

THE SECRETS OF UNICORN COMPANIES: AN EMPIRICAL INVESTIGATION

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Abstract: *Starting a new business is a challenging task, and many factors can affect the success or failure of the venture. One such factor is the field of activity in which the business operates. Some industries are more competitive than others, and some have more significant barriers to entry. This article aims to explore the influence of the field of activity on the survival and growth of new businesses. The startup ecosystem has been on the rise in recent years, with the emergence of several unicorns, or startups valued at over \$1 billion. This has led to increased interest in entrepreneurship and the potential for significant financial returns. However, the reality is that most startups do not become unicorns, and many do not survive beyond a few years. The field of activity in which a startup operates can significantly influence its survival and growth prospects. Several studies have explored the influence of the field of activity on the survival and growth of new businesses. These studies have found that factors such as competition, regulatory compliance, access to financing, and availability of talent can significantly influence a startup's chances of survival and growth. For example, industries with high levels of competition and technological intensity have been found to have lower rates of new firm survival and growth (Carrie, et al., 2002). This study investigates a possible correlation between several statistical dimensions of unicorn start-up companies in the world. For this purpose, we will use descriptive as well as inferential statistical methods such as presenting the main parameters of the numerical variables, some graphical representations; we will also employ a nonparametric correlation analysis. We consider that there is a possible correlation between the date the companies were set up, their field of activity, country of origin and their valuation respectively. Our study confirmed four research hypotheses, as follows: there is a correlation between the date the unicorn start-up companies were set up and their valuation, their valuation and their field of activity, the field of activity is in statistical association with the companies country of origin and the field of activity is influenced by the date the companies were set up. We will conclude by discussing the implications of these findings for entrepreneurs, policymakers, and investors, and provide recommendations for improving the survival and growth prospects of new businesses.*

Keywords: *start-ups, unicorns, survival rate, business success factors*

JEL Classification: *M13; M21;*

1. Literature review

The emergence of unicorns - start-ups that have achieved a valuation of at least \$1 billion - has captured the attention of entrepreneurs, investors, and policymakers alike. While much attention has been paid to the characteristics that distinguish unicorns from other start-ups, less attention has been paid to the role that the field of activity plays in unicorn success.

Several studies have explored the influence of the field of activity on the survival and growth of new businesses. Carree, Thurik, and Wennekers (2002) found that the level of competition and the degree of technological intensity of an industry significantly influenced the survival and growth of new firms. They found that industries with high levels of competition and technological intensity had lower rates of new firm survival and growth. Similarly, the study by Herrington, Kew, and Kew (2017) found that barriers to entry, such as access to financing and regulatory compliance, significantly influenced the survival and growth of new businesses in African countries.

Moreover, the availability of resources, such as financing and talent, can also be influenced by the field of activity. A study by Landström and Harirchi (2018) found that venture capitalists tended to invest more in technology-based startups than in other industries. This preference can make it easier for technology startups to access funding, which can be critical for survival and growth. Additionally, a study by Ondruska and Guzman (2019) found that the availability of talent, specifically skilled workers, and managerial talent, was a critical factor in the survival and growth of new businesses.

Another study, by Gompers, Kovvali, and Mukunda (Gompers, et al., 2018), found that startups in the software and internet industries were more likely to become unicorns compared to startups in other industries. This study also found that startups that had previously received investment from a top-tier venture capital firm were more likely to become unicorns.

Similarly, a study by Song and Lee (Song & Lee, 2018) found that startups in the healthcare industry had a higher likelihood of becoming unicorns compared to startups in other industries. The study also found that startups in the healthcare industry tended to have higher initial valuations, which could indicate a more favourable market for these startups.

The field of activity can significantly impact a start-up's chances of success and the emergence of unicorns. Each industry has its own set of challenges and obstacles that start-ups must overcome to succeed. For example, start-ups in the biotech industry face significant regulatory hurdles and require extensive research and development to bring products to market. Similarly, start-ups in the e-commerce industry must navigate complex supply chains and manage inventory effectively. These challenges can significantly impact a start-up's chances of survival and success (Song & Lee, 2018).

The competitive landscape within each industry can also impact unicorn survival chances. Start-ups in industries with high barriers to entry, such as biotech and fintech, may face fewer competitors, but those competitors may be well-funded and well-established. On the other hand, industries with lower barriers to entry, such as e-commerce, may have more competitors, but those competitors may be less established and easier to compete against. The competitive landscape can significantly impact a unicorn's ability to survive and thrive (Gompers, et al., 2018). Customer behaviour within each industry can also influence unicorn survival chances. Start-ups in industries with fickle or hard-to-please customers, such as the fashion industry, may struggle to build brand loyalty and customer retention. Conversely, start-ups in industries with loyal and engaged customers, such as the fitness industry, may have an easier time building brand loyalty and retaining customers.

Finally, economic conditions within each industry can impact unicorn survival chances. Start-ups in industries that are particularly sensitive to economic fluctuations, such as luxury goods or travel, may struggle during times of economic downturns or uncertainty. Conversely, start-ups in industries that are less sensitive to economic conditions, such as healthcare or education, may have an easier time weathering economic downturns (Landström & Harirchi, 2018).

A report by the European Commission found that certain fields of activity are more conducive to unicorn success than others. This recent institutional report by the European Commission found that the software and e-commerce industries are the most common fields of activity for unicorns (European Commission JRC Technical Report, 2022). These industries are characterized by relatively low barriers to entry, high growth potential, and the ability to scale quickly. By contrast, industries such as biotech and energy require significant investment in research and development, are subject to strict regulatory oversight, and have longer product development cycles, making it more challenging for start-ups to achieve unicorn status. The report also found that unicorns in certain fields of activity tend to achieve higher valuations than unicorns in other fields. For example, unicorns in the software and e-commerce

industries tend to achieve higher valuations than unicorns in the fintech or healthcare industries. This may be due to the fact that the software and e-commerce industries have larger markets and greater scalability than other industries. The report's findings highlight the importance of considering the field of activity when evaluating start-up opportunities. Entrepreneurs and investors should take into account the unique challenges and opportunities presented by different fields of activity and develop strategies to overcome those challenges and capitalize on those opportunities. The report's findings also have important implications for policymakers. Policymakers should consider the field of activity when developing policies to support start-up growth and innovation. For example, policymakers may need to provide more targeted support to start-ups in industries with higher barriers to entry, such as biotech and energy, to help them overcome those barriers and achieve success. Similarly, policymakers may need to develop policies that encourage the growth of industries with high growth potential, such as software and e-commerce, to create an environment that is conducive to unicorn success.

Several studies have supported the findings of the report "In search of EU unicorns - What do we know about them?" regarding the influence of the field of activity on start-up success and the emergence of unicorns. For instance, a study by Bellavitis and Filatotchev (Bellavitis & Filatotchev, 2019) found that the software and internet industries were the most prevalent fields of activity for unicorns, followed by the healthcare industry. The study further noted that industries with high R&D intensity, such as biotech and energy, had lower rates of unicorn creation due to the longer product development cycles and regulatory barriers associated with these industries. In a more recent study, Kipping and Clarke (Kipping & Clarke, 2020) have examined the characteristics of unicorns in the UK and found that start-ups in the software and e-commerce industries were overrepresented among unicorns. The study also noted that unicorns in these industries tended to have higher valuations than unicorns in other industries. Taken together, these studies provide further evidence for the importance of the field of activity in determining the success of start-ups and the emergence of unicorns. Entrepreneurs and investors should carefully consider the unique challenges and opportunities presented by different industries when evaluating start-up opportunities and developing strategies for success.

While there is considerable evidence to suggest that the field of activity is an important determinant of start-up success, some studies have suggested that this may not always be the case. For example, a study by Kortum and Lerner (Kortum & Lerner, 2000) examined the factors that contribute to the success of Silicon Valley start-ups and found that factors such as the quality of the management team, access

to financing, and the ability to scale quickly were more important determinants of success than the industry in which the start-up was operating.

Similarly, a study by Fehder and Hochberg (Fehder & Hochberg, 2014) have examined the characteristics of successful start-ups in the US and found that while certain industries, such as software and biotechnology, tended to have a higher concentration of successful start-ups, the differences between industries were not statistically significant. The study concluded that factors such as the quality of the management team, the ability to pivot and adapt to changing market conditions, and access to funding were more important determinants of success than the industry in which the start-up was operating. Furthermore, a study by Meoli and Vismara (Meoli & Vismara, 2016) found that while certain industries, such as healthcare and software, tended to have a higher concentration of unicorns in Europe, the difference between industries was not statistically significant. The study suggested that factors such as the quality of the management team, access to financing, and the ability to scale quickly were more important determinants of unicorn success than the industry in which the start-up was operating. Also, a study by a study by Guarascio and Tamagni (Guarascio & Tamagni, 2019) found that the field of activity was not a significant predictor of start-up success in Italy. The study examined a sample of new firms and found that other factors, such as human capital, access to finance, and the ability to innovate, were more important determinants of success.

The literature review highlights the importance of considering the field of activity when analysing the survival and growth of new businesses, including the likelihood of becoming a unicorn. While some industries may be more conducive to the emergence of unicorns, the majority of startups operate outside these industries and face significant challenges in terms of survival and growth. Policymakers, investors, and entrepreneurs should consider the factors identified in the literature review when developing policies, investment strategies, and business plans to support new businesses.

The availability of resources, such as financing and talent, can also be influenced by the field of activity. For instance, venture capitalists have been found to invest more in technology-based startups than in other industries, making it easier for technology startups to access funding, which can be critical for survival and growth (Landström & Harirchi, 2018). Similarly, the availability of skilled workers and managerial talent has been identified as a critical factor in the survival and growth of new businesses (Ondruska & Guzman, 2019).

The survival rates of companies can vary widely based on the industry or sector they operate in. Some industries are more competitive and have a higher risk of failure, while others may have more stable demand and fewer competitors. For example,

according to a study by the U.S. Bureau of Labour Statistics (Bureau of Labor Statistics, 2018), the 5-year survival rate for new businesses in the construction industry was 54.2%, while the 5-year survival rate for businesses in the healthcare and social assistance industry was 72.2%. On the other hand, the 5-year survival rate for businesses in the accommodation and food services industry was only 50.3%. Another study by Statista (Statista, 2021) showed that the 5-year survival rate for new businesses in the information sector was 50.9%, while the 5-year survival rate for businesses in the finance and insurance sector was 56.3%. The retail trade sector had a lower survival rate, with only 47.7% of new businesses surviving for 5 years. It's important to note that survival rates can also vary based on the size of the company. Small businesses have a higher failure rate than larger businesses. For example, according to the Small Business Administration (Small Business Administration, 2012), only about half of new businesses survive the first five years, and only one-third survive 10 years or more.

2. Data and methodology

This study investigates a possible correlation between several statistical dimensions of unicorn start-up companies in the world. We used data sets collected from <https://www.crunchbase.com/>. Data collected reflect the name of the company, the valuation (in billion USD), the year the companies were set up, the country and town of origin, the field of activity as well as their main investors from 2017 until 2023. The sample includes a list of 1210 companies from all over the world. We consider that there is a possible correlation between the date the companies were set up, their field of activity, country of origin and their valuation respectively. Our paper will focus on confirming four research hypotheses, as follows:

H1: There is a correlation between the date the unicorn start-up companies were set up and their valuation.

H2: There is an association between the valuation of the unicorn start-up companies and their field of activity

H3: There is an association between the field of activity and the unicorn start-ups' country of origin.

H4: There is an association between the field of activity and the date the unicorn start-up companies were set up.

For this purpose we will use descriptive as well as inferential statistical methods such as presenting the main parameters of the numerical variables, some graphical representations; we will also employ a non parametric correlation analysis.

3. Descriptive statistics and research hypothesis testing

In order to have a complete image regarding the unicorn start-up companies around the world we first built one-dimensional tables (based on a single variable) and computed the descriptive statistics for the numerical variables. Graphical representations were used to show the distribution of the companies by the non-numerical variables.

As seen in **Table 1**, we have investigated a total number of 1210 of unicorn start-up companies. As regards their worth, the maximum valuation of the companies investigated is of 140 billion USD – represented by ByteDance – a company set up in Beijing, China in 2017 which is an internet technology company that operates creative content platforms such as TikTok), followed by SpaceX – valued at 127 billion USD – a rocket and spacecraft manufacturer located in US. Shein also hit the 100 billion USD value in 2022. These three companies are the only so called hectacorns in the world, valued at at least 100 billion USD.

Table 1: Descriptive statistics

	Valuation	Date joined
	Billion USD	Year
Mean	3.2	2020
Median	1.6	2021
Mode	1	2021
Std. Dev.	7.53	2.00
Skewness	12.5	-1.88
Kurtosis	191.35	4.79
Minimum	1	2007
Maximum	140	2023
Observations	1210	1210

Source: authors' computation

Most of the unicorn start-up companies have a valuation of 1 billion USD, half of them having a valuation below 1.6 billion USD. The average valuation of a unicorn start-up company is equal to 3.2 billion USD.

As regards the date they joined, most of the companies joined in 2021; the median value is also equal to 2021, which means that half of the companies joined before and half after 2021. The “oldest” company joined in 2007 (Veepee and Vice Media)

while the “youngest” – in 2023. There are 4 companies that joined in 2023 (Thrive Capital, ShiftKey, Our Next Energy and MNT-Halan). A total number of 525 unicorn start-up companies – almost a half of the total - joined in 2021.

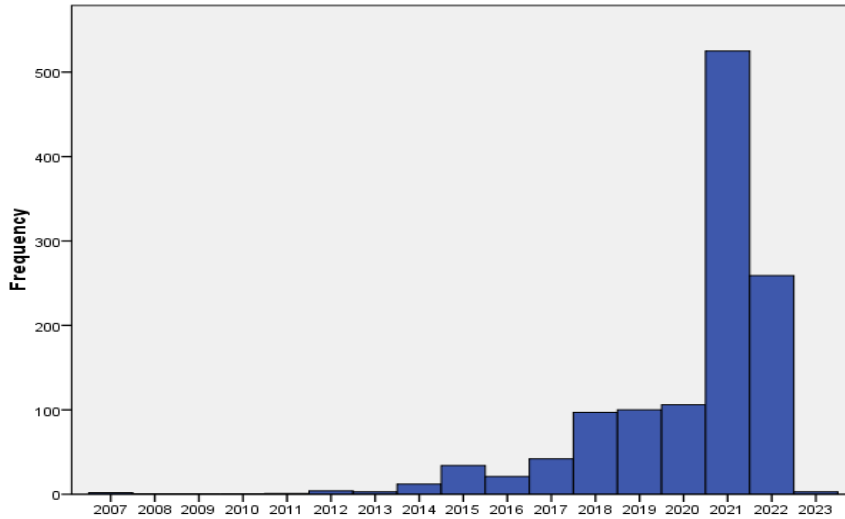


Figure 1. Histogram of the unicorn startup companies by the year they joined
Source: authors' computation

The distribution of the start-up companies by their location is presented in **Figure 2**. The majority of the companies (54%) are located in the US, followed by the companies located in China with a share of 14% in the total of 1210 unicorn start-up companies that exist around the world.

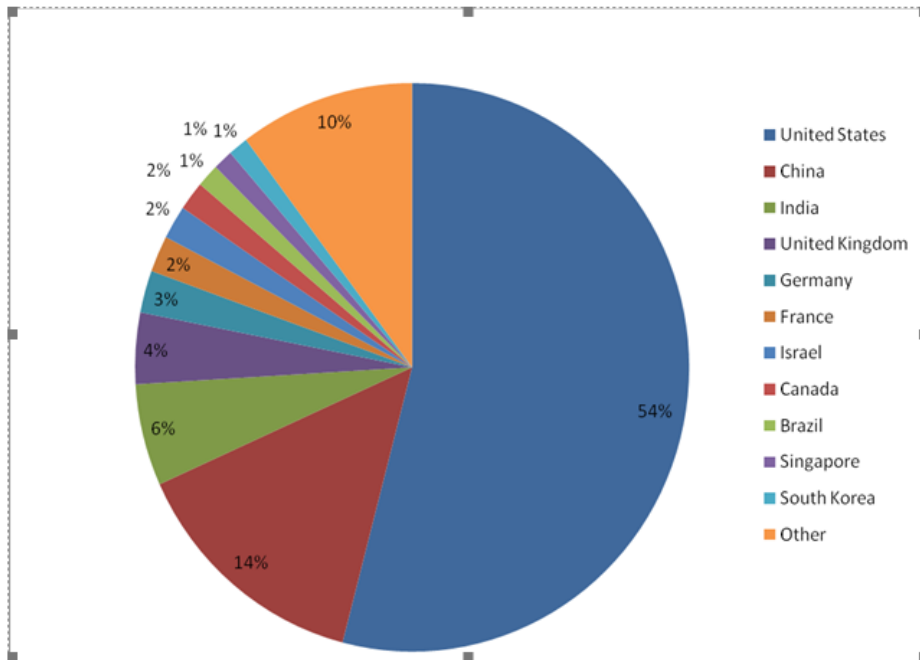


Figure 2. Distribution of the unicorn startup companies by their location
 Source: authors' computation

As seen in **Figure 3**, almost half of the unicorn start-up companies' field of activity is in Fintech and internet software&services, followed by e-commerce and health companies.

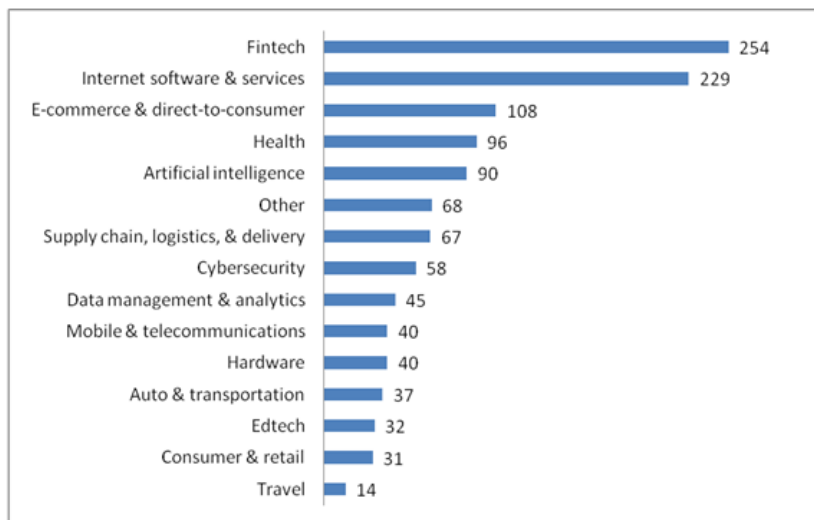


Figure 3. Distribution of the unicorn startups by their field of activity
 Source: authors' computation

In order to investigate and validate our research hypotheses, we will use the Chi-Squared method, which is a statistical test used for the analysis of correlation based on contingency tables, and that can be used in case the sample size is large enough. For this purpose we will first construct the cross tabulations between the values associated to each pair of variables taken into account, then we will compute the expected frequencies and determine the value of the test in our population. Decision regarding the existence of a correlation is taken by comparing the value of the test with the critical value for specific degrees of freedom and a chosen significance level.

Hypothesis H1: *There is a correlation between the date the unicorn start-up companies were set up and their valuation.*

The Chi Square value in the sample is 7969,63, and since this value is higher than 0, our conclusion is that there is a correlation at the sample level between the between the date the unicorn companies were set up and their valuation.

To expand our result on our total population we'll use the following hypothesis test:

$$H_0 : \chi^2 = 0$$

$$H_1 : \chi^2 \neq 0$$

In order to decide whether the H_0 hypothesis should be rejected, the calculated value of the Chi-Squared test, 7969,63, is compared to the critical one for 2951 degrees of freedom and a probability of 95%, which in our case is 3,078. As the calculated value is higher than the critical one, hypothesis H_0 is rejected, therefore, there is a strong correlation between the two variables at the level of total population.

Research hypothesis H1 is validated with a significance level of 5%.

Hypothesis H2: *There is an association between the valuation of the unicorn start-up companies and their field of activity.*

The Chi Square value in the sample is 392,17 and as such, we conclude that since this value is higher than 0, there is a correlation at the sample level between the valuation of the unicorn start-up companies and their field of activity.

The calculated value of the Chi-Squared test is compared to the critical one for 406 degrees of freedom and a probability of 95%, which in our case is 360.29. As the calculated value is higher than the critical one, hypothesis H_0 is rejected, therefore, there is an association between the two variables at the level of total population, but the association is weak, since the two values are similar.

Research hypothesis H2 is validated with a significance level of 5%.

Hypothesis H3: *There is an association between the field of activity and the unicorn start-ups' country of origin.*

The Chi Square value in the sample is 669.16, and since this value is higher than 0, our conclusion is that there is a correlation at the sample level between the field of activity and the unicorn start-ups' country of origin.

The calculated value of the Chi-Squared test, is compared to the critical one for 400 degrees of freedom and a probability of 95%, which in our case is 639.61. As the calculated value is higher than the critical one, hypothesis H_0 is rejected, therefore, there is an association between the two variables at the level of total population.

Research hypothesis H3 is validated with a significance level of 5%.

Hypothesis H4: *There is an association between the field of activity and the date the unicorn start-up companies were set up.*

The Chi Square value in the sample is 387.47, we conclude that since this value is higher than 0, there is a correlation at the sample level between the field of activity and the date the unicorn start-up companies were set up.

The calculated value of the Chi-Squared test is compared to the critical one for 169 degrees of freedom and a probability of 95%, which in our case is 200.33. As the calculated value is higher than the critical one, null hypothesis H_0 is rejected, therefore, there is an association between the two variables at the level of total population and the correlation is strong, since the calculated value of the Chi-Squared test is much higher than the critical one..

Research hypothesis H4 is validated with a significance level of 5%.

Conclusions and discussions

This study investigates a possible correlation between several statistical dimensions of unicorn start-up companies in the world. The collected data reflect the name of the company, their valuation (in billion USD), the year the companies were set up, the country and town of origin, the field of activity as well as their main investors from 2017 until 2023. Our empirical analysis was based on descriptive statistics, graphical representation as well as inferential statistical computations. We considered that there is a possible correlation between the date the companies were set up, their field of activity, country of origin and their valuation respectively. Our study confirmed all our four research hypotheses. First, the analysis confirmed a correlation between the date the unicorn start-up companies were set up and their valuation. Of course, this hypothesis is an intuitive one. The older the companies

are, the higher their valuation. Age does not increase valuation by definition. An older company will have a better valuation if it has strong brand recognition, and unicorns seem to know how to do that.

Second, our analysis confirmed an association between the valuation of the unicorn start-up companies and their field of activity. Third, the data validated the association between the field of activity and the unicorn start-ups' country of origin. The importance of the field of activity in determining a startup's survival and growth prospects highlights the need for entrepreneurs to carefully consider their industry and markets before starting a business. Policymakers and investors should also take into account the field of activity when developing policies and investment strategies to support new businesses.

Fourth, our computations confirmed the association between the field of activity and the date the unicorn start-up companies were set up. This is why we consider that entrepreneurs and investors should carefully consider the unique challenges and opportunities presented by different industries when evaluating start-up opportunities and developing strategies for success.

There are several political and economic implications related to the phenomenon of unicorn startups and their chances of survival based on their field of activity.

Politically, governments and policymakers who want to encourage economic growth and employment creation may benefit from the success of unicorn businesses. High-growth businesses can significantly boost the economy, raise taxes, and add jobs. Governments can help unicorn firms by fostering an atmosphere that encourages innovation and entrepreneurship, by opening finance sources, and by subsidizing research and development.

The economic success of unicorn firms can have a big impact on the overall economy. Technology has been a big engine of recent economic growth and employment creation, and unicorn businesses are frequently found in this field. These businesses have the potential to significantly increase value for shareholders while also fostering competition and innovation in the markets in which they compete. Additionally, the success of unicorn firms can draw capital and talent to an area, fostering a positive feedback loop of innovation and economic growth. Our research revealed that many high-growth firms ultimately fail and that only a small number of them achieve unicorn status. The high failure rate of startups can have implications for investors, who may be wary of investing in the startup ecosystem, given the perceived risk of failure. Additionally, the failure of unicorn startups can lead to job losses and can reduce economic activity in the regions in which these companies operate. In addition, our research shows that unicorn companies are

frequently concentrated sectors, including the technology sector, which might raise issues with economic concentration and competition.

Governments and politicians may assist unicorn startups by fostering an atmosphere that encourages innovation and entrepreneurship. The high startup failure rate and the concentration of unicorn firms in particular areas, however, may have detrimental economic effects. These consequences must be understood by policymakers and investors, and action must be taken to reduce any potential negative effects.

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