fact that entrepreneurs show comparably high levels of the need for power (e.g., Carland et al.,

1984; Carsrud and Brännback, 2011). Whereas these variables capture self-confidence, the variable *positive emotions* measures the number of words that are related to positive emotional feelings, such as “nice” or “love”. Research has shown that people tend to use more positive words when writing about positive events and more negative words when writing about negative events (Kahn et al., 2007). Furthermore, the variable *achievement* measures the number of words that express an individual's need for achievement and contains words such as “win” or “better”. Words from this category indicate the degree of need for achievement (Winter, 1998).

**Professionalization and leadership.** We use four LIWC variables to measure change in displayed professionalization and leadership. First, the variable *informal* measures the number of informal words that are used in a text (e.g., “lol”). Prior research has shown that the use of informal language relates to a perception of lower expertise (e.g., Haberstroh, 2010; Li et al., 2019). Regarding the demonstration of leadership, we use the LIWC Variables *I* (first-person singular), *we* (first-person plural), and *affiliation*. Research in business psychology has indicated that leaders tend to use more first-person plural words and fewer first-person singular words, whereas subordinates use the plural less frequently and the singular more often (Meinecke and Kauffeld, 2019). This finding suggests that an increase in LIWC variable *we* and a decrease in the LIWC variable *I* indicate displayed leadership. The LIWC variable *affiliation* measures the number of words that are used when someone tries to befriend others and wants to be affiliated with a social group (Antonakis and Atwater, 2002). From a subordinate perspective, employees are more satisfied with leaders who display higher degrees of affiliation (Steinmann et al., 2016).

**Loss of control, pressure, and negative emotions.** To examine the effects of loss of control, pressure, and associated negative emotions, we use the LIWC variables *risk*, *anxiety*, and *negative emotions*. First, the LIWC variable *risk* measures the number of words that are related to risks (e.g., “danger” or “doubt”). Using speculative language is related to risk, indicating that someone who uses these risk-related words displays uncertainty (Yang and Liu, 2017). Second, we use the LIWC variable *anxiety*, which includes the use of words such as “worried” or “fearful”, to measure work-related stress. Prior research has shown that the use of anxiety-related words is connected with stress and may predict depressive feelings (e.g., Eichstaedt et al., 2018; Wang et al., 2016b). Finally, we use the LIWC variable *negative emotions*, containing words such as “hurt” or “nasty”, to measure the overall well-being of entrepreneurs. Tov et al. (2013) showed that the use of negative emotional words is connected with self-reported negative feelings.

**Authenticity.** We use the LIWC summary variable *authenticity* to measure the authenticity reflected in entrepreneurs' Tweets. This variable is based on a study by Newman et al. (2003), which identified the use of certain words to distinguish between stories that were made up and stories that actually happened. With the evolution of their entrepreneurial identity, entrepreneurs tend to be more authentic toward their community (O'Neil et al., 2020).

### 5.3.3.2 Moderating factors

We use two moderating variables in our random effects panel regressions that could influence the main effect of VC funding on entrepreneurs' digital identities.

**Backing by reputable investors.** The first moderator is *Tier-1 investor*, which serves as an indicator that an investor is very reputable. *Tier-1 investor* is constructed as a dummy variable. We use information from Crunchbase, which shows all investors who participated in a deal, and from the "Venture Capital Journal Top 50"<sup>12</sup>, which ranks the largest VC firms depending on the amount of investment capital raised between 2015 and 2020. The variable takes a value of "1" if at least one of the investors is ranked in the top 50 and "0" if none of the deal participants were listed.

**Investment amount.** Second, we use the amount that was raised during the first funding round. The amount raised is provided by Crunchbase and included the total investment made during the first funding round. An increase in VC investments can drive innovation and growth (e.g., Kortum and Lerner, 2001; Samila and Sorenson, 2011). Furthermore, prior research has shown that the importance that entrepreneurs place on financial success may explain differences in their growth ambitions (Cassar, 2007). Hence, we tested whether the amount raised affected entrepreneurs' digital identities. Due to the wide range of amounts raised, we use the logarithmized amount of money raised (*log\_money*).

### 5.3.3.3 Control variables

We use several control variables in our random effects panel regressions. First, we incorporate the variable *gender*, which was given a value of "1" if the entrepreneur is male and "0" if the entrepreneur is female. Prior research has shown that males and females differ in the ways in which they express themselves via written language (e.g., Argamon et al., 2003; Newman et

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<sup>12</sup> "Venture Capital Journal" is a magazine published monthly covering topics the venture capital market and investment strategies. For further details, see <https://www.venturecapitaljournal.com/the-vcj-50-venture-capitals-heavy-hitters/> (accessed 07th February 2022).

al., 2008). Second, we use *industry dummies* that were extracted from Crunchbase. The impact of VC investments may differ depending on the industry in which the funded venture is active (Engel, 2002). Finally, we use the logarithmized word count ( $\log\_WC$ ) as a control variable that varies over time (Fisch and Block, 2021).

## 5.4 Results

### 5.4.1 Descriptive statistics

Table 17 displays descriptive statistics for our variables. With a share of 85.77%, the vast majority of founders in our sample are male. The mean number of words expressed on Twitter is 11,454.50. The range of words used is relatively wide, from a minimum of 112 to a maximum of 67,278. Fourteen percent of the founders in our sample have a Tier-1 investor participating in their deal. The mean funding amount is 3.6 million US dollars, with a minimum of 5,000 US dollars and a maximum of 412 million US dollars.

**Table 17.** Descriptive statistics.

This table presents means, standard deviations, minimum values, and maximum values of the variables used in our analyses.

Variable	Mean	SD	Min.	Median	Max.	n	Data source
Gender (1 = male)	85.77	0.35	0	1	1	2,094	Crunchbase
Number of words on Twitter	11,454.50	11,355.92	112	7,293	67,278	2,094	LIWC (Twitter)
Funding amount	3,606,397	13,700,000	5,000	1,400,000	412,000,000	2,094	Crunchbase
Tier-1 Investor	0.14	0.35	0	0	1	2,094	Crunchbase/VCJ

### 5.4.2 Univariate analyses

We performed a series of t-tests to examine whether entrepreneurs' digital identities changed after receiving a VC investment. We performed t-tests for the full sample and separately for entrepreneurs who received funding from reputable and less reputable investors as well as entrepreneurs who received funding below or above the median funding amount. The results are displayed in Table 18.

**Full sample.** Except for *negative emotions*, the LIWC values after funding differed significantly ( $p < .05$ ) from those before funding. All variables related to self-confidence and positive emotions showed a significant increase after funding (i.e., *clout* (before = 69.25; after = 73.23), *achievement* (before = 2.10; after = 2.38), *power* (before = 2.51; after = 2.62), and *positive emotions* (before = 5.59; after = 5.95)).

The variables related to the entrepreneur's professionalization and leadership showed more diverse results. While the variable *I* (use of first-person singular pronouns) decreased significantly (before = 2.63; after = 2.44), the variable *we* (use of first-person plural pronouns) increased significantly (before = 0.90; after = 1.25). Furthermore, the variable *affiliation* also increased significantly (before = 2.88; after = 3.36). The extent of informal language use, captured by the variable *informal*, decreased significantly after VC funding (before = 2.58; after = 2.14).

Related to loss of control, increased pressure from the investor, and negative emotions, a t-test of the variable *negative emotions* showed that the use of words associated with negative emotions significantly decreased after VC funding (before = 1.31; after = 1.22). Furthermore, the variable *risk* showed a slight but significant increase (before = 0.46; after = 0.49). The variable *anxiety*, the third variable related to this group of variables, showed no significant change.

Our final t-test was related to the authenticity of the entrepreneur. We found that LIWC variable *authentic* decreased significantly after a successful funding round (before = 44.51; after = 40.68).

**Table 18.** T-tests of LIWC variables before and after funding.

This table shows t-tests of LIWC variables compared before the funding and after the funding.

Variables	Mean before (SE)	Mean after (SE)	Mean(diff)
<b>Self-confidence and positive emotions</b>			
Clout	69.25 (0.272)	73.23 (0.291)	-3.98***
Achievement	2.10 (0.018)	2.38 (0.024)	-0.28***
Power	2.51 (0.021)	2.62 (0.025)	-0.11***
Positive emotions	5.59 (0.042)	5.95 (0.051)	-0.36***
<b>Professionalization and leadership</b>			
I	2.63 (0.032)	2.44 (0.034)	0.19***
We	0.90 (0.014)	1.25 (0.020)	-0.35***
Affiliation	2.88 (0.028)	3.36 (0.036)	-0.48***
Informal	2.58 (0.031)	2.14 (0.031)	0.44***
<b>Loss of control, pressure, and negative emotions</b>			
Negative emotions	1.31 (0.014)	1.22 (0.017)	0.09***
Anxiety	0.17 (0.004)	0.18 (0.005)	-0.00
Risk	0.46 (0.009)	0.49 (0.011)	-0.03**
<b>Authenticity</b>			
Authentic	44.51 (0.385)	40.68 (0.404)	3.83***
Observations	2,094	2,094	
p-values: *** < 0.1%, ** < 1%, * < 5%			

**Tier-1 investor.** In the next series of t-tests, we further examined whether the changes in LIWC variables differed between certain subgroups of the sample. More precisely, we examined more closely the change in LIWC variables ( $\Delta$ ) = mean of LIWC variable after

funding - mean of LIWC variable before funding) and conducted t-tests on the differences in these deltas between founders who received an investment from reputable investors (Tier-1) and founders who received an investment from less reputable investors (Tier-0). The results are displayed in Table 19. First, regarding self-confidence and positive emotions, the tests showed that founders who received funding from a reputable investor showed a significantly stronger increase in *clout* than founders who received funding from less reputable investors (Tier-0 = 3.69; Tier-1 = 5.72). We found no significant differences between Tier-1 and Tier-0 investors for changes in variables *achievement*, *power*, and *positive emotions*. In terms of professionalization and leadership, we found that entrepreneurs who received funding from a reputable investor showed a significantly stronger increase in the variables *we* (Tier-0 = 0.33; Tier-1 = 0.47) and *affiliation* (Tier-0 = 2.88; Tier-1 = 3.36). The t-tests showed no significant differences for the variables *I* and *informal*. Investigating the effects of loss of control, pressure, and negative emotions, we did not find significant differences in the change in variables *anxiety* and *risk* when distinguishing between entrepreneurs who received funding from a reputable or a less reputable investor. However, we found a slightly significantly stronger decrease in *negative emotions* (Tier-0 = -0.08; Tier-1 = -0.16) for entrepreneurs who received funding from Tier-1 investors. Finally, we found no significant difference in the change in *authenticity* when distinguishing between Tier-1 and Tier-0 investors.

**Table 19.** T-tests of LIWC variables Tier-1 and Tier-0 investors.

This table shows t-tests of the change of LIWC variables compared between founders who received funding from Tier-1 investors and founders who received funding from non-Tier-1 investors.

Variables	Mean Tier-0 (SE)	Mean Tier-1 (SE)	Mean(diff)
<b>Self-confidence and positive emotions</b>			
ΔClout	3.69 (0.310)	5.72 (0.727)	-2.03*
ΔAchievement	2.10 (0.018)	2.38 (0.024)	-0.07
ΔPower	2.51 (0.021)	2.62 (0.025)	-0.02
ΔPositive emotions	0.34 (0.053)	0.48 (0.129)	-0.14
<b>Professionalization and leadership</b>			
ΔI	-0.18 (0.036)	-0.25 (0.072)	0.07
ΔWe	0.33 (0.022)	0.47 (0.048)	-0.13*
ΔAffiliation	2.88 (0.028)	3.36 (0.036)	-0.20*
ΔInformal	2.58 (0.031)	2.14 (0.031)	-0.01
<b>Loss of control, pressure, and negativity</b>			
ΔNegative emotions	-0.08 (0.018)	-0.16 (0.046)	0.09†
ΔAnxiety	0.00 (0.006)	0.01 (0.015)	0.01
ΔRisk	0.46 (0.009)	0.49 (0.011)	-0.04
<b>Authenticity</b>			
ΔAuthentic	-3.62 (0.454)	-5.06 (1.087)	1.43
Observations	2,094	2,094	
p-values: *** < 0.1%, ** <1%, * <5%, † < 10%			

**Investment amount.** Table 20 compares differences between investors who received funding above the median (1.4 million US dollars) or funding that was equal to or below the median. We found a significantly stronger decrease in *authenticity* for founders who received funding above the median (below or equal median = -2.53; above median = -5.13). At a 10% level, the variable *affiliation* was significantly stronger for founders with funding above the median (below or equal median = 0.41; above median = 0.55). Furthermore, we found a significant difference at the 10% level regarding the variable *anxiety*. Whereas founders who raised funding equal to or below the median showed a slight decrease in *anxiety* (-0.01), founders who raised funding above the median showed a slight increase in *anxiety* (0.01).

**Table 20.** T-tests of LIWC variables amount funding above or below median.

This table shows t-tests of the change of LIWC variables compared between founders who received funding above the median or equal to or lower the median.

Variables	Mean <= median (SE)	Mean > median (SE)	Mean(diff)
<b>Self-confidence and positive emotions</b>			
ΔClout	3.79 (0.412)	4.17 (0.396)	-0.38
ΔAchievement	0.24 (0.033)	0.32 (0.036)	-0.08
ΔPower	0.09 (0.033)	0.13 (0.037)	-0.04
ΔPositive emotions	0.30 (0.068)	0.42 (0.070)	-0.12
<b>Professionalization and leadership</b>			
ΔI	-0.21 (0.050)	-0.17 (0.040)	-0.04
ΔWe	0.33 (-0.040)	0.37 (0.030)	-0.04
ΔAffiliation	0.41 (0.052)	0.55 (0.052)	-0.14†
ΔInformal	-0.46 (0.043)	-0.42 (0.040)	-0.04
<b>Loss of control, pressure, and negativity</b>			
ΔNegative emotions	-0.09 (0.025)	-0.09 (0.023)	-0.00
ΔAnxiety	-0.01 (0.007)	0.01 (0.009)	-0.02†
ΔRisk	0.02 (0.016)	0.05 (0.015)	-0.03
<b>Authenticity</b>			
ΔAuthentic	-2.53 (0.609)	-5.13 (0.574)	-3.83**
Observations	2,094	2,094	
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%			

### 5.4.3 Multivariate analyses

#### 5.4.3.1 Main effects

To further explore the effects of receiving VC funding on entrepreneurs' digital identities in multivariate analyses, we conducted several random effects panel regressions. We split the data into two periods, before and after funding, and used *log\_WC*, *tier-1 investor*, *log\_money*, *industry dummies*, and *gender* as control variables. The variable of interest was the dummy variable *after\_funding*, which indicates the occurrence of the funding round. The dependent variable was the LIWC variable. Tables 21.1–21.4 show the results for the variables that we investigated in the previous section. We found significant effects of the funding event (*after\_funding*) on several LIWC variables. This approach was similar to that of Fisch and Block (2021).

Regarding the self-confidence and positive emotions of the founder, VC backing significantly increased the use of *clout*, *achievement*, *power*, and *positive emotions* language. Furthermore, our panel regressions showed that language related to professionalization significantly

changed. First, we found that the occurrence of a successful funding event significantly decreased the use of *I* (first-person singular) and the use of *informal* language. Second, the use of *we* (first-person plural) and the use of *affiliation* increased significantly. Considering the downsides of the funding event and the ways in which they are reflected in entrepreneurs' digital identities, we found a significant increase in *risk*-related language after the funding event. The panel regressions showed no significant changes for the use of language related to *negative emotions* or *anxiety*. Eventually, the panel regressions showed that a successful funding significantly decreased the *authenticity* of entrepreneurs' posted Tweets.

**Table 21.1.** Random effects panel regression – Self-confidence and positive emotions.

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Clout	Achievement	Power	Positive emotions
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding	3.352 (0.304)***	0.240 (0.026)***	0.096 (0.026)***	0.261 (0.052)***
<i>Control variables</i>				
Log_WC	-0.723 (0.122)***	-0.044 (0.010)***	-0.020 (0.010) †	-0.113 (0.020)***
Tier-1 Investor	-2.421 (0.702)***	-0.189 (0.051)***	-0.316 (0.056)***	0.120 (0.114)
Log_Money	0.835 (0.140)***	0.076 (0.010)***	0.066 (0.011)***	0.077 (0.023)***
Gender	-6.565 (0.690)***	-0.149 (0.051)**	-0.063 (0.055)	-1.340 (0.112)***
Observations	4,188	4,188	4,188	4,188

p-values: \*\*\* < 0.1%, \*\* < 1%, \* < 5%, † < 10%

**Table 21.2.** Random effects panel regression – Professionalization and leadership.

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	I	We	Affiliation	Informal
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding	-0.153 (0.035)***	0.308 (0.021)***	0.349 (0.038)***	-0.372 (0.031)***
<i>Control variables</i>				
Log_WC	0.038 (0.014)**	-0.051 (0.008)***	-0.151 (0.015)***	0.080 (0.013)***
Tier-1 Investor	0.238 (0.087)**	-0.052 (0.042)***	-0.072 (0.078)	0.384 (0.079)***
Log_Money	-0.107 (0.017)***	0.054 (0.008)***	0.093 (0.016)***	-0.098 (0.016)***
Gender	-0.219 (0.085)*	-0.309 (0.042)***	-0.702 (0.076)***	-0.015 (0.078)
Observations	4,188	4,188	4,188	4,188

p-values: \*\*\* < 0.1%, \*\* < 1%, \* < 5%, † < 10%

**Table 21.3.** Random effects panel regression – Loss of control, pressure, and negativity.

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Negative emotions	Anxiety	Risk
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding	-0.027 (0.018)	0.008 (0.006)	0.038 (0.012)**
<i>Control variables</i>			
Log_WC	0.071 (0.007)***	0.006 (0.002)**	0.006 (0.004)
Tier-1 Investor	0.003 (0.039)	-0.024 (0.010)	-0.016 (0.023)
Log_Money	-0.014 (0.008) †	0.004 (0.002)*	0.004 (0.004)
Gender	0.135 (0.038)***	0.004 (0.010)	0.061 (0.022)**
Observations	4,188	4,188	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%			

**Table 21.4.** Random effects panel regression – Authenticity.

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Authenticity
	Coeff. (SE)
After_funding	-4.052 (0.447)***
<i>Control variables</i>	
Log_WC	-0.253 (0.178)
Tier-1 Investor	2.447 (1.004)*
Log_Money	-0.722 (0.200)***
Gender	2.835 (0.986)**
Observations	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%	

#### 5.4.3.2 Moderator: Backing by reputable investors

To assess whether the main effect was moderated by the reputation of the investor or the amount of money that was raised, we conducted two additional series of random effects panel regressions. In the first series (Tables 22.1–22.4), we added an interaction term (*after\_funding \* Tier-1 investor*) that examined whether the effect of successful funding was moderated by the reputation of the investor.

Regarding the variables that were related to entrepreneurs' self-confidence and positive emotions, we found a significant and positive effect on the LIWC variable *clout*, indicating that the presence of a reputable investor positively moderated the effect of successful funding on the variable *clout*. Investigating the moderating effect of investors' reputation on displayed professionalization and leadership, we found that the presence of a Tier-1 investor had a significant positive effect on the variable *we* and a slightly significant effect on the variable *affiliation* ( $p < .10$ ). This result indicated that the increase in the use of the first-person plural (*we*) and in *affiliation*-related language was reinforced by the presence of very reputable investors. There was no clear evidence concerning the effects that a Tier-1 investor had on variables related to loss of control, pressure, and negativity. While there was no significant moderating effect regarding the variables *anxiety* and *risk*, we found a small significant negative effect on the use of *negative emotions*. However, this effect was only significant at a 10% level. Furthermore, we found that Tier-1 investors significantly positively moderated the effect of a successful funding round on the use of the first-person plural pronoun (*we*). Regarding the variable *authenticity*, we found no evidence for a moderating effect of the presence of a Tier-1 investor.

**Table 22.1.** Random effects panel regression – Interaction effects Tier1-Funding (self-confidence and positive emotions).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Clout	Achievement	Power	Positive emotions
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding*Tier1	1.985 (0.809)*	0.068 (0.070)	0.023 (0.071)	0.134 (0.138)
After_funding	3.066 (0.326)***	0.230 (0.028)***	0.092 (0.028)**	0.242 (0.056)***
<i>Control variables</i>				
Log_WC	-0.720 (0.122)***	-0.043 (0.010)***	-0.020 (0.010) †	-0.113 (0.020)***
Tier-1 Investor	-3.413 (0.810)***	-0.223 (0.062)***	-0.327 (0.066)***	0.053 (0.133)
Log_Money	0.835 (0.140)***	0.076 (0.010)***	0.066 (0.011)***	0.077 (0.023)***
Gender	-6.565 (0.690)***	-0.149 (0.051)**	-0.063 (0.055)	-1.340 (0.112)***
Observations	4,188	4,188	4,188	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%				

**Table 22.2.** Random effects panel regression – Interaction effects Tier1-Funding (professionalization and leadership).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	I	We	Affiliation	Informal
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding*Tier1	-0.067 (0.092)	0.129 (0.057)*	0.194 (0.103) †	0.015 (0.083)
After_funding	-0.144 (0.037)***	0.290 (0.023)***	0.321 (0.041)***	-0.374 (0.034)***
<i>Control variables</i>				
Log_WC	0.038 (0.014)**	-0.050 (0.008)***	-0.150 (0.015)***	0.080 (0.013)***
Tier-1 Investor	0.272 (0.098)**	-0.116 (0.051)*	-0.169 (0.093) †	0.376 (0.089)***
Log_Money	-0.107 (0.017)***	0.054 (0.008)***	0.093 (0.016)***	-0.098 (0.016)***
Gender	-0.219 (0.085)*	-0.309 (0.042)***	-0.702 (0.076)***	-0.015 (0.078)
Observations	4,188	4,188	4,188	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%				

**Table 22.3.** Random effects panel regression – Interaction effects Tier1-Funding (loss of control, pressure, and negativity).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Negative emotions	Anxiety	Risk
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding*Tier1	-0.081 (0.048) †	-0.012 (0.016)	0.037 (0.031)
After_funding	-0.015 (0.019)	0.009 (0.006)	0.032 (0.012)**
<i>Control variables</i>			
Log_WC	0.071 (0.007)***	0.006 (0.002)**	0.006 (0.004)
Tier-1 Investor	0.043 (0.045)	-0.018 (0.013)	-0.034 (0.027)
Log_Money	-0.014 (0.008)†	0.004 (0.002)*	0.004 (0.004)
Gender	0.135 (0.038)***	0.004 (0.010)	0.061 (0.022)**
Observations	4,188	4,188	4,188

p-values: \*\*\* < 0.1%, \*\* < 1%, \* < 5%, † < 10%

**Table 22.4.** Random effects panel regression – Interaction effects Tier1-Funding (authenticity).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Authenticity
	Coeff. (SE)
After_funding*Tier1	-1.448 (1.189)
After_funding	-3.844 (0.478)***
<i>Control variables</i>	
Log_WC	-0.255 (0.178)
Tier-1 Investor	3.171 (1.167)**
Log_Money	-0.722 (0.200)***
Gender	2.835 (0.986)**
Observations	4,188

p-values: \*\*\* < 0.1%, \*\* < 1%, \* < 5%, † < 10%

### 5.4.3.3 Moderator: Investment amount

Tables 23.1–23.4 add an interaction term (*after\_funding \* log\_money*) that examines whether the effect of successful funding is moderated by the amount of money that was raised in a particular funding round. Regarding entrepreneurs' self-confidence and positive emotions, we found that the amount of money raised significantly positively moderated the effect of successful funding on the LIWC variable *achievement*, but only at a 10% level. We did not find moderation effects for the variables *clout*, *power*, or *positive emotions*. Regarding the variables related to professionalization and leadership, we were only able to find a slightly significant positive effect for the variable *affiliation*, indicating that a high amount of money raised positively influenced the effect of funding on the use of *affiliation*-related language. We were not able to find any significant moderating effects for the amount raised on the variables *negative emotions*, *anxiety*, and *risk*, which are all related to loss of control, pressure, and negative emotions for the entrepreneur. Eventually, we found that the amount of money raised significantly negatively moderated the effect of the funding event on the *authenticity* of entrepreneurs' online language.

**Table 23.1.** Random effects panel regression – Interaction effects log\_money (self-confidence and positive emotions).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Clout	Achievement	Power	Positive emotions
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding*log_money	-0.104 (0.160)	0.023 (0.014) †	0.010 (0.014)	0.015 (0.027)
After_funding	4.782 (2.227)*	-0.081 (0.191)	-0.042 (0.194)	0.054 (0.380)
<i>Control variables</i>				
Log_WC	-0.727 (0.122)***	-0.043 (0.010)***	-0.019 (0.010) †	-0.113 (0.020)***
Tier-1 Investor	-2.421 (0.702)***	-0.189 (0.051)***	-0.316 (0.056)***	0.120 (0.114)
Log_Money	0.887 (0.162)***	0.065 (0.012)***	0.061 (0.013)***	0.069 (0.027)**
Gender	-6.565 (0.690)***	-0.149 (0.051)**	-0.063 (0.055)	-1.340 (0.112)***
Observations	4,188	4,188	4,188	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%				

**Table 23.2.** Random effects panel regression – Interaction effects log\_money (professionalization and leadership).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	I	We	Affiliation	Informal
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding*log_money	0.016 (0.018)	0.016 (0.011)	0.038 (0.020) †	-0.005 (0.017)
After_funding	-0.377 (0.252)	0.087 (0.156)	-0.176 (0.282)	-0.306 (0.229)
<i>Control variables</i>				
Log_WC	0.039 (0.014)**	-0.050 (0.008)***	-0.150 (0.015)***	0.080 (0.013)***
Tier-1 Investor	0.238 (0.087)**	-0.052 (0.042)	-0.072 (0.078)	0.384 (0.079)***
Log_Money	-0.115 (0.020)***	0.046 (0.010)***	0.074 (0.019)***	-0.096 (0.018)***
Gender	-0.219 (0.085)*	-0.309 (0.042)***	-0.702 (0.076)***	-0.015 (0.078)
Observations	4,188	4,188	4,188	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%				

**Table 23.3.** Random effects panel regression – Interaction effects log\_money (loss of control, pressure, and negativiy).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Negative emotions	Anxiety	Risk
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
After_funding*log_money	0.006 (0.009)	0.004 (0.003)	0.006 (0.006)
After_funding	-0.112 (0.131)	-0.042 (0.044)	-0.050 (0.085)
<i>Control variables</i>			
Log_WC	0.071 (0.007)***	0.006 (0.002)**	0.006 (0.004)
Tier-1 Investor	0.003 (0.039)	-0.024 (0.010)*	-0.016 (0.023)
Log_Money	-0.017 (0.009) †	0.003 (0.003)	0.001 (0.005)
Gender	0.135 (0.038)***	0.004 (0.010)	0.061 (0.022)**
Observations	4,188	4,188	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%			

**Table 23.4.** Random effects panel regression – Interaction effects log\_money (authenticity).

This table shows the results of random effects panel regressions. The dependent variables are LIWC-variables. Variable *After\_funding* marks the occurrence of the funding event. Besides the displayed control variables, each regression also contains *Industry dummies* which are not displayed for the sake of brevity.

Variables	Authenticity
	Coeff. (SE)
After_funding*log_money	-0.529 (0.235)*
After_funding	3.232 (3.268)
<i>Control variables</i>	
Log_WC	-0.269 (0.178)
Tier-1 Investor	2.447 (1.004)*
Log_Money	-0.458 (0.233)*
Gender	2.835 (0.986)**
Observations	4,188
p-values: *** < 0.1%, ** < 1%, * < 5%, † < 10%	

## 5.5 Conclusion

### 5.5.1 Discussion of the main results

We find that the digital identities of founders change after a successful VC investment. First, our results indicate that entrepreneurs' self-confidence and positive emotions increase after the acquisition of VC financing. Second, our results suggest an increase in leadership and professionalization after investment. Third, changes regarding loss of control, pressure, and negative emotions are ambiguous. We find that entrepreneurs show a lower amount of negative emotions after successful funding but an increase in risk-related language. Finally, our results indicate a decrease in authenticity after the funding event.

The increase in language related to self-confidence indicates a self-confirmation of the entrepreneurs' activities through the successful acquisition of VC, which satisfies their need for achievement (Carragher et al., 2010). The increase in self-confidence after the investment might serve as an indicator of overconfidence. Prior research has shown that overconfident entrepreneurs are more prone to business failure, for example, due to overoptimistic budgeting or overconfidence in their abilities (e.g., Invernizzi et al., 2017; Koellinger et al., 2007). In contrast to our findings, Forbes (2005) showed that entrepreneurs who receive external equity funding are less overconfident. While Forbes (2005) argues that entrepreneurs with external funding show lower levels of overconfidence due to the monitoring of the investor and the entrepreneurs' responsibility to explain their actions, our findings suggest that the increase in confidence may be a direct consequence of successful investment. The increase in self-confidence might be interconnected with an increase in power that is caused by the new partnership with the investor, who provides the entrepreneur with additional financial resources and a valuable business network (e.g., Fast et al., 2012; Sapienza et al., 1996). This assumption is supported by our finding of a positive moderating effect of investors' reputation on increase in language related to self-confidence. This finding is in line with the fact that having a Tier-1 investor participate in the deal reinforces the positive effect of funding because reputable investors are usually more experienced and have greater networks to offer (e.g., Hsu, 2004).

The increase in professionalization and leadership after the investment may be interpreted as an intertwined effect. Prior research has shown that the presence of a VC investor has positive effects on the professionalization of a startup. The professionalization of a startup is mainly attributed to the coaching function of the VC investor, who provides helpful assistance after

investment (e.g., Colombo and Grilli, 2010; Sørensen, 2007). Expanding on previous research, our results indicate that VC investment also directly influences the professionalization and leadership skills of founders individually. First, the increase in leadership-related qualities may be attributed to VC-induced startup growth. Instead of just being a member of a small team, the founder is forced to take a leadership position as soon as the venture raises external capital and starts growing (Davila et al., 2003). Improved leadership qualities are further highlighted by the moderating effect of reputable investors. This finding might indicate that more reputable investors provide superior value-added services, such as management coaching, than less reputable investors, which allow entrepreneurs to improve their leadership skills (Hsu, 2004). Additionally, our results show a decreased use of informal language after investment. Hellman and Puri (2002) have shown that VC-backed startups are faster to apply measures that are important for external communication, such as hiring a marketing vice president. Although ventures actively use social media for communication and marketing, for example, through information-sharing and action-inducing content (Taecharungroj, 2017), our results suggest that the founder is made aware of the importance of professional online communication by VC investors.

Our results are less clear regarding loss of control, pressure, and negative emotions, which may be caused by the presence of a VC investor. Acquiring a VC investment may be a double-edged sword. Our findings suggest that the positive aspects of investment considerably outweigh the negative ones. The increase in risk-related language may be attributed to the growth of the startup that is induced by VC investment. Fast growth increases startup risks, which need to be managed by founders and the management team, for example, inappropriate startup infrastructure or inexperienced employees (Picken, 2017). Our findings suggest that founders are aware of increasing risks, which is reflected in their digital identities' increase in risk-related language.

Finally, we show that VC funding can negatively affect founders' authenticity. This finding could be directly related to the investment and might be initiated by investors or by founders. Less authentic language could be imposed on the founder by the investor, for example. While the founder had previously communicated openly and thus may have also shared business-relevant knowledge with the public, acting as a member of the venture's board, the investor could put a stop to this behaviour (Fried et al., 1998). Another reason could be explained by agency theory. Whereas entrepreneurs do not need to justify their actions before investor entry, they are obliged to explain their actions to investors after investment. The founder could then be inclined to communicate less authentically to keep the investors in the dark about his actions

(Bruton et al., 2000; Garg, 2013). Additionally, the positive moderating effect of the investment amount shows that authenticity further decreases when more money is at stake. Although prior research has not been able to show that investors' emphasis on control is connected to investment amount (Wiltbank et al., 2009), our results suggest that a higher investment amount might lead to increased control by the investor, which is associated with the level of authenticity displayed by entrepreneurs.

### **5.5.2 Limitations and future research**

Our study is not without limitations. Using Twitter offers the opportunity to collect vast amounts of written text by individuals over a certain period. Because users on Twitter can delete messages, which cannot be recovered easily, our study is not able to guarantee that the text that was investigated per individual is complete or whether it has been edited afterward.

By using only US-based founders and English LIWC dictionaries, our study is limited to founders located in the USA that use the English language. In general, using LIWC to analyze text limits the analyses to the dictionaries incorporated in the software. A more comprehensive way to analyze the data would be the use of open-vocabulary tools that use machine learning and can analyze text in a more nuanced way (Schwartz et al., 2013). Furthermore, while our study shows several changes in founders' digital identities after a successful VC investment, we are not able to show why these changes occur. Future research should try to identify the causal mechanisms more carefully. This task is beyond the scope of our exploratory, correlational research.

Our exploratory study offers several opportunities for future research. First, while our study was able to show that the digital identities of entrepreneurs change after successful funding, future research could investigate whether the changes differ between different types of founders and investors. Furthermore, the question of whether the changes have an impact on venture performance, for example, in terms of survival rates or regarding the possibility of acquiring further funding, could be analyzed.

## Chapter 6

### Conclusion

*Chapter 6 of this dissertation comprises the conclusion: Section 6.1 describes the main findings of each chapter and provides answers to the research questions of this thesis. Section 6.2 provides implications for theory and practice of this thesis. As a conclusion, section 6.3 describes the possibilities of future research.*

## 6.1 Findings per chapter

### 6.1.1 Chapter 2: The role of the decision maker's education and experience in VC screening

*RQ 1: How and to what extent do VC investors' educational background, investment experience, and entrepreneurial experience affect the importance of decision criteria in the screening process.*

A VC investors decision to invest in a proposing startup is influenced by several factors. One of the influencing factors is the decision maker's human capital. Chapter 2 investigates to what extent the VC investor's educational background as well as investment and entrepreneurial experience influence the importance of his decision criteria. To answer RQ 1, data from 229 investors who participated in a CBC experiment was used. By conducting logistic regressions with several sub-samples chapter 2 provides utility values of several decision criteria. First, regarding the level of education, chapter 2 shows that VC investors with a higher level of education (e.g., PhD) attribute more importance to the startup's possibilities to internationalize compared to investors with lower levels of education (e.g., bachelor's degree). Furthermore, they prefer innovation-centered business models and put less emphasis on the startup's profitability. Second, regarding the field of education, chapter 2 shows that investors with a background in natural sciences are more focused on the product. In addition, we find that investors with an educational background in business attribute less importance to the startups' possibilities to internationalize, compared to investors with different educational backgrounds. Third, chapter 2 shows that investors with entrepreneurial experience put more emphasis on the possibilities of international scalability when making an investment decision. Finally, chapter 2 shows that investors with more investment experience are more focused on the management team than investors with less investment experience.

### 6.1.2 Chapter 3: Differences in screening criteria between US and European VC investors

*RQ 2: How, to what extent, and why does the importance attributed to screening criteria differ between VC investors located in the US and VC investors located in continental Europe?*

Next to the influence of the investor's human capital on the decision whether to invest in a startup or not to invest, RQ 2 suggests that the investor's location might also play an important role. In particular, chapter 3 attempts to investigate differences in the importance of

decision-making criteria between VC investors located in the US and VC investors located in continental Europe. To answer RQ 2, chapter 3 uses a sequential multi method design. By identifying investment decision criteria via interviews and an extensive literature review, and by conducting a CBC experiment based on these criteria, the importance of seven investment criteria is calculated. In total, 430 VC investors participated in the CBC in chapter 3, from whom 128 are located in the US and 302 are located in continental Europe. To examine if the importance attributed to the decision criteria differs between these investors, a multilevel logistic regression with interaction effects is conducted. The analysis shows that VC investors based in the US put more emphasis on the proposing ventures' revenue growth rates compared to investors based in continental Europe. Furthermore, investors based in continental Europe attribute more importance to the startups' ease of international scalability. To interpret these results, 11 investors from whom four are located in the US and seven are located in continental Europe, were interviewed. Regarding the criterion international scalability, the investors argue that startups in the US are already operating in a large market where the international scalability is not prioritized. On the other side, European VC investors state that startups in Europe are forced to internationalize quickly due to the comparably small size of European countries. Regarding revenue growth rates, US investors state that the US market provides high liquidity that enables startups to grow faster. On the other side, European investors state that the revenue growth rates are less important due to the high requirements for growth capital which is often not available in European VC markets.

### 6.1.3 Chapter 4: Schumpeterian entrepreneurial impression and VC acquisition

*RQ 3: Which characteristics of a Schumpeterian entrepreneur are beneficial and which characteristics are detrimental when applying for VC funding?*

Following a high-risk high-reward strategy, VC investors are looking for highly innovative startups which bear the ability to disrupt industries and to achieve outstanding growth. These startups are often founded by visionary entrepreneurs who are often referred to Schumpeterian entrepreneurship. Chapter 4 investigates whether characteristics of Schumpeterian entrepreneurs positively or negatively influence the chances for acquiring VC. To answer RQ 3 more than 2 million Tweets from 3,313 founders were analyzed using text analysis software, combined with data on investment rounds of the founders' startups. Logistic regression analyses

show that VC investors have mixed feelings on characteristics related to Schumpeterian entrepreneurs. Whereas chances for a second round of funding increase for entrepreneurs who are visionary and optimistic, a high need for achievement decreases the chances. Furthermore, the Schumpeterian traits of uncertainty tolerance and self-confidence have no effects on the chances of acquiring further VC.

#### **6.1.4 Chapter 5: How does entrepreneurial success change an entrepreneur's digital identity?**

*RQ 4: Does the successful acquisition of a VC investment change the founder's digital identity and if so, which factors influence the change?*

The acquisition of VC can have tremendous effects on the financed startup as well as on the founders of the startups themselves. To answer RQ 4, the study presented in chapter 5 uses messages posted on Twitter from 2,094 founders and combines this data with funding information from Crunchbase. The messages on Twitter are examined with LIWC, a software that allows to analyze the language that is used by the founders. Panel regression analyses is applied to show if the language and therefore the digital identities of the founders change after a successful acquisition of VC. Furthermore, moderating variables are applied to examine the effects of the VC investors reputation and the investment amount on the change of the founders' digital identities. Chapter 5 shows that the acquisition of VC leads to an increase in self-confidence, positive emotions, professionalization, and leadership. Furthermore, the acquisition of VC indicates a decrease in the founders' authenticity. Regarding the backing by an investor with high reputation, chapter 5 shows that the founders' self-confidence and leadership qualities increase stronger compared to founders who acquired financing from less reputable investors. In addition, the results show that the investment amount negatively moderates the change in authenticity indicating a stronger decrease in authenticity the higher the acquired VC.

## **6.2 Implications for theory and practice**

The findings of this thesis contribute to the understanding of what factors influence decision-making in the VC investment process and the effects of the investment on the founder. Although numerous researchers have extensively studied VC investor decision-making since the 1970s, it is only in the last twenty years that a stream of research has developed, attempting to approximate more realistic research results through experimentation and real archival data (e.g., Shepherd et al., 2003; Franke et al., 2006; Petty and Gruber, 2011; Block et al., 2019). Using data

from a conjoint experiment, this dissertation is able to extend this research. Furthermore, using data from Twitter and language analyses, this thesis contributes to the upcoming research stream that investigates digital identities in an entrepreneurial context and in a VC context in particular (e.g., Fisch and Block, 2021; Horst et al., 2020).

First, chapter 2 outlines the implications that the VC investors' human capital has in the decision-making. Prior research suggests that the combination of education and experience create schemata that enable decision makers to form an opinion (Franke et al., 2008; Matlin, 2005). The findings in chapter 2 implicate that these schemata influence how much importance VC investors attribute to their decision-making criteria when screening potential portfolio companies. Examining the influence of the level of education, as well as the field of education of the investor on the decision criteria, the findings add to debates on the consequences that the human capital of the investor has for startup financing (e.g., Zarutskie, 2010; Martin, et al., 2013). Furthermore, the finding that investors with more investment experience put more emphasis on the startups' management teams contributes to the ongoing jockey versus horse debate, showing that experience may play an important role in this context (e.g., Kaplan et al., 2009; Mitteness et al., 2012). The findings in chapter 2 have practical implications for startups and VC investors. To increase their chances of acquiring VC financing, startups could attempt to find information on the educational background of the investors and highlight certain strengths of their startups. Investors could use the findings to benchmark their own decisions to the market.

Second, chapter 3 has implications for research on the importance of screening criteria in VC decision-making in general and research examining syndication deals with investors from different countries (e.g., Hall and Hofer, 1993; Petty and Gruber, 2011; Nahata et al., 2014). The findings show that VC investors differ in their investment decisions, depending on their location. Whereas continental European investors show a comparably strong focus on the international scalability of the proposing startup, investors located in the US show particular strong emphasis on the revenue growth rates. This adds to the debate that investors adjust their screening criteria when investing across borders (e.g., Wright et al., 2005; Dai et al., 2012). Next to these theoretical implications, chapter 3 has practical implications for startups and investors, too. It enables startups to highlight the most important criteria depending on their location when applying for VC financing. Furthermore, the results help investors that look for cross-border syndicated deals to better understand each other's preferences and to better match their screening criteria.

Third, chapter 4 has implications for research on VC decision-making, entrepreneurial digital identities, and impression management. Whereas Schumpeterian entrepreneurs, who show certain traits such as high self-confidence and a visionary mindset, are very prominent in research on entrepreneurship policy and VC investing (e.g., Block et al., 2017; Estrin et al., 2020; Kortum and Lerner, 2000), findings from chapter 4 indicate that not all Schumpeterian traits are beneficial when applying for VC. Drawing on the theory of impression management and digital identities (e.g., Goffman, 1959; Fisch and Block, 2021), it is shown that displaying traits of a Schumpeterian digital identity influences the chances of acquiring VC financing. While showing an entrepreneurial vision and optimism increases the chances of an investment, the display of an achievement motive decreases the chances. This contributes to research on impression management in an entrepreneurial context, emphasizing that entrepreneurs may adjust their digital identities to increase their chances to receive VC financing. Hence, chapter 4 has practical implications for entrepreneurs as well. The findings show that entrepreneurs must carefully adjust their digital identities on social media platforms, as they may influence the decision-making of VC investors.

Finally, chapter 5 has implications for research on founder identities. Whereas most research on founder identities has been qualitative (e.g., e.g., Fauchart and Gruber, 2011; Powell and Baker, 2017; York et al., 2016), chapter 5 uses archival data to show changes in the identity after a successful VC investment. The findings indicate that the investment increases the founder's self-confidence, positive emotions, professionalization, and leadership skills. Simultaneously, it decreases their authenticity. Whereas previous research has shown that a VC investment may have positive and negative effects on the founder (e.g., Mäkelä and Maula, 2008; Kaplan and Strömberg, 2003; Hellmann and Puri, 2002), findings from chapter 5 indicate that founders are mainly positively affected by the acquisition of VC. This bears implications for investors, showing that the investment may trigger an evolution of the entrepreneurs' digital identities. They should monitor the founders social media activity and if necessary help them adjusting it.

### **6.3 Limitations**

Even though the studies presented in this thesis were designed and conducted with utmost care, this thesis is not without limitations. Chapters 2 and 3 utilize data received from a conjoint experiment. While results from conjoint experiments in a decision-making context are closer to

real-world decisions and suffer from less bias (Shepherd and Zacharakis, 1999), conjoint experiments are limited in their generalizability. First, the potential companies that had to be assessed by investors presented in the experiment in chapters 2 and 3 are hypothetical and therefore less complex than real companies. For example, the experiment did not grasp factors such as the quality of the business plan or the way the proposal entered the deal flow. Instead, the experiment used seven distinct criteria that were the only basis of the decision-making process. Furthermore, these seven criteria are not always available for assessment in real screening scenarios. Sometimes, investors may use less than the seven presented criteria in their screening. This is contradicted by the conjoint experiment, as it explicitly assumes that the decision makers use a full compensatory model when evaluating the criteria, weighting each of them against each other. Regarding chapter 3, the diversity of the European VC market may limit the findings. Country specific factors such as the economic size cannot be included as control variables in the models. Nonetheless, previous research indicates that European investors barely differ in their decision-making (Muzyka et al., 1996).

Chapters 4 and 5 use data from Twitter and Crunchbase to investigate founders' digital identities. First, the use of Twitter data bears several limitations. While the studies presented assume that the founders are the only persons using their Twitter accounts, it is possible that one personal account is used by multiple people. No conclusions could be drawn about the individual in such cases. Furthermore, Twitter offers the possibility to delete messages. Hence, it could be that not all posted Tweets are actually included in the data due to the possibility to delete them. This could bias the data source, for example when founders start deleting dubious and unprofessional Tweets after or before acquiring VC. In addition, both chapters are limited to English speaking founders who are based in the US. Although LIWC dictionaries exist in multiple languages, the original English dictionary was used in this thesis. This limits the generalizability of the findings to the US. Regarding chapter 4 in particular, it is assumed that entrepreneurs are aware that potential investors might also use the entrepreneurs' posted Tweets as a source of information when making an investment decision and that entrepreneurs use IM to deliberately create a certain online impression. Regarding chapter 5, although the findings show that the founders' digital identities change after a successful funding, the study is not able to explain the mechanics behind this evolvement.

#### 6.4 Avenues for future research

Investigating decision-making criteria of VC investors, the factors that influence the decision to invest in a startup and the effects that the investment may have on the founders, this thesis offers several avenues for future research. First, chapter 2 provides insights on the influence of the VC investors' human capital. While it is shown that certain characteristics such as education and experience influence the importance attributed to the decision criteria, chapter 2 is not able to show to which extent these differences contribute to the startup's success. Hence, future research investigating factors and mechanics influencing the success of a VC investment should take into account the different educational and experiential backgrounds of the VC investors. Furthermore, chapter 2 has included only two types of experience, i.e., investment and startup experience. It could bear additional insights to regard the investors' experience in a more nuanced way, for example by differentiating between successful and unsuccessful startup experience (Fisch and Block, 2021).

Second, chapter 3 shows that the importance that is attributed to screening criteria by VC investors might differ depending on the investors' location. Whereas only differences between investors based in the US and continental Europe are investigated, future research could investigate differences between other regions, e.g., the Asian VC market. Furthermore, future research on cross-border syndication deals could take the findings from chapter 3 into account. It could be investigated if foreign lead investors in a syndicated deal highlight criteria they would usually highlight in their domestic markets, or if they adjust to the differing weightings of the screening criteria of their syndication partners. Furthermore, chapter 3 does only investigate continental European and US VC markets. Research on the differences could be expanded to other types of financing, that may apply fundamentally different criteria when making an investment decision, for example venture debt or social impact investors (e.g., Block et al., 2021).

Third, chapter 4 investigates to what extent entrepreneurs' digital identities may influence VC investors' decision to invest in a startup. Build on IM theory and theory on Schumpeterian entrepreneurs, it was shown that certain digital identity traits are beneficial and certain traits are disadvantageous when trying to acquire further VC investments. Future research could investigate the mechanics behind this in more detail, for example by comparing different types of investors. It could be possible that, while in a VC investment context, high degrees of achievement motivation could be harmful, business angels could actually prefer entrepreneurs who show high degrees of achievement motivation. Furthermore, while chapter 4 examines US investors and US founders exclusively, the found effects may change in other regions. This could

be due to differing entrepreneurial images in other cultures (Pahnke and Welter, 2019). In addition, while chapter 4 focuses on Schumpeterian entrepreneurs, it would be meaningful to examine other types of entrepreneurs (Fauchart and Gruber, 2011). Whereas the effects of the entrepreneurs' traits on the chances of acquiring further VC investments was investigated, a next step could be to investigate if these traits have effects on other entrepreneurial success measures, such as profitability, or firm survival. Regarding imprinting theory, it could also be meaningful to analyze the imprinting effect of Schumpeterian entrepreneurs on their ventures themselves. Using longitudinal Twitter data could help understanding the imprinting effect over a long period of time, especially in cases in which the founder as well as the founded organization itself are active on social media.

Finally, chapter 5 outlines the consequences of a VC investment on the founders' digital identities. Since research on digital identities in an entrepreneurship context is still in its infancy, there are many opportunities for future research. While chapter 5 has shown that entrepreneurs' digital identities change after the successful acquisition of VC, future research could investigate in more detail whether these changes differ depending on the types of founders and the types of investors. In addition, it would be meaningful to examine if these changes may affect future venture performance. Furthermore, while chapter 5 focuses on a US sample, future research could investigate if entrepreneurs' digital identities do also change in other regions and if these changes differ from US founders.

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**Appendix**

**Figure A1.** Introduction to conjoint experiments presented to respondents.

**Please imagine the following situation:**

You are confronted with a set of growth ventures with different characteristics and you need to decide which of these ventures is the most attractive to you as an investor (initial screening). The only information you have on all of these ventures is the following:

**The venture matches your geographical, industrial and investment size preferences!**

**Venture characteristics**

1. Venture has market traction & a validated business model
2. Venture has multiple paying customers
3. Venture is showing growth in sales & customers
4. Venture has multiple employees

**Figure A2.** Choice task presented to respondents.

**Which of these two growth ventures is more attractive to you? (1 of 15)**  
 The two ventures only differ in the below mentioned characteristics.  
 They are both operating in the same industry & have the same level of revenue.

Growth venture A

Growth venture B

Characteristics of the venture		
<u>Current investors:</u>	<u>External investors - Unfamiliar to you</u>	<u>External investors - Unfamiliar to you</u>
<u>International scalability:</u>	Easy	Difficult
<u>Current revenue growth:</u>	100%	50%
<u>Management team (track record):</u>	<u>All</u> team members with relevant track record	<u>No</u> team member with relevant track record
<u>Current profitability:</u>	Not profitable	Break even
<u>Value added for customers:</u>	Medium	Low
<u>Business model:</u>	<u>Lock-in</u>	<u>Complementary offering</u>
<b>More attractive:</b>	<input type="radio"/>	<input type="radio"/>

**If you have made your choice, click the grey arrow below to continue.**

Figure A3. Survey questions.

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**A. Socio-economic characteristics of the decision maker**


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**A1. What is your gender?**

- Female  Male

**A2. What is your age?**

- Under 25  25-34  35-44  45-54  55-64  > 64

**A3. In which country is your company headquartered?** **A4. Is your personal office located in the same country as your headquarters?**

- Yes  No

**If no**, in which country is your personal office located?

**A5. What is your highest educational degree?**

- Less than high school degree  
 High school degree or equivalent  
 Bachelor degree  
 Master degree or MBA  
 PhD or doctoral degree

**A6. What is your field of education?** *(multiple answers possible)*

- Law  Business or economics  Natural sciences  Engineering  Other
- 

**B. Decision maker's experience**

**B1. How many years of experience working for an investor do you have?** *(in years)*

**B2. How many years have you been working for your current employer?** *(in years)*

**B3. Have you ever been an entrepreneur yourself?**

- Yes  No

**If yes**, how many companies have you founded?

**B4. Your current position within the investor company is ...**

- Partner / CEO  Director / Principal  Investment Manager  Analyst  Other

**B5. How many board seats in portfolio companies do you currently hold?**

- 0  1  2  3  4  > 4

**B6. Please describe your type of prior working experience.**

- Mostly working for start-ups/SMEs  Working for large firms & start-ups/SMEs  Mostly working for large firms

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**C. Deal experience & preferences**


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**C1. What is your preference regarding syndication?**

- Investing alone
  Investing together with one investor
  Investing together with > 1 investor
  Indifferent

**C2. Cash-on-cash multiple: Please fill in the approximate percentage (%) of deals you participated in that returned ...**

<input type="text"/>	< 1x invested capital	<input type="text"/>	1x-2x invested capital	<input type="text"/>	2x-5x invested capital	<input type="text"/>	5x-10x invested capital	<input type="text"/>	> 10x invested capital
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Total (in %)

**C3. In which stages are you investing?** *(multiple answers possible)*

- Seed-stage
  Early-stage
  Growth-/expansion-stage
  Later-stage

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**D. Investor characteristics**


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**D1. Which of the following investor types best describes your company?**

- Corporate venture capital fund
  Venture capital fund
  Growth equity fund
  Leveraged buyout fund
  Single-family office
  Multi-family office
  Business angel
  Other

**D2. What is the AuM (Assets under Management) of your company?** *(in EUR or USD)*

- ≤ 10 million
  11-25 million
  26-100 million
  101-250 million
  251-999 million
  ≥ 1 billion

**D3. How many investment professionals work in your company (excluding administration staff, but including yourself)?**

- 1
  2-5
  6-10
  > 10

**D4. In which industry does your company mainly invest?** *(multiple answers possible)*

- Software & services
  IT infrastructure/systems
  Financial services
  E-Commerce
  Biotechnology & healthcare
  Media & entertainment
  Consumer products & services
  Industrials & industrial technology
  Energy
  Other

**D5. What is your company's average Internal Rate of Return (IRR)?**

- ≤ 0%
  1-10%
  11-20%
  21-30%
  31-40%
  > 40%
  N/A

**D6. The source of funding (limited partners) of your company is approximately split between ... (in %)**

Private individuals  
(e.g. business  
angel)

Private institutions  
(e.g., corporates or other private  
funds)

Public institutions  
(e.g., governmental  
funds)

Total (in %)

**D7. In which type of firm does your company mainly invest? (please choose one)**

B2B  B2C  C2C / P2P

**D8. In which region(s) does your company invest? (multiple answers possible)**

North America  South America  Oceania  Asia  Africa  Europe  Middle East

**D9. What is the % of deals you do with foreign companies relative to all your deals? (in %)**

**D10. What value added services does your company provide to portfolio companies (next to the financing provided)? (multiple answers possible)**

Coaching / mentoring  Strategic advice / consulting  Recruitment support  PR / marketing support

Business development / client introduction  Supporting next fundraising  Legal support

Other

**Table A1.** Main effects: Education.

We use logistic regressions with the dependent variable “preference of the decision maker” which takes a value of “1” if the respective venture was selected by the investor and “0” if the venture was not selected. Models (1-3) comprise only those investors who hold either a “Bachelor’s degree”, “Master’s degree” or a “PhD or doctoral” degree. Models (4-6) comprise only those investors who are solely educated in “Business or economics”, “Natural sciences”, or “Engineering”.

<b>Model</b>	(1)	(2)	(3)	(4)	(5)	(6)
<b>Sample</b>	<b>Bachelor</b>	<b>Master</b>	<b>PhD</b>	<b>Business</b>	<b>Natural Science</b>	<b>Engineering</b>
<b>Variables</b>	<b>Coef. (SE)</b>	<b>Coef. (SE)</b>				
Profitability: break even	0.775 (0.166)***	0.488 (0.109)***	0.348 (0.261)	0.511 (0.112)***	0.462 (0.391)	1.183 (0.212)***
Profitability: profitable <i>(reference group: not profitable)</i>	1.043 (0.234)***	0.867 (0.124)***	0.411 (0.252)	0.943 (0.124)***	0.892 (0.463)*	0.790 (0.407)*
Revenue growth: 20%	0.529 (0.194)***	0.650 (0.117)***	0.584 (0.336)*	0.628 (0.122)***	0.357 (0.470)	0.284 (0.326)
Revenue growth: 50%	1.425 (0.257)***	1.453 (0.122)***	1.441 (0.341)***	1.339 (0.129)***	1.493 (0.607)**	1.542 (0.399)***
Revenue growth: 100% <i>(reference group: 10%)</i>	2.091 (0.262)***	1.883 (0.134)***	1.900 (0.410)***	1.818 (0.144)***	2.499 (0.486)***	2.458 (0.454)***
Management team: some team members	0.675 (0.178)***	0.836 (0.109)***	0.852 (0.405)**	0.860 (0.120)***	0.454 (0.188)**	0.553 (0.309)*
Management team: all team members <i>(reference group: no team member)</i>	0.999 (0.158)***	1.183 (0.125)***	1.128 (0.360)***	1.188 (0.123)***	0.859 (0.427)**	0.630 (0.320)**
Current investor: external investors - unfamiliar	0.143 (0.151)	0.011 (0.105)	0.492 (0.335)	0.104 (0.104)	-0.213 (0.411)	0.170 (0.386)
Current investor: external investors - tier 1 <i>(reference group: no external investor)</i>	0.493 (0.204)**	0.412 (0.111)***	1.062 (0.326)***	0.537 (0.120)***	0.410 (0.503)	0.199 (0.301)
Business model: innovation-centered	0.328 (0.191)*	0.575 (0.117)***	1.284 (0.296)***	0.584 (0.128)***	0.365 (0.654)	0.419 (0.246)*
Business model: lock-in	0.726 (0.213)***	0.580 (0.113)***	1.269 (0.321)***	0.679 (0.124)***	0.362 (0.461)	0.779 (0.297)***
Business model: complementary <i>(reference group: low cost)</i>	0.257 (0.200)	0.216 (0.120)*	0.713 (0.258)***	0.362 (0.123)***	-0.312 (0.428)	0.175 (0.278)
Value-added of product/service: medium	0.803 (0.156)***	0.910 (0.110)***	1.157 (0.326)***	1.031 (0.109)***	1.104 (0.429)**	1.157 (0.328)***
Value-added of product/service: high <i>(reference group: low)</i>	1.622 (0.206)***	1.392 (0.124)***	1.982 (0.352)***	1.587 (0.128)***	2.621 (0.525)***	1.525 (0.412)***
International scalability: moderate	0.361 (0.150)**	0.564 (0.103)***	1.235 (0.255)***	0.401 (0.100)***	1.145 (0.313)***	1.403 (0.256)***
International scalability: easy <i>(reference group: difficult)</i>	0.564 (0.142)***	1.000 (0.113)***	1.628 (0.381)***	0.819 (0.110)***	1.284 (0.397)***	1.434 (0.266)***
N (observations)	1,456	4,005	494	3,692	338	546
N (number of groups)	56	154	19	142	13	21

Notes: Standard errors (SE) are reported as robust standard errors that are clustered on the individual respondents’ level. Significance levels are denoted by asterisks, \*\*\* 0.1%, \*\* 1%, and \* 5%.

**Table A2.** Main effects: Experience.

We use logistic regressions with the dependent variable “preference of the decision maker” which takes a value of “1” if the respective venture was selected by the investor and “0” if the venture was not selected. Model (1) comprises only those investors who have started at least one company, Model (2) comprises only those investors who have started more than one company, i.e., who act as serial entrepreneurs. Model (3) comprises only those investors who have less than 8 years of investment experience, Model (4) comprises only those investors who have 8 or more years of investment experience.

Model	(1)	(2)	(3)	(4)
Sample	Entrepreneur	Serial Entrepreneur	Experience low	Experience High
Variables	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
Profitability: break even	0.576 (0.125)***	0.582 (0.173)**	0.726 (0.127)***	0.387 (0.119)***
Profitability: profitable <i>(reference group: not profitable)</i>	0.873 (0.146)***	0.816 (0.192)***	0.967 (0.155)***	0.801 (0.139)***
Revenue growth: 20%	0.422 (0.133)***	0.381 (0.182)*	0.541 (0.146)***	0.664 (0.125)***
Revenue growth: 50%	1.358 (0.151)***	1.086 (0.201)***	1.412 (0.157)***	1.455 (0.148)***
Revenue growth: 100% <i>(reference group: 10%)</i>	1.787 (0.156)***	1.757 (0.208)***	1.925 (0.170)***	1.914 (0.154)***
Management team: some team members	0.821 (0.132)***	0.735 (0.176)***	0.699 (0.129)***	0.867 (0.124)***
Management team: all team members <i>(reference group: no team member)</i>	1.133 (0.147)***	0.990 (0.204)***	0.955 (0.137)***	1.275 (0.135)***
Current investor: external investors - unfamiliar	0.051 (0.125)	0.054 (0.181)	0.064 (0.135)	0.106 (0.110)
Current investor: external investors - tier 1 <i>(reference group: no external investor)</i>	0.551 (0.136)***	0.508 (0.193)**	0.410 (0.140)***	0.548 (0.125)***
Business model: innovation-centered	0.515 (0.133)***	0.364 (0.172)*	0.765 (0.161)***	0.391 (0.113)***
Business model: lock-in	0.543 (0.136)***	0.379 (0.170)*	0.933 (0.151)***	0.442 (0.123)***
Business model: complementary <i>(reference group: low cost)</i>	0.173 (0.147)	0.026 (0.193)	0.393 (0.145)***	0.150 (0.129)
Value-added of product/service: medium	0.953 (0.127)***	0.851 (0.181)***	0.995 (0.115)***	0.824 (0.126)***
Value-added of product/service: high <i>(reference group: low)</i>	1.589 (0.158)***	1.574 (0.242)***	1.623 (0.141)***	1.398 (0.143)***
International scalability: moderate	0.611 (0.116)***	0.612 (0.142)***	0.529 (0.122)***	0.586 (0.110)***
International scalability: easy <i>(reference group: difficult)</i>	1.169 (0.119)***	1.290 (0.171)***	0.904 (0.135)***	0.989 (0.121)***
N (observations)	2,834	1,534	2,678	3,276
N (number of groups)	109	59	103	126

Notes: Standard errors (SE) are reported as robust standard errors that are clustered on the individual respondents' level. Significance levels are denoted by asterisks, \*\*\* 0.1%, \*\* 1%, and \* 5%.

**Table A3.** Model with interaction effects (subsample Venture Capital Funds and Growth Equity Funds).

Regression type: multilevel logistic regression with random intercepts and random slopes.

Dependent variable: preference of decision-maker.

Attributes and levels	Log-odds
Profitability: break even * US	0.067 (0.135)
Profitability: profitable * US <i>(reference group: not profitable)</i>	0.115 (0.159)
Revenue growth: 20% * US	0.086 (0.153)
Revenue growth: 50% * US	0.439 (0.172)**
Revenue growth: 100% * US <i>(reference group: 10%)</i>	0.400 (0.183)**
Management team: some team members * US	-0.089 (0.138)
Management team: all team members * US <i>(reference group: no team member)</i>	0.015 (0.167)
Current investor: ext. investors - unfamiliar to you * US	-0.176 (0.143)
Current investor: ext. investors - tier 1 * US <i>(reference group: no external investor)</i>	0.130 (0.164)
Business model: innovation-centered * US	-0.126 (0.160)
Business model: lock-in * US	0.184 (0.179)
Business model: complementary offering * US <i>(reference group: low cost)</i>	-0.002 (0.165)
Value-added: medium * US	0.149 (0.139)
Value-added: high * US <i>(reference group: low)</i>	0.330 (0.160)**
Int. scalability: moderate * US	-0.429 (0.133)**
Int. scalability: easy * US <i>(reference group: difficult)</i>	-0.855 (0.144)***
N (decisions)	8,476
N (decision-makers)	326

*Notes:* Estimated with robust standard errors clustered at the level of the decision-maker in parentheses.

\* &lt; 0.10, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01.