A Work Project, presented as part of the requirements for the Award of a Master's degree in Finance from the Nova School of Business and Economics.

The Unicorn Phenomenon in Europe: What drives multibillion Dollar Start-Up valuations?

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17-12-2021 **Nova School of Business and Economics**

Abstract

The evolvement of unicorns has accelerated considerably in Europe in recent years. As there is still little literature on success factors compared to conventional start-ups, this study focuses on the impact of the reputation of early-stage investors, strategic investors, the university attended by the founders, the influence of innovation hubs and previous entrepreneurial experience. The results of the study suggest that, after applying a regression model, the university attended by the founders and the involvement of corporate venture capitalists are statistically significant differentiators. In contrast to literature, the reputation of early-stage investors, innovation hubs and serial founders are not significant.

Keywords: Venture Capital, Entrepreneurship, Unicorns, Start-Ups

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List of Abbreviations

VC	Venture Capital
IPO	Initial Public Offering
CVC	Corporate Venture Capital
Log	Logarithmic
GDP	Gross Domestic Product
US	United States of America
IRR	Internal Rate of Return
LP	Limited Partner
GP	General Partner

1 Introduction

According to Schumpeter (1912), discontinuous and revolutionary change are core of economic development and foster the economy to surpass its static mode and lay the foundation for dynamic fits and starts. Due to the bureaucratic and administrative burden, increased number of decision makers and increased risk aversion, maturing and mature companies tend to be less innovative and avoid unnecessary business risks (Williams, 2015). Henceforth, it becomes the responsibility of start-ups to provide the impetus and stimulus necessary for economic growth and innovation (Sheppard et al., 2015). The resulting entrepreneurial endeavors are important for job creation, innovation, and productivity growth (Praag&Versloot, 2007). As a start-up is a transient organization looking for a repeatable and scalable business model (Blank, 2014), the willingness to accept additional risk for disruption is given by default (Covin&Wales, 2018). Consequently, the success of start-ups is highly skewed, with 90-95% of projects failing to achieve their projected return on investment (Ghosh, 2011), and around 75% of venture capital-backed start-ups failing to repay the initial VC investment received (Ghosh, 2012). The best performers among start-ups, commonly referred to as "unicorns", are privately owned companies with a valuation exceeding $1 bn. (Lee, 2013). While Europe produced 36% of the world's start-ups in 2009-2019, it contributed only 14% of the start-ups that achieved unicorn status (McKinsey, 2020). Although Asia and the US have historically provided a more prosperous environment for unicorns, European unicorns continue to evolve and have accelerated tremendously in 2021. With 84 unicorns engendered in the first three quarters of the year, Europe has surpassed China in the number of Unicorns produced since 1990 (Kanetkar, 2021).

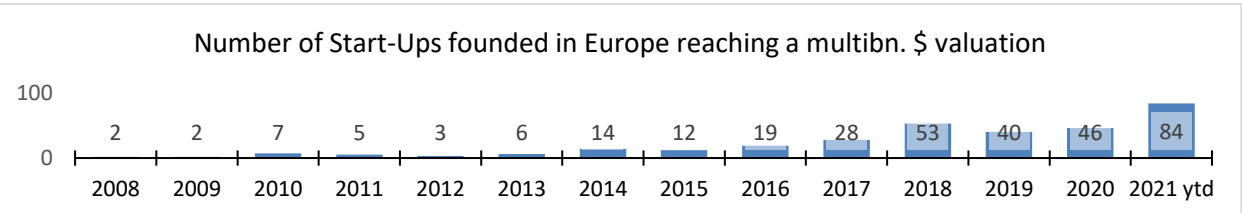

Figure 1: Number of Start-ups founded in Europe reaching a multibn. $ valuation (Source: Data Set)

Fast-paced equity stories are becoming increasingly prevalent, such as the one by Gorillas, a German B2C grocery delivery start-up that achieved unicorn status just nine months after its inception (Crunchbase, 2021). Accordingly, the amount of venture capital in the market is accelerating and expected to reach €90.0 bn. for start-ups founded in Europe in 2021, compared to €38.7 bn. in 2020 (Dealroom, 2020). Europe has the capacity to emerge as a hotspot for unicorns in the forthcoming years, with top universities and access to cutting-edge talent, rising and existing innovation hubs, and accelerating venture capital engagement (Rist, 2019). Hence, this thesis tries to examine distinguishing factors of unicorns compared to ordinary start-ups.

The contribution to existing literature is twofold. First, this paper tests determinants of success for extreme scenarios, comparing unicorns with start-ups. Most determinants of success have been described in the literature only by comparison of conventional start-ups, thereby mitigating extreme scenarios such as hyper-growth of a firm. Second, this paper shifts the location focus of unicorn literature, most of which has, to my best knowledge, been conducted in the US. One may expect deviating results as historically, European start-ups were forced to scale on a much higher capital efficiency due to a lack of later-stage investors compared to the US (Basta, 2019). In addition, cultural differences, pressure to expand across borders early-on, difficulty to hire talent, language barriers and stricter regulations are forcing European start-ups to professionalize much earlier, resulting in lower succession rates during investment rounds (McKinsey, 2020). Lastly, the US differs from Europe in the greater centralization of economic activity and innovation (Puga, 2002), especially in Silicon Valley, and in the willingness to take higher risks with less aversion to fail (Cotterill, 2012). These factors make it worthwhile to challenge the findings of existing literature for Europe. The study commences by summarizing the corresponding literature and deriving profound hypotheses on the potential success drivers of unicorns, followed by various regression models. Afterwards, the results are summarized, and possible inferences are debated. Further, limitations and future research impulses are outlined, followed by a brief conclusion.

2 Literature Review and Hypothesis Development

2.1 Investors Reputation

A company's reputation provides customers with information prior to their purchase decision and at the same time creates competitive advantages for the more reputable companies (Kreps&Wilson, 1982). Since young companies have insufficient resources (Stinchcombe, 1965), their growth can be accelerated by venture capitalists who provide valuable additional resources (Lee et al., 2011). To maximize the value created by investors, start-ups seek to work with the highest quality partners (Hallen, 2008). Assessing quality in a highly competitive financial intermediary market such as venture capital, start-ups mainly look at the reputation of investors to decide whether to collaborate (Shu et al., 2010). However, reputation is difficult to define (Lin et al., 2017) and therefore it is important to understand what value VCs provide in order to understand how reputation is built.

Value adding of VCs goes beyond equity financing: they provide support through network contacts, infrastructure, suppliers, potential customers, and experienced management teams (Kaplan&Stromberg, 2003). Due to their proactive nature, venture capital funds intervene in their portfolio companies and try to positively influence the companies' results (Siegel et al., 1988). Moreover, companies that have received venture capital tend to grow faster and stronger owing to the signaling effect both internally and externally to the market (Davila et al., 2003). Particularly in the early stages of a start-up, venture capital is a critical factor for the growth and success of different firms (Venkataraman&Shane, 2000). According to Welpe et al. (2010), more experienced VCs tend to contribute more value in successive rounds. Additionally, entrepreneurs accept higher discounts in their term sheets to get a more reputable VC into the cap table (Hsu, 2004). Hence, there might be a causal relationship between a VC's reputation and a start-up's performance, and thus the likelihood of becoming a unicorn.

Yet, the success of VC firms is highly skewed: 65% of firms return <1x, 25% return <5x, and the remaining 10% return >5x the initial capital invested (Correlation Ventures, 2014). One in

ten VC investments must be able to return the entire fund (Robinson, 2017), which is why VC funds look for start-ups that have the potential to return the total committed capital (Thiel, 2014). Thus, it may be presumed that the distorted returns of venture capitalists are mainly generated by VCs with an excellent reputation. Following a study by Krishnan et al. (2015), evaluating post-IPO performance based on VC investor reputation, the authors conclude that "more reputable VCs provide more valuable advisory and monitoring services to their portfolio firms, in addition to initially selecting better-quality portfolio firms to invest in". This is consistent with the findings of Nahata (2007), who outlined that post-IPO cumulative market capitalization is higher for start-ups that were initially backed by more reputable VCs. Based on the results of the existing literature, the first hypothesis is derived.

Hypothesis 1: Unicorns are backed more frequently by highly reputable venture capital investors than ordinary start-ups.

2.2 Corporate Venture Capital

Corporate venture capital (CVC) has become increasingly important in Europe in recent years: In 2009, CVCs, alongside institutional venture capital funds, participated in 230 deals with a volume of €1.5 bn.; in 2018, this number increased to 867 deals with a volume of €8.8 bn. (Woodman, 2019). CVCs have an advantage over institutional venture capital due to their longer investment horizons and their focus on strategic goals rather than solely financial goals, their superior industry knowledge, and the absence of purely performance-based compensation schemes (Chemmanur et al., 2014). Chemmanur et al. (2014) find that CVC-backed companies produce 26.9% more patents that are cited 17.6% more often than start-ups backed by institutional VCs. This is consistent with existing literature describing that CVC-backed firms are more likely to go public (Gompers&Lerner, 2000), achieve higher valuations when going public (Ivanov&Xie, 2010), and have higher long-term returns (Tian, 2012). Although it is not certain whether this effect is due to better selection or a better ability to foster and improve innovative processes in start-ups, or both, it gives an indication of the superiority of CVC-

funded companies compared to institutional VC-funded companies. Hence, Hypothesis 2 is derived.

Hypothesis 2: Being backed by a corporate venture capital fund increases the likelihood of becoming a unicorn.

2.3 Universities Reputation

The phenomenon of university dropouts who have founded a billion-dollar company in their garage is one of the most widespread stereotypes. Prominent dropouts like Mark Zuckerberg, Bill Gates or Steve Jobs nourish this thought. Paul Graham, co-founder of the Y Combinator, says "you can't, without asking them, distinguish people who went to one school from those who went to another three times as far down the US News list." (Graham, 2007). Peter Thiel offered young people $100,000 to skip college and work directly on their entrepreneurial ideas (Goldstein, 2011). Hence, the question may arise whether education is worthy and whether the quality of a college impact the likelihood of founding a unicorn. To do this, it is worth looking at the academic literature on the influence of a founder's alma mater.

A top university is defined as one with world-leading research, academic excellence, and the highest level of innovation in science and technology (Crow&Dabars, 2015). Taras et al. (2020) assessed the performance of students from differently ranked universities in a global real-world consulting project. The study indicates that students' overall performance improved by 1.9% for every 1,000 ranking places of the respective university attended. Whether these results are self-fulfilling is debated in the literature: top universities can choose from a larger pool of applicants, which means that they can select students who perform better in cognitive tests, emotional intelligence, language, etc., regardless of the university attended (Hoekstra, 2009). In alignment, Broecke (2012) suggests that the superior performance depends on unobservable factors such as student motivation. However, a study by Drydakis (2016) controls for these effects by using a sample of undergraduate graduates with identical pre-university characteristics. It shows that graduates who attend a higher ranked university receive more

invitations and earn higher starting salaries than graduates who studied at lower ranked universities (Drydakis, 2016). Whether the effects are due to omitted variables such as attracting more highly qualified and motivated students (Dobbs et al., 2008) or due to superior educational provision combined with better services and infrastructure (Hoekstra, 2009) is under discussion in literature. However, there seems to be a link between the university attended and graduate success as measured by salaries and employability (Dale&Krueger, 2002).

Yet, the question remains whether this superior performance also applies to entrepreneurial activities. In general, higher education is associated with being more successful as an entrepreneur (Luthje&Franke, 2002). A study by Daghbashyan and Harsman (2014) examined the relationship between university choice and propensity for entrepreneurial activity using a sample of Swedish universities and graduates. The authors posit that the frequency of becoming an entrepreneur is approximately twice as high for more prestigious institutions for studies in social science, natural science, medicine, and education (Daghbashyan&Harsman, 2014). In Europe, the most innovative universities are primarily associated with the highest ranked universities, having incorporated entrepreneurship into their curriculum (Wilson, 2008). Hence, these institutions may produce more entrepreneurial students concentrated in universities that rank high on all other metrics as well (England, 2015). Combined with the earlier findings that graduates from top universities tend to perform better than graduates from universities with lower rankings, hypothesis 3 can be derived.

Hypothesis 3: Having a founder who graduated from a top-tier university increases the probability of founding a Unicorn Start-up.

2.4 Innovation Hub

Innovation Hubs are defined as “regional concentrations of large and small companies that develop creative products and services […]” (Wessner, 2011). In particular, networking with other high-performing companies, research institutions and universities has a positive impact on a company's level of innovation, as measured by the number of patent applications (Turkina

et al., 2021). High-tech start-ups and innovation are highly concentrated in very few global cities and metropolitan areas (Adler et al., 2019), even more so than population or GDP (Bettercourt et al., 2007). These findings have been supported by measures of innovation in the form of patents (Acs et al., 2002), new product innovations (Feldman&Audretsch, 1999), venture capital (Chen et al., 2010) and research and development departments (Carlino et al., 2012). More than 49% of US companies funded by venture capitalists are located in the three cities where most venture capitalists are also based: San Francisco, Boston and New York (Chen et al., 2010). Lerner (1995) demonstrates that venture capital funds tend to be more likely to serve on the board of their respective portfolio companies if they are located in their immediate vicinity. This may have a positive impact since venture capital funds are believed to mostly add positive value to their investee companies as evidenced by post-IPO performance (Brav & Gompers, 1997), innovation and patent activity (Kortum & Lerner, 2000), operational growth (Hellmann & Puri, 2000), scale potential (Puri & Zarutskie, 2008), and an improved rate of job creation (Gompers & Lerner, 2001). Hence, it could be concluded that more successful start-ups - "unicorns" - tend to concentrate in higher density in innovation hubs than ordinary start-ups. Thus, Hypothesis 4 can be derived:

Hypothesis 4: Being located in an innovation hub in Europe increases the probability of becoming a Unicorn.

2.5 Serial Founder

VC financing is accompanied by an asymmetric information problem, where the entrepreneur knows more about the start-up and its vision than the investor (Fried&Hisrich, 1994). This risk is mitigated through staging investments (Gompers, 1995), restrictive contractual terms (Yitshaki, 2008), and a preference for start-ups out of the immediate environment (Shane&Cable, 2002). Information asymmetries can be further diminished by assuming that serial founders tend to be more proficient at starting a business, managing employees, and raising venture capital, which subsequently leads to a higher probability of creating a successful

start-up (Westhead et al., 1998). A serial founder is defined as a person who has owned and sold or closed a business in which they had a majority or minority stake and is now running a business that has either been inherited or purchased (Westhead et al., 2005). Junfu Zhang (2007) found that serial founders tend to raise more and more quickly venture capital in early-stage rounds than novice entrepreneurs. Moreover, the study concludes that regardless of whether the previous start-ups received venture capital, all entrepreneurs with previous experience tend to raise more venture capital in later rounds (Zhang, 2007). This is in line with the findings of Hsu (2007), who argues that serial entrepreneurs tend to raise more venture capital, and Gompers et al. (2010), who demonstrates that serial entrepreneurs have a higher probability of being successful with their subsequent venture. Further, Massis et al. (2016) suggest that unicorns are more likely to be founded by entrepreneurs with serial start-up experience than ordinary start-ups. Therefore, hypothesis 5 is derived.

Hypothesis 5: Having a Founder on-board who has previous founding experience increases the probability of founding a Unicorn

3 Data

3.1 Dataset

The dataset consists of 331 start-ups that have achieved unicorn status since their inception as well as approximately 8,000 start-ups that have not. The data sets were obtained from one of the leading and most renowned global big data start-up platform. In order to ensure a better comparability, only unicorns founded after 2008 with Europe as their place of origin were selected for the regression model. Hence, substantial differences in business models evolving over time are mitigated. Subsequently, the sample was reduced from 331 to 169 unicorns founded in Europe after 2008. To obtain statistically robust results, a one-to-one matching between unicorns and non-unicorns was performed in accordance with Kelly and Kim (2018). In this data matching, a random sample of unicorns was matched with non-unicorns under specific conditions. The criteria for matching were an identical year of establishment and an

identical industry. For example, a non-unicorn from the transport sector founded in 2008 was matched with a unicorn from the transport sector founded in 2008. Conditions for matching were that no start-up could be matched twice, and that no start-up could be a unicorn itself. Another condition was that the non-unicorns had to receive funding at least once. After the matching procedure, a total of 338 relevant data sets (169 unicorns and 169 non-unicorns) were identified based on equivalent characteristics. The datasets were then diligently verified for their accuracy and further complemented with missing relevant data from other data providers.

3.2 Variables

3.2.1 Dependent Variable

Although post-money valuations are provided for almost all unicorns and start-ups in the dataset, these post-money valuations tend to be unreliable and may become outdated during the course of the study. Therefore, a dummy variable of 1 was introduced if the start-up has a total valuation of more than $1 bn. and belongs to the unicorn dataset, or 0 if the company has a valuation of less than $1 bn. and belongs to the start-up dataset.

3.2.2 Independent Variables

The first independent variable is the reputation of early-stage-VCs. Based on the existing body of literature there is still no consensus about a universal definition of VC reputation: While Gompers (1999) and Lee et al. (2011) acknowledge the time period of active funds, Nahata (2007) suggests a success-based approach based the number of IPOs as a valid marker for VC reputation. Although IPOs are considered the most complicated and uncertain exit, as the company price is evaluated by the public based on great information asymmetries (Rama&Roman, 2012), recent research indicates that M&A exits provide a similar incentive for venture capital funds to exit (Amor&Kooli, 2020). Thus, this study adopts a performance-based approach that assesses the number of exits above €100 million for European early-stage investors. A list of approximately 4,500 investors from the identical database as for the start-ups and unicorns was utilized as a foundation for the European investors. This ensures that the nomenclature of venture capital funds is equivalent. In addition, a list of the top 50 US early-

stage investors was retrieved from Pitchbook and Entrepreneur.com respectively, ranked by total amount invested in early-stage and seed investments. Hence, the study additionally considers VC investments by highly regarded investors outside of Europe. To test the impact of VC reputation on a start-up's likelihood of becoming a unicorn, only early-stage investments were considered. This is done out of the consideration that VC investments by top companies in a later stage could become self-fulfilling to some extent. As the probability of failure decreases with each subsequent round of investment (Quintero, 2017), later-stage investments have a higher probability of producing a Unicorn, fostering the development by injecting additional capital. In order to control for possible differences in the number of early-stage rounds, the number of early-stage rounds was added as a control variable, taking into account seed, early VC, early convertible loans or Series A investments. Since most Series A rounds are based on a developed, tested product, but still in the scaling phase (Reiff, 2021), a truncation was applied for subsequent rounds, excluding them from further consideration. For the analysis, a dummy variable of one was introduced if a company was backed by a renowned VC in one of the early-stage rounds.

The second independent variable is corporate venture capital. A dummy variable of one was added if at least one corporate venture capital fund invested in the start-ups or unicorns.

The third independent variable is the founder's university, regardless of whether he or she holds a bachelor's, master’s, or doctorate degree and regardless of whether the degree belongs to business, tech, it, social science or others. To identify the founders' universities, all founders were screened using publicly available data such as LinkedIn profiles, website profiles and other trusted sources. If a founder could not be associated with a university through all available, publicly accessible sources, it was assumed that the founder had not studied at a highly regarded institution. This was the case for about 15% of all founders. To determine whether the founder's university had an impact on the likelihood of a start-up becoming a unicorn, a dummy variable of 1 was included if at least one founder studied at a top university.

Three clusters of top universities were introduced: (1) QS University Rankings 2021 Top 10 Europe, (2) QS University Rankings 2021 Top 10 US, (3) Financial Times Top 10 Business Schools in Europe. The most recent ranking results were selected, as university rankings do not essentially change over time (Usher, 2013). The QS World University Rankings examine global universities program-agnostic based on research reputation, learning and teaching environment, research impact and globalization (Writer, 2021), while the Financial Times Ranking was added to additionally consider top business schools that were not included in the previous ranking. QS University Rankings and Financial Times are among the most reputable sources of university rankings (Hughes, 2018). Universities outside the US and Europe are negligible in the dataset. To control for differences in the size of founding teams and team dynamics (Eesley&Roberts, 2012), the number of founders was added as a control variable.

The fourth independent variable is innovation hub. Since the dataset obtained does not describe the founding location for each start-up on a city-by-city basis, headquarters were used as an input to determine whether a start-up operates in an innovation hub, accepting the potential limitation that successful start-ups may be more likely to change their location to be closer to innovation hubs and venture capitalists. As illustrated by Dealroom (2020), London, Paris and Berlin are considered the innovation hotspots in Europe. Therefore, a dummy variable of one was introduced if a company has its headquarters in one of these cities.

The fifth independent variable is whether a Start-up was founded by a Serial Founder. Hence, a dummy variable of 1 has been added if at least one founder of the founding team has prior entrepreneurial experience. This is the case if one of the publicly available sources, such as LinkedIn, indicates previous entrepreneurial experience as a founding partner.

Three additional control variables were introduced. (1) The analysis controls for the business model of each firm. Although B2B start-ups are increasingly emerging as successful investment targets, venture capitalists have historically favored B2C investments over B2B business

models (Wilhelm, 2020). This control variable is designed to account for implicit differences in the business model, namely divergent monetization schemes, conversion cycles, unit economics, acquisition channels and exit routes (Kelly, 2014). Additionally, the regression controls for (2) GDP Growth in Europe. In a perfect matching setup, this control variable would be redundant, as each unicorn would be matched with a start-up based on, among other parameters, year of foundation. However, as the database was too narrow for some companies to be matched perfectly, the restriction had to be relaxed by another year for 15 matches. To control for economic differences, especially during the financial crisis, GDP growth was introduced as a control variable. Lastly, (3) venture capital investment in Europe in the first year of funding of the respective start-up was added as an additional control variable. Since the European venture capital market has experienced tremendous growth over the last decade, this variable is meant to control for market-related drivers for high-growth investments. For example, one explanatory variable for the success of unicorns compared to start-ups could be the increasing amount of dry powder in the market (Capolaghi, 2021), which puts pressure on venture capitalists to effectively invest their assets throughout the fund cycle (Mason et al., 2002). Subsequently, start-up valuations may be driven up inorganically (Pitchbook, 2017).

3.3 Descriptive Statistics

On average, the unicorns in the sample objected received $ 412 mn. in funding, while the start-ups received $ 8.9 mn. in funding. The unicorns conducted an average of 7.5 investment rounds, while the control group of non-unicorns conducted an average of 4.5 investment rounds. 43.2% of unicorns have a highly reputable early-stage investor in their cap table, while 33.7% of start-ups have a highly reputable early-stage investor in their cap table. 47.3% and 32.0% have a founder who attended a top 10 university or business school and subsequently founded a unicorn or start-up respectively. 44.4% of unicorns have at least one serial founder, while 28.4% of start-ups have at least one serial founder. 77.5% of unicorns had at least one corporate fund in their cap table, compared to 35.5% of start-ups. 36.1% of unicorns are based in a European

innovation center (Berlin, London, Paris), while 30.8% of start-ups are based in the same cities. 45.6% of unicorns and 58.0% of Start-ups operate a B2B business model. On average, unicorns were founded by 2.574 entrepreneurs, while Start-ups were founded by 2.018 entrepreneurs. Unicorns raised an average of 1.941 early-stage rounds, while non-unicorns raised an average of 2.692 early-stage rounds. In the first year of funding of a unicorn, VCs in Europe invested an average of €16.69 bn., compared to €16.48 bn. in the first year of funding of a start-up. European GDP growth in the founding year averaged 0.6% for unicorns, while GDP growth in the founding year averaged 0.3% for start-ups. This effect deviates strongly due to the substantial deltas in GDP growth as a result of the financial crisis.

Descriptive Statistics	**Group 1: Unicorns**			**Group 2: Non-Unicorns**			**Comparison of Means**
	Observations	**Mean**	**Standard Deviation**	**Observations**	**Mean**	**Standard Deviation**	**t-Values**
Dependent	169						
Unicorn	169	1	0	169	0	0	
Independent	169						
VC Reputation	169	0,432	0,038	169	0,337	0,036	1,8241**
Founders University	169	0,473	0,039	169	0,320	0,036	3,0135***
CVC	169	0,775	0,032	169	0,355	0,037	8,6373***
Serial Founder	169	0,444	0,038	169	0,284	0,035	2,9605***
Innovation Hub	169	0,361	0,037	169	0,308	0,036	1,0258
Control Variables	169						
B2B	169	0,456	0,038	169	0,580	0,038	-2,2792**
# Founders	169	2,574	0,141	169	2,018	0,086	3,3141***
# Investors	169	1,941	0,111	169	2,692	0,132	-4,1442***
VC Investments Y1	169	16,690	1,194	169	16,475	0,817	0,1421
GDP Growth at Founding Year	169	0,006	0,001	169	0,003	0,002	1,5587*

Figure 2: Descriptive Statistics of Group 1: Unicorns and Group 2: Non-Unicorns: * Statistically significant at 1% level; ** Statistically significant at 5% level; * Statistically significant at 10% level**

4 Empirical Analysis

To test the effect of the explanatory variables, a regression was applied. The logarithm was applied to VC investments in Europe to normalize its distribution. Models 1 to 6 were computed to assess the statistical significance of the control variables and each independent variable in isolation. Model 7 includes all independent variables and model 8 excludes CVC due to the substantial effect with the goal to rule out potential interdependencies among the independent variables.

Log Regression Model	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Control Variables								
B2B	-0,0982*	-0,0908*	-0,1024**	-0,1077**	-0,0939*	-0,0830	-0,1001**	-0,0894*
# Founders	0,0549***	0,0507***	0,0406**	0,049***	0,054***	0,0455**	0,0301*	0,0386**
# Investors (Early Stage)	-0,0779***	-0,0809***	-0,0589***	-0,0802***	-0,0781***	-0,0775***	-0,0615***	-0,0822***
VC Invest. Year of First Funding	-0,0857**	-0,0782**	-0,0417	-0,0861**	-0,0879**	-0,085**	-0,0427	-0,0789**
GDP Growth at Founding Year	2,9205**	2,8495**	2,0738	2,6815*	2,9287**	2,8472**	1,8505	2,5791*
Independent Variables								
VC Reputation		0,0813					0,0086	0,0706
CVC			0,3738***				0,3625***	
Founders University				0,156***			0,1319***	0,1453***
Innovation Hub					0,0410		0,0081	-0,0045
Serial Founders						0,1055*	0,0590	0,0811
General								
#Observations	338	338	338	338	338	338	338	338

Figure 3: Regression Model

5 Discussion

5.1 Investors Reputation

Hypothesis 1 attempted to assess the impact of early-stage VC's reputation on the likelihood of becoming a unicorn. Contrary to the suggestion of literature, no statistically significant impact was found. One potential explanation is that VC reputation may not be explorable by a success-based approach. This may seem counterintuitive at first, as reputation is the result of repeated success (Bohnet&Huck, 2004). From a VC's perspective, reputation can be built by funding many highly rated start-ups, which is consistent with the logic used in this study. However, it can also be built up by having highly regarded general partners, a mature fund in the market with many cycles raised, or above-average IRRs for their limited partners (Krishnan&Masulis, 2011). Highly regarded VCs may further distinguish themselves by other factors, such as the success rate of portfolio companies relative to the companies in which they have invested overall, or the percentage discount in term sheets when entering a company (Hsu, 2004).

Another potential explanation is that VC reputation per se is not a differentiator between successful and extremely successful start-ups. This statement is consistent with the findings of Mahto et al. (2018), stating that start-up performance has been strongly associated with VC reputation in the past, but that this effect has declined significantly in recent years. A fundamental driver of this is the increasing hypercompetition among VC investors (Mahto et al., 2018). Moreover, this explanation is consistent with the findings of Bock and Hackober (2020), who also found no significant effects of VC reputation on the likelihood of becoming a unicorn for start-ups in a comparable study setup in the US and China. The argumentation could be modified by assuming that more reputable VCs do not provide additional value to start-ups than less reputable VCs. This in turn would raise the question of what is the true differentiating factor of VCs' reputation and value added if they cannot outperform their respective competitors. US VC investor Vinod Khoshla (2013) notes that 70-80% of VCs contribute negative value and that about 95% of VCs do not contribute any value at all. This may be due

to several limiting factors associated with VC investment, such as misaligned incentives between VCs and founders (Hoque, 2014), contractual conflicts between CEOs and investors (Yitshaki, 2008), time-consuming funding and reporting requirements (Timmons&Sander, 1989), and pattern-driven investment approaches (Brand, 2017).

5.2 Corporate Venture Capital

Hypothesis 2 aimed to examine the impact of CVC on the probability of becoming a unicorn. The regression outlines statistical significance at each conventional significance level. One potential explanation is that CVCs are more proficient at sourcing than other investors. This is in line with the recent body of literature, stating that a CVC may search for investments with disruption potential in their respective industry and potential strategic synergies (Pinkow&Iversen, 2020), while VCs seek pure financial returns (Arping&Falconieri, 2009). Hence, CVCs assess start-ups more diligently and rigorous, are less likely to being mislead by opportunistic founders and may digest and utilize information more efficiently than purely financially oriented investors (Basu et al., 2011). Subsequently, the deeper industry knowledge may lead to higher success probabilities of start-up selection.

Building upon, the explanation may be drawn that CVCs add greater value than other investors. Specifically, start-ups need capital, coaching and customers, with VCs only able to provide the first two and only CVCs the last (Gimmy et al., 2017). For example, if a CVC invests in a start-up and at the same time undertakes a joint project with it, generating initial revenues, adapting the product to the market, and being a flagship customer (Orn&Growney, 2020) can enhance a start-up's performance far beyond what a VC could provide.

5.3 Founders University

Hypothesis 3 tried to evaluate the impact of a founder’s university on the probability of founding a unicorn. The results are significant at every conventional significance level. This contradicts the prominent opinion of famous investors such as Paul Graham and Peter Thiel, doubting the effect of college. The impact can possibly be explained by the fact that universities

improve the human capital of its students and increase their productivity and performance, fostered by an improvement of insights, knowledge, and skills (Nurmahmudah&Putra, 2020). Hence, one may conclude that higher-ranked universities create superior human capital compared to lower-ranked universities, as higher-ranked universities can hire the best staff, receive more external funding, provide highest-standard library resources, and publish frequently in renowned journals (Altbach, 2006). This statement is consistent with the literature outlined which states that graduates of higher ranked universities perform better on comparable tests than graduates of lower ranked universities (Taras et al., 2020).

Another potential argumentation is that this effect is solely explainable by omitted variable bias. Firstly, as outlined in the literature chapter, top-ranked universities tend to be more selective and attract a more sophisticated and intelligent student body due to a higher number of applications and more diligent selectivity (Hoekstra, 2009). This implies that top colleges can construct superior cohorts of students which may outperform other colleges' students in any profession. Secondly, top-tier graduates tend to be raised in more wealthy families, with 38 US top-tier colleges having more students from the top 1% family income class than from the bottom 60% (Leonhardt, 2017). Considering that being raised in a wealthy family equips students with a superior toolkit for life to accumulate wealth (Fagereng et al., 2018), this may explain why some of these students become tremendously more successful than others. Thirdly, the overall average age of a unicorn founder is 34 years (Banderuk, 2017) and considering that the average graduate is between 24 and 27 years in Europe (Little et al., 2008), unicorn entrepreneurs already gained multiple years of professional experience prior to their entrepreneurial endeavors. More mature people in general are associated with having larger and better networks (Calvo&Wellisz, 1980), and accumulated capital to finance the venture early on (Blanchflower&Oswald, 1998). Additionally, considering that top-tier graduates have a higher employability and get better-paid jobs (Witteveen&Attewell, 2017), it could be possible to assume that these graduates work on more relevant projects, have exposure to a more

inspiring peer group and operate in a more competitive and enhancing environment post-graduation. This would diminish the direct effect of the university attended.

Another potential explanation is that top-ranked universities provide, aside from improved human capital, unique value for building high momentum ventures compared to lower ranked universities. Owing to the signaling effect of attending a top university (Fox, 1993), graduates appear to have greater access to the resources they need to succeed, regardless of their social background. With more than 40% of US VCs employing MBA graduates from Harvard, Stanford, or Chicago Booth (Gompers et al., 2016), it is likely that these VCs are more willing to support entrepreneurs from their respective alma mater, as this may reduce information asymmetries for the investment. In fact, between 2007 and 2012, graduates from Stanford, Harvard, Berkley, MIT, NYU and the University of Pennsylvania received 10% of all world's start-up financing (Schiller, 2017). The same accounts for Europe: Looking at the alma mater of Analysts in France from the most reputable VC funds, almost 50% either studied at HEC, ESSEC or ESCP Europe (Fonsale, 2020). In other words, this explanation demonstrates that due to the high information asymmetries in a start-up, the reputation and signaling effect of the university attended by the founder can provide disproportionate access to resources.

5.4 Innovation Hub

Hypothesis 4 tried to investigate the impact of being located in either Berlin, London or Paris on the probability of becoming a unicorn. Innovation hub was insignificant at any conventional statistical significance level. These results in line with Bock and Hackober (2020), who only found significant effects for the Silicon Valley when looking for innovation hubs in the US and China. One possible interpretation is that innovation hubs tend to attract entrepreneurial activities but not disproportionately more unicorns than conventional start-ups. In fact, the statistical insignificance described in this study could be due to the highly successful control group, which invariably received at least some kind of early-stage funding and thus stands out from the vast majority of start-ups in the ecosystem. It is possible that a comparison of unicorns

with a random sample of representative start-ups with and without funding could reveal significant effects for innovation centers. This statement is supported when objecting the number of start-up headquarters in Germany in 2021, where Berlin only contributes 17.1% (Statistia, 2021). The same accounts for the UK, where London leads with 105 start-ups founded per 10,000 inhabitants but is accompanied by 8 additional cities exceeding 70 start-ups founded per 10,000 inhabitants, including Manchester and Liverpool (Statista, 2018). In France, approx. 26% of Start-Ups are founded and located in Ile-de-France (Statista, 2018).

5.5 Serial Founder

Hypothesis 5 tried to evaluate the impact of having a serial founder in the founding team on the probability of founding a unicorn. The result is significant at the 10% level in the isolated model and not significant at any conventional significance level in the model including all independent variables. One potential explanation is that not differentiating between successful and unsuccessful serial founders dilutes the expected effect of having a serial founder on the founding team. Nahata (2019) finds that unsuccessful and successful serial founders suffer less equity dilution, are more likely to retain their CEO position and achieve higher valuations than novice founders. However, the study design did not consider extreme scenarios such as the creation of unicorns. Hence, successful and unsuccessful entrepreneurs may outperform novice entrepreneurs on a marginal scale as suggested by Nahata (2019), Zhang (2007), Hsu et al. (2010), Gompers et al. (2019) and Massis et al. (2016), but not in the event of hypergrowth as outlined by the regression results. Thus, the interpretation may be drawn that having a serial founder on board increases the probability of receiving initial funding but does not increase the probability of becoming more successful at a later stage. In fact, this is the most likely explanation, as the underlying dataset only includes start-ups and unicorns that have raised at least some venture capital. This statement is supported by the fact that VCs tend to rely more on the quality and track record of a founding team when making an early-stage investment decision (Sagie, 2020) but shift that focus more towards the track record of the company, such

as strategy, customer adoption and competition once a start-up scales (Kaplan&Strömberg, 2000). Thus, it may be concluded that the involvement of a serial founder increases the likelihood of early-stage funding, as supported by the current literature, but does not significantly increase the likelihood of an extreme event such as the evolvement of a unicorn.

6 Limitations and Future Research

6.1 General Limitations and Future Research

Certain limitations are attributable to this paper and may require further scientific investigation. It is worth mentioning that this study is limited to the explicit data set. Although several statistical analyses were conducted and the data was carefully cross-checked, cleaned and complemented diligently, it cannot be assumed with certainty that this data sample is representative of the entire population. In addition, the categorization into unicorns and non-unicorns was undertaken at a particular point in time, without taking into account that some start-ups may still become unicorns in subsequent years.

Moreover, the database has inherent weaknesses: Firstly, the database merely enumerates start-ups that are still operationally active. The results depicted could be considerably divergent if conventional start-ups, which have ceased operations in the period under consideration, had been used as the basis for comparison. Furthermore, it was assumed that unicorns are fundamentally more successful than non-unicorn start-ups. However, it may be that some start-ups turned cash flow positive throughout the time horizon and decided to continue growing without further capital injections, which does not necessarily indicate inferiority.

In addition, the sample is still limited. Even though 2021 was a unique year for European unicorns to initiate statistical analyses on comparable business models, a greater sample size would be desirable to obtain more robust results. In accordance, a larger start-up base to match would allow to introduce more restrictive matching conditions and enable the matching logic to be based on a deeper industry logic with greater accuracy. Additionally, future research with more extensive resources may replace the one-to-one matching procedure with an averaging

approach for the start-ups. Instead of matching one start-up to one unicorn, the averages of all suitable matches could be utilized for the control group to reduce deviations in the data compared to the total population. Further, future research may, if obtainable, control for more explanatory independent variables that could bias the regression results as omitted variables. Such control variables could include the number of mergers and acquisitions, as this may explain inorganic growth; the age of the founders to control for seniority; the social background to account for pre-university stimuli of the founders and more.

6.2 Limitations of the Methodology and Future Research

Besides generic data deficiencies, there are potential limitations in the methodology due to missing data and partly non-measurable factors. With regard to investor reputation, the logic of deriving the reputation of VCs from the number of exits >100mn. carries the risk that emerging but already very successful VCs are neglected because they simply have not yet had enough time to execute sufficient exits. However, these VCs might have a great reputation in the industry by virtue of their general partners. Moreover, the data did not include information on the lead investor in each investment round. Lead investors are commonly characterized by the highest capital investment and commitment in the round and are usually the investors who have been invested for the longest period of time (Bernstein et al., 2015). Lead investors are also often at the top of the round constellation and have the closest relationship with the founders (Lutz&George, 2012). It could be subject of future research with a more extensive data base to repeat this study and substitute VC reputation by other drivers of reputation, only considering the lead investor. However, the results on VC reputation are still meaningful, as the performance-based approach is the most commonly adopted in literature, and regardless of lead or co-investor, early-stage investments always involve a considerable degree of uncertainty and require high-quality monitoring and evaluation.

A constraint with regard to CVC is that the data did not allow to distinguish between early-stage CVC and late-stage CVC. It is conceivable that later-stage CVCs may evolve into a self-

fulfilling prophecy, as CVCs may join the cap table at a later stage when a company is already successful and has a higher probability of achieving unicorn status. It is subject to further research to distinguish between CVCs that have entered at an early investment stage and CVCs that have entered at a later stage. In addition, it might be appropriate to distinguish CVCs into institutional, which can be equated with an institutional VC fund with financial interests, strategic, which are mainly interested in strategic synergies, and touristic, which invest infrequently and less professionally (Orn&Growney, 2020). This distinction may help to further understand which CVCs genuinely engender unicorns. However, the results are still meaningful due to the very low p-value and the given comparability with the study by Bock and Hackober (2020), who published analogous results for the US and China.

With regard to university rankings, current studies are still partly uncertain as to what exactly explains the superior success of top graduates. It is conceivable that omitted variables such as intrinsic motivation are the only relevant explanations. Therefore, it is difficult to distinguish between causality and correlation when interpreting the results. Although difficult to measure in reality due to the enormous amount of data required, it would be beneficial to compare unicorn founders with non-unicorn founders with precisely the same pre-university characteristics. This would allow to draw ceteres paribus conclusions on the influence of university quality on the likelihood of founding a unicorn. It is the subject of further academic research to cascade the variable university reputation into more differentiated and revealing parameters such as graduates' grade point average, graduates' pre-university performance, graduates' social background and graduates' pre-founding work experience in order to reliably assess the effect of the university attended. However, the results are still conclusive, as it is less relevant from a VC investor's perspective which of these factors predominantly determines a start-up's higher probability of success.

A limiting factor in the evaluation of innovation hubs is that only the headquarters data is fully reported. While it can be ensured that the data derived from the platform only covers start-ups

founded in Europe, it does not provide complete details about the exact city where a start-up was located when it was founded. Therefore, this study had to adjust the hypothesis and test whether unicorns are headquartered in an innovation hub. However, a more precise hypothesis would be whether unicorns are more likely to be founded in innovation hubs rather than relocating there. This would remove the potential bias that more successful start-ups are more prone to relocate in innovation hubs due to closer proximity to investors, wider access to talent, generally better access to capital or prestige. Further research with access to a more in-depth data base is necessary to replicate this analysis in terms of start-up location and to mitigate the effects of relocation. However, the results are still meaningful for investors as it can be assumed that start-ups tend to relocate towards innovation hubs rather than away from them. Since the results are not statistically significant, they would probably neither be significant using the founding location of a start-up.

7 Conclusion

Unicorns are driving innovation and disruption in virtually any industry and substantially impact the way in which individuals consume, businesses operate, and by extension, the creation of public wealth. This paper was motivated by the substantial research gap on success drivers of European unicorns. As suggested by the study results, it is particularly valuable to understand which university the founders attended and whether corporate venture capital was invested in start-ups. Specifically, the university attended suggests that unicorn-founders tend to be pooled at high class institutions, regardless of the subject studied. Contrary to the suggestions of current literature, this study further demonstrates that the reputation of the early-stage investor, the association with an innovation hub and the involvement of a serial founder do not have a significant impact on the likelihood of becoming a unicorn. These findings question the applicability of current literature to extreme scenarios such as that of a unicorn. Therefore, it may be the subject of future research to verify the results and extend the explanatory variables to obtain more drivers of European unicorn success factors.

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