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Start-Up Valuation: Bumble Inc. Case Study

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Executive Summary

This paper has been based on which methods should be used in order to value a Start-Up. The structure of the paper has been divided into four parts. In the first part, we have mainly defined what a start-up is. It has been clarified which are the main characteristics that distinguish a start-up from a more mature company, such as the lack of history, its profitability, its dependence on private capital, the risk it presents, the number of different investors and rounds needed to raise funding and finally the illiquid nature of an investment in a start-up. We then proceeded to define what a VC is and how it works. The different types of financing rounds in which start-ups participate in order to obtain financing were studied. Finally, some technological trends that will mark the industry in the future were defined.

The second part of the work focused on studying the main types of company valuations that exist. A distinction has been made between two different types depending on their suitability when valuing a start-up, since, as has been said, these have different characteristics to more mature companies, so that the methods normally used may not be useful. On the one hand, traditional valuation methods have been studied, including DCF, LB O, Public Comparables and Precedent Transaction. On the other hand, valuation methods for start-ups have been studied, including the Venture Capital Method, the Real Options Method, the First Chicago Method, the Berkus Approach and several others. Next, the impact of different subjective factors on the valuation of start-ups was discussed. Finally, the points of the shareholders agreement that could affect the valuation of a company have been mentioned.

In the third part of the paper, a case study of the company Bumble Inc, a company that owns online dating platforms, has been carried out. The company has been studied in depth, as well as the market in which it operates. Then, the different valuation methods mentioned in the second part of the paper were calculated and compared in a joint analysis.

Finally, in the fourth part of the paper, a series of conclusions have been drawn about start-up valuations and how they are influenced by interest rate changes.

Contenido

Introduction

In today's dynamic and evolving business landscape, start-ups have become powerful drivers of innovation, disruption and economic growth. These agile and ambitious companies harness technological advances and entrepreneurial spirit to create new products, services and business models that challenge traditional industry paradigms. However, in the midst of this wave of innovation, start-ups face a critical challenge: determining their true value in a highly competitive and rapidly evolving marketplace.

Valuing a start-up is a critical process for the survival of start-ups, as it is the basis by which a company raises capital to finance its operations. The total value of the shares is appraised, and an investor is negotiated with which percentage of the company is sold in exchange for a specific amount of money.

In order to understand this process, this paper will first define what a start-up is and its characteristics, mentioning the different financing rounds in which start-ups participate, their characteristics and the main actors involved. Then, in the second part of the paper, we will study the different types of valuations that can be applied to companies, differentiating between methods commonly used in mature companies and more specific methods for start-ups. They will be analysed in depth and their compatibility for use with start-ups will be discussed. In the third part of the paper, these methods will be applied to a real company, Bumble Inc. and the results obtained will be analysed and compared with each other. Finally, the conclusions of the paper will be presented, emphasising how macroeconomic factors affect start-up valuations.

Part 1. What is a Start-Up?

2.1. Definition

A start-up is a young company or organization that is in the initial stages of business, often created to develop a new product or service to grow and establish itself as a successful enterprise. Start-ups are typically small and agile, with a goal of rapid growth and expansion (Rebecca Baldrige, 2022).

With the objective of improving deficiencies of existing products or creating entirely new categories of goods and services, a start-up innovates and aims at disrupting entire industries.

The process of starting a new business can be risky and uncertain, as it involves developing and testing a new idea, finding, and securing funding, building a team, and navigating the challenges of the market. However, start-ups also have the potential to be highly rewarding, both financially and personally. Many successful businesses, including well-known tech companies like Apple and Microsoft, began as small start-ups.

Start-ups also tend to be more agile and flexible than larger, established companies, as they have fewer layers of management and bureaucracy and can more easily adapt to changes in the market. This can allow them to move quickly and take advantage of new opportunities, but it can also make them more vulnerable to failure if the product or service does not catch on or if the market shifts in an unexpected way.

1..1. Example of Start-Ups

There are many different types of start-ups, ranging from technology companies and app developers to retail businesses and consulting firms. Some start-ups are focused on creating and selling a specific product, while others provide a service or offer a platform for connecting buyers and sellers.

Start-ups have become a beacon of innovation and in the past decade, some of the most valuable companies in the world started as a start-up.

There are currently 1214 start-ups valued over $1bn all over the world (The Complete List of Unicorn Companies, 2023). Out of the total number of unicorns 56% are located

in North America, 24% in Asia and 14% in Europe. In addition, over 21% of all unicorns are Fintechs, and 19% are Internet software & services start-ups.

Some of the world's most valuable start-ups include ByteDance ($225bn), SpaceX ($137bn), SHEIN ($100bn), Stripe ($50bn) or Revolut ($33bn).

1..2. Start-Ups main characteristics

There are many unique attributes that distinguishes start-ups from traditional companies. These characteristics are the following (Damodaran, Valuing Young, Start-up and Growth Companies: Estimation Issues, 2009):

- Absence of history: start-ups are young companies with few years of existence, which results in having little operational record and therefore data available to study the company and compare it to its peers.
- No financial performance: given its short history, start-ups lack of reliable financial information. During the first years of operations, some start-ups even don't have any revenues, and don't become profitable until they have reached a more mature stage.
- Dependent on private capital: given the high risk that presents investing in a company with such financials, start-ups have to turn to private investors to raise capital with a promise that the business will exponentially grow in the future.
- Success rate: because of the high risks that the business represents, many start-ups fail before being able to turn profitable.
- Multiple claims on equity: due to the nature of the business, capital needs to be raised several times during the lifetime of the start-up. Early investors are exposed to having their shares of the business diluted after several new financing rounds. In order to safeguard their investments, investors seek advantageous conditions that give them priority access to cash flows generated by the company's operations and in the event of liquidation. They also strive for control or veto rights, enabling them to influence the decision-making process and have a voice in the company's actions.

- Non-liquid investments: since investments in start-ups are privately held and not open to public investors, they are by nature illiquid and not easy to monetize in a short-term period.

These specific attributes create issues that will complicate the use of traditional valuation methods. For instance, as mentioned before, there won't be any available and useful financial information to value the company. Also, the risk that a start-up represents will affect valuations, given that future assumptions conducted to value the business will not be credible. Finally, given the illiquid nature of an investment in a start-up, investors will turn to more liquid and secure investments, therefore affecting valuations.

2.1. Venture Capital

Venture capital (VC) is a type of private equity financing that is provided by investment firms or individual investors to start-up companies and small businesses that are believed to have long-term growth potential. VC firms typically invest in companies at an early stage when they are still in the process of developing and testing their product or service and have not yet begun to generate significant revenue (HAYES, 2023).

VC firms provide capital in exchange for an ownership stake in the company. The goal of VC firms is to invest in companies that will grow and become successful, resulting in a high return on investment when the firm or investor eventually sells their stake in the company. This typically involves a multi-year process in which the VC firm works closely with the company to help it grow and achieve its goals.

VC firms typically specialize in Series A and Series B financing rounds and in a particular industry or type of business. They use a variety of methods to identify promising start-ups, such as attending industry conferences and events, conducting market research, and working with business incubators and accelerators.

VC firms typically provide more than just financial support to the companies they invest in. They also offer strategic guidance and mentorship and can help the company connect with industry experts and potential partners. Some VC firms have a network of portfolio companies that they can draw upon to help each other grow and succeed.

The process of securing venture capital funding can be competitive, as VC firms are selective about the companies they invest in and may receive many more pitches than

they can fund. Start-ups seeking VC funding typically go through a rigorous due diligence process, in which the VC firm evaluates the company's business plan, market opportunity, management team, and financial projections. If the VC firm decides to invest, it will typically negotiate the terms of the investment, including the amount of funding, the ownership stake the firm will receive, and any other conditions or requirements.

VC firms typically operate on a fund model, in which they raise money from a group of limited partners, such as pension funds, endowments, and high-net-worth individuals, and use that money to make investments in a portfolio of companies. VC firms typically charge their limited partners a management fee for the services they provide, as well as a percentage of the profits earned from successful investments (Zider, 1998).

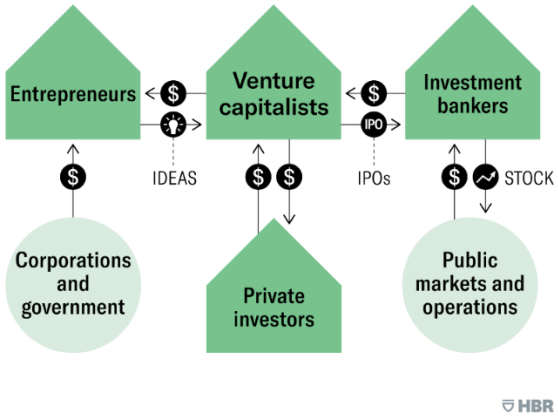
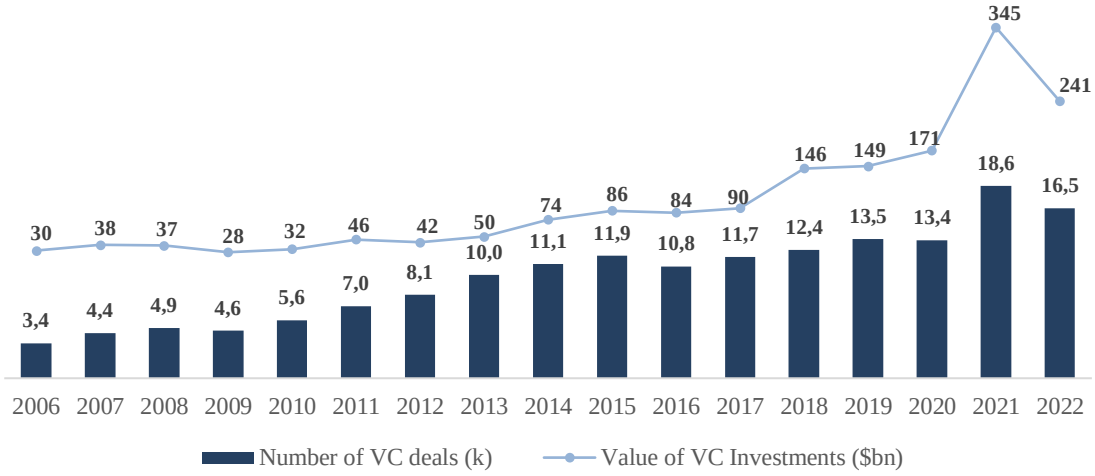


Figure 1-How the VC industry works

As seen in Graph 1, Venture Capital activity experienced an increase In North America in both deal size and deal number. This was mainly due to market optimism due to the end of covid and favourable market conditions with interest rates zero.



Graph 1-VC deal evolution (Statista)

As for Venture Capital activity after 2021, concerns stemming from geopolitical tensions, inflation, economic instability, and turbulence in the banking sector have created a sense of unease among VC investors, leading to a slowdown in investment activity (Leonard, 2023).

Despite these challenges, global venture investments saw a 10% increase to reach $95 billion in the first quarter of 2023, mainly driven by significant deals involving OpenAI and Stripe. The substantial fundraising rounds conducted by these companies contributed to a remarkable 37% surge in funding within the US compared to the previous quarter. However, if we exclude these exceptional investments, US funding actually declined by approximately 7%, while global funding dropped by 9%.

China also witnessed a funding boost in the early part of the year, experiencing a 21% increase compared to the previous quarter, largely attributed to a RMB 500 billion injection by the central bank.

On a global scale, the average deal size for early-stage investments decreased by 13% compared to the previous quarter. However, there was a slight increase in seed-stage deal sizes.

2.1. How are start-ups financed?

Creating and developing a start-up is one of the hardest economic journeys for any businessman. As seen in Figure 2, Start-Ups incur losses before generating any kind of revenue. A start-up requires time to even start generating revenues, and once it does, it will be years before the company generates profits. Given these characteristics, it is safe to say that start-ups are of very high risk but have a very high potential return if they are successful.

Due to the risk profile presented, start-ups are financed in phases, by different types of investors and at valuations depending on their level of development and using equity (Damodaran, 2009). Due to the lack of financial consistency, start-ups do not use debt to finance its operations, since it will add an unnecessary financial risk, and banks will be reluctant to lend money to a business that is not mature and financially stable. As seen in Figure 2, depending in the life stage of the start-up, there are different types of financing rounds.

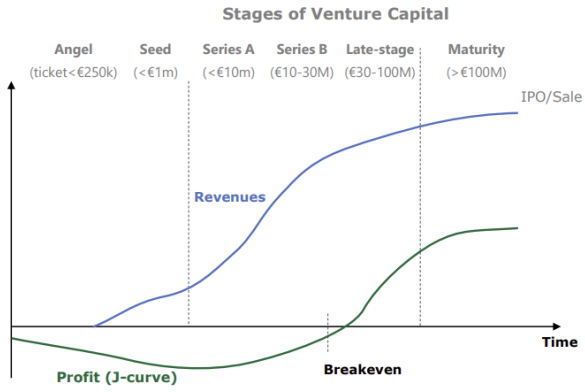


Figure 2-Start-Ups different stages (Damodaran, 2009)

1..1. Seed & Angel

The initial stage of funding for a new company is commonly known as pre-seed funding, where founders, close acquaintances, supporters, and family members contribute capital to help kickstart operations. This phase is distinct from formal funding rounds and occurs during the early stages of establishing the company.

Seed funding represents the first official round of equity funding for a business, marking the initial infusion of capital (REIFF, 2023). It serves to finance crucial aspects like market research and product development. Seed funding amounts can vary, ranging from $10,000 to $2 million.

In contrast, angel investors are affluent individuals who provide financial support to small startups and entrepreneurs in exchange for an equity stake in the company. Angel investors typically offer either one-time investments to assist the business's inception or ongoing funding to support it during its challenging initial phases (GANTI, 2022).

Some startups exclusively pursue seed funding and may not proceed to seek Series A funding rounds. During seed funding, companies typically receive valuations ranging from $3 million to $6 million. Once a business establishes a track record, such as acquiring a user base or achieving consistent revenue, it may be prepared to pursue additional capital raising opportunities.

1..2. Early-Stage VC – Series A, B

Series A and Series B funding are two rounds of funding that startups often go through as they grow and develop their business. Series A funding is the next round of funding after seed funding. In Series A, startups need to have a solid plan to develop a business plan that will generate long-term profits. Investors are looking for innovative companies with a strong strategy to turn those ideas into a successful, money-making business. They invest around $2 million to $15 million, and firms in this stage are valued up to $24 million. Most of Venture Capital Firms engage in Series A rounds, and a few of them usually lead the pack. Equity crowdfunding is also becoming common for companies to generate capital.

A Series B involves raising funding to help the start-up get to a later stage, increasing revenue and reach by expanding into new markets. Start-ups that have already gone through previous rounds of funding already have a validated business model, a significant customer base and a natural next step is to scale the business. Start-ups that participate in Series B are usually more mature and established companies, reflected in the valuations that are usually carried out at this stage, which tend to be between $30 million and $60 million.

Series B and Series A are similar in terms of the processes and main actors. The difference is that in Series B there is the addition of a new specialized Venture Capital Firms that focuses in later-stage investing. Some Venture Capital Firms participate and lead in both rounds as the main investor in order to attract more investors. Angel investors may also invest in this round, but with much less influence than in the previous rounds.

1..3. Late-Stage VC – Series C & Other

Series C funding represents a pivotal investment round for companies that have already achieved significant success. During this stage, investors provide capital to support the development of new products, expansion into new markets, or acquisitions. The primary objective of Series C funding is to facilitate rapid and successful scaling of the company. Typically, investors participating in this round include growth equity firms, private equity firms, institutional investors, and large secondary market groups. These investors expect to make substantial investments in companies that have already demonstrated a successful business model.

Series C funding often marks the final external equity funding round for a company, although some companies may proceed to Series D and E rounds. Companies securing substantial funding in Series C rounds are typically prepared to continue their global expansion efforts. Additionally, Series C funding can be utilized to enhance valuations in anticipation of an initial public offering (IPO). Companies engaging in Series C funding should possess well-established customer bases, revenue streams, and a proven track record of growth.

To illustrate, consider a hypothetical example of a startup that specializes in vegetarian alternatives to meat products. If this company has achieved remarkable success in selling its products within the United States, it may seek Series C funding to expand into the European market. The company could strategically acquire a competitor that holds a significant share of the European market, forming a synergistic partnership. As the venture becomes less risky and more promising, additional investors would be inclined to invest in the company (REIFF, 2023). Companies opting for Series D funding typically do so either to make a final push before an IPO or because they have yet to accomplish the goals set during the Series C funding phase.

1..4. Acquisition, LBO, IPO & SPAC

Once a start-up reaches a more mature stage, the company has succeeded validating its product/service by the market, there are recurring revenues, and the company achieves operative profits. Historical data and performance allow for reliable projections for the future.

These new features presented by the company directly contradict the basic characteristics that distinguish a start-up. Therefore, when a start-up reaches its maturity stage, it is no longer considered a start-up, but a mature company.

It is during this transitional period that the investors of start-ups seek an exit to monetize their investments. There are several methodologies for investors to exit their investment in a start-up. The main ones are:

- Acquisitions / M&A: a strategic investor, usually a competitor, acquires the company, which is now completely own by the acquirer. Investment Banks act as advisors for both the buyer and the seller in the transaction, providing a valuation of the company. Given the stage in which the company is at the moment,

Investment Banks usually carry out traditional valuation methods such as DCF, Precedent Transactions or Public Comparable.

- LBO: a Private Equity firm acquires the company using an LBO, a method of acquiring another company by borrowing a significant amount of money, usually 90% debt and 10% equity. The Private equity firm will sell its stake in the company after some years of operating it. In opposition to traditional M&A, in an LBO the acquirer doesn't always buy 100% of shares of the company. For the transaction, Investment Banks are also involved, and given the nature of the deal, they use an LBO valuation method (KENTON, 2023).
- IPO: an Initial Public Offering (IPO) is a traditional listing of a company in which it offers a percentage of the shares to the public investors for the first time, allowing the company to raise capital. This transition from private to public it's crucial for private investors to monetize their past investment in the start-up. Determining the value of a company during an IPO is a challenging process, so Investment banks and equity research firms collaborate to evaluate the company's pricing and educate potential investors on its potential value (Fernando, 2023).
- SPAC: a Special Purpose Acquisition Company (SPAC) is a public listed company with the sole purpose of raising capital through an IPO to acquire a or merging with another company (Young, 2023). With this methodology, a start-up is acquired by a SPAC and instantly becomes a public company. It is a less complex process than listing the company through an IPO, and the valuation methods are more similar to a traditional M&A.

2.1. Future trends

There are several technological trends that will shape the future creation of start-ups in the coming years. On the one hand, the unprecedented success of OpenAI and its ChatGPT application has led to the widespread integration of artificial intelligence (AI) as one of the most prominent trends in the industry. Through user-friendly interfaces, companies can harness the power of AI to create intelligent products and services. In the retail market, this trend is also being applied, with companies such as Stitch Fix using AI algorithms to recommend personalised clothing options to customers (Marr, 2022).

Another significant trend is the emergence of the metaverse, a more immersive internet environment in which people can work, play and socialise. Augmented reality (AR) and virtual reality (VR) technologies will continue to advance, offering more realistic experiences. Facebook was once a big bet on this trend, and companies such as Microsoft and Nvidia are actively developing metaverse platforms for collaboration on digital projects.

Blockchain technology is also expected to advance significantly by 2023, enabling the creation of decentralised products and services. Decentralised data storage and encryption through blockchain will improve data security, while providing innovative ways to access and analyse information.

Another interesting trend is the convergence of the digital and physical worlds driven by technologies such as digital twins and 3D printing. Digital twins are virtual simulations that replicate real-world processes, products or operations, enabling cost-effective testing and experiments. Engineers can make adjustments based on virtual tests and then use 3D printing to create physical components.

Quantum computing represents one of the most important innovative leaps of the moment and is currently the focus of global R&D efforts. This revolutionary technology has the potential to process and store information at unprecedented speeds.

Finally, advances in green technology will respond to the urgent need to combat climate change, one of the major problems facing society today. Clean energy sources, such as green hydrogen, with minimal greenhouse gas emissions, will gain ground. The development of decentralised electricity grids, powered by distributed energy generation, will increase resilience and reduce carbon emissions. As people become more aware of the environmental impact of technology, there will be greater emphasis on sustainable practices and transparency in supply chains.

Part 2. Valuation Methods

A start-up faces several challenges that may affect its future survival. One critical aspect start-up is involved in is the need of capital to finance its idea. In order to raise capital, it is essential to know the value of the company to negotiate with investors the details of the investment, like the amount and the percentage of the company that represents the raise in capital.

The problem is that there is not just one valuation method. Depending on the characteristics of the company, one method or another will normally be used. The same is true for start-ups. Due to their particular attributes, start-ups are not usually valued using the same criteria as those used to value more mature companies.

This part of the paper will focus on an in-depth study of the different valuation methods that exist when valuing companies, distinguishing between those most commonly used with more mature companies and those used to value start-ups.

2.1. Traditional Valuation Methods

Fundamentally, there are two main traditional approaches to value a company (Bre):

- Intrinsic Valuation: based on projecting and calculating the net present value of the company's future cash-flows.
- Relative Valuation: based on comparing to what similar companies are worth.

2.1.1. Intrinsic Valuation

2.1.1.1. DCF

A Discounted Cash Flow Analysis is an intrinsic valuation method which states that any company is worth the present value of its future cash-flows. To calculate the valuation of a company using a DCF, you have to divide it into two parts: the projection period (the near future) and the Terminal Value (the distant future). To be precise in the projection of the future cash-flows, usually it is assumed that the projection will be from 5 to 10 years (Bre).

So, there are 6 main steps in order to calculate the value of a company using a DCF:

a) Project a company's Free Cash Flows (FCF) over a 5-10 year period:

In this section we will be calculating the Unlevered Free Cash Flow, which is the FCF excluding net interest expense and mandatory debt repayments.

First of all, it's necessary to project the company's revenue growth over the 5-10 year period in order to determine the projected annual revenue. From there, we need to assume an operating margin in order to calculate the Earnings Before Interest and Taxes (EBIT). After that, using the rest of projected information, we calculate the FCF using the following formula:

$$Unlevered\ FCF = EBIT(1-t) + Non\ Cash\ Expenses - \Delta WC - CapEx$$

- EBIT: Earnings Before Interest and Taxes
- t: tax rate
- Non-cash expenses: Depreciation and Amortization
- Δ WC: Change in Net Working Capital
- CapEx: Capital Expenditures

b) Calculate the company's Weighted Average Cost of Capital or WACC:

In a DCF analysis, as a Discount Rate, we will be using the WACC to calculate the present value of both the FCF and the Terminal Value.

We will estimate a company's WACC by separating its capital structure into two components, Equity and Debt, and calculating the cost of each one. The formula is as follows:

$$WACC = r_E \frac{E}{E+D} + r_D \frac{D}{E+D}(1-t)$$

- E: Equity market value
- D: Debt market value
- t: tax rate
- r_D: Cost of Debt, calculated as an average of the interest rates (%)
- r_E: Cost of Equity, obtained using the Capital Asset Pricing Model (CAPM) formula → $r_E = r_f + (r_m - r_f) \times \beta$
    - r_f: risk-free rate

- r_m: expected market return
- β: Coefficient that represents the risk of the company relative to all other companies in the stock market

c) Calculate the Terminal Value:

It is quite difficult to be able to correctly project the future financials of a company in a 5 to 10 year period, and even more difficult to do it until the end of its lifetime. So, in order to estimate the value of a company after the projection period, we calculate what is called the Terminal Value. It can be obtained in two ways:

- Multiples: we assume that the company gets sold for a certain multiple at the end of the projection period. So, to calculate the Terminal Value one must multiply the implied multiple by the end of projection's financials.
- Gordon Growth: we assume that the company's Free Cash Flow keeps growing in the future and that it will operate forever, but the present value of the FCF's each year keeps decreasing due to the WACC being higher than the growth rate of the FCF. So, in order to calculate the infinite sum of future FCF after the projection period, we use the following formula → $TV = \frac{FCF_n(1+g)}{(r-g)}$
  - FCF_n: FCF in the last year of the projection period
  - g: expected future growth rate (should be lower than the expected growth of the GDP of the country in which operates the company)
  - r: WACC

d) Discount the Terminal Value and the FCF to present value and sum them up:

Once calculated both the projected FCF and the Terminal Value, we discount them and sum them in order to calculate the Enterprise Value:

$$EV = \frac{FCF_1}{1+WACC} + \frac{FCF_2}{(1+WACC)^2} + \cdots + \frac{FCF_{n-1}}{(1+WACC)^{n-1}} + \frac{FCF_n}{(1+WACC)^n} + \frac{TV}{(1+WACC)^n}$$

e) Calculate Equity Value through Enterprise Value:

With the Enterprise Value, we can calculate the Equity Value through the "bridge":

$$Equity\ Value = EV - Net\ Debt - Minority\ Interest - Preferred\ Stock$$

f) Calculate the value per share of the company:

Now, with the Equity Value calculated, we can proceed to obtain the share price:

$$Share\ price = \frac{EqV}{\#\ of\ shares}$$

Limitations and suggested approach for Start-Ups

Given the nature of a DCF analysis, there are certain limitations when conducting a start-up valuation using this method. Since it's necessary to project financial data far in the future and is based on the ability of the company to generate positive cash-flows, it will be difficult to predict an accurate valuation using a DCF. The main challenges that present this analysis when applied in a start-up are:

- Projections: given the lack of positive cash flows during the first years of operations, and the difficulty to predict the investment in CapEx (and subsequently the D&A expenses), the valuation may end up being negative.
- WACC: since start-ups are only financed by equity, the WACC would be equal to the cost of equity. But since there are no public comparable peers to calculate the Beta, there is an issue when deciding which beta should be used when calculating the WACC.
- Terminal Value: compared to traditional companies, in which the Terminal Value represents around 60% of the total value of the company, in a start-up valuation using a DCF, the Terminal Value could be up to 90% of the total value of the company. Also, given the nature of a start-up in which growth is a key attribute, it's difficult to project the future growth g.

To mitigate the limitations presented by a DCF analysis, investors turn to different approaches to come up with a valid valuation:

- Top line and bottom line, no detail: Valuing young companies is challenging due to uncertainty in cash flow and reinvestment details. Hence, the valuation should focus on revenues and earnings, with little consideration for intermediate items that separate earnings from revenues or reinvestment requirements that separate earnings from cash flows.

- Focus on short-term: given the difficulty to correctly predict future cash-flows for start-ups, the projection period should be cut to 3 to 5v years.
- Mixing relative and intrinsic valuation: for the Terminal Value calculation, use the multiple option instead of the Gordon Growth.
- Discount rates: take into consideration additional risks, like business failure risk.

2.1.1.2. LBO

A Leveraged Buyout (LBO) is the acquisition of another company using a significant amount of debt to meet the cost of the acquisition. In an LBO, there is usually a ratio of 90% Debt and 10% Equity. This is a common structure used by Private Equity Firms when investing in companies. By using a high percentage of debt in the acquisition, and then paying off the debt using the company's cash-flows to repay the debt, they boost returns when selling the company after some years of operating it. Usually, Private Equity firms target around 15-25% of IRR.

Although an LBO is more of an acquisition structure, Private Equity Firms use it as a valuation method by setting a target IRR and establishing how much they would be willing to pay for the company.

The valuation process of an LB O is as follows:

a) Initial assumptions to take into consideration:
   - Target IRR
   - Debt Structure:
     - Types of Debt (i.e. term loans, mezzanine, revolver, etc.)
     - Interest rates
     - Leverage multiple according to the type of Debt (usually using an EBITDA multiple)
     - Amortization and annual repayments
   - Entry and Exit multiples
   - Time period (t)

b) Projections:

It's necessary to project the financial statements of the acquired company into the future (for an LBO it's usually 3-5 years). To do so, we assume a revenue growth (%), operating expenses as a percentage (%) of revenues to get to EBITDA, Depreciation & Amortization according to CapEx investments, etc. It's important to take into account the operational enhancements the Private Equity Firm is planning when developing the projections.

Also, a new capital structure needs to be taken into consideration, since the Private Equity firm probably paid the existing debt when acquired the company and imposed a new debt (the one used to buy the company). These changes will also affect the financial statements, since the interest expenses will me modified, and subsequently the Cash available for financing activities (the cash that will be used for debt repayments).

c) Exit:

At the end of the time period, when selling the company, the Private Equity firm will use the Exit Multiple from the assumptions and the last year's financials to come up with an Enterprise Value. By subtracting the Net Debt and other adjustments, The Private Equity firm can come up with the Exit Equity Value.

d) Valuation:

Using the target IRR and the Exit Equity Value, a Private Equity Firm can come up with the maximum Entry Equity Value they're willing to pay for the company:

$$Entry\ Equity\ Value = \frac{Exit\ Equity\ Value}{(1 + IRR)^t}$$

Limitations and suggested approach for Start-Ups

Just as with the previous analysis with the DCF, the nature of start-ups presents significant limitations when valuing them using traditional valuation methods. Some of the most important limitations when using an LBO to value a start-up are:

- Target IRR: since an investment in a start-up represents a higher risk than any other traditional investments, the target IRR should be higher than what Private Equity firms usually aim for.

- Debt: because of the high risk and the lack of positive cash-flows or profit during its first years of operations, start-ups are not financed by any debt.
- Debt repayment: due to the lack of positive cash-flows, the start-up would not be able to repay the debt.

Taking into consideration some of the main attributes that makes a company a good LBO candidate, such as having a stable and predictable cash-flows, being a low-risk business, having the opportunity to cut costs or a solid base of assets to use as collateral for debt, by nature, a start-up is a bad candidate for an LBO.

To mitigate these limitations presented by an LBO analysis, investors turn to different approaches to come up with a valid valuation.

First, investors should aim at using a low percentage of debt for the acquisition of the start-up. In addition, given the negative cash-flows, investors should negotiate the use of different types of debt, like Mezzanine, that allows the interest payments to be cumulative (PIK interest) and does not allow annual repayments.

Finally, investors should adjust the target IRR and take into consideration the risk that presents an investment in a start-up.

2.1.2. Relative Valuation

2.1.2.1. Trading comparables

This valuation method is used in any industry because is universally applicable. To value a company using this methodology, we need to multiply on of the operating results of the company by a given multiple, which is calculated by taking the average multiple from peers in the industry.

For this valuation method to be efficient, it's essential to have access to a good data set of public companies that operates in the same industry as our start-up. Depending on the industry, we will be looking at different metrics and valuation multiples.

Some of the most common multiples used in valuations are EV/Revenue, EV/EBITDA, EV/EBIT, EqV/NetIncome, etc. In addition, for valuation purposes, normally it is used a projected multiple for FY+1 when valuing a company using trading comparables.

To determine what makes a good comparable for the valuation, a company, or a start-up, must have the following features:

- Geography: the compared companies must belong to the same geographical area, since the economic, social, political and operational situation varies in different countries.
- Industry: to be efficient and valid, we need to compare companies that have similar business models and characteristics.
- Financials: companies with different sizes present different risks and opportunities.

Limitations and suggested approach for Start-Ups

This methodology, as the ones presented before, also present challenges when applying it to value a start-up. Some of these challenges are:

- Multiples: since a start-up usually presents negative results (EBITDA, EBIT, Net Income, etc.), it will be impossible to be able to compare it to it's peers in the industry using these metrics. The only multiple that could be used is EV/Revenue (if the start-up already generates revenue).
- Projections: in traditional valuation it is often used the next year's financials to calculate the multiple. When valuing a start-up, it's difficult to predict future financial results.
- Comparables: there are certain features difficult to match when trying to find comparable companies for a start-up. For instance, it may be difficult to find companies that have similar business models or operates in the same industry.
- Expected growth: one of the key value features of a start-up is its expected growth, and this valuation method ignores it.

To mitigate these limitations presented by a Trading Comparables Valuation Method, investors turn to different approaches to come up with a valid valuation.

- Use different type of metrics that do not take into consideration the financials of the company, but rather its operational and business success. For internet companies, is quite common to use metrics such as Unique Visitors, Registered Users, number of downloads, etc.

- Use predictions from further in time (FY+2 or FY+3) so the start-up has time to start generating positive operating results.

2.1.2.2. Precedent Transactions

This methodology shares similar characteristics to the previous valuation method. The difference is that Precedent Transactions values companies using information on how other investor valued companies in the same industry in recent years. The multiples used are the ones in which companies were valued in recent M&A transactions.

With this methodology, investors use the same metrics as in the Trading Comparables analysis. Also, when using Precedent Transactions, it's possible to use information from both public and private companies.

To determine what makes a good transaction to be included in the analysis, it must have the following features:

- Geography: the company acquired must belong to the same geographical area, since the economic, social, political and operational situation varies in different countries.
- Industry: to be efficient and valid, we need to compare transactions in which the companies have similar business models and characteristics.
- Financials: companies with different sizes present different risks and opportunities, so we need to find transactions in which the companies had similar financials.
- Time: it's important to compare transactions from recent years, as the economic, social and political environment varies with time.
- Type of buyer: it's key to compare transactions according to the type of buyer, since strategic buyers (Corporations) may pay a higher multiple (existence of synergies) for a company than a Private Equity firm.

Limitations and suggested approach for Start-Ups

This methodology, as the ones presented before, also present challenges when applying it to value a start-up. Some of these challenges are:

- Financials: since a start-up usually presents negative results (EBITDA, EBIT, Net Income, etc.), when using this methodology, we can obtain a negative valuation for a start-up.
- Information: for different purposes, specific information about transaction multiples is, sometimes, not disclosed in an acquisition. So finding useful data for the analysis may be a challenge.
- Comparables: there are certain features difficult to match when trying to find comparable companies for a start-up using this methodology.

To mitigate these limitations presented by a Precedent Transactions Valuation Method, investors turn to different approaches to come up with a valid valuation.

- Use of their own transactions data base to come up with a valid multiple.
- Use EV/Revenue as a metric to compare different transactions. In addition, as mentioned in point 2.1.2.1, there are different operational metrics that could be also used to value a start-up.

2.2. Start-Up Valuation Methods

Start-ups are companies that are in the early stages of operation and are often seeking funding to grow and develop. Valuation is the process of determining the worth of a company, which is important for both founders and investors because it allows them to track the effectiveness of strategic decision-making and the performance of the venture (Maria Garkavenko, 2022). Start-up valuation is different from the valuation of established companies because start-ups often have little or no revenue and are therefore considered high risk.

The value of a start-up is difficult to calculate due to the lack of a universally accepted formula. Valuing a start-up is at best an estimate, which can be based on various methods such as the expected return on investment and the amount invested. Higher and more accurate valuations increase the chances of attracting funding, although research shows that the average start-up has less than a 1% chance of reaching a billion-dollar valuation (Parikh, 2018).

2.2.1. Venture Capital Method

It's the most common approach used by Venture Capital Firms when valuing a start-up. It is used from the perspective of an investor who is seeking a specific return on investment. Investors will seek a return equal to some multiple of their initial investment or will seek to achieve a specific internal rate of return based upon the level of risk they perceive in the venture.

The investor also estimates the future sale price of the start-up and uses these factors to determine the maximum price they are willing to pay for an investment, taking dilution into account. Since this method follows only the interest of the Venture Capital firm, who values the start-up according to the expected return for their investors after a limited period of time, the Venture Capital Method is criticized in the industry for its lack of theoretical basis. This method is valid for both start-ups that have not yet produced revenues and start-ups that have produced revenues (Nasser, 2016).

This approach has four steps to it (Damodaran, 2009):

a) Step 1: define a period in which the VC will sell the company. Then estimate the expected earnings or revenues for the projected years.
b) Step 2: the value at the end of the projected period is calculated by multiplying the financials of the last projected year by a selected valuation multiple based on traditional valuation methods. The result will be the Exit Value of Investment. Depending on the multiple used, we will obtain either the Enterprise Value or the Equity Value, so extra steps should be taken in order to end up with the Equity Value.
c) Step 3: set a target IRR. This IRR should reflect the risks that a start-up represents and the illiquid nature of the shares of a start-up. Then, the estimated Equity Value calculated in step 2 is discounted back with the IRR to obtain the present value of Equity Value. Generally, IRR is set high to capture the risk that presents an investment in a start-up. The resulting value of the Equity Value today will be the post-money valuation of the start-up.

$$Post\ money\ Valuation = \frac{Equity\ Value\ in\ n\ years}{(1 + Target\ IRR)^n}$$

The pre-money valuation can be calculated with the following formula:

$$Post\ money\ Valuation = Pre\ money\ Valuation + New\ capital\ infussion$$

d) Step 4: a VC firm invests capital in a start-up in exchange of a portion of the company. In order to decide what percentage of the firm they receive in the transaction, the following formula is used:

$$\%\ of\ Equity = \frac{New\ capital\ infussion}{Post\ money\ Valuation}$$

Despite having several limitations, such as the lack of attention to operational items of the financial projections and focusing only on revenues and earnings, the Venture Capital Method presents improvements over the traditional valuation methods when applied to start-ups.

First of all, the start-up is valued at the end of the exit stage set by the Venture Capital. Given the longer projection period, the financials of the start-up at that stage will be more mature and easier to compare to other companies in the industry.

Secondly, the use of a target IRR as a discount rate simplifies the calculations and includes additional aspects (i.e. risk of failure) that parameters like WACC do not take into account.

Finally, in this methodology the financial projections are forecasted using only the most important items for the valuation, simplifying the estimates. Nevertheless, as mentioned before, it could also mean that the projections may not be entirely accurate.

2.2.2. Real Options

Real options encompass the valuable rights available to a company's management to either pursue or reject a business project or investment opportunity based on evolving economic, technological, or market conditions. In contrast to financial options that involve tradable securities, real options typically involve tangible assets like machinery, land, buildings, and inventory. By considering real options, managers can assess the opportunity cost associated with continuing or abandoning a project, enabling them to make informed decisions (Hayes, 2021).

Valuation techniques for real options closely resemble the pricing of financial options contracts, with the spot price or current market price representing the present net present value (NPV) of a project. The NPV signifies the expected cash flow derived from the new project, discounted by a rate that reflects the potential earnings from alternative ventures. This alternative rate or discount rate could be based on the yield of a US Treasury bond or a comparable benchmark.

Real Options valuation is a popular method used for start-up valuation due to the complex and flexible nature of start-ups. Start-ups progress and validate concepts through a step-by-step approach, requiring new investments for each stage. This is reflected in the financing rounds for start-ups, where only those who validate concepts and meet milestones succeed in moving to the next stage and financing round. Real Options approach considers this characteristic of start-ups by treating the different founding opportunities and steps as call options for investors and the company. Each financing round provides the option to decide whether to finance the next step or not, without obligation. The maximum loss for investors and start-ups is limited to the initial

investment, which is equivalent to the call option premium. This flexibility allows start-ups to be valued as Real Options.

There are mainly two Real Options valuation methodologies for start-ups: the Cox-Ross-Rubinstein and the Black & Scholes model. Both methods allow to calculate the value of a start-up following an equivalent analysis for the calculation of a Call Option, which is applied to Financial Options, and in similar way to Real Options.

Parameter	***Financial Option***	***Real Option***	***Start-Up Valuation***
C	Call Option value	Valuation of a project	Valuation of the Start-Up
S	Sport price of the underlying asset	NPV of the expected Cash - flows from the project	NPV of the expected Cash-flows from the Start-Up
E	Strike price	Required investment for the project	Required capital for the Start-Up
r	Risk-free rate	Time value of money	Time value of money
t	Time to maturity	Possible deferral of the investment decision	Time until raised capital is invested
σ	Standard deviation of returns on the stock	Riskiness of the project	Riskiness of the Start-Up

Table 1-Real Option parameters

2.2.2.1. Black & Scholes model

It's one of the most important concepts in modern financial theory. It's a differential equation widely used to price options contracts that can be also used to value underlying assets. In this case, it can be used for start-up valuation purposes (Hayes, 2023).

Following this model, we can value a Call Option (or a Start-Up in this case) with the following formulas:

$$C = S \times N(d_1) - E \times e^{-r \times t} \times N(d_2)$$

Where:

$$d_1 = \frac{ln\frac{S}{E} + (r + \frac{\sigma^2}{2}) \times t}{\sigma \times \sqrt{t}}$$

$$d_2 = d_1 - \sigma \times \sqrt{t}$$

$$N(x) = Normal\ distribution$$

2.2.2.2. Cox-Ross-Rubinstein model

This model makes the assumption that the underlying asset (or the stock) takes on one of only two possible values each period, following a multiplicative binomial process over discrete periods. While this may seem unrealistic, the assumption leads to a formula that can accurately price options (Levyne, 2020).

For this model, the following parameters are also considered on to of the already mentioned before:

- u: factor that determines potential upside
- d: factor that determines potential downside
- p: probability of upside scenario
- n: total number of periods

The formulas for this model are as follows:

$$u = \sigma \times \sqrt{t/n}$$

$$d = \frac{1}{u}$$

$$p = \frac{R_f - d}{u - d}$$

$$R_f = (1 + r)^{t/n}$$

Once calculated, the next step is to build two trees, one for the spot price of the underlying asset (S) and one for the Call Option Value (C) (Pennacchi).

The values in the S tree are calculated from left to right using the values of S, u and d.

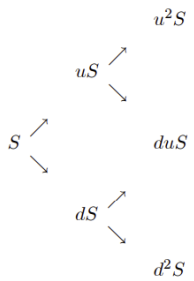


Figure 3 - S Tree (Pennachi)

The values of the C tree are calculated starting from right to left, using the right values of the S tree. Note that in the Figure 4 the value X stands for the strike price, which in our case we have used the letter E to identify it.

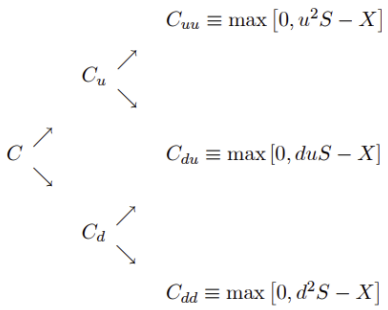


Figure 4- C Tree (Pennachi)

From the C tree is deducted the following formula:

$$C_{u^i d^{n-i}} = \max\left(0; S_{u^i d^{n-i}} - E\right);\ \forall\, i\ \in [0, n]$$

In the end, the Call Option value is obtained with the following formula:

$$C = \frac{1}{{R_f}^n} \sum_{k=0}^{n} {C_n}^k \times p^k \times (1-p)^{n-k} \times \max\left(0; u^k \times d^{n-k} \times S - E\right)$$

2.2.3. First Chicago

The First Chicago method is widely used by Venture Capital Firms and Private Equity firms when valuing start-ups. It involves creating three valuations (worst, normal, and best-case scenarios) using the DCF Method or another formula and assigning probabilities to each scenario. The final valuation is the weighted average of these scenarios. The First Chicago Method is meant for post-revenue start-ups (Nasser, 2016).

This analysis shares the same procedure as the Venture Capital method, with some extra steps. Those are:

a) Number of scenarios: when projecting the financial data, choose different scenarios that considers all possible outcomes of the future of the company. Usually, investors when using this methodology define three scenarios:

i. Best-Case → Target scenario stated in the Business Plan
ii. Mid-Case → Survival scenario, the start-up does not reach expected projections
iii. Worst-Case → Failure scenario, lost all value

b) Multiples: select a valuation multiple accordingly with the scenario and obtain different Exit Equity Values.
c) Discount rate: since the risk of failure is already considered in one of the scenarios, WACC is used as the discount rate for the valuation. Since start-ups are only financed by equity, the resulting discount rate will be the cost of equity of the WACC formula.
d) Scenarios' probability: determine the probability of each scenario to use it for the post-money valuation.

2.2.4. Berkus Approach

A straightforward and practical guideline exists for approximating the value of a fledgling company with no historical track record or income. This approach was formulated by Dave Berkus, an esteemed author and business angel investor. The foundation of this method revolves around a fundamental question: Do you believe that the start-up has the potential to generate $20 million in revenue within its first five years of operation? If the answer is affirmative, a financial valuation is allocated to each of the five key risk factors encountered by all early-stage companies. Each factor can contribute up to €500k in value to the start-up, resulting in a valuation of €2 million. If the company has already initiated sales, the valuation can reach €2.5 million.

This method not only provides investors with an estimation of the pre-money valuation but also assists founders by identifying areas in which they can enhance their business. It should be noted that the Berkus Method is specifically designed for pre-revenue start-ups (Nasser, 2016).

If Exists:	*Add to Company Value up to:*
Sound Idea *(basic value)*	$1/2 million
Prototype *(reducing technology risk)*	$1/2 million
Quality Management Team *(reducing execution risk)*	$1/2 million
Strategic relationships *(reducing market risk)*	$1/2 million
Product Rollout or Sales *(reducing production risk)*	$1/2 million

Table 2- Berkus Valuation Table (Nasser, 2016)

2.2.5. Additional valuation methods for Start-Ups

Start-up valuation is a complex process. Given the particular characteristics of start-ups, traditional valuation methods are difficult to apply in most cases. Some current methods, such as the Venture Capital Method or Real Options attempt to provide a way out when valuing a start-up, but given the variety that exists in the market, it is not always possible to use these methods. That is why there are several alternative start-up valuation methods that try to provide solutions when the others have failed. Some of these methods are:

There are several methods that can be used to value a start-up, including:

- The Risk Factor Summation Method: This approach is a variation of the Berkus Method, which involves assessing the value of a startup by establishing an initial valuation and subsequently adjusting it based on 12 risk factors that are inherent to the process of building a company. To determine the initial value, an average value is calculated based on comparable startups. The risk factors are then represented as multiples of $250k, with a range from $500k for low risk to -$500k for high risk. However, one of the challenges with this valuation method lies in obtaining relevant data pertaining to similar startups. It is important to note that the Risk Factor Summation Method primarily applies to startups in the pre-revenue stage (Nasser, 2016).
- The Scorecard Valuation Method: The initial valuation of a project is established, and then adjustments are made based on specific criteria. The unique aspect lies in the evaluation of these criteria, which is determined by their significance in

contributing to the overall success of the project. It's important to note that the Scorecard Valuation Method is primarily utilized for pre-revenue start-ups (Nasser, 2016).

- The Book Value Method: This valuation approach pertains to the quantifiable value of the physical assets possessed by the start-up. However, it is not well-suited for evaluating start-ups since their value primarily lies in intangible assets such as research and development (for biotech start-ups), user base, and software development (for web start-ups), among others. Therefore, this method is not particularly relevant for assessing the worth of start-ups that prioritize intangible assets over tangible ones. (Nasser, 2016)

2.3. Factors related to valuation

After taking a closer look at the previous valuation methods, it's important to point out that no single valuation method is perfect, and it is important to consider the strengths and limitations of each method and how they apply to the specific start-up being valued. The best approach may involve combining multiple methods and using them in conjunction with expert judgment and market data.

Ultimately, the value of a start-up is a function of its potential for growth and the risks associated with that growth. Accurate valuation requires a deep understanding of the company, its market, and the competitive landscape, as well as the ability to make informed assumptions about the future.

As a result, start-up valuations are often based on qualitative characteristics rather than quantitative analysis of financial performance. Researchers have used various methods, including surveys and interviews with venture capitalists and regression analysis, to study start-up valuation. More recently, advances in data science have led to the use of machine learning models for start-up valuation and the prediction of success (Maria Garkavenko, 2022).

There are several qualitative factors to take into account.

According to Jaydip Parikh in his article "7 factors that influence Start-up valuations" (Parikh, 2018), VC and Bas should focus on the following aspects when conducting a start-up valuation:

1. Paying customers who actually use the product: None of the leading start-ups in the United States operate solely as free-to-use services. Without exception, each of these companies has a customer base that generates revenue. Regardless of how ground-breaking an idea may appear, it is imperative for a start-up to acquire customers who are willing to financially support the value it provides. To attract investment, a start-up must establish a well-defined revenue model that outlines how it generates income.
2. Traction: Where are you going and how fast are you getting there?: A desirable startup for investment is one that is in the early stages of its lifecycle and has strong potential for growth, with a clear plan about where the company is heading in the next months. One example of a start-up that had a remarkable growth during its first months as a company, and therefore was reflected in the valuation, was the company Bird, that managed to get a $1 billion valuation after 1.25 years after being founded.
3. Profitability: Show me the money!: Start-ups shouldn't only focus on revenues. It could lead to disaster to disregard margins, profitability and cash-flows.
4. Brand value: Brand awareness is important for start-ups because it helps attract customers and drives success. Marketing efforts can help increase brand awareness, but it can also come from word of mouth and PR.
5. Frequency of capital infusion: Investors often see a start-up that has received multiple rounds of funding as a promising opportunity, since earlier investors had confidence in its potential. Past funding can also make it easier for a start-up to secure additional funding in the future. However, it can be challenging for a start-up to attract initial investors and secure seed capital. Once a start-up has established itself and gained buzz in the investor community, subsequent rounds of funding may be based on previous funding rounds and the company's reputation.
6. Competition and maturity of market: Being the first to enter a new market or develop a novel business concept can be challenging for start-ups, as they must convince both investors and consumers of the value of their idea. But if successful,

it can have a significant positive impact in the valuation of a start-up. On the other hand, entering a mature market with established players may limit a start-up's growth potential and make it harder to secure funding.

7. Understanding of business model: Ultimately, the level of funding you secure and the valuation you achieve depend on the nature of your industry and your ability to effectively navigate it. While hindsight offers perfect clarity, the key lies in making well-informed decisions in the present moment, as these choices can significantly impact your success (Nasser, 2016).

Another point of view about which factors affect a start-up valuation is the one given in the article by Maria Garkavenko (Maria Garkavenko, 2022). It's stated that the factors that could have an impact in the valuation are: Financial Capital, Human Capital, Product and Technology, Market and Industry, Social Capital and Online Legitimacy. In the study conducted in the paper, the authors came up with the conclusion that Financial Capital, Human Capital, Online Legitimacy and Industry and Market Timing are the main factors that affects valuation. Using data science methods, the researchers concluded the following:

- Financial Capital: This study found that past funding and number of previously secured funding rounds have a direct impact on start-up valuation. However, the number of funding rounds may not be as important as the amount of money raised in those rounds. Additionally, the number of crowdfunding campaigns led by a start-up was found to indirectly affect valuation through its impact on the number of previously secured funding rounds. Further research is suggested to investigate the role of fundraising and crowdfunding in predicting and explaining start-up valuation.
- Human Capital: This study found that the human capital factor, which includes team heterogeneity characteristics, is the second-most predictive factor for start-up valuation. The number of different nationalities in a start-up and the presence of American officers in the team were found to be both good predictors and direct causes of start-up valuation. Additionally, the investor experience of the management team was found to be a direct cause of start-up valuation and a good predictor of it. The variables of the team experience group (officer age, past appointments, and money raised by previous companies) were found to be among the best predictors of valuation but were not direct causes of it.

- Online Legitimacy: This study found that various web-visibility variables have an impact on start-up valuation and can be useful for predicting it. The search results from the start-up's own domain and Techcrunch.com were found to be important predictors and direct causes of valuation. The number of appearances of a start-up in any news source was found to be a good predictor but not a direct determinant of valuation. Other web-visibility variables, including search results from websites and Twitter-related variables, were found to be good predictors of valuation but not direct determinants of it. Twitter likes was found to be the only direct cause of valuation among Twitter variables. Future research should analyse the roles of different social media networks for start-up valuation.
- Industry and Market Timing: This study found that the start-up age and industry costliness variables from the industry-related variable group directly affect start-up valuation.

There are several other studies evaluating the importance of such variables when conducting a valuation. For example:

- The article "Twitter sentiment as a weak signal in venture capital financing" by A. Tumasjan (Tumasjan, 2021) states that Online Legitimacy and Product & Technology are the main factors that influence the valuation of a start-up. To do so, the researchers gathered data of 4600 VC financing rounds in the US. The findings of the authors are that twitter sentiment is positively associated with venture valuation. However, it is not correlated with long-term investment success.
- The article "Valuation of a startup: Moving towards strategic approaches" by M. Dhochak and P. Doliya (M. Dhochak, 2020) states that Human Capital, Social Capital and Industry & Market are the main factors that influence the valuation of a start-up. To do so, researchers gathered data of 25 VCs in India.
- The article "Private equity investment criteria: An experimental conjoint analysis of venture capital, business angels, and family offices" by J. Block (J. Block, 2019) states that Financial Capital, Human Capital and Product & Technology are the main factors that influence the valuation of a start-up. To do so, the researchers gathered data from 749 private equity investors. The findings were that revenue growth is the most important investment criterion, followed by the value added of product/service, the management team's track record, and profitability.

Like these articles, there are over 11 more similar articles that study the effect that the factors previously mentioned have on the valuation of a start-up.

2.4. Shareholders Agreement Effect in valuation

When investing in a start-up, there are several factors related to the Investment Structure that influence the company's valuation. These factors are determined during the Negotiations phase, which is where Venture Capital firms play a significant role by participating in financing rounds.

The agreed-upon terms during negotiations can cause an investor to pay more or less for a particular start-up, since it will determine how protected and advantaged the investment is.

This section outlines some Term Sheet aspects that significantly impact the valuation. These aspects must be discussed and agreed upon by the founders and various investors.

Commonly disputed points in Term Sheets include (Does a company's shareholders' agreement impact its valuation?, 2023):

- Number of new shares: depending on the valuation and financing round, there will be conflict between what percentage of the equity the founders are willing to give up and what percentage of the company the Venture Capital wants to acquire according to the specific criteria of the VC.
- Restriction on transfer of shares: shareholders may negotiate restrictions on the transfer of shares. However, it's important to find a balance as overly restrictive transfer provisions may limit the liquidity of the shares and make them less appealing to potential buyers.
- Rights of first refusal: gives existing shareholders often have the right of first refusal, which allows them to purchase shares before they are offered to new investors. This provision can create uncertainty for potential new investors if the terms of the financing round are unclear.
- Employee Option Pool: VC firms typically want to establish an employee option pool to attract talented individuals to the company. However, founders may have concerns about dilution of their own shares as a result.

- Funder Vesting: founder's stock may be subject to a vesting period, ensuring their commitment to the company over time.
- Dividends: the issue of dividends, including their value and growth rate, is an important agreement to be reached between the founders and the VC.
- Founders Salary: decide with the investors the annual salary of the founder.
- Drag-along and tag-along rights: these agreements allow majority shareholders (drag-along) to sell their shares along with the company, and provide an opportunity for minority shareholders (tag-along) to participate as well.
- Voting and governance rights: the allocation of voting rights and the composition of the Board of Directors and management team are crucial for decision-making processes and governance.
- Exit clauses: sell provisions are included in the agreement, which can impact how and when shareholders can exit the startup.

Part 3 – The BUMBLE Inc. Case

After exploring company valuation methods in Part 2 of this paper. Both traditional valuation methods and valuation methods more in line with start-ups have been studied. With the theory in mind, it is now time to put the knowledge we have studied to the test and use it to value a real case.

In this Part 3 of the final master's thesis, we will study the real valuation case of Bumble, an American company that operates dating platforms.

First of all, an overview of the company will be given to present Bumble Inc. and understand what is they do, the history of the company, their different platforms and their business model. Then, the details of the IPO of Bumble Inc. will be given for future analysis. For valuation purposes, it's essential to understand the industry's key drivers and its main players. Finally, the different valuation methods studied in this paper will be applied.

The objective of this study will be to compare the results obtained with each other together with the valuation obtained in 2021 when the company went public through an IPO and thus reach a conclusion. That is why the valuation study will be carried out as of 2021.

3.1. Company overview

In recent years, society has undergone a huge change in the way we live. The internet revolution has not only changed us as people, but it has also changed our habits as members of a society and the way we interact with each other.

In order to adapt to the new society we live in, and in order to empower relationships between people, especially women, in 2014 Whitney Wolfe Herd and Andrey Andreev founded Bumble, an American company based in Austin, Texas with over 650 employees. Bumble is an online dating app with an international presence. The operation of the App is very simple, users only have to "swipe left" to reject a candidate or "swipe right" to indicate interest.

According to founder Whitney Wolfe Herd, Bumble is a "feminist dating app" (ALTER, 2015) in which, in heterosexual couples, women are the ones to make the first move and

open up to men in case of a match. When both parties are gay, either person can send a message first.

As of January 2021, Bumble had a monthly user base of 42 million and was the second most popular dating app in the United States, behind only Tinder.

The app is one of the products of Bumble Inc, which offers online dating and social networking platforms in North America, Europe and internationally. It owns and operates various websites and apps that offer subscription-based dating products and in-app purchases. The company operates three apps, Bumble, Badoo and Fruitz.

3.1.1. History

Whitney Wolfe Herd, former vice president of marketing at Tinder, founded Bumble in 2014 after leaving Tinder and suing the company for discrimination and sexual harassment. She settled for more than $1 million. After this incident, Andrey Andreev, founder and CEO of Badoo, and Whitney got in touch discussed the possibility of forming a partnership and founding a company in the online dating space. After a $10 million investment by Andreev, the resulting company would be owned by Andreev (79% of the shares) and Wolfe (20%).

Soon after, they founded Bumble. The new company used Badoo's infrastructure to develop the new platform, and in order to solidify the project and design the final interface, they hired two former Tinder employees, Chris Gulczynski and Sarah Mick. Bumble was launched three months later, in December 2014.

The company introduced BFF mode in 2016, allowing users to not only find matches, but also find platonic friends. It also partnered with Spotify to connect users' music interests with their profiles and launched Bumble Bizz, a professional matchmaking app.

In November 2017, Bumble's parent company MagicLab was valued at over $1bn and when in 2019 The Blackstone Group acquired a majority stake in the company, Bumble and its sister apps reached a valuation of $3bn. The company generated $162m in net revenue in 2018 and launched its lifestyle magazine, Bumble Mag, in 2019. In 2020, MagicLab rebranded as Bumble Inc, overseeing both Bumble and Badoo, and the user base surpassed 100 million.

Bumble went public in February 2021, raising $2.15bn through its IPO and reaching a valuation of over $5bn. It listed on Nasdaq, with shares initially trading at $43, but reaching $76 on the first day, valuing the company at more than $13bn.

In February 2022, Bumble made its first acquisition when it bought Fruitz, a freemium dating app popular with Generation Z in Europe.

3.1.2. Bumble Inc. Applications

3.1.2.1. Bumble

The online dating app was founded in 2014 as one of the few online dating platforms created with the idea that women should be at the centre of the interaction, taking the first step and have to contacting the other user in case of a match. The App is a leader in the online dating market in many countries, like the US, UK, Australia or Canada, and as of December 2022, it had approximately 2 million paying users.

The operation of the App is very simple. As a first step, new users must complete some required basic information regarding name, age, gender identity, sexual orientation or who they are looking for. Also, users must upload a set of photos. Users also have the opportunity to further personalise their profile by giving extra information that may be of interest to potential matches.

Bumble utilizes a matchmaking algorithm to facilitate connections between individuals based on their preferences. This algorithm recommends potential matches to users, who can then indicate their interest by swiping right or move on to the next profile by swiping left. Additionally, users have the option to leave compliments on specific photos or profiles based on their geographic location.

When a mutual match occurs, a connection is established. In heterosexual connections, it is required that women take the first step by initiating a chat. Free users are granted the ability to extend one match per day, giving them an additional 24 hours to engage with the connection.

Bumble offers two premium subscription options, namely Bumble Boost and Bumble Premium. These subscriptions provide users with enhanced features that increase their

likelihood of finding a compatible match. Some of the most popular features included in the subscription plans are:

- Beeline: the Beeline shows you which users have already viewed your profile and voted yes, but on whom you have not yet voted one way or the other. Thanks to the Premium subscription, users not only have access to Beeline, but can also apply their filters according to the information available with Beeline for a more personalised experience.
- Rematch: allows subscribed users to "rematch" any of the previous "matches" that have already expired after a 24-hour period.
- Extend: Bumble Boost and Bumble Premium subscribers have an unlimited number of 24-hour extensions on conversations.
- Travel Mode: allows users to modify their location and explore potential matches in different parts of the world.
- Incognito mode: enables users to swipe privately and maintain their anonymity, and only becomes visible to those whom they have shown interest in by swiping right.

In addition, Bumble offers users various in-app purchases, catering to both subscribed and non-subscribed users. These additional features enhance the user experience and provide more opportunities increase the number of connections. Some of the available in-app purchases include:

- SuperSwipe: This feature allows users to express their interest in potential matches by notifying them directly. Normally, a "yes" vote remains anonymous until both parties show mutual interest, but SuperSwipe offers a more upfront approach.
- Spotlight: Users can use the Spotlight feature to boost their profile visibility and increase their chances of being seen by more potential matches. By moving their profile to the top of the list, they can attract immediate attention.
- Compliments: Extra Compliments can be purchased, enabling users to react to other users' bios, photos, or profile messages. This feature adds a personal touch and allows for more engaging interactions.

Aside from its dating aspect, Bumble extends its offerings to foster social connections in other areas as well. Bumble BFF allows users to find and build friendships, while Bumble

Bizz focuses on professional networking and mentoring. These additional products follow a similar format to Bumble Date, where users create profiles and connect through mutual "yes" and "no" votes. This diversification provides users with the opportunity to explore different types of relationships beyond romantic connections.

3.1.2.2. Badoo

Badoo, launched in 2006 by Andrey Andreev, is one of the first free online dating apps for web and mobile. Focused on all types of users, the platform has a strong presence in the European and Latin American markets. As of December 2022, Badoo had 1.2 million paying users on the app.

The app operates similarly to Bumble, where users begin by customizing their profiles with essential details such as photos, work or education background, height, and religion. Badoo goes a step further by allowing profile videos and utilizing the "Moods" feature to express thoughts, emotions, or desired types of dates. Another unique aspect is the "My Interests" feature, enabling users to highlight specific topics on their profiles using keywords.

Badoo employs a matchmaking algorithm akin to Bumble and utilizes the familiar "yes" or "no" swipe vote. Additionally, Badoo includes a "People Nearby" feature, displaying potential connections in close proximity. Users on Badoo have the option to directly message anyone they are interested in without requiring a mutual vote. The app also features the "Bumped Into" functionality, connecting individuals who frequently cross paths.

Similar to Bumble, Badoo offers two premium subscription options: Badoo Premium and Badoo Premium Plus. Badoo Premium subscription includes features such as:

- Liked you: notifies users when their profile receives likes
- Invisible mode: allows users to browse the app without being visible to others.Undo vote: undoes a “no” vote on a potential match.

Badoo Premium Plus membership includes weekly or daily features such as:

- Chat with anyone: unlocks additional chats each week.
- Extra shows: increases visibility to more users with an Extra Show each week.

- Crush: allows users to express interest in potential matches.

These subscription plans, like those on Bumble, offer flexible packages. Additionally, Badoo provides the option to purchase "Badoo credit," which can be used to access various app features.

3.1.2.3. Fruitz

Fruitz is an online dating app focused on the Z Generation. As of December 2022, it was the second most downloaded dating app in France, its main market.

The way the app works is very simple. When registering, users must select a fruit for their profile to symbolise what their intentions are for using the app:

- **Cherries** for users looking for a serious relationship.
- **Grapes** for users that want to have a date.
- **Watermelons** for users who are not looking for a serious relationship.
- **Peaches** for users searching for a “casual” and “fun” relationship.

This simple detail allows users to show their intentions from the outset, normalising interactions between users.

Like Bumble and Badoo, Fruitz offers two premium subscription options, Fruitz Premium and Fruitz Golden. These options include:

- Filter by Fruit: allows users the ability to apply filters based on the fruit preferences displayed on other users' profiles.
- Who Liked Me: provides users with a comprehensive view of individuals who have expressed interest in them by liking their profile.

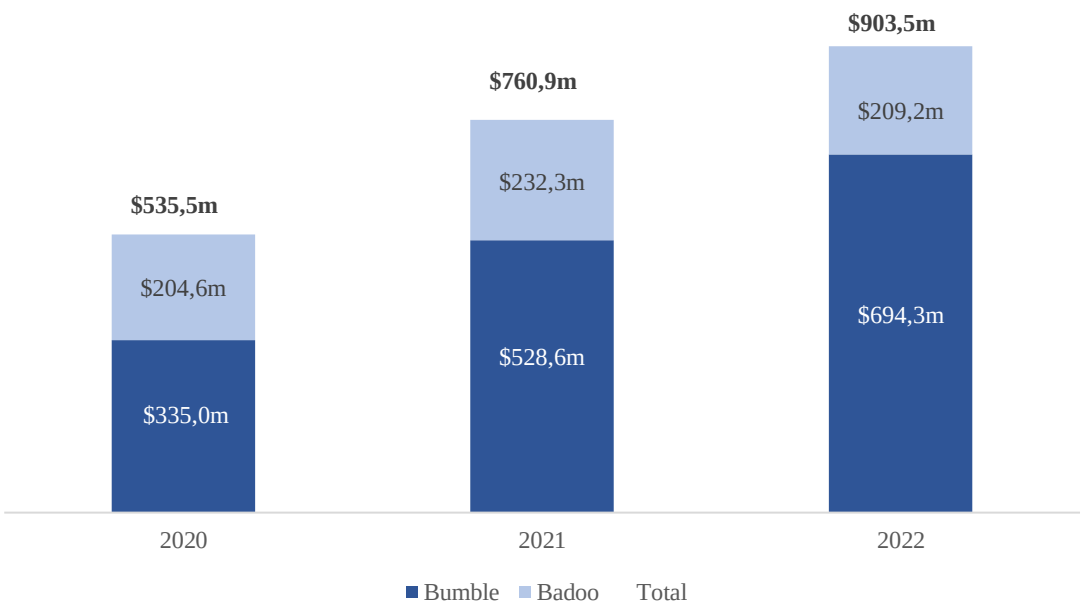
3.1.3. Business Model

Bumble Inc monetises its online dating apps Bumble, Badoo and Fruitz through a freemium model. This model allows users to sign up and use the basic features of the app for free, and in order to access and unlock enhanced features in the app, users must pay a monthly premium subscription.

Depending on which application, there are also additional options to the freemium model in order to generate money. In Bumble, there is the possibility to purchase additional in-app purchases for both paying and non-paying users. On Badoo, users can purchase Badoo credits for one-off upgrades. Finally, Bumble Inc also monetises its platforms through video and banner advertising.

As of December 2022, Bumble Inc. generated $903.5 million in revenue, a 18% increase from the previous year. If we analyse the sales breakdown of the company, Bumble is the App that generates more revenue.

Bumble generated $694.3 million in revenue in 2022, a 31% increase from the previous year. In opposition, Badoo generated $209.2 million in revenue, a 10% decrease from the previous year.



Graph 2- Bumble Inc. Sales Breakdown (Bumble Inc. Annual report)

With 2 million paying users, Bumble had an ARPU (Average Revenue per Paying User) of $28.90, while Badoo had an ARPU of $13.06.

3.2. IPO

As of November 2019, Bumble Inc. was owned by the Blackstone Group, which bought out co-founder Andrey Andreev, and Whitney Wolfe Herd, the company's CEO and co-founder. In order to help the company achieve its goals, the major shareholders decided to take the company public.

On February 11, 2021, Bumble Inc. went public on the Nasdaq under the ticker symbol BMBL in order to raise capital to fund the company's expansion and repayment of debt obligations.

With the help of Goldman Sachs and Citigroup, Bumble Inc. executed a strategy to go public on February 2021. Initially, the plan was to raise $1bn at a share price of $38.

In the end, the company went public under the following conditions (IQ, 2021):

- 50,000,000 Class A common stock were issued.
- Total number of diluted shares Post-IPO: 115.3 million
- Price per share of $43.
- Company valuation: $5bn.

In the deal, Bumble Inc. raised a total of $2.15bn to fund its forward operations, well above the $1bn it initially thought it would raise. After the deal, the company's capital structure was as follows:

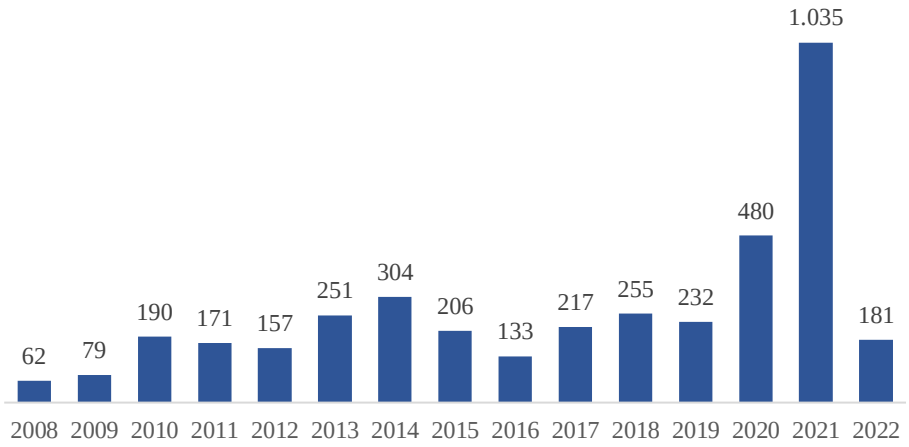
- Pre-IPO Owners: 76% of the shares
- New investors: 24% of the shares

Given the investor interest, on its first day of trading the company's shares soared 63%, surpassing a valuation of $8bn. Thanks to the IPO, Whitney Wolff Herd became the youngest female billionaire in history.

In September 2021, Blackstone divested a percentage of its stake in the company, selling 18 million shares at a price of $54 a share, realising proceeds of around $972m. In March 2023, Blackstone again disposed of a block of shares at a price of $23 a share.

However, since its IPO in February 2021, the company has lost much of its market capitalisation. As of May 2023, the company has a share price of $16.73 per share, 137.6 million shares and a 72.8% free-float.

Finally, it is important to mention that the company went public at a very significant time. Due to the pandemic, the number of IPOs from 2019 to 2021 has grown exponentially. In part, this is due to investor appetite for technology companies as a refuge from the global pandemic situation, and due to the low interest rates set to protect the economy from the effects of the pandemic. As can be seen in the chart, this trend has diminished in 2022, mainly due to market conditions generated by the war in Ukraine and rising interest rates.



Graph 3- Number of IPOs in the US 2008-2022 (Statista)

3.3. Industry Overview

Industry analysis is a key step in analysing the valuation of a company. The level of competition, growth projections, or the overall profitability of the industry are key factors that influence the valuation of a company.

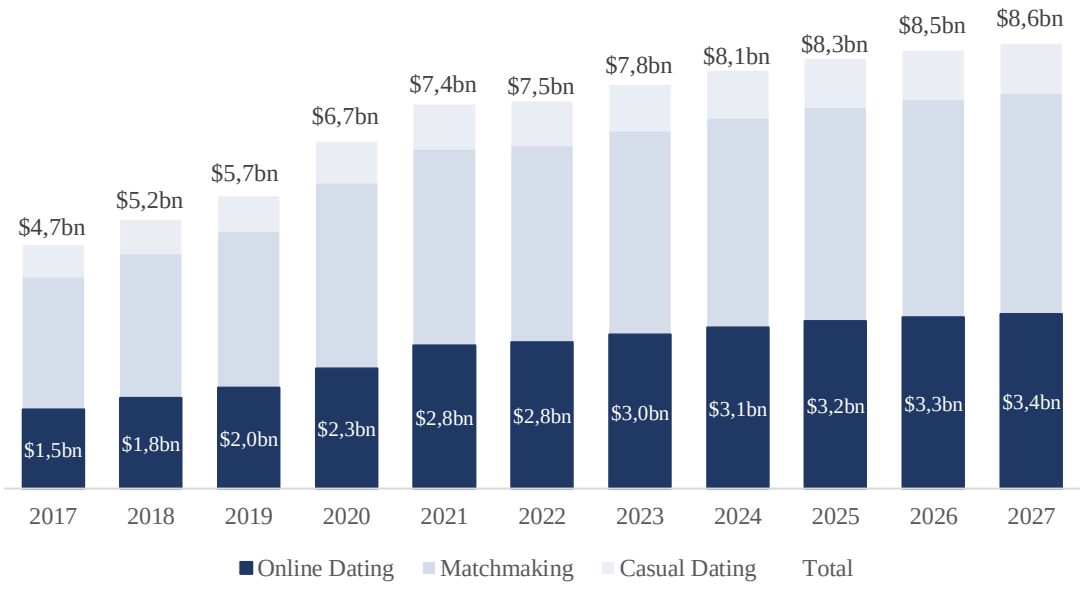
Dating services provide users with the ability to connect and form relationships through online platforms. These services range to various types of connections, including seeking life partners, engaging in flirts, or finding sexual partners. Therefore, there are three main markets inside the dating service industry:

- The **Matchmaking market** specifically focuses on dating services that employ mathematical algorithms to facilitate the systematic search for partners interested in committed, long-term relationships. These services aim to match individuals based on compatibility and shared interests.
- The **Online Dating market** encompasses platforms that provide a platform for members to engage in flirting, chatting, and potentially falling in love. Examples

of such platforms include Tinder and Bumble, which emphasize casual interactions and easy flirting among their users.

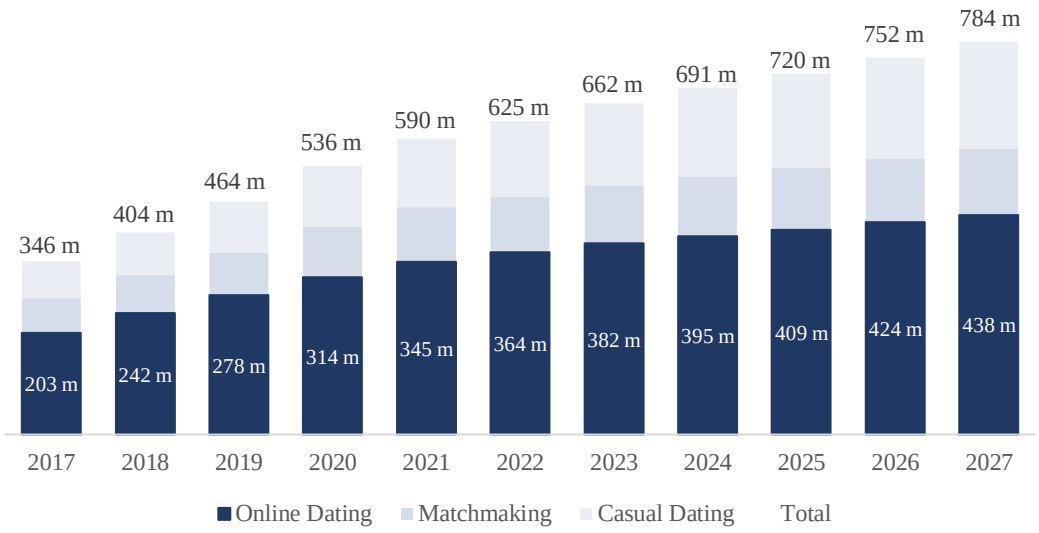
- The **Casual Dating market** encompasses online services that facilitate sexually oriented contacts outside of traditional romantic relationships. These platforms are focused to individuals seeking casual encounters or short-term connections of a more intimate nature.

Bumble Inc. platforms operates in the Online Dating market. As shown in the Graph 4, the Online Dating market is expected to grow until 2027 from $2.98bn in market size to $3.39bn with a %CAGR of 3.2%. As seen in the graph, after a few years of systematic growth in the industry, the overall market size growth projection until 2027 slows down considerably for all markets (Dating Services, 2023).



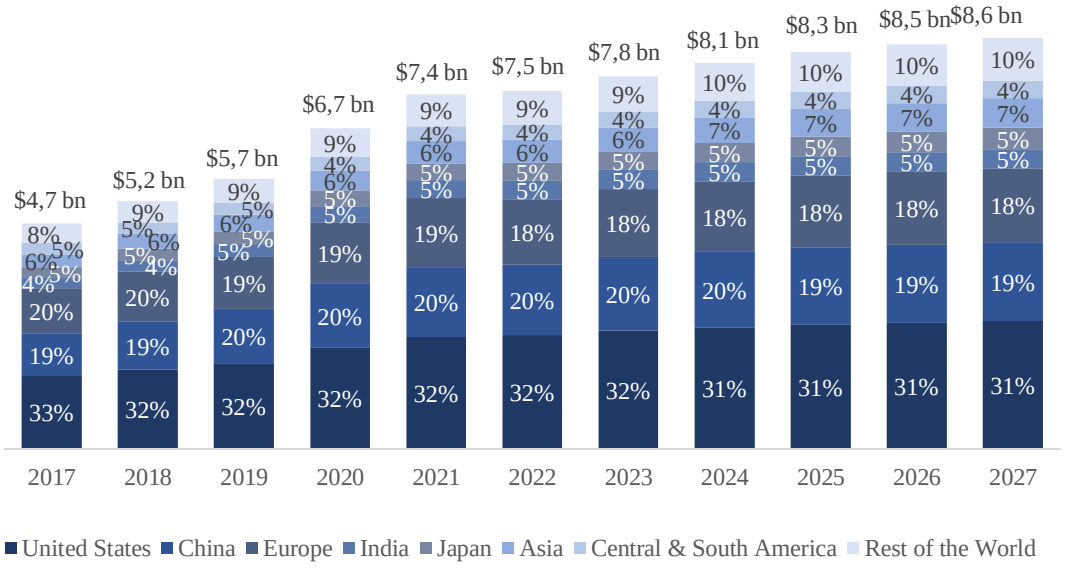
Graph 4- Dating services market size evolution (Statista)

Regarding the evolution of the number of users, we can observe in Graph 5 that Online Dating is the segment of the industry with the most users worldwide, with a forecast to reach 438 million users in 2027.



Graph 5- Dating services users evolution (Statista)

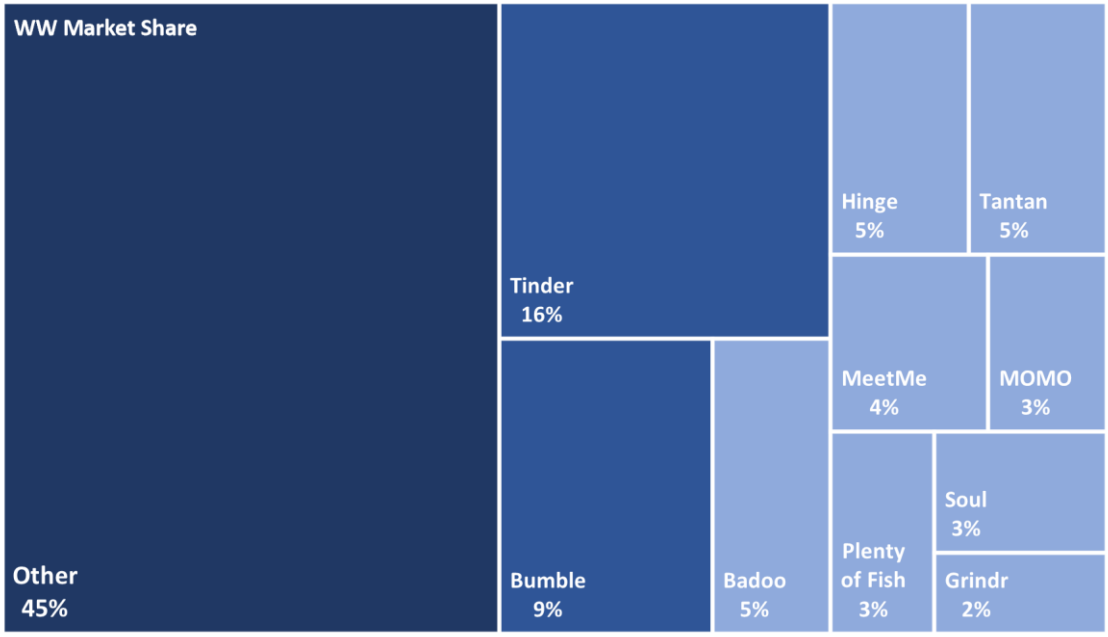
Focusing on the distribution of the industry's revenues by geography, the United States represents the world's largest market with 32% of global revenues as of 2023. In second place is China, with 20% of global industry revenues. In third place is Europe, which in recent years has fallen from second place with 20% of global revenues in 2017 to 18% in 2023. Then, as global markets with significant weight, we find India and Japan, which each account for 5% of global industry revenues.



Graph 6- Dating services geography breakdow

3.3.1. Key Players

The online dating platform industry is experiencing a phase of consolidation as it faces challenges and changes. The emergence of successful platforms like Tinder has led to a flood of new dating apps entering the market in recent years. However, breaking into this industry is extremely difficult due to its unique dynamics. The value of a dating platform lies in the number of users it attracts, and with so many new apps available, users are hesitant to join platforms with limited interaction opportunities. As seen in the Graph 7 below, the market leader in applications for online dating, Tinder, has only a 16% of worldwide market share in 2022. In opposition, 45% of the market is represented by applications with a small market share. This is a clear indication on the high number of platforms that are on the market at the moment.



Graph 7- Online Dating Apps market share (Statista)

Consolidation in the industry is further driven by the dominance of major players who possess significant financial resources. These industry leaders can acquire new niche dating apps, expanding their offerings and providing more choices to their user base.

As a result, a small number of companies now control a wide range of dating applications, cementing their position as the industry leaders. Some of these companies are The Match Group, Bumble Inc., ParshipMeet or Spark Networks.

- **The Match Group:**

  The Match group is a US based company that provides dating products worldwide, with a portfolio of more than 45 brands with different apps and online platforms and around 42 different languages offered in its applications. The company currently employs 2,700 people (Business Overview, 2023).

  More than 50% of the relationships that have started online have originated on one of The Match Group's apps, generating 8.4 million relationships and 2.5 million marriages between 2011 and 2015 alone.

  As the main player in the market, the company owns four of the top five dating brands in North America, including Tinder, the world's leading dating app. Launched in 2012, it has become the most popular online dating app among millennials. Another of its most popular apps is Hinge.

  The company also has brands focused on specific geographic markets, such as Pairs, Azar and Hakuna, which are mainly focused on the Asian market. It also owns apps focused on specific population groups such as The League, which targets ambitious, career-focused people. There is also BLK, focused on the African-American community, and Chispa, focused on the Latin American community.

  With a market capitalization of $8.8bn, the company has strong revenue and profit growth with expanding margins. In the last twelve months to May 2023, the company has generated annual revenues of $3.2bn, and since 2018 has experienced a CAGR of 17%. In terms of operating income, The Match Group generated $505m in the last year, representing a margin of 16%. Compared to previous years, the operating margin has declined significantly, from an average of 30% to 16%. The company went public in 2015.

- **ParshipMeet:**

  The ParshipMeet Holding is a German based company that provides online dating, entertainment, and online matchmaking services through its applications. Through its two main segments, Dating and Video, ParshipMeet cover a broad spectrum of applications in the European and North American markets.

In the dating space, the company has the following applications: Parship, eharmony, ElitePartner and LOOVO. In the Video space the company has: MeetMe, Skout, Tagged, GROWLr and Livebox.

With a 4% worldwide market share, MeetMe is the most popular app in ParshipMeet's repertoire of platforms. Founded in 2005, MeetMe is the mobil version of a bar where people can interact with each other. With more than 20 million chats per day, MeetMe is focused on a demographic of people between 18 and 34 years old and has a strong presence in the US.

The company is an operating subsidiary of ProSiebenSat a media conglomerate in Europe. With a market capitalization of €1.87bn, the company generated revenues of €4.1bn in 2022, from which €520 million came from the Dating and Video division. The conglomerate has an EBITDA margin of around 16%.

- **Spark Networks:**

Spark Networks is a German based company that owns and operates different premium online dating websites and mobile applications. With over 100 million of registered users, the company focuses on 40+ age demographic and religious communities. The company has a strong presence in the European market and is expanding into the North American market.

Spark Networks has several brands in their portfolio. Zoosk is their most popular app. The app has over 40 million singles in over 80 countries. EliteSingles is another of the company's apps that fouses on educated and successful single professionals. SilverSingles focuses on singles with 50+ of age. Christian Mingle is an app that focuses on connections between Christian singles that are searching for relationships build around faith. Another brand is Jdate, which focuses on connections between Jewish singles. Saprk Network has more brands in their portfolio, like Darling, Attractive World or JSwipe.

During the past years, the company has lost almost all its value in market capitalization, to a total of €25 million at a share price of €0.95. With a revenue of €187.8 million in 2022, the company has experienced a decrease in revenues over the past years. Just as with the revenues, the EBITDA margin has been decreasing to a 7.1% in 2022.

Apart from Bumble Inc., these are the three main industry leaders. Nevertheless, Big Tech company Meta has announced the launch of a Facebook Dating App to compete with the major players in the industry. Although the dating app has just been launched, given the size of the company and the almost 3 billion users that Facebook has, this new application will threaten to disrupt the industry in the future.

The current consolidation of the industry, in which there are very few public companies, will pose a problem when trying to value Bumble Inc in the case study using Public Comparables.

3.4. Valuation

So far, this thesis has tried to understand what a start-up is, to learn and study the different valuation methods both traditional and specific for start-ups, and to introduce Bumble Inc. as a company, how it works and to go deeper into the industry it operates in. It is now time to put this knowledge into practice and to value Bumble Inc. in order to compare the results obtained with the different valuation methods.

For the case study, the traditional valuation methods (DCF, LBO, Public Comps, Precedent Transactions) and the three main valuation methods for start-ups, Venture Capital Method, Real Options and First Chicago, will be used.

Since the IPO of Bumble Inc. took place in February 2021, the case study will take place on 31/12/2020, assuming that the IPO was conducted on the next day. Therefore, to simplify calculations, the capital structure used will be the resulting after the IPO.

Before starting with the different valuation methods, the company's future financial projections will be presented. These will be the same as those that will be used later in the different valuation methods.

Finally, in order to be able to compare all the results obtained, a Football Field graph will be presented where all the prices per share obtained with the different valuation methods will be presented.

3.4.1. Financial Forecast

Establishing forward-looking financial projections is one of the most important steps in any valuation method. With these predictions it will be possible to create a valuation model that will give an approximate idea of how much a company is worth.

As mentioned above, this study is carried out as of 31/12/2020, so the projections established should be from 2021 onwards.

Instead of carrying out a detailed study of financial projections in this work, it has been decided to use reports produced by the investment banks J.P. Morgan and Jefferies and use the information available in them. These reports provide forward-looking projections, industry competitors, useful valuation information, as well as recommendations to buy or sell shares.

For the P&L and Cash-flows projections, the Jefferies report has been used because of the longer-term projections provided by Jefferies, and for this study, projections up to 2027 will be needed.

For the P&L, as seen in Table 3, the items projected by Jefferies correspond to revenues and EBITDA only. Although it is true that by making projections for only these two P&L lines, many important aspects are being overlooked in order to obtain the vale of the Free Cash Flows, which is ultimately what we´re going to need for analyses like the DCF, LBO or the First Chicago Method. Nevertheless, the Jefferies study also provides projections of Unlevered Free Cash Flows, which will make it possible to follow the study.

The projections from 2021 to 2027 for Bumble Inc. are as follows (Jefferies, 2021):

Bumble Inc
Operative Model

► Profit & Loss	2020A	2021E	2022E	2023E	2024E	2025E	2026E	2027E
($ MM)								
Revenue	580	718	885	1.090	1.313	1.550	1.790	2.030
Growth (%)		*24%*	*23%*	*23%*	*20%*	*18%*	*15%*	*13%*
EBITDA	122	173	223	286	358	439	526	617
Margin (%)	*21%*	*24%*	*25%*	*26%*	*27%*	*28%*	*29%*	*30%*

► Cash Flow Items	2020A	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Cash taxes		(66)	(39)	(29)	(39)	(52)	(65)	(79)
% of Sales		*(9,2%)*	*(4,4%)*	*(2,6%)*	*(3,0%)*	*(3,3%)*	*(3,3%)*	*(3,3%)*
Capital Expenditure		(19)	(17)	(21)	(25)	(30)	(34)	(39)
% of Sales		*(2,6%)*	*(1,9%)*	*(1,9%)*	*(1,9%)*	*(1,9%)*	*(1,9%)*	*(1,9%)*
Stock based compensation		(28)	(16)	(10)	(12)	(14)	(16)	(18)
% of Sales		*(3,9%)*	*(1,8%)*	*(0,9%)*	*(0,9%)*	*(0,9%)*	*(0,9%)*	*(0,9%)*
Change in WC		(47)	3	4	5	5	5	4
% of Sales		*(6,6%)*	*0,3%*	*0,3%*	*0,4%*	*0,3%*	*0,3%*	*0,3%*
Unlevered FCF		**13**	**154**	**230**	**287**	**349**	**415**	**485**
% of Sales		*1,9%*	*17,4%*	*21,1%*	*21,9%*	*22,5%*	*23,2%*	*23,9%*

Table 3- Financial Projections (Jefferies)

It's important to mention that since the company is based in the US, for this case study it will be used the federal corporate tax rate of the US, which is 21%.

3.4.2. Traditional Valuation

In this section, all traditional valuation methods mentioned in part 2 of the paper will be applied. As mentioned above, these methods are more reliable for more mature companies with more established financials and may present problems when used for start-ups.

In this section the objective is to obtain a price per share using the different valuation methods, as well as to assess why they may be unreliable methods for Bumble Inc.

3.4.2.1. DCF

For the DCF study, the information found in the Jefferies report set out in table x will be used. The steps followed are as follows:

a) Projection Period:

The projections of the Unlevered FCF can be obtained from Table 4:

► Unlevered Free Cash Flow	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBITDA	**173**	**223**	**286**	**358**	**439**	**526**	**617**
(-) Cash taxes	(66)	(39)	(29)	(39)	(52)	(65)	(79)
(-) Capex	(19)	(17)	(21)	(25)	(30)	(34)	(39)
(-) Change in WC	(47)	3	4	5	5	5	4
(-) Stock based compensation	(28)	(16)	(10)	(12)	(14)	(16)	(18)
Unlevered FCF	**13**	**154**	**230**	**287**	**349**	**415**	**485**

Table 4-DCF Projections

c) WACC:

In this section, the average of two different WACCs has been used for the valuation. On the one hand, a WACC mentioned in the Jefferies report has been considered, and on the other hand a WACC with the traditional method has been calculated.

For the traditional method, it is first necessary to define the capital structure of Bumble Inc. As mentioned above, we will use the capital structure resulting from the IPO (market capitalization of $4.96bn and a debt of $821 million).

It is worth mentioning that the comparables for calculating the beta are taken from Jefferies and J.P. Morgan reports. The choice of these companies will be discussed in the Public Comparables and Precedent Transactions section.

The WACC calculation is as follows:

► **WACC Calculation**

Cost of equity (Ke)	
Risk free rate	**1,0%**
Debt/Equity	**17%**
Levered Beta	**1,75**
ERP	**6,3%**
Cost of equity	**12,0%**

Beta	
Infront & Capital IQ	**3 Year Beta**
Match Group	1,48
ProSiebenSat Media SE	2,46
Spark Networks	n.a.
Netflix	1,22
Peloton	1,33
Facebook	1,23
Average Unlevered Beta (excl. Bumble)	**1,54**

Bumble tax rate	
US	21,0%

WACC

Calculation	
Cost of equity	**12,0%**
Cost of debt	**3,0%**
D/(D+E)	**14,2%**
WACC	**10,6%**

Table 5- WACC calculations

With this value, an average is calculated using the WACC obtained in the Jefferies report to use in the DCF valuation.

► **WACC**

WACC from Calculations	10,6%
WACC from Jefferies	9,0%
WACC	**9,8%**

Table 6- Final WACC

d) Terminal Value:

To calculate Terminal Value, it has been used the Gordon Growth Method instead of using a revenue or EBITDA multiple for the end period.

For the calculations, it's been considered to use a terminal growth of 2%, which is below to the long-term expected US GDP growth or inflation. In case of using a higher value, it would imply that the company would grow over the GDP of the US.

The result is as follows:

► **Terminal Value**

UFCF 2027	**485**
Growth rate	**2,00%**
Terminal Value	**6.345**

Table 7- Terminal Value

e) Equity Value and Share Price:

Using the results obtained so far, one can go on to calculate the Equity Value of Bumble Inc. and its share price using a DCF valuation method. The result obtained is $33.2 per share.

► Discounted Cash Flows	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Unlevered FCF	13	154	230	287	349	415	485
Terminal Value							6.345
Discount Factor	1,10	1,21	1,32	1,45	1,60	1,75	1,92
Discounted UFCF	**12**	**127**	**174**	**198**	**219**	**237**	**3.550**

Table 8- Discounted UFCF

► **Valuation**

Discounted FCF	1.219	*27,0%*
Discounted TV	3.298	*73,0%*
Enterprise Value	**4.517**	
(+) Cash & Cash Equivalents	128	
(-) Debt	(821)	
(-) Non controling interest	(1)	
Equity Value	**3.823**	
# shares	115,3	
Share Price	**33,2**	

Table 9 - DCF Share Price

A study has also been carried out to see how the price of a share would vary by modifying the values of the WACC and terminal growth (g). According to the sensitivity table obtained, Bumble's share price could vary between $31.1 and $36.1.

		WACC				
		9,0%	9,5%	**9,8%**	10,0%	10,5%
g	1,50%	36,1	33,0	31,3	30,2	27,8
	1,75%	37,2	34,0	32,2	**31,1**	28,6
	2,00%	38,5	35,0	**33,2**	32,0	29,3
	2,25%	39,8	**36,1**	34,2	32,9	30,2
	2,50%	41,2	37,3	35,3	34,0	31,0

Table 10- DCF Sensibility Table

As a traditional valuation method, there are some limitations that influence the valuation of the company. Firstly, this analysis is based on projections made by an Investment Bank that does not have real information on the state of the company's finances, such as

projections of CAPEX, Working Capital, or Depreciation and Amortisation. For this reason, the projections may not be accurate and may be overestimated.

On the other hand, as a company with a high growth rate, the growth potential beyond 2027 may be underestimated by using a terminal growth of only 2%.

Another aspect that can negatively influence the valuation of the company is the value obtained from the WACC. A start-up usually represents a higher risk than a more mature company, so initially a much higher discount rate should be used.

However, given that the company already had positive EBITDA in 2020, and the projections made by Jefferies indicated positive EBITDA and FCF until 2027, this valuation method has obtained better results than expected, achieving a Terminal Value of around 73% and a share Price of $33.2, very close to the $38 at which the company was initially thought to go public. Again, this may be due to the overestimation of the projections made by Jefferies.

3.4.2.2. LBO

When using an LBO as a valuation method, the maximum value that a Private Equity Firm would be willing to pay for a company's shares based on expected returns is calculated.

In order to perform the analysis, the entry and exit conditions as well as the Sources & Uses of the transaction must first be defined. For the input and output multiples, the multiples obtained from the Public Comps section have been used. For the input multiple, the LTM multiple has been used, and for the output multiple, the 2023E multiple has been used. Then, in the Sources section, it has been decided to opt for a 70% debt-financed operation, in which 60% will be through a Senior Loan and 10% through a Mezzanine loan. The transaction costs and the arrangement fee have been set at 1% and 0.5% respectively.

Entrance Hypothesis	
Entrance date	31/12/2020
Revenue 21E	717,6
Entry Multiple	9,9x
Entrance EV	**7.118,6**
(-) Net Debt	(692,8)
(-) Non-controlling interest	(0,8)
Entrance EqV	**6.424,9**

Uses & Sources	
Uses	
Acq EqV + Debt	7.245,8
Transaction costs	72,5
Arrangement fee	25,7
Total	**7.344,0**
Sources	
Term loan	4.497,5
Mezzanine	642,5
Equity	2.204,0
Total	**7.344,0**

Exit Hypothesis	
Exit date	31/12/2025
Revenue 26E	1789,9
Exit Multiple	5,2x
Exit EV	**9.307,5**
(-) Net Debt	(4.724)
(-) Non-controlling interest	(1)
Exit EqV	**4.582,4**

Table 11- Entry & Exit Assumptions + Sources&Uses

Then, next step should be to proceed to calculate the FCF, debt payments, interest payments, calculate the net cash flow obtained and finally calculate the IRR value. However, because it is a very long method, this process will be explained in the Excel file that will serve as an appendix for this work.

Therefore, we will proceed directly to calculate the value of the shares using an LBO valuation method. To do this, two IRR targets will be assigned, a minimum of 15% and a maximum of 25%. With these values, a valuation of $13.0 and $19.8 per share is obtained.

► Valuation

Target	Min	Max
IRR	15%	25%
Equity @ exit	4.582,4	4.582,4
Equity Invested	2.278,2	1.501,6
Entry EV	1.584,6	807,9
NOSH	115,3	115,3
Share Price	**19,8**	**13,0**

Table 12- LBO Share Price

As with the DCF analysis, valuing a start-up using an LBO can be problematic. Firstly, the financial projections made by Jefferies may not be accurate. Secondly, the multiples used are those calculated in the Public Comps section. In the online dating industry there are few comparable public companies, and among these, some operate in more industries through other lines of business, so the multiples may not be entirely comparable.

Another aspect to mention is the value of IRR used. In the private equity industry, an IRR between 15% and 25% (targets used in the study) is usually expected. However, as this is a start-up, higher IRRs should be used to take into account the risk involved in investing in such a company.

3.4.2.3. Public Comparables

Moving on to relative valuation methods, it is now time to value Bumble Inc. using the value of other companies operating in the online dating industry. To do so, the multiples at which the selected public companies are trading will be compared, focusing on EV/Revenue and EV/EBITDA multiples. As in the other analyses, the valuation is done at 31/12/2020.

The selected public companies include companies operating in the sector, such as The Match Group, ProSieben Sat Media, Grindr and Spark Networks. In order to be able to complement the analysis with more companies in order to obtain a more contrasted result, companies from the tech industry have been added that also show similar growth to Bumble Inc. Among them, Meta Inc. (Facebook's parent company) has been selected due to its intention to launch its own online dating application.

The other companies compared, as well as the projected forward multiples, have been selected from Jefferies and J.P. Morgan reports (J.P. Morgan, 2021), as well as Capital IQ.

	Country	Market Cap	EV	Valuation Metrics					
				EV / Revenue			EV/EBITDA		
				LTM	2021E	2022E	LTM	2021E	2022E
		$ MM	$ MM	x	x	x	x	x	x
Bumble Inc.	US	8.540	8.939	*n.a.*	*12,5x*	*10,1x*	*n.a.*	*51,8x*	*39,8x*
Public Comparables									
Meta	USA	754.633	703.856	*9,5x*	*6,6x*	*5,6x*	*20,2x*	*13,4x*	*11,2x*
Netflix	USA	228.707	239.012	*9,9x*	*8,2x*	*7,1x*	*55,3x*	*37,4x*	*29,3x*
Snap Inc.	USA	95.988	95.454	*34,3x*	*22,2x*	*15,2x*	*n.a.*	*239,4x*	*77,4x*
Peloton	USA	43.675	42.183	*16,1x*	*6,2x*	*4,8x*	*158,5x*	*96,0x*	*43,7x*
The Match Group	USA	40.808	43.696	*16,1x*	*14,1x*	*12,1x*	*49,2x*	*37,9x*	*30,9x*
ProSiebenSat Media SE	Germany	3.695	6.244	*1,4x*	*1,5x*	*1,0x*	*6,5x*	*8,3x*	*5,2x*
Grindr	USA	1.048	1.416	*n.a.*	*n.a.*	*3,5x*	*n.a.*	*n.a.*	*9,2x*
Spark Networks	Germany	194	291	*1,0x*	*0,9x*	*0,8x*	*29,9x*	*9,2x*	*8,4x*
Average				**12,6x**	**8,5x**	**6,3x**	**53,3x**	**63,1x**	**26,9x**
Median				**9,9x**	**6,6x**	**5,2x**	**39,6x**	**37,4x**	**20,3x**

Table 13- Public Comparables (J.P. Morgan, 2021) (Jefferies, 2021) (Capital IQ)

From this analysis, the median 2021E and 2022E revenue multiples are extracted to calculate the valuation of the company. A range of 90% to 110% has then been established to obtain a valuation range for the price per share. The results obtained are a price per share range of $31.0-$39.2 for EV/Revenue 2021E and a range of $38.2-$48.1 for EV/Revenue 2022E.

► **EV / Revenues** **2021E** **2022E**

High range	1,10
Low range	0,90

	FY+1			*FY+2*		
	Low	Mid	High	Low	Mid	High
Revenue		717,6			1.090,2	
Revenue Multiple	5,9x	6,6x	7,3x	4,7x	5,2x	5,7x
Enterprise value	4.263	4.736	5.210	5.102	5.669	6.236
(+) Cash & Cash Equivalents	128,0	128,0	128,0	128,0	128,0	128,0
(-) Debt	(820,9)	(820,9)	(820,9)	(820,9)	(820,9)	(820,9)
(-) Non controlling interest	(0,8)	(0,8)	(0,8)	(0,8)	(0,8)	(0,8)
Equity value	3.569	4.043	4.516	4.408	4.975	5.542
# shares	115,3	115,3	115,3	115,3	115,3	115,3
Price per share	**31,0**	**35,1**	**39,2**	**38,2**	**43,2**	**48,1**

Table 14- Public Comparables Share Price

As a traditional valuation method, comparing public companies with a start-up generates problems in obtaining valuation results. Firstly, as has been observed, the selected comparables are not entirely suitable for the analysis. As the industry is in the process of consolidation towards the dominance of a few companies, there are not many public companies operating in this industry. Moreover, of the other companies selected for the analysis that do not operate in Bumble's industry, with the exception of Facebook (which intends to bring its online dating application to market), none are readily comparable to Bumble. This may result in the multiples obtained not being in line with market reality, thus altering the valuation obtained.

Another aspect that can affect the valuation using this method is the company's revenue projections. A start-up is characterised by exponential growth during its first years. In this case, when using a revenue multiple, if future revenue projections vary significantly, it will significantly affect the valuation of the company.

3.4.2.4. Precedent Transactions

In this method we will value Bumble Inc. using available information on transactions in the sector. Using Precedent Transactions, we will first collect all transactions in the last 5 years, both in Europe and North America. Ideally, transactions from companies with an Enterprise Value above a set minimum, such as $100 million, would be choseen. With the help of Capital IQ, a list of about 600 deals of companies related to the online dating industry has been obtained. The following five deals were selected, resulting in an EV/Revenue multiple of 2.4 times.

PRECEDENT TRANSACTIONS - MODEL OUTPUT

Date	Target company	Target Country	Bidder Company	Bidder country	Bidder sector	EV ($ MM)	Revenue ($ MM)	EBITDA ($ MM)	EV / REV.	Avg EV / REV.	EV / EBITDA	Avg EV / EBITDA
2021	*ProSiebenSat.1 Media*	*Germany*	*Mediaset España*	*Spain*	*Media*	*7.474*	*4.951*	*959*	*1,4x*	*4,2x*	*7,7x*	*7,7x*
2020	*Grindr LLC*	*USA*	*n.a.*	*n.a.*	*n.a.*	*1.378*	*n.a.*	*n.a.*	*5,7x*	*4,2x*	*n.a.*	*7,7x*
2020	*The Meet Group, Inc.*	*USA*	*Parship Group GmbH*	*Germany*	*Media*	-	-	-	*2,4x*	*4,2x*	*15,4x*	*7,7x*
2018	*Snap Inc.*	*USA*	*Private Individual*	*n.a.*	*Family Office*	*9.316*	*n.a.*	*n.a.*	*9,4x*	*4,2x*	*n.a.*	*7,7x*
2017	*LOVOO GmbH*	*Germany*	*The Meet Group, Inc.*	*USA*	*Online Dating*	-	-	-	*2,2x*	*4,2x*	*n.a.*	*7,7x*
Average									**4,2x**		**11,6x**	
Median									**2,4x**		**11,6x**	

Table 15- Precedent Transactions

Following the example taught in Public Comparables, a valuation range is established using a multiple of between 90% and 110% of that obtained above. The result is a price per share of between $10.8 and $13.2.

► Precedents		2020A		
High range	1,10			
Low range	0,90			
		FY		
		Low	Mid	High
Revenue			579,5	
Revenue Multiple		2,2x	2,4x	2,6x
Enterprise value		1.247	1.385	1.524
(+) Cash & Cash Equivalents		-	-	-
(-) Debt		-	-	-
(-) Nonoperating assets (liabilities)		-	-	-
Equity value		1.247	1.385	1.524
# of shares		115,3	115,3	115,3
Price per share		10,8	12,0	13,2

Table 16- Precedent Transactions Share Price

The main problem encountered in applying this method in Bumble has been finding comparable transactions. On the one hand, companies that have acquired online dating companies in recent years have not shared transaction information. This directly disqualifies these transactions from being used in this analysis. On the other hand, of the transactions in which information related to purchase multiples has been shared, the vast majority are not relevant for this study, either because they are not directly related to Bumble's business model or because they operate at another point in the industry value chain, such as developing software for these companies.

Due to this situation, the results obtained in this section are not in line with reality. Normally, Precedent Transactions is the valuation method that gives higher valuations compared to DCF, LBO and Public Comparables. This is because companies usually pay a premium for the shares they buy.

3.4.3. Start-Up Valuation

Once the valuation analyses using traditional methods have been completed, a valuation study will be carried out using the more specific valuation methods for start-ups

mentioned in the second part of the paper. Although these methods solve many of the problems encountered when valuing companies using traditional valuation methods, they are still not 100% perfect.

3.4.3.1. Venture Capital Method

First, the start-up will be valued using the Venture Capital method. This is one of the methods most commonly used by Venture Capitalists when valuing companies. It is assumed that Venture Capital intends to make an investment in Bumble Inc. that can replace the IPO of the company. Therefore, the VC should invest the same amount in the company as was raised through the IPO.

For this method, a number of assumptions has been made:

- Investment period: a total of 6 years, from 31/12/2020 to 21/12/2026. This period is from the IPO (it has been assumed in this case study that the IPO was on that date to simplify the study) and the penultimate year of the projections.
- Exit multiple and exit metric: the 2027E revenue of $2,029.9 million will be used along with the 2022E customised median multiple from the Public Comparables section of the study at 10.3x. The reason behind this selection is that using the multiple obtained in the Public Comps section would result in a negative pre-money valuation. In order to obtain more meaningful results, the three most comparable companies to Bumble have been selected, both by activity, region and size. In some sense, this measure also makes sense, since the forward multiple for companies that operate in high-growth industries tend to have higher multiples in the future.
- Target IRR: it was decided to set a target of 40%, because previously, especially in the case of DCF and LBO, the valuation had been studied with a WACC of 9.8% for DCF and an IRR for LBO of between 15%-25%. This increase to 40% should more than sufficiently take into account the risk involved in a start-up, as well as additional risks, such as the illiquid nature of an investment in a start-up.
- VC Investment: $2.15bn, the same amount raised with the IPO of Bumble Inc.

Using all these assumptions, and following the calculations mentioned in the second part of the thesis, a post-money valuation of $2.76bn has been obtained.

► **Holding Period**

Entry Date	31/12/2020
Exit Date	31/12/2026
Holding Period	**6,0y**

► **Exit Value**

($ MM)

Forward Revenue at Exit (2027E)	2.029,9
Industry Multiple	10,3x
Exit Enterprise Value	**20.833,5**

► **Post-Money Valuation**

($ MM)

Target IRR	40%
Post-Money Valuation	**2.766,9**

Table 17- VC Method Post-money valuation

With a pre-money valuation of $617m, the Venture Capital in question would hold 77% of the shares.

► **Pre-Money Valuation**

($ MM)

Post-Money Valuation	2.766,9
VC Investment	2.150,0
Theoretic VC Ownership	*77,7%*
Pre-Money Valuation	**616,9**

Table 18- VC Method Pre-money Valuation

Based on the post-money valuation, we arrive at a final value of $18.0 per share. Also, by setting the Target IRR and the Exit Multiple as elements in a sensitivity table, a share price range between $12.9-$24.5 is obtained.

► **Share Price**

($ MM)

Post-Money Valuation	**2.766,9**
(+) Cash & Cash Equivalents	128,0
(-) Debt	(820,9)
(-) Non-controlling interest	(0,8)
Equity Value	**2.073,3**
# shares	115,3
Share Price ($)	**18,0**

Table 19- VC Method Share Price

		EV/Revenue Multiple				
		9,5x	10,0x	**10,3x**	10,5x	11,0x
Target IRR	30%	28,6	30,5	31,4	32,3	34,1
	35%	21,6	23,1	23,8	**24,5**	26,0
	40%	16,2	17,4	**18,0**	18,5	19,7
	45%	12,0	**12,9**	13,4	13,9	14,8
	50%	8,7	9,4	9,8	10,2	11,0

Table 20- VC Method sensibility table

Although this method is more accurate than traditional methods, it should be noted that assumptions have been used when calculating the exit multiple in order to facilitate the study.

3.4.3.2. Real Options

The Real Options method is one of the most difficult to apply, due to its formulas and difficult interpretation. In this case, the Black & Scholes method will be used, because it is a newer and improved version of the Cox-Ross-Rubinstein method. Using Table 21 in section 2.2.2, we can set the parameters for this exercise.

Parameter	***Start-Up Valuation***	***Financial Option***	***Real Option***
C	Valuation of the Start-Up	**To be calculated**	Valuation result
S	NPV of the expected Cash-flows from the Start-Up	$4.51bn	EV from DCF
E	Required capital for the Start-Up	$2.15bn	Expected capital to be raised
r	Time value of money	1%	Risk-free rate
t	Time until raised capital is invested	6 years	Investment period
σ	Riskiness of the Start-Up	40%	Same as the IRR set in VC Method

Table 21- Real Option valuation parameters

To obtain the valuation using Black & Scholes, first it's necessary to calculate the values d_1 and d_2 using the formulas from section 2.2.2. Once these have been calculated, the Enterprise value can be obtained and a price per share arrived at. The results obtained are an EV of $2.81bn and a price of $18.4 per share.

► **Parameters**

S	NPV of the expected CFs from the Start-up	4.516,8
E	Required capital for the start-up	2.150,0
r	Time value of money	1,0%
	Valuation date	31/12/2020
	Expiration day	31/12/2026
t	Time until raised capital are invested	6,0
s	Riskiness of the Start-up	40%
d_1		1,31
d_2		0,33
$N(d_1)$		0,90
$N(d_2)$		0,63
C	**Value of the Startup**	**2.810,0**

► **Share Price**

Post-Money Valuation	**2.810,0**
(+) Cash & Cash Equivalents	128,0
(-) Debt	(820,9)
(-) Non controling interest	(0,8)
Equity Value	**2.116,4**
# shares	115,3
Share Price ($)	**18,4**

Table 22- Real Option Share Price

3.4.3.3. First Chicago

The last valuation method to be studied in this case study will be the First Chicago Method. Three scenarios will be considered in this analysis:

- **Best-Case**: base scenario used throughout this case study set out in the Jefferies report. It will be studied using an analysis similar to the Venture Capital Method.
- **Mid-Case**: scenario in which Bumble Inc. does not meet its growth expectations. The Jefferies report refers to a case in which the company will only grow at a CAGR% of 15% between 2020 and 2027. It will be studied using a similar analysis to the Venture Capital Method.
- **Worst-Case**: the company has failed and must sell its assets to meet its liabilities. It will be studied using a liquidation valuation method.

For this study, a series of assumptions must be made:

- Investment period: as in the Venture Capital Method and Real Options, this parameter is set at 6 years.
- Exit multiple and exit metric: same as in VC Method, the 2027E revenue of $2.03bn along with the 2022E customised median multiple from the Public Comparables section of the study at 10.3x.
- Discount rate: the WACC calculated in the DCF (9.8%) together with a liquidity discount of 30% has been used as the basis. The result obtained is 21.8% using the following formula:

$$Discount\ rate = \frac{1}{(1 + WACC + Liquidity\ discount)^{\#\ of\ years}}$$

- Assets discount rate: for the worst case scenario, a factor discounting the value of the assets by 30% will be used because the value of the assets is usually overestimated in the market and because a large part of the assets are made up of Goodwill from other acquisitions in which the company could have overpaid for, so that it would be lost value that could not be recovered.

With these assumptions, the Equity Value can be calculated for the different scenarios.

► **Parameters**

Entry Date	31/12/2020
Exit Date	31/12/2026
Holding Period (as VC Valuation)	**6,0y**
Discount Rate: Calculated WACC	9,8%
Liquidity Discount Rate	30%
EV/Revenue Multiple	10,3x

► **Scenarios Valuation**

($ MM)

Best-Case Scenario: Jefferies Broker Report	
Revenue 2027E	2.029,9
EV/Revenue Multiple	10,3x
Terminal Value	20.833,5
Present Value of TV	**2.790,9**
(+) Cash & Cash Equivalents	128,0
(-) Debt	(820,9)
(-) Non-controlling interest	(0,8)
Equity Value	**2.097,3**

Mid-Case Scenario: Jefferies Broker Report	
Revenue 2027E	1.629,2

EV/Revenue Multiple	10,3x
Terminal Value	16.721,0
Present Value of TV	**2.240,0**
(+) Cash & Cash Equivalents	128,0
(-) Debt	(820,9)
(-) Non-controlling interest	(0,8)
Equity Value	**1.546,3**

Worst-Case Scenario: Current Book Value	
Total Assets	3.451,0
Discount Value on Assets	30%
Total Liabilities	1.303,4
Book Value	**1112,3**

Table 23- First Chicago scenarios

To define the probability of each scenario happening, it has been based on industry standards, among which it stipulates that the risk of a start-up failing is around 40% (same risk used for Real Options). With the probabilities defined, a value of $12.9 per share has been obtained.

► **Scenarios Assessment**

($ MM)

Scenario	Equity Value
Best-Case	2.097,3
Medium-Case	1.546,3
Worst-Case	1112,3

► **Share Price**

($ MM)

Equity Value	**1.482,9**
# shares	115,3
Share Price ($)	**12,9**

Table 24- First Chicago Share Price

Finally, table 25 shows a sensitivity table using as variables the exit multiple and the probability of the worst-case scenario, obtaining a range of $12.4 and $13.4 per share.

		EV/Revenue Multiple				
		9,5x	10,0x	**10,3x**	10,5x	11,0x
Worse-Case Prob.	30%	12,2	12,9	13,2	13,6	14,3
	35%	12,0	12,7	13,0	**13,4**	14,0
	40%	11,9	12,5	**12,9**	13,2	13,8
	45%	11,8	**12,4**	12,7	12,9	13,5
	50%	11,7	12,2	12,5	12,7	13,3

Table 25- First Chicago sensibility table

3.4.4. Current Valuation & Football Field Analysis

After having done all the methods to value Bumble Inc., it is time to compare all the results obtained in Football Field chart and evaluate how Bumble Inc. stock has performed since its IPO.

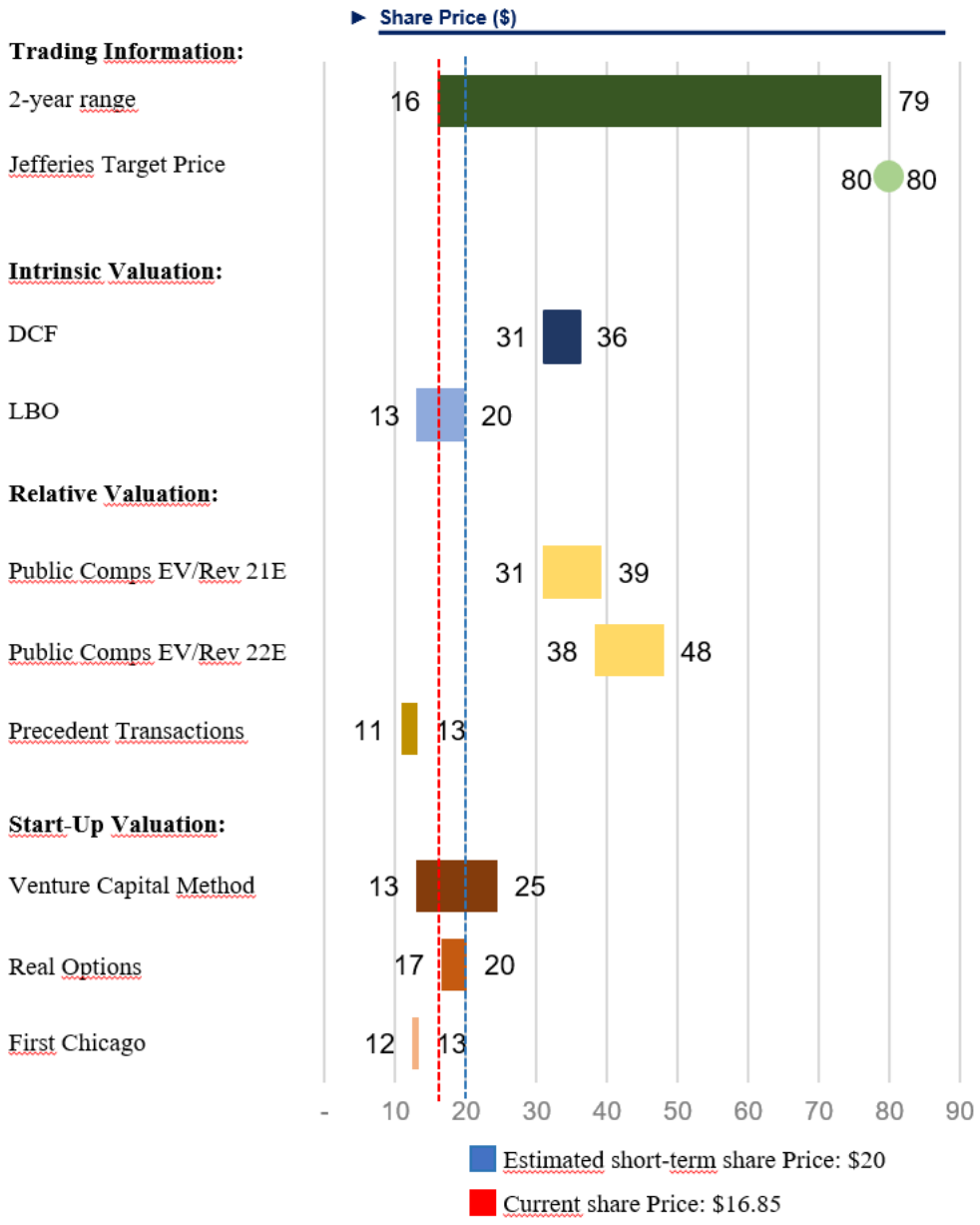
Bumble Inc. went public in February 2021 at a price of $43 a share. On its first day of trading, the stock closed at $70.3, up 63% in a single day. Since then, however, the company has seen the share value decline over the past few years, to a current value of $16.85 per share. Since its first day on the stock market, closing at $70.3 a share, Bumble Inc. has lost 76% of its entire stock value. However, analysts at Jefferies estimate that the company could reach a price of $20 per share in the near term, thereby slightly increasing its market capitalisation.

Graph 8- Bumble Inc. share price evolution (Capital IQ)

Before proceeding further, it is important to highlight three aspects to bear in mind when comparing valuation methods:

- All of the proposed valuation methods have been applied in the knowledge that as a start-up, the results obtained may be far from reality.
- Bumble operates in a relatively small industry, in which there are virtually no public companies operating in the same market and no transactions large enough to make the transaction information public. This has made the valuation study very difficult, especially in the Public Comparables and Precendent Transactions.

That said, a comparison of the valuation methods and their results is presented in Graph 9:



Graph 9- Football Field Analysis

- **2 year range:** since the company went public only two years ago, the company's share price has been studied for the last two years instead of just one year. The share price has plummeted in the last two years. This may be because investors have realised that the estimates made by the company when it went public were overestimated. If we compare the evolution of the shares with the other valuation methods, we can see how investors overestimated the potential of Bumble in the beginning and have been rectifying over time to a more realistic value. Other

aspects that may have also played a role in the decline in the value of Bumble Inc. shares is the macroeconomic situation due to the war in Ukraine and rising interest rates. Also, after the upward trend in start-up valuations during covid, prices have been correcting in recent years.

- **Jefferies Target Price**: this Jefferies estimate has been shown to be far from reality. At the time it was made, in March 2021, the share price was around $60, and has been falling ever since. This is probably due to the forward-looking estimates they made about the company's finances, which are very far from reality.
- **DCF**: using the estimates made by Jefferies, a range has been obtained that is very close to the price at which the company was initially due to go public ($38). However, the company went public at a higher price, and for several months traded at a higher price than the DCF.
- **LBO**: the value obtained makes sense, given that normally the valuation with an LBO gives smaller values than that of a DCF due to the exit multiple being lower than the entry multiple or having a higher discount rate than the DCF (PEs usually demand higher returns).
- **Public Comparables**: this method has given the highest values of all the different types of valuation methods. Firstly, companies with a high growth rate and a high multiple were used for this study. Secondly, higher values have been obtained with the 2022E multiple than with the 2021E multiple. This is highly unusual, given that multiples normally stabilise as time passes and companies become more mature. This result may have been obtained because multiples of companies in other industries (e.g. Snap Inc.) have been used and Bumble Inc.'s projected revenues for 2022 grow more in proportion than the multiple decreases from 2021 to 2022. Indirectly, we may have obtained a result that, for a company like Bumble Inc., which operates in a high-growth industry, makes absolutely sense, which is that future multiples should be higher since market expects these companies to keep growing in the future.
- **Precedent transactions**: the lowest values of the entire study have been obtained. As mentioned above, this may be due to the lack of really relevant transactions and the realisation by investors that the companies in the industry are overvalued.
- **Venture Capital**: this valuation method, while generating a lower share value than the IPO, has obtained values that are much more in line with the company's

current share price. This may be due to the high IRR used for the calculations, which took into account the risk involved in a start-up of these characteristics.

- **Real Options**: as these are mathematical formulas, there is little room for assumptions and hypotheses, generating valuations that are lower than those of the IPO, but more in line with the current share price.
- **First Chicago**: this method gives a slightly lower value than Venture Capital and Real Options, as well as lower than the company's current share price. This may be due to being too conservative with the worst-case scenario.

The case study has been completed. In this part of the work, the knowledge obtained in the theoretical part of this thesis has been put to the test, applying the different valuation methods to a start-up that has been listed on the stock exchange in the last two years. With the results obtained, we proceeded to discuss and compare them by means of a Football Field graph, obtaining results in line with those expected according to the assumptions made and information obtained.

Conclusion

In this last part of the paper we conclude our research on the following question: How should a start-up be valued?

In the first part of the paper we defined what a start-up is, what characteristics it has that differentiate it from other more mature and established companies, and how a company with these attributes obtains financing to be able to operate.

In the second part of the paper, the different valuation methods that exist have been studied. On the one hand, we began by describing the valuation methods most commonly used by more mature companies, mentioning why these methods present problems when applied to start-ups and what measures could be taken to adapt them to the analysis of start-ups. On the other hand, different valuation methods commonly used for start-ups have been studied, which are better adapted to the particularities of these companies.

In the third part of the paper, a case study of a real start-up has been carried out. Bumble Inc. has been selected, a company that owns and operates online dating platforms and went public in February 2021. The company, its business model and the industry in which it operates were described. The valuation methods discussed in section 2 were then applied and compared together.

Also, throughout the paper, some trends affecting the start-up world have been mentioned, such as the technological trends around which future start-ups will be created, or the increasing number of IPOs during the pandemic, due among other reasons to low interest rates and investor appetite for technology stocks.

With the end of the pandemic and the end of the restrictions, the situation experienced for two years has come to an end. Countries have reopened their economies and travel between countries is once again permitted. However, there are other factors that are strongly influencing investors. On the one hand, the war in Ukraine has dealt a severe blow to the global energy market. As a consequence, the global economy has experienced strong war-related inflation in the last year. On the other hand, due to the complicated economic situation, central banks have raised interest rates. Therefore, this concluding section will analyse what impact the current macroeconomic situation is having on current and future start-up valuations.

4.1. Interest rates and how they affect Start-Up Valuation

First, this section will begin by defining what an interest rate is, why it has evolved recently and how it affects the valuation of a company.

An interest rate is the rate used by banks to lend money to individuals and businesses. It is expressed as a percentage and is calculated by the world's leading financial institutions.

Different geographic regions use different interest rates and calculate them differently. For example, in Europe, its interest rate is calculated based on EURIBOR, which is the rate used by European banks to lend to each other.

Although each region has its own particular way of calculating interest rates, they usually all use the Taylor rule. This is a monetary policy used by central banks with the aim of setting interest rates according to the inflation and growth levels of a country's economy. According to the Taylor rule, central banks should adjust their target interest rates according to the difference between the actual inflation rate and the desired inflation rate, as well as the difference between actual output and potential output of the economy.

The aim of this rule is to prevent economic crises in case of uncontrolled inflation by stabilising the economy and prices in general.

Knowing what an interest rate is and why it varies, it is necessary to discuss how the variation of interest rates affects the valuation of a company. Generally, a business is valued based on the present value of the future cash flows that the company can generate. To calculate this present value, a discount rate is used that is related to the time value of money. On the one hand, interest rates directly affect the discount rate used when valuing a company. Taking the WACC (discount rate used in a DCF) as an example, this is calculated directly taking into account the cost of debt, which ultimately refers to the interest rate of the company's debt. Therefore, a change in the interest rate will have an impact on the valuation of the company. On the other hand, rising interest rates have a negative impact on the global economy, so the company's future revenue and cash flow projections will be affected, thus influencing the company's valuation.

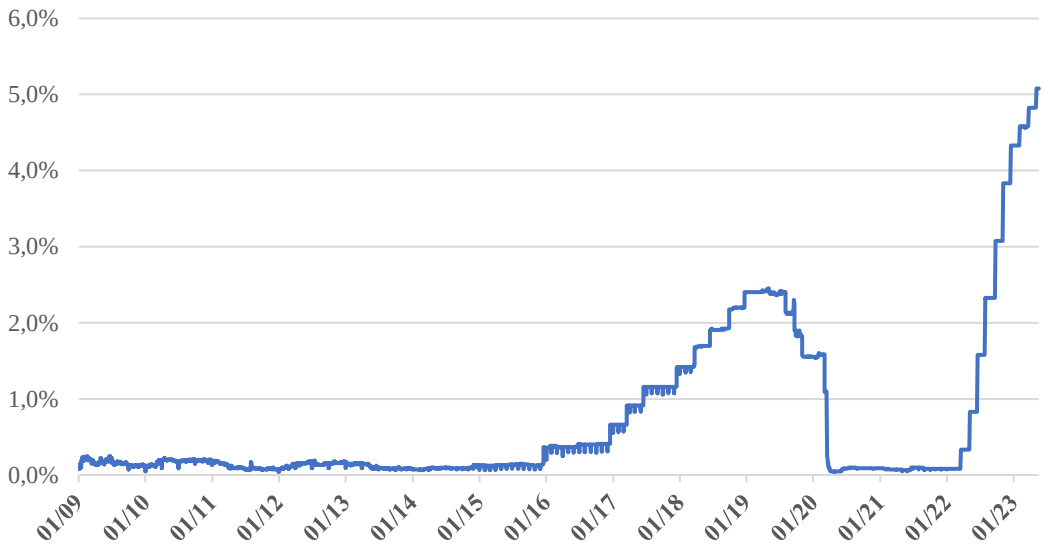
Knowing this, it is not surprising to see such high valuations during 2021. On the one hand, interest rates were close to zero, creating a more optimistic and favourable market for companies to access capital. However, as mentioned above, this scenario changed

from the beginning of 2022. In the particular case of start-ups, their nature has played in their favour in the valuations of these years. Favourable monetary policies, establishing zero interest rates and facilitating access to capital, together with widespread investor optimism about the end of the pandemic, drove a market with high valuations and ease of financing. This situation is reflected in the chart xx mentioned in point x of this paper.

4.2. Market corrections in 2022 and future outlook on Valuations

The end of the pandemic was supposed to be the beginning of the global economic recovery. However, the outbreak of the war in Ukraine meant a step backwards in the opposite direction. Among other things, one of the consequences of the war is the increasing global inflation that is being experienced.

To combat inflation, central banks are raising interest rates using Taylor's Rule. In May 2023, the US interest rate climbed to over 5% (Macrotrends), its highest value since the 2008 economic crisis. As a result, borrowing has become more expensive in the last year, affecting people and businesses around the world. By adapting this measure, central banks are indirectly decreasing economic activity.



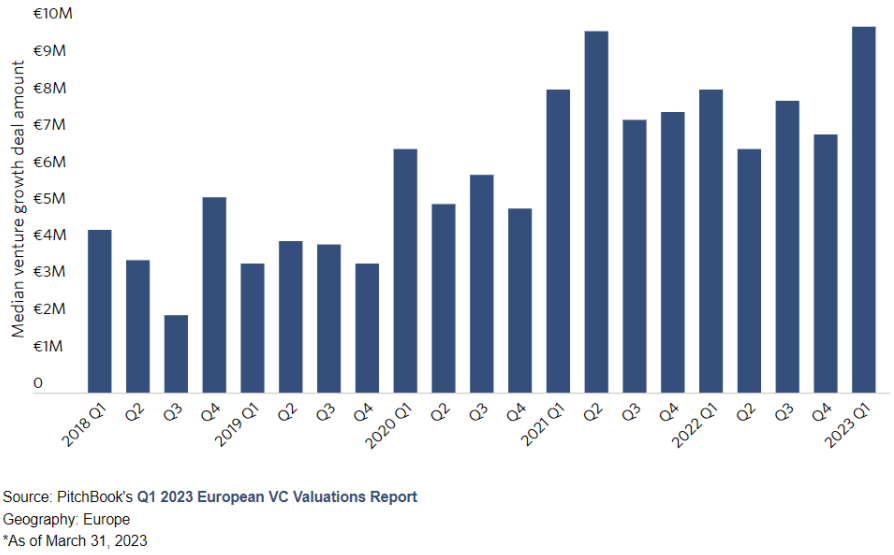
Graph 10- US Interest rate evolution

One of the effects of rising interest rates is the change in the valuations of businesses, and in particular, start-ups. On the one hand, as mentioned above, growth forecasts for these types of companies will have to be put under review and adapted to a tougher economic

environment, with lower growth expectations. On the other hand, in companies with high growth potential where earnings are expected in the future, rising interest rates have a greater impact on these types of companies as discount rates are more forward-looking than in the present.

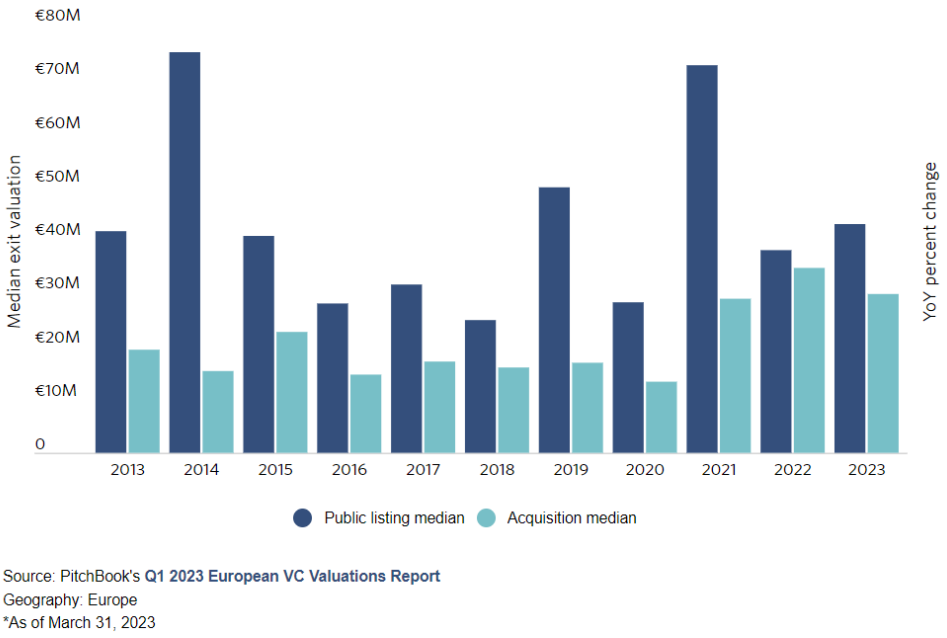
This has been proved by observing how the share prices of technology companies with high growth potential have been correcting in recent months. Leading global companies such as Tesla, Facebook and Amazon have lost a large part of their market capitalisation in just a few months.

Despite this, Q1 2023 has seen a considerable increase in the average size of late-stage VC European deals, from an average of $7 million in Q4 2022 to almost $10 million in Q1 2023 (Hodgson, 2023).



Graph 11- Median European VC late stage deal amount (Pitchbook)

It can also be seen how in Q1 2023, the average exit valuation of acquisitions in the European market remained lower than the total valuation in 2022. However, there has been a notable increase from Q4 2022 to Q1 2023, almost tripling to €29.6 million. Consequently, strategic acquisitions have become the preferred exit strategy for VCs and founders, largely due to the volatility of financial markets resulting in the reduced attractiveness of IPOs.



Graph 12- Median exit valuation for European start-ups (Pitchbook)

Moreover, valuations and trading activity in the US continues to decline in Q1 2023, leaving the high valuations experienced during 2021 in the past (Navas, 2023).

These different situations between these two markets raise the question of how macroeconomic conditions actually affect the valuation of a start-up. For the future, Venture Capitalists should reach conclusions on valuations by combining this factor with the theoretical aspects of valuation methods studied in this paper.

However, in practice, start-up valuations take on a more subjective character that is influenced by factors such as those discussed in point xx of this paper.

After presenting the findings of this work with Simón Torras, Co-Founder of Bageera (start-up in the ClimateTech sector), and Victor Cuxart, analyst of Nauta Capital's Investment team, we discussed today's valuations and reached a common consensus. Ultimately, a valuation will depend on the willingness of founders and investors to reach a common agreement between the capital raised versus what the percentage of the company is given to the VC, and all theoretical methods presented in this paper should only be used as a basis for assistance.

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