



Schumpeterian entrepreneurial digital identity and funding from venture capital firms

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Abstract

Schumpeterian entrepreneurs are considered agents of innovation and technology transfer. However, to fulfill this role, they need entrepreneurial finance. From the perspective of digital identity, we examine the relationship between a Schumpeterian digital identity and venture capital (VC) funding. Because the VC industry celebrates innovative and visionary entrepreneurship, we posit that a founder's digital identity as a Schumpeterian-type entrepreneur influences the venture's chances of receiving VC funding. A quantitative analysis of the language used by 3313 founders in a large sample of Twitter messages, however, provides a mixed picture. While some dimensions of Schumpeterian entrepreneurship have a positive relationship with the acquisition of resources from VC firms (entrepreneurial vision and optimism), other dimensions seem to have no (uncertainty tolerance and rationality) or even a decreasing (achievement motivation) effect. The negative relationships observed can be explained by the particularities of the VC business model, which does not align with Schumpeterian entrepreneurship in all respects. Our study contributes to research on Schumpeterian entrepreneurship, the financing of technology transfer, and the link between entrepreneurial digital identity and entrepreneurial finance. From a practical perspective, the results of our study demonstrate the limits of VC with regard to the financing of technology transfer and highlight the need for public funding through governmental VC or agencies for (disruptive) innovation.

Keywords Entrepreneurial identity · Digital identity · Venture capital · Schumpeterian entrepreneurship · Twitter · Text analysis

JEL Classification M13 · O31 · G24

We uploaded all data and analyses presented in this manuscript anonymously to the Open Science Foundation (OSF). The files can be accessed here: <https://osf.io/2mcpd/>.

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1 Introduction

Joseph A. Schumpeter described an entrepreneur as an agent of change who brings innovation into the market. More specifically, Schumpeter saw 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 among the hot spots of entrepreneurship and innovation around the world.¹ For example, Silicon Valley's entrepreneurship, with disruptive superstar entrepreneurs such as Elon Musk (PayPal, SpaceX, and Tesla), Larry Page (Google), and Mark Zuckerberg (Facebook), is referred to as Schumpeterian entrepreneurship (e.g., Thiel & Masters, 2014).

Such entrepreneurs, however, cannot act alone and need external resources to exploit the opportunities that 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 venture capital (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 & 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 et al., 2018; Stuart & Sorenson, 2007).

At first sight, the Schumpeterian type of entrepreneur seems to be very popular in an entrepreneurial finance context among venture funders. Leading VC firms such as Kleiner Perkins or Sequoia Capital celebrate the Schumpeterian type of entrepreneurship and see themselves as trustful partners at eye level, helping innovative entrepreneurs turn their visions into reality.² On closer inspection, however, Schumpeterian entrepreneurs may also possess 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 by a 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 VC's designated direction, complicating the goal alignment of entrepreneurs and funders. Hence, whether VC firms favor Schumpeterian-type entrepreneurs and which aspects of Schumpeterian entrepreneurship they value remain open questions.

Founders can actively manage their digital identity as it is presented toward potential funders and other stakeholders. Through the use of social media tools such as Twitter, founders can create a digital identity that matches the expectations of potential funders. However, to date, our understanding of how founders' digital identity influences their resource acquisition ability is limited. In particular, we lack knowledge

¹ 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).

² 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 February 12th, 2021).

about what types of digital identities of founders are helpful in resource acquisition. Combining a digital identity perspective (e.g., Fisch & Block, 2021; Fischer & Reuber, 2014; Smith et al., 2017) with Schumpeter's theory of entrepreneurship (Schumpeter, 1934), our study investigates the relationship between founders' social media identities and resource acquisition from VC firms. We hypothesize that some aspects of Schumpeterian entrepreneurship (e.g., entrepreneurial vision and optimism, uncertainty tolerance, rationality, and confidence) show a positive relationship, whereas others (e.g., self-centrism, achievement motive, power motive) have a negative relationship.

To assess our hypotheses, we draw on a computerized text analysis of entrepreneurs' language use on Twitter. Our quantitative analysis of Twitter messages from 3313 entrepreneurs provides a mixed picture. While some dimensions of a Schumpeterian entrepreneurial digital identity 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 effects (e.g., achievement motive). The negative effects can be explained by the particularities of the VC business model.

With these results, our study contributes to research on Schumpeterian entrepreneurship (e.g., Audretsch & Link, 2012; Block et al., 2017; Henrekson & Sanandaji, 2020; Malerba & McKelvey, 2020) and on the way in which it is perceived in an entrepreneurial finance context. We show that, in contrast to both popular wisdom and the self-image of VCs, Schumpeterian entrepreneurship is not unequivocally welcomed by VC firms. Our study provides nuanced insights and shows which dimensions of Schumpeterian entrepreneurship align with the expectations of VC firms and which do not. In this way, our study also contributes to the literature on the entrepreneur-related funding criteria of VC firms, which represents an established research stream in entrepreneurial finance (e.g., Block et al., 2014, 2019a, 2019b; Franke et al., 2008). By showing that VCs do not support Schumpeterian entrepreneurship without restrictions, our study also contributes to the literature on the financing of technology transfer (e.g., Audretsch et al., 2016). Our results imply that VC is not a silver bullet regarding the financing of technology transfer. For projects in which an entrepreneur shows a strong achievement motivation (e.g., in academic entrepreneurship, Hossinger et al., 2021), funding through governmental VC and/or agencies for (disruptive) innovation could be more suitable. Third, we contribute to research on entrepreneurs' use of social media, in particular Twitter (e.g., Fisch & Block, 2021; 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 the use of Twitter as a tool has the potential to go beyond information acquisition (Fischer & Reuber, 2011), product and venture marketing (Fischer & 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). In this vein, our study also follows recent research by Tumasjan et al. (2021), who extend this line of research to professional investors by assessing the role of Twitter sentiment in VC financing.

2 Schumpeterian entrepreneurship and entrepreneurial (digital) identity

We investigate how a Schumpeterian entrepreneurial digital identity relates to VC financing. As a background, we therefore briefly review research on Schumpeterian entrepreneurship (Sects. 2.1 to 2.3) as well as research on entrepreneurial digital identities (Sect. 2.4).

2.1 Schumpeterian entrepreneurship and economic development

In Schumpeter's (1934) theory of economic development, economic dynamism and growth are characterized by the 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).³ By exploiting these opportunities, entrepreneurs bring innovation into the market and destroy existing market equilibria (e.g., Audretsch & Link, 2012; Hébert & Link, 1989, 2006). 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.

Schumpeter's view of entrepreneurship is popular in the literature on innovative entrepreneurship and in debates on entrepreneurship policy (e.g., Audretsch & Link, 2012; Block et al., 2017; Estrin et al., 2020; Hébert & Link, 2006). 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 & Ruef, 2018; Henrekson & Johansson, 2010), many of which are backed by VC (e.g., Kortum & Lerner, 2000; Lerner & Nanda, 2020). To illustrate, less than 0.5% of all U.S. new ventures receive VC funding, while more than 50% of IPOs are VC-backed (e.g., Aldrich & Ruef, 2018; Kaplan & 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 used by policymakers. Instead, policymakers should focus on the type of entrepreneurship that is primarily represented by founders with Schumpeterian qualities. Even though many new and innovative Schumpeterian-type ventures fail, the majority of ventures with great societal and economic impact are in this category.

2.2 Schumpeterian entrepreneurs as agents for innovation and technology transfer

Schumpeter sees entrepreneurship as a temporary function responsible for bringing innovation into the market. In this regard, Schumpeter clearly distinguishes between invention

³ Schumpeter defines innovation in a broad sense that comprises, among others, product, process, and organizational innovation.

(i.e., the discovery of new knowledge) and innovation (i.e., the introduction of new applications into the market as a result of new knowledge). While innovation is associated with entrepreneurship, invention is not. Hence, according to Schumpeter, the inventor is a different person than the entrepreneur. The entrepreneur transfers the knowledge from the inventor into commercial applications or products and introduces them into the market, thereby overcoming social, legal, or political barriers. In this way, new knowledge and inventions are turned into innovation, and the entrepreneur acts as an agent for innovation and technology transfer. This knowledge transfer can occur either directly, moving from inventor to entrepreneur within the same firm or organization, or indirectly, involving knowledge spillovers that lead to knowledge spillover entrepreneurship (e.g., Acs et al., 2009; Block et al., 2013).

What types of skills and traits are needed to pursue this role and who possesses these skills? According to Schumpeter, individuals who possess the skills needed for this function are rare and of “a special type” (Schumpeter, 1934, p. 81). In this regard, 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). Finally, Schumpeter also makes a distinction between entrepreneurs and 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. Rather, it is simply a coincidence. In Sect. 3, we will describe in detail the skills and traits of Schumpeterian entrepreneurs.

2.3 Schumpeterian entrepreneurship and entrepreneurial finance

Schumpeterian entrepreneurs acting as agents for innovation and technology transfer need (financial) resources to fulfill their particular role. As described above, Schumpeterian entrepreneurs must be distinguished from shareholders or investors. It is their job as entrepreneurs to organize resources and funding for their innovative ventures. An important source of financing for Schumpeterian entrepreneurs in the science or research stage is governmental money, which may come in the form of governmental venture capital (e.g., Audretsch et al., 2016; Colombo et al., 2016; Masiak et al., 2020; Minola et al., 2017) or funding from innovation agencies such as the Defense Advanced Research Projects Agency (DARPA) (Bonvillian & Van Atta, 2011; Colatat, 2015; DARPA, 2008). Unlike private VCs, such governmental actors are willing to fund science and basic research, where the outcome is potentially highly disruptive but also very uncertain. For example, the DARPA, which was formed in response to the 1957 Sputnik shock, had a significant influence on the development of computer and information technology (Ruttan, 2006), materials science (Stickey, 1996), personal computers (Fong, 2001), and the internet (DARPA, 2008). For private VCs, investments in such early-stage ventures are often too uncertain and do not yield a satisfactory return for risk. Without government money, such early-stage, science- or research-based Schumpeterian ventures could stay unfunded.

However, private (nongovernmental) VCs, as providers of risk capital and private equity, are still an important source of innovation and entrepreneurial finance. They come in as investors at a later commercialization stage, helping entrepreneurs to grow their firms

from small start-ups to scale-ups and successful innovative firms. The relationship between VC and the development of start-ups and the impact of VC on start-up growth and innovation has been thoroughly analyzed in the literature. Prior research on the firm level (e.g., Bertoni et al., 2011; Colombo & Grilli, 2010; Cumming & Johan, 2016; Kelly & Kim, 2018; Samila & Sorenson, 2010) and the industry level (e.g., Kortum & Lerner, 2000) clearly shows that VC can act as an accelerator of start-up innovation and growth. The literature also shows that VCs not only select innovative ventures and provide badly needed innovation finance but also help start-ups accumulate knowledge and networks to professionalize their processes and establish commercially viable products and business models (e.g., Hellmann & Puri, 2002).

What is thus far unclear, however, is to what extent the goals and processes of VCs truly align with the identity and (personality) traits of Schumpeterian entrepreneurs, which is the focus of our article. However, before we formulate specific hypotheses about this relationship, we briefly review the literature on entrepreneurial digital identity, which is important to an understanding of our research context and design.

2.4 Entrepreneurial (digital) identity

Entrepreneurship provides individuals with the opportunity to pursue their own goals. These goals and their resulting behavior are informed by an entrepreneur's identity (Cardon et al., 2009; Fauchart & Gruber, 2011), which describes an entrepreneur's basic social motivation, basis of self-evaluation, and frame of reference (Fauchart & Gruber, 2011). We argue that a specific Schumpeterian entrepreneurial identity exists, and that having this identity is related to the likelihood of obtaining VC funding. We measure an entrepreneur's identity through his or her *digital* identity. The concept of "digital identity" refers to an individual's digital self-representation, which typically manifests on social media sites such as LinkedIn, Facebook, or Twitter (e.g., Fisch & Block, 2021). Exploring entrepreneurs' digital identities has gained momentum in recent entrepreneurship research because an entrepreneur's digital presence is increasingly important in the management of networks and business success (e.g., Fischer & Reuber, 2014; Nambisan, 2017; Smith et al., 2017).

Research on entrepreneurs' digital identities is often inspired by research in psychology and computer sciences, which pioneered the scientific use of digital footprints. This research shows that digital footprints deliver accurate information about individuals' actual identities and that online and offline identities often closely resemble each other (e.g., Gosling et al., 2011; Kosinski et al., 2013). In contrast, entrepreneurship research on digital identities is still nascent. Initial studies highlight the importance of using digital footprints and studying digital identities (e.g., Nambisan, 2017; Smith et al., 2017) and demonstrate that research on digital identities can deliver novel and timely insights into entrepreneurship (e.g., Obschonka et al., 2017; Smith and Smith, 2019).

3 Hypotheses about schumpeterian entrepreneurial digital identity and VC funding

We now develop hypotheses regarding how a Schumpeterian entrepreneurial digital identity influences a venture's ability to acquire funding 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 & Puri, 2002; Parhankangas & Landström, 2006) and argue that founders who have a digital identity that matches the expectations of VC firms' will find it easier to acquire funding from them. Where possible, we cite the original statements made by Joseph A. Schumpeter. We divide our hypotheses among the three main traits of the Schumpeterian entrepreneur: the characteristics of the entrepreneur as a change agent, the entrepreneur's leadership behavior, and the entrepreneur's motivation (e.g., Cantner et al., 2017; Ripsas, 1998).

3.1 Founder's digital identity displaying the characteristics of a schumpeterian change agent

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

3.1.1 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 "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."⁴ This statement illustrates that VC firms often aim to find such visionary entrepreneurs and partner with them. The business models of firms are centered around these 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 manner in which VCs pursue investments (e.g., Block et al., 2019a, 2019b; Cochrane, 2005). Thus, we posit the following:

H1a An entrepreneurial digital identity that displays a strong degree of entrepreneurial vision is positively associated with VC funding.

⁴ See <https://www.sequoiacap.com> (accessed December 19th, 2020).

3.1.2 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 regarding a venture's future. Throughout the entrepreneurial journey, entrepreneurs need to overcome many obstacles and uncertainties (e.g., Ayala & 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 that need to be overcome is even greater for innovative entrepreneurship than for less innovative and nondisruptive entrepreneurship (e.g., Baum & 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 experience with past investments that successful innovation is rare and that many entrepreneurs fail to achieve entrepreneurial success (Tian & 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 An entrepreneurial digital identity that displays a strong degree of entrepreneurial optimism is positively associated with VC funding.

3.1.3 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 through their experience, intuition, and thoughtful planning. Once this uncertainty goes away, the importance of entrepreneurs diminishes, so 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; Kim and Kelly, 2018; Mason & Stark, 2004). Hence, such firms also seek entrepreneurs who are accustomed to such high levels of uncertainty and can make entrepreneurial decisions in such contexts. 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 An entrepreneurial digital identity that displays a strong degree of uncertainty tolerance is positively associated with VC funding.

3.2 Founders' digital identity displaying schumpeterian leadership behaviors

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

3.2.1 Rationality

In contrast to conventional wisdom, Schumpeter does not see leadership as a skill or trait that characterizes how leaders inspire followers to achieve common goals. Instead, Schumpeter describes leadership as behavior that captures the manner in which 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 nor 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. To this end, the entrepreneur has to convince their banker, who Schumpeter refers to as the only person that the entrepreneur "has to convince or to impress" (Schumpeter, 1934, p. 89).

Schumpeter also stresses the importance of rationality in the way that 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 necessary to the development and pursuit of a plan that fulfills the entrepreneurial function. Hence, rational planning and conduct are more important for entrepreneurs than they are 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 the leading VC firm Sequoia Capital suggests, contrary to 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").⁵

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

⁵ See <https://www.sequoiacap.com/article/elements-of-enduring-companies> (accessed July 13th, 2021).

H2a An entrepreneurial digital identity that displays a strong degree of rationality is positively associated with VC funding.

3.2.2 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 in a setting of 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 have this confidence and believe that they possess these skills (Kirzner, 1999). Prior entrepreneurship research thoroughly investigates the role of founder confidence. Empirical studies show that founders generally have more confidence in their skills than other individuals (e.g., Koellinger et al., 2007). This greater level of confidence can explain the decision to start a venture in situations of high risk and uncertainty with low prospects of success (Cassar, 2010). However, this aspect of founder personality is controversial. When high confidence turns into overconfidence, venture performance may suffer (e.g., Invernizzi et al., 2017).

However, in what way do VC firms value founder confidence? We argue that for these firms, the positive aspects of founder confidence outweigh the negative ones. Regarding the positive aspects of founder confidence, 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 of founder confidence, however, do not matter as much to these firms, as they are prepared for them in the following ways. First, most VC firms have a diversified portfolio of investments (Norton & 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 the investments made do not perform according to their expectations, they either stop funding them or replace the founders (Ewens & Marx, 2018). This line of argument brings us to the following hypothesis:

H2b An entrepreneurial digital identity that displays a strong degree of confidence is positively associated with VC funding.

3.2.3 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, affecting 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 dynamics of the VC industry for at least two reasons. First, many ventures, including innovative and successful ventures, start as team ventures (Patzelt et al., 2020). Hence, the reality does not fit Schumpeter's description of the entrepreneur as a lone ranger. Second, VC firms aim to cooperate with entrepreneurs.

Such firms not only invest in ventures as financial investors but also aim to contribute to the development of their portfolio startups through the provisioning of management support (e.g., Schefczyk & Gerpott, 2001; Stuart & Sorenson, 2007) and network access (Ter Wal et al., 2016). Prior research shows that this active approach of investors does indeed help ventures to grow, professionalize, and commercialize their innovation (Hellmann & Puri, 2002; Samila & Sorenson, 2010). Such cooperation between investors and entrepreneurs becomes more difficult, if not impossible, when the entrepreneur is self-centered and thus 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 An entrepreneurial digital identity that displays a strong degree of self-centrism is negatively associated with VC funding.

3.3 Founder's digital identity displaying schumpeterian motivations

Schumpeterian entrepreneurs have distinct motives. Entrepreneurs are not primarily motivated by 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 non-financial motivations, Schumpeter refers to the power motive and the achievement motive (Schumpeter, 1934, p. 93). We will now develop hypotheses involving these two motives.

3.3.1 Power motive

Following Schumpeter, entrepreneurship is not a profession, nor do entrepreneurs form their own social class. Entrepreneurship is a function, and thus one can only be an entrepreneur when one “carries out new combinations” (Schumpeter, 1934, p. 78). By doing so, however, entrepreneurs can experience social benefits and success, 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 argues 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 in which they have invested, particularly when things do not go well (e.g., Bernstein et al., 2019). They robustly negotiate with the entrepreneur regarding the venture's ownership and control rights (e.g., Hellmann, 1998; Kaplan & Strömberg, 2003) and reserve the right to replace the entrepreneur when the success of their investment is at stake (Ewens & 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 who display a strong degree of power motivation. The following hypothesis should apply:

H3a An entrepreneurial digital identity that displays a strong degree of power motivation is negatively associated with VC funding.

3.3.2 Achievement motive

Prior research shows that entrepreneurs are characterized by strong achievement motivation, 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 previously failed to accomplish. 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 that use fossil fuels; with SpaceX, he wants to show that rockets can be recycled, and his ultimate dream is to fly to Mars and live there. 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 aligns 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 that of the market (Hall & Woodward, 2010). If the founder, however, has a strong achievement motivation, such financial incentives may not have strong effects. Such founders are intrinsically motivated and act as stewards. The founder does not primarily work toward the 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 nonfounders working in new ventures. From the above arguments, we posit the following:

H3b An entrepreneurial digital identity that displays a strong achievement motivation is negatively associated with VC funding.

4 Data and variables

4.1 Data

4.1.1 Founder and financing data

We use Crunchbase (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 about 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. Due to its recency and broad coverage, Crunchbase is

frequently used in recent management and entrepreneurship research (e.g., Butticè et al., 2021; Fisch & Block, 2021; Ratzinger et al., 2018).

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

This approach produces an initial sample of 13,834 founders who founded 15,397 ventures. Furthermore, we exclude founders whose Twitter accounts are 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 who founded 695 ventures are excluded.

We extend our founder-venture data with individual-level data from Twitter, which we use to operationalize our independent variables. Using Twitter's API from November 2019 to December 2019, we retrieve 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, in those cases where a venture received a second round of funding, before the second funding round. This approach leads to the exclusion of 6009 founders with 6492 ventures, resulting in a sample of 7171 founders and 8210 ventures.

To keep the sample as homogenous as possible, we only consider individuals and ventures located in the US.⁶ To obtain reliable results from the text analysis software Linguistic Inquiry and Word Count (LIWC), we exclude all cases in which the founder tweeted less than 50 words in the examined period (i.e., all tweets that were posted from the first tweet to the date of the first funding or, in case that no funding occurred, to the last recorded tweet), resulting in a final sample of 3586 ventures founded by 3313 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 3704 total observations.⁷

4.1.2 Data on founders' digital identities (independent variables)

Our data on founders' digital identities are obtained from the social media platform Twitter via a computerized text analysis of each founder's tweets. Twitter is a social media platform that allows users to send short messages, called tweets, to a broad public audience (e.g., Fischer & Reuber, 2011). In recent years, entrepreneurs have increasingly used social media platforms to interact with their stakeholders (e.g., Fischer & Reuber, 2011; Smith et al., 2017).

To conduct the computerized text analysis, we use LIWC with its most recent dictionaries (LIWC2015). LIWC enables researchers to count and categorize words in texts in a meaningful way. LIWC is the primary tool for computerized language analysis. Numerous studies in psychology use LIWC (e.g., Boyd et al., 2019; Tausczik & Pennebaker, 2010). Inspired by research in psychology, management research uses LIWC to document the

⁶ This approach is also used because our language analysis software is only able to process the English language.

⁷ Note that we uploaded all data and analyses presented in this manuscript to the OSF (https://osf.io/2mcpd/?view_only=e803fd68b72f4a4184ac162cc7b9ff37).

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 et al. (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 according to whether they actually undertake these practices or if they only state their commitments in their reports.

Technically, LIWC (version 1.6.0) calculates 93 variables, which are separated into linguistic and psychological variables. The linguistic variables allow for general descriptions of the analyzed text (e.g., words per sentence), standard linguistic dimensions (e.g., personal pronouns and adverbs), and 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 6400 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, then it means that 5.4% of the words in the text align with the category "positive emotion." The category "positive emotion" includes words such as "awesome," "cheer," and "nice." In contrast to 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., 2015). We conduct z-transformations for the LIWC variables to simplify the interpretation of the regression results.

We apply LIWC to text retrieved from Twitter. To obtain meaningful results from LIWC, we cleaned the Twitter data by excluding links, hashtags, and nametags (Fisch & Block, 2021). We analyze each entrepreneur's tweets in LIWC, yielding an LIWC score for all tweets created between the first and second rounds of funding, or if a venture did not receive a second round of funding, then between the first round of funding and the final tweet. To avoid potential bias, we do not consider Tweets created before the first funding round or after the second funding round.

4.2 Variables

4.2.1 Dependent variable

Our dependent variable captures whether a venture received a second round of VC funding. The ability to attract follow-on financing is a variable that is frequently used in prior research to capture venture and/or funding 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 the date on which the first and (when applicable) second rounds of funding were announced.

While all ventures in 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 pass a certain quality check (e.g., an investor's due diligence process) and are thus more comparable (e.g., Fried & Hisrich, 1994; Gompers et al., 2020).

4.2.2 Independent variables: linguistic and psychological variables via LIWC

We measure founders' digital identities by applying LIWC to a founder's tweets. We use the following LIWC variables to capture our hypothesized effects.

4.2.2.1 Entrepreneurial vision Previous research shows that the 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 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").

4.2.2.2 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 founders' optimism using the 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). This variable comprises 620 words linked to positive emotions, such as "love," "nice," and "optimism."

4.2.2.3 Uncertainty Tolerance Speculative and uncertain language expresses risk (Yang et al., 2012). The LIWC variable "risk" refers to dangers and situations that individuals try to avoid and includes 103 words such as "danger," "doubt," and "fail" (Pennebaker et al., 2015). To measure the degree to which 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 uses less risk-related language and therefore shows a higher level of uncertainty tolerance.

4.2.2.4 Rationality We use the LIWC summary variable "analytic" to measure the degree to which a founder exhibits rationality (H2a). This 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., 2015). 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.

4.2.2.5 Confidence We approximate a founder's degree of confidence using the LIWC summary variable "clout" (H2b). Clout seeks to capture confidence in an entrepreneur's language. This variable is based on a meta-analysis of the differences in language styles among people of different (social) ranks (Kacewicz et al., 2014).

4.2.2.6 Self-centrism The frequent use of first-person singular words is linked to self-focus and self-centrism (Pennebaker et al., 2003). Hence, we use the LIWC variable "I" to meas-

ure 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.”

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

4.2.2.8 Achievement motive Similarly, the variable “achievement” measures an individual’s drive for achievement (Pennebaker et al., 2015). We approximate founders’ achievement motives using the LIWC variable “achievement” (H3b), which includes 213 words that refer to achievements or success, such as “success,” “win,” and “better.”

4.2.3 Control variables

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

4.2.3.1 Authentic We incorporate the founder’s authenticity into our models by using the LIWC summary variable “authenticity.” This 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 to determine the authenticity of the language, in which one group of participants had to lie intentionally while the other group had to tell the truth.

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

4.2.3.3 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 dummy variable for gender that takes a value of 1 if the founder is male and 0 if the founder is female. Information on gender is provided by Crunchbase.

4.2.3.4 Patent applications (log.) Patents can serve as signals of quality and can reduce asymmetric information in the VC context (e.g., Conti et al., 2013; Kelly & Kim, 2018). We include the number of patents that a venture has filed prior to its second funding round. If there is no second round of funding, then we include the number of patents prior to the last tweet in our sample. We collect patent data from the API of the United States Patent and Trademark Office (USPTO). The downloaded patent data are then 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) are counted. The number of patents is logarithmized.

4.2.3.5 Funding amount (log.) We use the funding amount of the first funding round to control for start-ups' initial quality (Shane & Stuart, 2002; Ter Wal et al., 2016). The funding amount ranges from \$1,000 to \$251,000,000, so we logarithmize the variable.

4.2.3.6 Number of investors (log.) Investors make the decision to invest along with other VCs for risk sharing, to leverage 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. Due to high skewness, we logarithmize the variable.

4.2.3.7 Investor reputation Prestigious VC investors may serve as a signal of the quality of a venture (Pollock et al., 2010). Crunchbase offers a list of all investors who participated in a particular deal. To identify which of these can be classified as top-tier investors, we used the "Venture Capital Journal Top 50."⁸ This ranking includes the largest VC firms and is based on the direct investment raised by capital firms from January 1st, 2015, to June 30th, 2020. The variable "Tier 1 Investor" is coded as a dummy variable that takes 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.

4.2.3.8 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 & Stern, 2015). The most renowned venture capital clusters are 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 each take a value of "1" if a venture is headquartered in its respective region and "0" otherwise.

4.2.3.9 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 & Preisendörfer, 1998; Ughetto, 2016).

4.2.3.10 Number of industries Being active in multiple industries (e.g., through diversification) has several implications for ventures. For example, such diversification can both increase coordination costs and create growth opportunities (Rawley, 2010; Stern & 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.

⁸ "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/>.

Table 1 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	Measures the percentage of future-focused words within the analyzed Tweets, such as “may,” “will,” and “soon.” May range from 0 to 100	LJWC (Twitter)
Optimism	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	LJWC (Twitter)
Uncertainty tolerance	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	LJWC (Twitter)
Rationality	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	LJWC (Twitter)
Confidence	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	LJWC (Twitter)
Self-centrism	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	LJWC (Twitter)
Power motive	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	LJWC (Twitter)
Achievement motive	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	LJWC (Twitter)
<i>Control variables</i>		
Authentic	Measures the authenticity of the analyzed Tweets based on a study by Newman et al., 2003. May range from 0 to 100	LJWC (Twitter)
Number of words on Twitter (log.)	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	LJWC (Twitter)
Female	Dummy variable that captures whether the founder is male (= 1) or female (= 0)	Crunchbase
Patent applications (log.)	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

Table 1 (continued)

Variable	Definition	Database
Funding amount (log.)	Captures the amount of money raised in the first funding round in US dollars. The variable was logarithmized	Crunchbase
Number of investors (log.)	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	Captures the number of founders	Crunchbase
Number of industries	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

Table 2 Descriptive statistics of variables

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	3704	Crunchbase
<i>Independent variables: LIWC variables</i>							
H1a: Entrepreneurial vision	1.18	0.65	0.00	1.16	6.90	3704	LIWC (Twitter)
H1b: Optimism	5.93	2.41	0.00	5.52	23.75	3704	LIWC (Twitter)
H1c: Uncertainty tolerance	99.51	0.49	94.00	99.58	100	3704	LIWC (Twitter)
H2a: Rationality	81.12	14.09	1.00	84.43	99.00	3704	LIWC (Twitter)
H2b: Confidence	72.46	13.50	1.13	73.19	99.00	3704	LIWC (Twitter)
H2c: Self-centrism	2.42	1.59	0.00	2.24	17.21	3704	LIWC (Twitter)
H3a: Power motive	2.60	1.11	0.00	2.49	10.88	3704	LIWC (Twitter)
H3b: Achievement motive	2.37	1.14	0.00	2.20	14.35	3704	LIWC (Twitter)
<i>Control variables</i>							
Authentic	40.48	18.29	1.00	39.79	99.00	3704	LIWC (Twitter)
Number of words on Twitter (log.)	7.37	1.75	3.91	7.36	11.28	3704	LIWC (Twitter)
Female	0.89	0.32	0	1	1	3704	Crunchbase
Patent applications (log.)	0.20	0.54	0	0	4.48	3586	USPTO
Funding amount (log.)	13.89	1.82	6.91	14.22	19.34	3586	Crunchbase
Investor reputation	0.16	0.36	0	0	1	3586	Crunchbase/VCJ
Number of investors (log.)	0.92	0.85	0	0.69	4.54	3586	Crunchbase
HQ: San Francisco	0.39	0.49	0	0	1	3586	Crunchbase
HQ: Boston	0.06	0.25	0	0	1	3586	Crunchbase
HQ: New York	0.15	0.36	0	0	1	3586	Crunchbase
HQ: Other region	0.40	0.49	0	0	1	3586	Crunchbase
Number of founders	2.12	1.03	1	2	9	3586	Crunchbase
Number of industries	3.77	1.80	1	4	11	3586	Crunchbase

This table presents means, standard deviations, minimum values, and maximum values for the variables used in our analyses. A total of 3713 observations were obtained from 3319 founders who have founded 3595 ventures

4.2.3.11 Industry founding year and year of first funding dummies Depending on a venture's industry, the amount of capital that it requires varies. For example, ventures active in technology-driven industries require more venture capital. We aggregated Crunchbase's 47 groups into 26 industry groups. We created dummy variables for all of these industries, which each take a value of "1" if the venture is active in its 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 & 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 1.

5 Results

5.1 Descriptive statistics

Table 2 presents descriptive statistics for our sample. Approximately 45% of the ventures in our sample (1610 of 3586) received a second round of funding between January 2006 and December 2019. The average elapsed time between the first and second rounds of funding is 532 days.

The average number of words used in all observations is 5926 ($\log.=7.37$), 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 1000 US dollars to 251,000,000 US dollars ($\log.=19.34$). Reputable investors (i.e., investors listed in the VCJ's Top 50) participated in approximately 16% of the first-round investments, while the total number of investors participating in the first round has a mean of 3.72 investors ($\log.=0.92$) and ranges from a minimum of 1 investor ($\log.=0$) to a maximum of 94 investors ($\log.=4.54$). The ventures in our sample were founded by 2.12 founders on average, ranging from 1 founder to a maximum of 9 founders. From a possible pool of 47 distinct 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.

5.2 Main results: logistic regression analysis

We use logistic regression analysis to test our hypotheses. Table 3 shows the results of these regressions. We use the dummy variable “second round of funding” as the dependent variable to capture whether a second funding round occurred. Because the summary LIWC variables and the other LICW variables used are not equally scaled, we transform 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 cluster the standard errors to the founder level in all models.

Model 1 shows the findings without the independent variables, including only control variables. We find that the variables “authentic,” “funding amount ($\log.$),” “investor reputation,” “number of investors ($\log.$),” and “number of founders ($\log.$)” have a significantly positive effect on the probability of acquiring 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

Table 3 Logistic regressions

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
		<i>Logit (SE)</i>	<i>Logit (SE)</i>	<i>Logit (SE)</i>	<i>Logit (SE)</i>
<i>H1: Change agent</i>					
H1a: Entrepr. vision		0.101 (0.043)**			0.109 (0.043)**
H1b: Optimism		0.131 (0.042)***			0.149 (0.046)***
H1c: Unc. tolerance		0.020 (0.041)			0.004 (0.043)
<i>H2: Leadership behavior</i>					
H2a: Rationality			0.049 (0.056)		0.092 (0.058)
H2b: Confidence			0.122 (0.046)***		0.070 (0.050)
H2c: Self-centrism			-0.075 (0.062)		-0.102 (0.064)
<i>H3: Motivation</i>					
H3a: Power motive				0.022 (0.045)	0.007 (0.046)
H3b: Achiev. motive				-0.075 (0.046)	-0.155 (0.049)***
<i>Control variables</i>					
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)

Table 3 (continued)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
		<i>Logit (SE)</i>	<i>Logit (SE)</i>	<i>Logit (SE)</i>	<i>Logit (SE)</i>
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 dummies	Included	Included	Included	Included	Included
Observations (clusters)	3704 (3313)	3704 (3313)	3704 (3313)	3704 (3313)	3704 (3313)
Pseudo-R ²	0.225	0.229	0.229	0.226	0.234

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

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)

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 and nonsignificant. 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 that the expression of a higher degree of rationality would positively influence the chances of a second round of funding, which is not supported by our model. Regarding the degree of confidence displayed, 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 displaying self-centered behavior reduces the probability of acquiring further funding (H2c). While the coefficient of “self-centrism” is negative, the effect is nonsignificant. 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 stemming from entrepreneur’s motivation, our full model 5 shows a strong significant negative effect of the achievement motive.

Model 5 includes all independent variables jointly. While the effects for “entrepreneurial vision” and “optimism” hold, those for “confidence” are no longer supported. Simultaneously, the effect size of the “achievement motive” increases and becomes significant at the 1% level.

5.3 Robustness checks

5.3.1 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 provides the ability to address both censoring and truncation issues (Ter Wal et al., 2016). As with our models in Table 3, we transform the LIWC variables into z scores to facilitate the interpretation of the results.

Table 4 shows the results of our survival time analyses, in which 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 4 shows that displays of “entrepreneurial vision” (H1a) and “optimism” (H1b) significantly reduce the time to a second funding round. As with the logit model, we find no significant effect for the display of “uncertainty tolerance” (H1c).

In line with logit Model 3 (Table 3), the survival analysis Model 3 shows that “confidence” (H2b) significantly decreases the time to a second funding round. Furthermore,

Model 3 in Table 4 shows that the display of “rationality” significantly decreases the time to a second round of funding.

In contrast to our fourth logit model (Table 3), we do find support for H3b in Model 4 of our survival analyses, which shows that the display of an “achievement motive” may significantly increase the time to a second round of funding.

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 effect inverts in the full model, becoming nonsignificant.

5.3.2 Squared terms

In an additional robustness check, we examine whether our main relationships hold while also considering the effects in a squared format. This post hoc analysis could also uncover interesting relationships that follow an inverted u shape. The results are displayed in Model 2 of Table 5. The main effects of “entrepreneurial vision” (positive), “optimism” (positive), and “achievement motive” (negative) remain robust. Interestingly, the results show a negative effect for “uncertainty tolerance” that becomes less negative with high levels of uncertainty tolerance. In contrast to H1c, this suggests that uncertainty tolerance is initially viewed negatively by VCs but that higher levels of uncertainty tolerance are viewed less negatively.

5.3.3 Interaction effects

In a final robustness check, we consider whether certain contextual factors moderate our results. The results are displayed in Table 6. We focus on the three industrial categories that are the most represented in our sample: software, hardware, and services. We inject each industry with the variables “female,” “patent applications (log.),” and the location dummies. The models underline the robustness of our main analysis, as the effects of “entrepreneurial vision” (positive), “optimism” (positive), and “achievement motive” (negative) remain unchanged.

Additionally, in Model 3 (“industry: services”), several interesting interactions emerge. The results show that female entrepreneurs and ventures with more patent applications in the service industry are less likely to receive a second round of funding, while entrepreneurs located in San Francisco and Boston are more likely to receive a second round of funding. In Model 3, the effect of “rationality” is positive and (weakly) significant, lending (weak) support for H2a.

6 Discussion and conclusion

6.1 Main results and interpretation

We adopt a digital identity perspective to examine the effect of a Schumpeterian entrepreneurial digital identity 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

Table 4 Robustness check: piecewise exponential survival analyses

Variables	Model 1 Coefficient (SE)	Model 2 Coefficient (SE)	Model 3 Coefficient (SE)	Model 4 Coefficient (SE)	Model 5 Coefficient (SE)
<i>H1: Change agent</i>					
H1a: Entrepr. vision		0.049 (0.022)**			-0.056 (0.023)**
H1b: Optimism		-0.112 (0.025)***			-0.126 (0.027)***
H1c: Unc. tolerance		-0.023 (0.024)			-0.009 (0.023)
<i>H2: Leadership behavior</i>					
H2a: Rationality			-0.065 (0.035)*		-0.100 (0.036)***
H2b: Confidence			-0.085 (0.030)***		-0.036 (0.032)
H2c: Self-centrism			0.041 (0.037)		0.07 (0.038)*
H3: Motivation					
H3a: Power motive				-0.001 (0.024)	0.011 (0.026)
H3b: Achiev. motive				0.054 (0.026)**	0.116 (0.029)***
<i>Control variables</i>					
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 dummies	Included	Included	Included	Included	Included

Table 4 (continued)

Variables	Model 1 Coefficient (SE)	Model 2 Coefficient (SE)	Model 3 Coefficient (SE)	Model 4 Coefficient (SE)	Model 5 Coefficient (SE)
Observations (clusters)	9257 (3313)	9257 (3313)	9257 (3313)	9257 (3313)	9257 (3313)

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

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%

Schumpeterian entrepreneurship increase the chances of receiving funding from VC firms. However, other commonly assumed 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 concerning 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 with those of the 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 who are 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 nonfinding 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 & Kuckertz, 2010; Petty & Gruber, 2011). Our study is not able to capture these heterogeneities.

6.2 Practical implications for entrepreneurs and policy makers

The results of our study have practical implications for entrepreneurs and policy makers. It seems that the business model and goals of VC are not in all aspects and without reservations in line with those of Schumpeterian entrepreneurship. In particular, entrepreneurs with a strong achievement orientation should carefully evaluate their prospects for obtaining VC funding and consider alternatives (if they exist), such as public funding through subsidies, innovation agencies for (disruptive) innovation, and governmental VC. This argument holds true in particular for academic entrepreneurs who often do not consider financial rewards as their main entrepreneurial motivation but are rather intrinsically motivated to engage in technology transfer (Hossinger et al., 2021). For policy makers, the results of our study imply that public funding of particular forms of Schumpeterian entrepreneurship may be needed. Our study serves as a justification for governmental VC and agencies for (disruptive) innovation such as the Defense Advanced Research Projects Agency (DARPA) in the US (e.g., Bonvillian & Van Atta, 2011; Colatat, 2015; DARPA, 2008) and the newly created Bundesagentur für Sprunginnovationen (SPRIN-D) in Germany. Governmental money is very important, particularly for Schumpeterian entrepreneurs who are still in their (basic) research phase and face high uncertainty about the research outcome.

6.3 Limitations and avenues for future research

Our study has some limitations. For example, Schumpeter (1934) outlines further dimensions that we cannot capture with our research design. These dimensions include, among others, creativity, which is difficult to measure with computerized text analysis. Future research could employ different research designs (e.g., surveys, conjoint experiments) to capture these dimensions and assess their impact on VC investment decisions. Relatedly, while we are limited to the dimensions included in LIWC, future research could employ

Table 5 Robustness check: squared terms

Variables	Model 1	Model 2
	<i>Logit (SE)</i>	<i>Logit (SE)</i>
<i>H1: Change agent</i>		
H1a: Entrepr. vision	0.109 (0.043)**	0.116 (0.051)**
Entrepr. vision ²	–	–0.000 (0.015)
H1b: Optimism	0.149 (0.046)***	0.129 (0.057)**
Optimism ²	–	0.005 (0.020)
H1c: Unc. tolerance	0.004 (0.043)	–0.122 (0.064)*
Unc. Tolerance ²	–	0.037 (0.015)**
<i>H2: Leadership behavior</i>		
H2a: Rationality	0.092 (0.058)	0.094 (0.072)
Rationality ²	–	0.010 (0.034)
H2b: Confidence	0.070 (0.050)	0.065 (0.053)
Confidence ²	–	–0.012 (0.029)
H2c: Self-centrism	–0.102 (0.064)	–0.077 (0.073)
Self-centrism ²	–	–0.017 (0.027)
<i>H3: Motivation</i>		
H3a: Power motive	0.007 (0.046)	–0.007 (0.052)
Power motive ²	–	0.015 (0.019)
H3b: Achiev. motive	–0.155 (0.049)***	–0.150 (0.058)***
Achiev. motive ²	–	0.001 (0.019)
<i>Control variables</i>		
Authentic	0.187 (0.050)***	0.186 (0.050)***
Number of words on Twitter (log.)	–0.477 (0.027)***	–0.458 (0.030)***
Female	0.084 (0.132)	0.082 (0.132)
Patent applications (log.)	–0.13 (0.078)*	–0.131 (0.078)*
Funding amount (log.)	0.181 (0.027)***	0.183 (0.027)***
Investor reputation	0.241 (0.117)**	0.232 (0.117)**
Number of investors (log.)	0.269 (0.053)***	0.271 (0.054)***
HQ: San Francisco	–0.086 (0.093)	–0.079 (0.093)
HQ: Boston	0.109 (0.167)	0.119 (0.167)
HQ: New York	–0.117 (0.120)	–0.113 (0.121)
Number of founders	0.184 (0.039)***	0.184 (0.039)***
Number of industries	–0.004 (0.051)	–0.006 (0.051)
Industry dummies	Included	Included
Founding year dummies	Included	Included
First funding year dummies	Included	Included
Observations (clusters)	3704 (3313)	3704 (3313)
Pseudo-R ²	0.234	0.236

This table shows the results of our main analysis (Model 1) and the results of a robustness check that also considers the squared terms of our independent variables (Model 2). We perform a logistic regression with the dependent variable *second round of funding* (dummy)

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)

Table 6 Robustness check: interactions

Variables	Model 1	Model 2
	<i>Logit SE</i>	
<i>H1: Change agent</i>		
H1a: Entrepr. vision	0.109 (0.043)**	0.107 (0.044)**
H1b: Optimism	0.147 (0.046)***	0.151 (0.046)***
H1c: Unc. tolerance	-0.004 (0.043)	-0.005 (0.043)
<i>H2: Leadership behavior</i>		
H2a: Rationality	0.091 (0.058)	0.090 (0.058)
H2b: Confidence	0.070 (0.050)	0.070 (0.050)
H2c: Self-centrism	-0.102 (0.064)	-0.103 (0.064)
<i>H3: Motivation</i>		
H3a: Power motive	0.008 (0.046)	0.007 (0.046)
H3b: Achiev. motive	-0.156 (0.049)***	-0.155 (0.049)***
<i>Control variables</i>		
Authentic	0.186 (0.050)***	0.185 (0.050)***
Number of words on Twitter (log.)	-0.477 (0.027)***	-0.476 (0.027)***
Female	0.044 (0.189)	0.196 (0.157)
Patent applications (log.)	-0.242 (0.134)*	-0.204 (0.102)**
Funding amount (log.)	0.183 (0.027)***	0.179 (0.027)***
Investor reputation	0.242 (0.117)**	0.249 (0.117)**
Number of investors (log.)	0.266 (0.054)***	0.267 (0.054)***
HQ: San Francisco	-0.040 (0.158)	-0.041 (0.114)
HQ: Boston	0.023 (0.270)	0.136 (0.207)
HQ: New York	-0.117 (0.188)	0.024 (0.139)
Number of founders	0.186 (0.039)***	0.183 (0.039)***
Number of industries	-0.003 (0.051)	-0.001 (0.052)
Industry: Software	0.284 (0.285)	0.371 (0.120)***
		0.104 (0.044)**
		0.155 (0.046)***
		-0.007 (0.043)
		0.097 (0.059)*
		0.069 (0.050)
		-0.100 (0.064)
		0.006 (0.046)
		-0.153 (0.049)***
		0.190 (0.050)***
		-0.478 (0.027)***
		0.333 (0.162)**
		-0.044 (0.101)
		0.184 (0.028)***
		0.245 (0.117)**
		0.267 (0.054)***
		-0.203 (0.117)*
		-0.154 (0.204)
		-0.088 (0.151)
		0.192 (0.039)***
		0.000 (0.052)
		0.368 (0.120)***

Table 6 (continued)

Variables	Model 1 <i>Logit SE</i>	Model 2
Industry: Hardware	0.092 (0.109)	0.514 (0.304)*
Industry: Services	0.108 (0.100)	0.106 (0.100)
<i>Interactions</i>	Industry: Software	Industry: Hardware
Industry × Female	0.083 (0.261)	−0.359 (0.286)
Industry × Patent applications (log.)	0.168 (0.159)	0.161 (0.150)
Industry × HQ: San Francisco	−0.066 (0.192)	−0.141 (0.191)
Industry × HQ: Boston	0.143 (0.344)	−0.091 (0.357)
Industry × HQ: New York	−0.000 (0.239)	−0.517 (0.274)*
<i>Dummies</i>		
Industry dummies	Included	Included
Founding year dummies	Included	Included
First funding year dummies	Included	included
Observations (clusters)	3704 (3313)	3704 (3313)
Pseudo-R ²	0.234	0.235

This table shows the results of a robustness check that interacts selected contextual factors. We perform a logistic regression with the dependent variable *second round of funding* (dummy)

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)

different software tools that enable the measurement of further identity components in a similar way. For example, a stream of prior entrepreneurship research uses digital footprints to infer the Big Five personality traits based on a method that combines artificial intelligence and language analysis (e.g., Block et al., 2019a, 2019b; Obschonka et al., 2017). The Big Five provide a snapshot of an individual's personality and comprise the dimensions of openness, extraversion, conscientiousness, agreeableness, and neuroticism (McCrae & Costa, 2008). It would be interesting to assess whether and how VC investors consider the (digital) personality of entrepreneurs when making investment decisions. Using the Big Five personality components as variables would also allow for a different measurement of Schumpeterian entrepreneurs. For example, Schumpeterian entrepreneurs could have a personality that is characterized by high openness and low agreeableness (e.g., Obschonka & Fisch, 2018). Future research may find it interesting to further explore the intersection of entrepreneurial personalities and VC funding.

Second, we cannot rule out the possibility that entrepreneurs' Twitter accounts are used by more than one person (e.g., including people other than the entrepreneur) or are even professionally managed. Thus, it is particularly challenging to distinguish between what founders have themselves posted online and what someone else has posted in their name. In a similar vein, we cannot rule out that entrepreneurs (or the individuals who manage their Twitter accounts) engage in impression management to craft an online identity that they think will be successful when interacting with stakeholders, such as VCs. In this case, the entrepreneur's digital identity and their actual "offline" identity would differ. Because we are unable to observe the entrepreneur's actual identity, our study explicitly focuses on the effect of entrepreneurs' *digital* identities on VCs' investment decisions. Even though research in psychology indicates that digital footprints can reveal accurate information about individuals' actual personalities (e.g., Gosling et al., 2011; Kosinski et al., 2013), the fact that digital identities may not reflect the entrepreneurs' actual identity is a common limitation in prior entrepreneurship research on digital footprints, for example, those derived from Twitter (e.g., Fisch & Block, 2021; Obschonka & Fisch, 2018). Future research could advance the current research by investigating whether and to what extent entrepreneurs' digital identities and their offline identities overlap. Such an approach would require data on entrepreneurs' actual identities (e.g., collected via a survey), and the results would enable further insights into the validity of our results.

A third limitation refers to our reliance on Twitter to capture entrepreneurs' digital identities. While Twitter is the most frequently used social media site in prior entrepreneurship research and plays a critical role for entrepreneurs in today's business world (e.g., Reuber and Fischer, 2014; Smit and Smith, 2021), entrepreneurs likely use a multitude of communication channels to engage with potential investors and other stakeholders (e.g., Philippi et al., 2021; Scuotto et al., 2017). Additionally, communication activities on Twitter might differ from that of other social media sites because the microblogging service favors brief communications messages. Thus, future research could revisit the reliability of our findings by constructing digital identities based on information gathered from more personal social media sites such as Facebook (e.g., Kosinski et al., 2013), more professional networks such as LinkedIn (Piva & Rossi-Lamastra, 2018), or other Web 2.0 platforms such as Reddit (Corbet et al., 2022). It would be interesting to see whether and how the effects we identify change based on the platform used. Relatedly, future research could compare different social media sites to assess whether VC investors pay more attention to information posted on certain platforms than others (e.g., Twitter vs. LinkedIn).

Our study shows that Schumpeterian founder identities have both positive and negative effects on resource acquisition from VC firms. Future research could analyze the effects

of Schumpeterian entrepreneurial digital identities on other types of funders or more fully explore the heterogeneity within the group of VCs. We would expect, for example, that the negative effect of the achievement motive disappears or even becomes positive regarding 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).

An additional promising area of future research would involve an investigation into the role of Schumpeterian founder identities in a non-US cultural and historical context, in which a different entrepreneurial image and view of entrepreneurship prevail (Pahnke & Welter, 2019).

Another avenue would be to look at other types of founder identities, such as missionaries or communitarians (Fauchart & Gruber, 2011). In addition to the categorization of Fauchart and Gruber (2011), future research could also focus on Kirznerian entrepreneurship and investigate whether a Kirznerian entrepreneurial identity has an influence on resource acquisition from VC firms or other providers of entrepreneurial finance. Kirzner (1973), as a contributor to the economics of entrepreneurship from the Austrian School (Douhan et al., 2007), regards the entrepreneur as an arbitrageur alert to unnoticed (arbitrage) opportunities resulting from price differentials and other disequilibria in the market. It is unclear how VCs view such forms of entrepreneurship. Clearly, Kirznerian entrepreneurial opportunities are less related to innovation and novelty and more to imitation and arbitrage (e.g., Lyalkov et al., 2020). Nevertheless, they might be highly profitable and therefore of great interest for VCs and other providers of entrepreneurial finance, as the surprising popularity of copycat or imitative internet start-ups among VCs highlights.

Finally, our study demonstrates that founder identities matter for resource acquisition. It remains undetermined, however, whether founder identities also matter for entrepreneurial success. Future research could also estimate the effects of founder identities on entrepreneurial success measures such as firm survival, profitability, or product success. Research on founder identities could also be viewed from an organizational imprinting perspective (Marquis & Tilcsik, 2013). Does a Schumpeterian founder's identity 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 identity makes it possible to analyze such intriguing questions.

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Declarations

Conflict of interest We do not have any conflict of interest to declare.

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