Master Thesis
Master in Management, Major in International Finance
Academic Year 2022 – 2023

How to value a Startup?
A Share Price Assessment of Bumble

Author:
Alejandro ANDREU – alejandro.andreu@hec.edu

Under the Supervision of:
Patrick LEGLAND – Affiliate Professor, Finance Department

May 2023

ACKNOWLEDGEMENTS

First, I would like to thank those who contributed directly or indirectly to this writing of this thesis. To begin, I would like to give special thanks to my former professor and the supervisor of this thesis, Professor Patrick Legland. The number of insightful documents and information he provided has been endless, and a big part of this thesis has been written thanks to him. Moreover, I would also like to thank all my HEC professors that have indirectly contributed to the writing of this thesis through the knowledge they taught me or through their mentoring.

On the other hand, I recognize all the help and support that I got from HEC alums and collogues with discussions about startups and the venture capital environment. The community interested in these topics is vast, and all information that I got was tremendously helpful for the thesis.

Lastly, I would like to express how grateful I am to my family and the HEC family for allowing me to live such a fantastic experience. These three years have been incredibly nourishing and have changed me in many ways.

EXECUTIVE SUMMARY

This paper examines the typical attributes of startups, extensively studying their main characteristics. The analysis shows that most startups need more historical data and financial information to forecast future trends. Moreover, they stand out for companies with operating losses and high operational risk. Nevertheless, on the other hand, they are ventures with high potential growth and upside. Startups heavily rely on equity financing as opposed to traditional debt financing. This thesis also shows numerous examples and references, the shortcomings of some traditional valuation methods, and analyses the quality of alternative non-traditional methods.

The case study extensively studies the company and industry of Bumble Inc., Showing that the Online Dating industry is very competitive and depends highly on marketing and selling expenditures. However, Bumble, the second most significant player worldwide, is well positioned in the market, using a disruptive methodology in its networking app. The main risks that the company faces are competitive risks, privacy and security risk, and reputational risk.

Lastly, the case study also assesses Bumble Inc.'s share price using the valuation methods examined in the first part of the paper. While most valuation methods produce a range of values in line with the market, some non-traditional valuation methods could be more accurate due to the substantial size of Bumble Inc. compared to most startups. The outcome of the case study values Bumble Inc. between $20 to $25 per share, implying that the company may be undervalued at the moment, with a current share price of $17.8.

TABLE OF CONTENTS

LIST OF FIGURES

SECTION I – LITERATURE REVIEW

1. Introduction to Startups

a. Definition

The definition of Startup refers to a company in the initial stages of business. Startups are founded by one or more businesspersons who believe there is demand for a product or service they are trying to develop. There are multiple ways to define a startup – Steve Blanc defines the startup as "a temporary structure that seeks to find a renewable, profitable and scalable business model."

Despite broad definitions, the business community recognizes that all startups stand out because of their innovation, aiming to remedy deficiencies or create new categories of products. Thus, most startups are known as disruptors within their respective industries. Along with innovation, other traits that startups can highlight are speed, growth, a small headcount, and a crucial founder's role complemented by a distinct culture. (Forbes, 2022)

Along with innovation comes riskiness, which leads to high costs and low revenues through the development phase. This lack of income makes founders look for capital through different sources, leading to a high dependency on investors to develop the company further.

Steve Blanc also explains that when a company has already been established in the market and has found its clients, distribution channels, branding, etc., it should no longer be called a startup. This opens the debate of when a company should stop being considered a startup since some people still think of companies like Spotify or PayPal that were considered startups one day no longer should be called startups as they have grown significantly and have an established business model. (Grant, 2022)

Despite sharing multiple traits, startups can be differentiated by their type of startup. Although the literature dedicated to the classification of startups is somewhat limited, the industry distinguishes six types of startups depending on the business goal: (Startup Savant, 2022)

1. **Scalable Startups**: They identify a market opportunity through market research to exploit it through an idea. They aim for fast top-line growth to achieve the highest return on investment possible and usually require significant investments. Most unicorn startups are scalable startups; good examples are Google or Facebook.

2. **Prominent Company Startups:** Backed by the funding of large companies, they aim to reach new markets, develop disruptive products, and help the large company make the most of the continuous market changes. A perfect example would be Apple which has diversified its product offering in recent years with AirPods, Apple TV, and Apple Music.

3. **Small Business Startups:** are created by people that work for themselves and tend to be the owner's source of income. Thus, rather than looking for scalability, these aim for longevity and financial stability.

4. **Social Entrepreneurship Startups:** They are not created to produce profits but to make a positive social or environmental impact. However, they can also make money if they are not a non-profit organization. The main goal is to make a difference in the world, so they highly value Corporate Social Responsibility (CSR). Ben & Jerry's ice cream is a good example, whose primary goal is to reform prisoners.

5. **Lifestyle Startups:** They are born from the founder's passion and interests, working solely to do a business out of his hobbies or desires. Therefore, it is more focused on something other than being profitable and more on sharing the entrepreneur's passion. A good example would be a fanatical traveler who shares his tips and documents all his experiences.

6. **Buyable Startups:** These companies are developed to grow to a certain level so that they can be sold to a larger company. These are usually tech-focused in the app development or web industries. They have lower capital requirements and are sold at peak value. (Sendpulse, 2023)

b. The History of the Startup Culture

The concept of a startup has been evolving with time, maintaining its core values the same. For instance, today, a startup is mainly associated with the technology field, but this was not the case in past decades. Startup culture has been evolving throughout the years. Starting in the twentieth century, the predominant business model was a traditional corporate structure based on a vertical organization constructed around management. This model highlighted stability and predictability but lacked dynamism and innovation.

Between the 1970s and the 1980s, entrepreneurs started to rise within society, challenging these traditional values and embracing a culture based on risk, disruption, and innovation. This was the beginning of the startup culture. This culture attracted many people, especially those without access to traditional corporate structures, allowing them to build their path. The culture experienced a particular boom in Silicon Valley, USA, where venture capitalists were investing in all these new ideas.

Technology played a crucial role in its development, as the internet, computers, and new software allowed entrepreneurs to create new products and services increasingly efficiently. This increase in productivity allowed these new ventures to reach new customers faster, not only through the use of the Internet but also by reducing traditional marketing and sales costs.

In the 1990s and early 2000s, technology startups experienced an intense rise in IPOs and venture capital investments, which created countless startups like Amazon or eBay. This period is referred to as the dot-com bubble, a period where the enormous public interest in technology, willingness from investors, and the abundance of new ideas thanks to the internet led people to believe that they could make massive profits in little to no time. Companies started to go public despite having bad financials or investors not caring about the long-term prospects of these companies, which ended up creating a crazy bubble. (Faster Capital, 2023)

The amount of capital invested in these ventures and the investors' expectations led to much speculation and overvalued of most stocks. The bubble eventually burst in early 2000 when the Nasdaq index started to decrease rapidly. After the crisis, investors became more cautious when funding technology startups, starting to develop what would become the conditions that venture capital requires now when investing in any company.

Nonetheless, startups played an essential role in the globalization phenomenon, as they turned out to be a global sensation, becoming an essential part of the economies and cultures, contributing to the wealth and employment of the population.

c. Trends

Business is in a constant transformation, following the latest trends that offer new opportunities and challenges of all sizes and forms. The latest trends in Venture Capital and the startup industry are:

1. **Purposeful Business:** Customers are more and more interested in finding a brand or a product that fits all their needs and remaining loyal to the company for a long time. This is why today, some of the most successful startups have managed to not only offer excellent services and products but specialize in offering solutions for a societal challenge. (Marr, 2023)

2. **Sustainability:** Following green investment, ESG has become a central pillar for startups in the last few years. The majority of startups have been building their business on sustainability. This is, reducing waste, using energy-efficient manufacturing processes, reducing environmental impact, offering green alternatives to products, etc. This trend is not only followed by startups but has also been growing in other industries as well since green banking has been imposing restrictions to offer funding in addition to all ESG requirements from governments to obtain subsidies. For instance, Amazon introduced carbon footprint as the fourth KPI in 2019 when evaluating all its package routes. (Amazon, 2021)
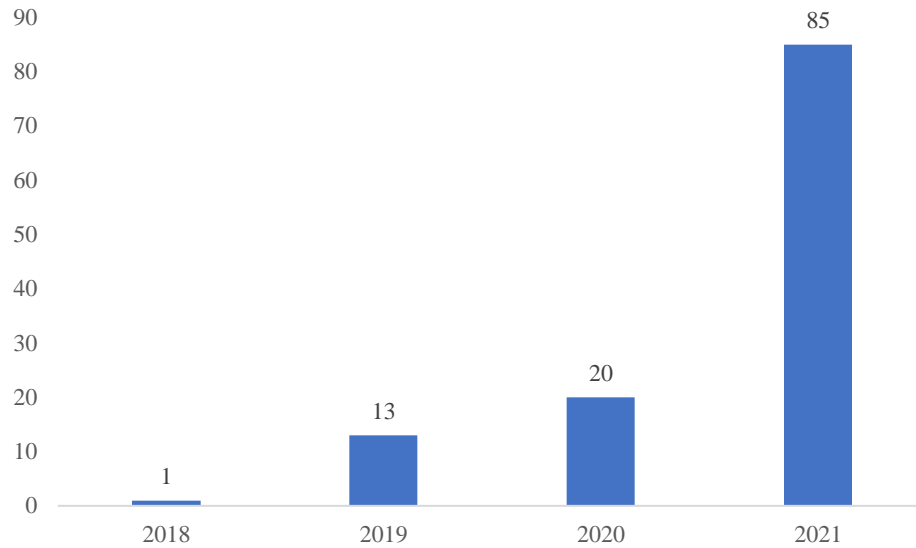
Figure 1: Capital invested in sustainability startups in Asia from 2018 to 2021 in $ Mn
Source: *(Statista, 2023)*

3. **Biotech:** Since the pandemic of Covid-19, the search for health and biotech companies has surged. Companies like DNA Nudge have experienced an increased number of searches and customers, all looking for products offering nutrition recommendations, exercise routines, skincare products, etc. These products are all tailored to the individual DNA and allow us to look into the customer's past, but soon could also be telling future information, like predicting health issues, for instance. (Howarth, 2023)
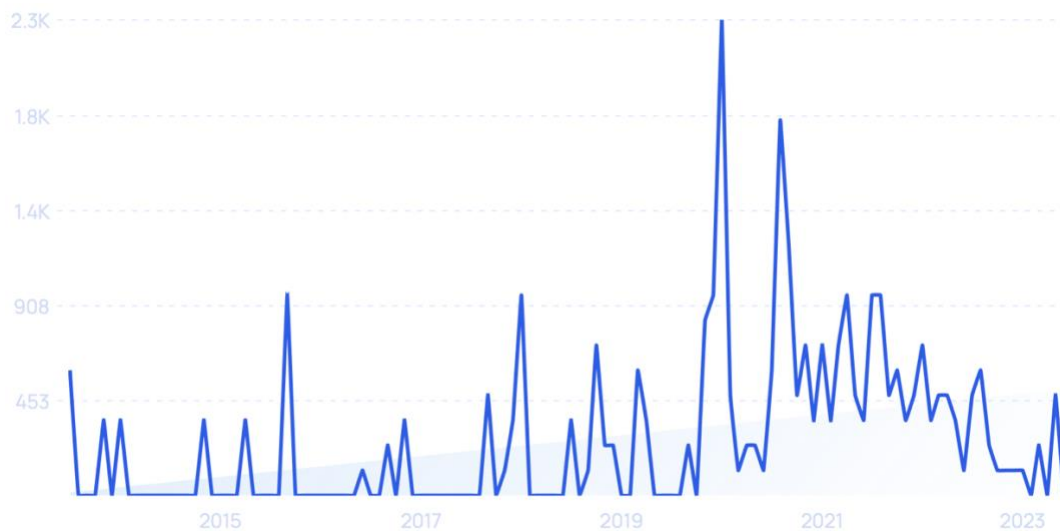
Figure 2: DNA Nudge searches - demand for their products rocketed at the start of 2020
Source: *(Exploding Topics, 2023)*

4. **Digital Innovation in Africa:** Africa has been experiencing an increase in venture capital funding since 2019 (+228%). The continent has a lot of untapped potential, which has yet to be addressed by startups in the past. For instance, in 2020, Africa received $2.02 billion in funding, as opposed to $1.16 billion in 2018. (Partech, 2020)

5. **Artificial Intelligence** (AI): The rise of AI has brought more and more startups into the market. The number of M&A deals regarding AI acquisitions has been growing steadily, only dipping in 2020 due to the Covid-19 outbreak, peaking at 312 deals in 2021 and 259 deals in 2022. As *Figure 3* shows, startup funding has been growing at a CAGR of 32.8% since 2015, only dipping in 2022.
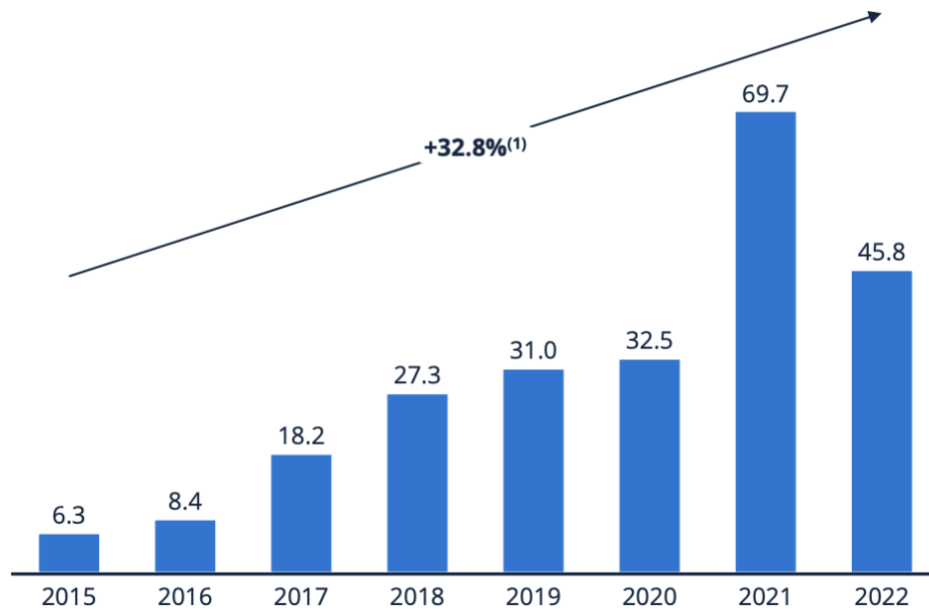
Figure 3: AI Startups - Annual global funding in $ Bn
Source: *(Statista, Artificial Intelligence: in-depth market analysis, 2023)*

Moreover, in the last few years, startups have been competing with the Tech industry for the best young talent. Startups have been focusing on developing an attractive work environment, emphasizing a healthy working culture, and offering the best employee experience by being transparent and providing benefits and flexibility. However, the Tech industry has been replicating these points, trying to also create an attractive work environment in the last few years. (Marr, 2023)

d. Sensitivity of startup valuation to the economic environment and inflation

The success of startups is influenced by various factors, as mentioned, including the macroeconomic environment, inflation, and business cycles. The macroeconomic environment encompasses factors such as interest rates, inflation, and overall economic conditions. During expansionary economic periods, startups may have easier access to capital and favorable market conditions, empowered by higher customer consumption which enhances the startups' growth and valuation. Contrarily, during economic downturns, startups can encounter more significant difficulties in accessing capital or funding opportunities due to the decrease in consumption and uncertainty, which can affect the startups' growth and valuation as well.

Thus, macroeconomic drivers can influence startup valuations. This means that current market conditions drive startup valuation models. Berre and Le Pendeven have demonstrated that startups' valuations are highly pro-cyclical, affecting them via two channels. These are GDP growth rates and cash-on-market. (Berre & Le Pendeven, 2012)

How these economic macroeconomic drivers affect valuations through cash flows, growth, and risk. Inflation, for instance, can affect cash flows through:

1. **Pricing Power**: The size of the market and the market share of the company are related to pricing power. If the startup can pass the price increases to their customers, they will be better protected from the effects of high inflation, although this effect depends on each industry.

2. **Cost Structure:** Cost efficiencies and pricing power determine the cost structure. The degree of affectation for the company depends highly on how sensitive the company's costs are to inflation. Startups with higher expenses will be more impacted by inflation than companies with lower costs of goods sold.

3. **Investment Efficiency:** The amount that a company needs to invest in order to expand or grow its business is determined by investment efficiency. Companies that need to invest more significant amounts for a more extended period of time will be highly affected by inflation. On the other hand, the more flexible and accessible the investments are, the easier it is for the company to cancel or postpone the investment to deal with inflation levels.

In the same way that inflation affects cash flows and growth, it can also affect the companies' risk through:

1. **Cost of Equity:** The more vulnerable a company is to market and economic changes, the higher the cost of equity the startup will have. The equity risk premium will rise for those companies that operate in a more unstable industry bearing higher operational risks. The opposite can happen for companies that operate in a safer and steadier market.

2. **Cost of Debt:** The cost of debt can also increase for companies that become more likely to default in the case of higher inflation. This means that the price of borrowing money, excluding any tax benefits, can increase compared to companies that have better, more stable businesses with consistent cash flows and earnings. There is also a secondary effect, which can make some businesses take even more debt in higher inflation situations to deal with the low growth and earnings of the company.

3. **Failure Risk:** Higher inflation can negatively affect companies with higher failure risk. Startups with unproven business models or product-market fit can be adversely affected by higher inflation, raising the likelihood of the business failing. (Easy Cap Raise, 2023)

e. The impact of current higher interest rates on startup valuation

It is essential to always have in mind the current macroeconomic conditions when thinking about investing, developing a company entering a new market, etc. These conditions also impact the fundraising efforts of startups during their development.

Although there is a significant number of macroeconomic factors that can affect these efforts, there is one fundamental shift that is above all others. In April 2022, the 12-month EURIBOR became positive for the first time since February 2016, which means that now with a EURIBOR of 3.875% in June 2023 (Euribor-rates.eu, 2023), risk-free financial instruments have also turned positive. This way, companies can invest today in risk-free or almost risk-free assets and obtain a 4 or 5% return per year with deposits at reputable banks.

As a result, the required return for venture capital investments will also increase to match the difference in risk there is between investments. This raise in required return has a direct impact on the startup's valuation. Although multiple funds have announced new funds in the past few months, like EQT Ventures with a new $1.1 billion fund in November 2022, Speedinvest with a $500 million fund in December 2022, or Index Ventures a second $300 million seed fund in November 2022, all these factors will increase the difficulty to raise funds for early-stage startups.

As interest rates increase, the more demanding and selective VC funds will become, translating into a more challenging and more competitive environment for pre-seed and seed startups to raise funds. (New Nordic Ventures, 2022)

2. Startup Growth Stages

Startup beginnings are usually marked by uncertainty, adaptation, changes, and unforeseen events. Although each startup has its path, most experience a challenging journey to develop from a simple idea to a profitable business. The majority of startups go through six different stages that have been differentiated by experts. This section examines every stage of the life of a startup, from the creation of the idea (Pre-seed stage) to the sale of the company (Exit stage).

a. Pre-Seed Stage

The birth of every startup comes from an idea to address a specific problem or a specific demand gap in a market. During this stage, the founders look for feedback regarding their idea from outsiders in order to make their idea a reality. They develop their idea by analyzing the problem, the potential of the market, possible client reach and penetration, cost estimates, and also potential investors and partners. The founders need to consider if there is a similar product in the market and if there is competition. It is also when most entrepreneurs set the legal foundations of the startup, even if they are yet to create an operational product. Finally, it is also when founders develop a roadmap to realize the idea they have developed. (Indeed, Indeed, 2022)

b. Seed Stage

During the seed stage, entrepreneurs start looking for funding, as most of the time, they have already used their own funds to start developing the idea and setting up the initial team. To do so, founders start developing a timeline to assess the funding, resources, and goals they want to reach in the following months. Thus, throughout this stage, the team needs to start developing its

business model, objectives, and missions (Indeed, Indeed, 2022). The seed stage is similar to the validation stage, as it is when entrepreneurs need to validate their "seed" idea or hypothesis through prototyping and experimentation. Nonetheless, some startups need help to validate the opportunity and do not survive this second stage. The typical investors in this first round of financing include founders, friends, family, incubators, or venture capitalists. (Indeed, Indeed, 2022)

c. Startup Stage

Once the company has gathered all information, it can start to launch its products or service. This means that at this point, companies start developing a minimum viable product, which is an operational but simpler model of the product. This product is evaluated by its stakeholders, and all feedback is gathered to improve and adapt the MVP to their necessities. This feedback is one of the crucial elements of this stage in order to start product testing and increase the customer base (Indeed, Indeed, 2022). According to Forbes, startups usually take more than three times longer than expected to validate their business model. (Forbes, 2020)

d. Growth Stage

The growth stage is where startups begin experiencing profitability and strong market demand that leads to recruitment and team expansion. Here is when companies start to experience a rapid increase in cash flow. However, management has much pressure during this stage, as they need to develop a good strategy and execution to meet new demands, tap into new segments and adapt to their audience. This is why, usually, after rapid growth, the company needs to start hiring a lot of new employees to manage the workload and maintain the growth of the startup. (Indeed, Indeed, 2022)

e. Established Stage

In this stage, the company has reached a steady status where its business is succeeding. The brand value has started to develop due to the loyalty of the customer base. This implies that cash flows become more and more stable, which helps the company lower its risk profile and, therefore, its cost of capital. However, it is essential for founders not to relax and continue growing the company and start working on the expansion stage. (Indeed, Indeed, 2022)

f. Expansion Stage

Since Angel investors and Venture Capital funds have some required returns, it is crucial that founders remain alert and keep trying to grow the company. Thus, after the Established Stage,

startups try to expand their business model to other markets and distribution channels. Another option for entrepreneurs is to launch a new line of complementary products that serve a different need to their current customers, leveraging their existing relationship. For instance, a car manufacturer and seller might start to offer insurance or maintenance services as well. (Indeed, Indeed, 2023)

g. Maturity Stage

The maturity stage is the stage where the startup reaches consistency in revenues over a long period of time through a loyal customer base. At this stage, founders and entrepreneurs can start to relax, as the risk the company has of failing is much lower. Thus, usually, at this time, management teams take over the control of the company. Getting to the maturity stage means that the company has become a strong player in the industry and understands very well its business model, customers, and brand perception. (Indeed, 2022)

h. Exit Stage

The exit stage is the last phase that a startup can go through. During this stage, the founders or shareholders might decide to sell the company to realize its returns. There are several exits that companies can take. The first one is through an Initial Public Offering (IPO), where the company decides to go public, allowing all previous investors to sell their shares and obtain their desired return. Secondly, the company can also be sold to a private investor through a merger or an acquisition (M&A). Depending on the investor's intentions, the buyer can be a Private Equity, a strategic buyer, etc. All options create shareholder value and allow the company to expand further, and sometimes provide owners with an option to sell when the company has grown beyond its capabilities. (Indeed, Indeed, 2022)

3. Types of Financing

The ability to raise funds is a critical element of a startup's success, as it enables the financing of projects and allows the company to grow. There are three different types of financing that a company can use to fund its operations (Vernimmen, Quiry, Dallocchio, Le Fur, & Salvi, 2022)

a. Equity

Equity financing is one of the most common ways to finance a startup. In this method, the company issues a share of stock that provides investors with ownership of the startup in exchange for funds. Depending on the type of ownership or shares and the funds received, there are multiple types of equity financing for an enterprise.

Founders

In the first stages of a startup, it is standard for founders to rely on their funds to develop their idea or project using personal savings or profits generated by other businesses. This type of funding is relatively simple, as it does not deal with external parties, but it has considerable limitations, as the amount of money founders can provide is finite. The money is usually used to cover the initial expenses or to set up a simple working team.

Friends & Family

As an alternative to self-funding, some founders in the earliest stages of the startup might appeal to their friends and family for funding. One of the positive aspects of Friends & Family is that there is no jury to convince when pitching their idea. However, this option is not available for every founder, as not all entrepreneurs have wealthy friends or family. Typically, these first two methods raise between a few thousand and $300k, depending on the number of founders and the industry the startup operates in.

Angel Investors

Although most investors are former entrepreneurs or founders themselves, some of them come from VC firms. They usually invest individually or sometimes put money together with a syndicate that pools cash from several other angels. Most angels only invest in startups that operate in industries where they are experts. This is why the advice and guidance that angel investors can offer founders may be more specialized than advice offered by VC funds. Angel investors rely less than VC firms on due diligence processes; on the contrary, angels tend to focus more on the

personal relationship with founders as they are more interested in the mentorship process rather than only focusing on the returns they can achieve. (Nowshin, 2023)

Crowdfunding

This method relies on raising small amounts of money from a high number of investors. There are two types of crowdfunding, donation and investment crowdfunding. The first one usually involves small amounts of money donated through a collaborative process in exchange for rewards, which can be products or other advantages. The second one, the investors get ownership of the company in the forms of equity or debt in exchange for the money provided. Crowdfunding can be very beneficial for the startup, as it is a way to reach or interact with potential clients and enhance their brand value. The amounts raised with crowdfunding are around a few thousand dollars. Moreover, this method has been growing fast in the last few years (33.7% in 2022 in the US) and already generating $17.2 billion in the US. (Foundera, 2023)

Venture Capital

Venture Capital Funds (VC) usually offer funding to some startups with significant growth in exchange for a significant equity stake in the company. VC is the most common type of funding since the amount that funds invest is typically the larger of all the options available for a startup. This is why it is the most used type of funding since it is perfect for startups looking for incredible growth levels. Furthermore, having the support of a trusted firm can be leveraged by the startup to boost their growth, using the knowledge of the firm, and can also increase the probability of getting funding as well as the cost of this funding. This last point refers to one of the most common biases of VC, Fear of Missing Out (FOMO). This bias explains that in VC, once one firm has invested in a startup, other firms will not hesitate to invest without asking too many questions. (Sifted, 2023)

Funding from venture capital can vary depending on the funding round that the fund targets. This range can be extensive, from a few thousand dollars in the very early stages to millions of euros in later funding rounds. Depending on the ground that they target, these funds can focus on very different aspects (Nowshin, 2023):

1. **Pre-Seed Stage:** During this round, VC funds will only be looking for a startup's vision rather than numbers like revenue, customers, etc. Funds look primarily at the team; it is standard for funds to invest in startups where the idea might be blurry, but the management team is incredibly talented and committed.

2. **Seed-Stage:** VC funds will be looking for a detailed explanation of the problem, the market opportunity, and the solution presented by the founders. Through these presentations, investors will look at the founder's capabilities and ask specific questions to find shortcomings and give feedback to entrepreneurs. Some investors that target Seed-Stage rounds like to test early prototypes; thus, if founders can show advanced operating prototypes, they will likely secure the funds. It is a common practice that some seed investors reinvest in later rounds of financing if the startup is doing well. This is a strategy that some funds use to double-up their bet on the "better-looking" investments. The use of reserves can be very beneficial for high-growth startups, as it facilitates the search for funding in later rounds. Thus, it is essential for startups to maintain a great relationship with early investors. (Attar, 2023)

3. **Series A:** At this stage, investors start to focus more on numbers rather than the idea. As startups get to Series A rounds, VC funds look for financial modeling information, the business model, and the "hockey stick" curve to understand when the company will need funds, how those funds are going to be used, etc. This means that during this phase, founders need to forecast the following years; usually, VC funds expect a minimum 3-year forecast. One of the key metrics that the investors will look at is the growth expectations of the startup, which will essentially bring the scalability needed for investors to obtain their desired rate of return. Lastly, another critical aspect is unit economics; it is imperative for investors to see that before the company starts to scale to big numbers, the startup has figured out the unit economics to avoid cases like Uber, where the company has excellent revenues and size, but most of its products are still not profitable.

4. **Series B and later rounds:** Investors in these rounds basically look for a differentiated product with a large market. As the company has already grown quite a bit and has generally gone through multiple funding rounds, they also expect to have an exceptional team, as a lot of critical hires should have been made. Finally, scalability and growth keep being key indicators for investors as well as capital efficiency.

In conclusion, VC not only provides crucial funding throughout the different funding rounds of a startup but primarily provides knowledge and experience that helps the startup achieve growth and profitability that can be scaled up to accomplish success.

Private Equity

Private Equity funds acquire shares of private companies or a controlling stake in public companies. After gaining control, they focus on developing and restructuring the company with debt and efforts to increase profitability to create value through deleveraging, EBITDA uplift, and multiple expansions. Typically, these funds focus on later stages of companies, where they have reliable and stable cash flows, rather than high-growth companies that can be more similar to startups.

b. Debt

Debt financing is an alternative way of getting funds to develop the company through its life cycle. As opposed to equity, debt does not require giving up ownership of the company, which makes it a prevalent method to raise funds. However, as good as it seems not to lose ownership, retain control over the company decisions, and have a defined period for the debt, there are also some cons. Debt is not easy to acquire; most banks require stable and solid cash flows to be sure the company will repay its debt. Furthermore, unlike with equity financing, the startup is required to pay back the money within a certain period. These disadvantages explain why it is not as common to raise debt in the first stages of a startup since the cash flows usually need to be more stable to be used to repay debt.

The types of debt that can be used by startups are vast, but some of the most common are:

1. **Short-term vs. Long-term Financing:** Short-term financing refers to debt that has a repayment period of less than a year. On the other hand, long-term financing has more extended repayment periods, as it is used for longer projects like real estate purchases, equipment updates, etc.

2. **Monthly Recurring Revenue (MRR):** This type of debt is mainly used for startups with some recurring revenue stream, like SaaS companies with monthly subscriptions. On average, the amount lent can be around 3x-5x the MRR of the company.

3. **Revenue-based Financing:** Revenue-based financing is a more flexible type of debt, where payments are based on a percentage of the monthly revenues of the company. This type of debt can benefit companies with high-growth aspirations or others with less stable cash flows, as the payments adapt to the natural fluctuation of startup revenues. This makes this type of debt a reasonable alternative to equity without demanding shares of the company. (Hekkert, 2023)

c. **Other**

Other forms of funding include grants or subsidies and incubators or accelerators. The first is a sum of money that is provided by the government. As it is not easy to potentiate innovation, governments have grants or subsidies for some companies that comply with specific requirements that can be used to cover expenses, such as R&D, marketing, equipment, etc. The criteria to get these types of grants are pretty selective. For instance, the government might have a budget to devote to sustainability and green-environmental projects that improve the carbon footprint of the company. This implies that unless the project the company wants to develop ticks certain boxes, the government will not grant the company the money.

The second one consists of programs or organizations focused on providing support and helping develop some startups. They usually focus on the high-tech sector, working with them for two years. After the incubator period, the startup enters its industrial production phase and becomes independent.

4. **Equity Funding Rounds**

As previously mentioned before, when startups are raising funds, especially in their early stages, they rely on Venture Capital. Depending on the stage they raise this money, they go through different rounds that differ from each other. These funding rounds increase progressively in size, as can be seen in *Figure 4* below. They also change the type of investors from one round to the other. Usually, most startups start with a seed round, to later go through series A, B, and C. As a last step, typically, most startups that have grown enough do an IPO which serves as an exit strategy for most investors that have taken part in the funding rounds. (Quantic, 2021)
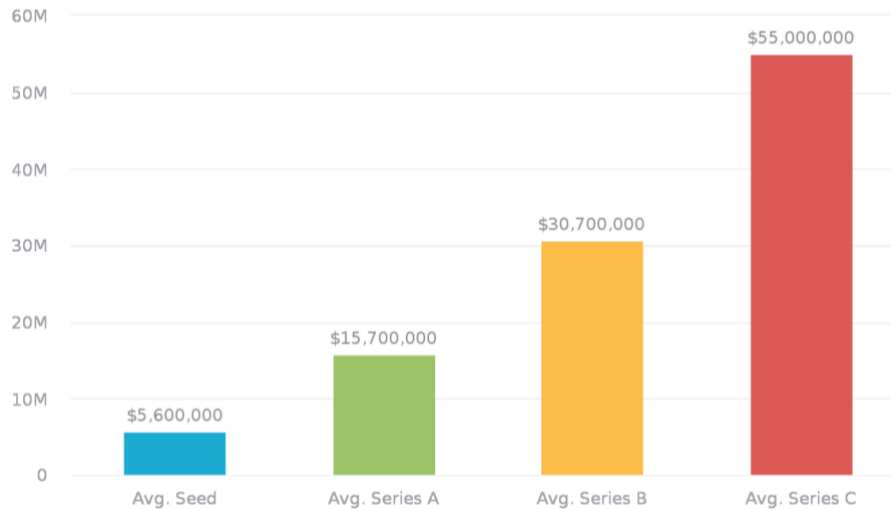
Figure 4: Average size per round in 2019
Source: Visible.vc, 2018

a. Pre Seed

Pre-seed is the earliest stage of funding for startups; it usually involves angel investors, friends and family, self-funding, incubators, accelerators, and dedicated VC funds. The money is mainly used to start the company itself, which makes it one of the riskiest rounds of funding, as the startup has not yet proven the business model nor the market-product fit. The average size round for pre-seed is between $50k and $ 1 million.

b. Seed

During this funding round, the startup already has a significant idea of the business or product they want to develop. At this stage, the go-to-market strategy is being developed, and the company has little to no revenue. This is why it is considered a great success to raise funds in both pre-seed and seed funding rounds. The investors involved in the seed round are similar to pre-seed, looking for early investments that grant them access to reinvest in the later stages of the startup. Although the average seed round size was around $5.6 million in 2018, the round's size has significantly increased in the last decade, as can be seen in *Figure 5*.
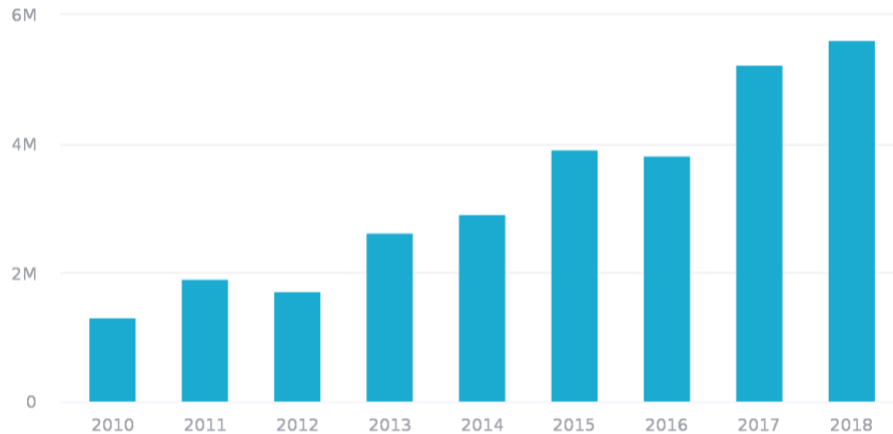
Figure 5: Average Seed Round Size by Year in $Mn
Source: Visible.vc, 2018

c. Series A

After the seed rounds, it is time for the startup to raise a later venture capital round, Series A. This round can be intimidating for some founders, as it is a make-or-break round, where the company shows if it has potential for high growth or if it fails.

One crucial factor that comes into play after the seed rounds is the valuation of the company. This is because to go through a venture capital round, there needs to be a post-money valuation of the company, which is, of course, influenced by previous rounds of funding.

During this round, the company generally uses the money raised to grow the business and enter the market. Although the initial investors and founders would want to keep as much ownership as possible, usually, investors get the opportunity to purchase between 5 and 30% of the company. In the same way that the average seed round size has grown a lot in the last decade, the average size of Series A has also moderately increased, as can be seen in *Figure 6*, with an average round size of $22 million in 2019 (Visible.vc, 2018).
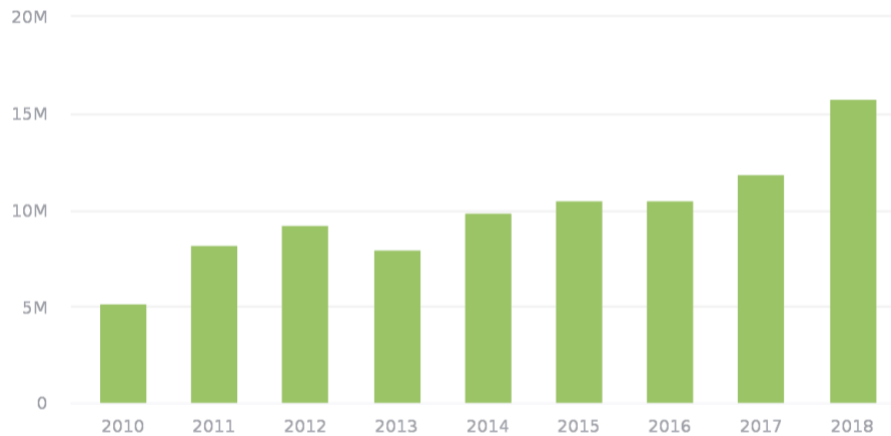
Figure 6: Average Series A Round Size by Year in $ Mn
Source: Visible.vc, 2018

d. Series B

After the business has already been launched and established, the startup might have to raise Series B. This funding round is usually less risky than the previous ones, as the company has already demonstrated having a good business model that works. This is translated in the interest of investors, as it generally is easier for the founders to find investors for their Series B than other previous rounds.

The money raised in Series B is used to grow the business further and expand it to other markets or products, as the unit economics and the product-market fit already works. Typically, companies raising Series B raise, on average, $30 million. (Visible.vc, 2018).

e. Series C

Series C is a funding round that founders mostly do if they need extra capital to expand the business. In the case where the previous round (Series B) has yet to be enough to expand the business fully, founders can opt to raise more money through Series C. Following the trend from previous rounds, getting to Series C makes the company less risky and more of a success, which typically implies that companies with relatively high valuations are already looking to expand internationally.

The average size of Series C can be between $30 to 100$ million, which allows the company not only to expand its business through organic growth but allows other options like acquiring or merging with other companies.

f. Later Funding Stages

After Series C, some companies decided to raise more money through Series D, E, F, or G because they were not able to raise enough money in their previous rounds or because they needed to reach their targets. This implies that the company might have a lower valuation than in previous rounds, which can affect the reputation of the company.

Thus, keep raising money with Series D, E, F, or G can harm the company as it shows it is their only way to survive, which exposes the quality of the company.

On the other hand, successful companies that do not need further rounds of funding might decide to go for an IPO or directly sell the company to external investors, providing an exit opportunity for all previous investors and founders.

Figure 7 shows the different stages of the startup financing cycle, showing the different equity funding methods mentioned previously, and the various stages that the startup goes through until secondary offerings.
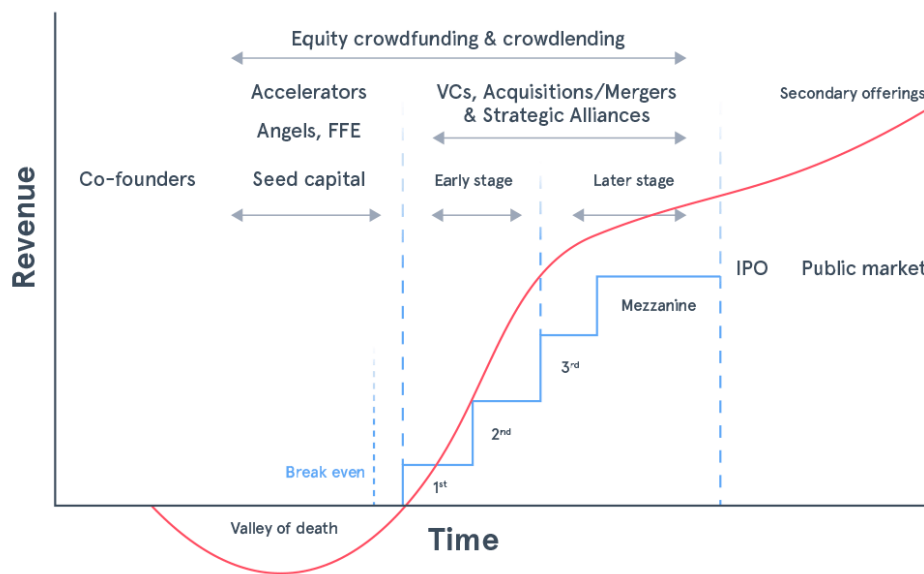
Figure 7: Startup Financing Cycle
Source: Quantic, 2021

5. Startup Valuation

Startup Valuation consists in determining the value of a startup considering the market environment and the industry where the business operates. This includes the need for money from the company to develop, the willingness of investors to pay premiums, the demand and supply of the market, reputation, hotness of the industry, traction, revenues, etc. (Upcounsel, 2023)

A vital aspect to be considered when doing a company valuation is the purpose of this valuation. This is because the importance that the valuation needs to give to certain factors affects the accuracy that the valuation is going to have. For instance, in the case of LBOs, the most critical factor of the valuation is going to be the deleveraging and the future cash flows from the company. Otherwise, the accuracy of the valuation will not be great, which explains why this method might only be suitable for a company with stable revenues and earnings.

When valuing a company, there is an essential difference between doing a mature business valuation and a startup valuation. When valuing a mature business, the company has stable revenues and costs, which makes it a lot easier to forecast the future earnings that the business will produce. In the case of a startup, it is much more difficult, as most of the time, they still need an established business model, steady revenues and earnings, or a consolidated position in the market (Damodaran A. , 2009). Not having historical data to forecast the future performance of the company makes it difficult to predict with accuracy the future earnings or needs of the company, which translates into a theoretical valuation. Furthermore, not having a consolidated position in the market also complicates valuation through comparable companies or precedent transactions, making the analysts work much harder and inaccurate. Lastly, there is also asymmetrical information when valuing the startup. This is because secrecy exists around early projects, which creates imbalances when valuing the business from the founders' or investors' point of view. Therefore, undervaluation and overvaluations are common occurrences.

Taking all the above into account, for this case study, all valuation methods that have been selected have been divided into traditional or non-traditional valuation methods. Traditional valuation methods are generally considered for already mature businesses with stable earnings. Moreover, non-traditional methods are mainly focused on valuing startup companies. *Figure 8* shows all the methods selected.

Valuation Method

Traditional	Discounted Cash Flow (DCF)
	Leveraged Buyout (LBO)
	Comparable Companies
	Precedent Transactions
	Real Options
	Book Value
	Liquidation Value
Non-Traditional	Berkus
	First Chicago
	Risk Factor Summation
	Scorecard
	Cost-to-Duplicate
	Venture Capital

Figure 8: Chosen Traditional and Non-Traditional Valuation Methods

a. Traditional Valuation Methods

As mentioned in the previous section, these valuation methods are mainly used to value companies with a mature position in the market and steady revenues and earnings. The following methods are primarily used in finance by analysts who work in M&A or Private Equity firms.

Discounted Cash Flow (DCF)

The Discounted Cash Flow (DCF) method is regarded as the most accurate and dependable among all valuation theories. The analysis considers the ability of the business to produce stable cash flows in the future. These streams of cash flow are then discounted using a rate that reflects the company's weighted average cost of capital (WACC) to obtain an Enterprise Value of the firm.

$$EV_0 = \frac{FCF_1}{(1+WACC)^1} + \frac{FCF_2}{(1+WACC)^2} + \cdots = \sum \frac{FCF_t}{(1+WACC)^t} \qquad (1)$$

With:

EV_0: Enterprise Value at t=0

FCF_t: Free Cash Flow of period t

WACC: Weighted Average Cost of Capital

The DCF is a method that is focused on valuing the company with an intrinsic principle, not using the market perception of the company. This is one of the factors that makes the valuation accurate. However, the model has three main weaknesses that can affect the accuracy of the valuation. The first and most famous weakness is its sensitivity to the assumptions made in the model inputs. The second one is its continuous capital structure, which assumes the company will maintain a constant WACC during the life of the firm, which is not likely. Furthermore, lastly, the long-term cash flows are calculated using a terminal value, which is an approximation for all the cash flows the company will produce in perpetuity after the first ten years.

Nonetheless, for companies that are mature and have stable cash flow streams, the valuation method is highly reliable, as the effect that these weaknesses will have is minor. Thus, for Startup valuations, DCF might not be the most accurate method as startups usually need several years to become a reliable and stable source of cash flows.

The following explanation shows the different parts of a DCF analysis explaining the calculation of Cash Flows, the calculation of the Terminal Value, the different ways to calculate the WACC, and how to obtain the Enterprise Value. (Breaking into Wall Street, Breaking into Wall Street, n.d.)

- *Free Cash Flow*

Free Cash Flow (FCF) represents the amount of cash generated by a business after accounting for reinvestment in non-current capital assets by the company. (Corporate Finance Institute, Corporate Finance Institute, 2023)

FCF speaks about the strength of the company to reduce debt, pursue opportunities that help grow the company, pay dividends, or do share buybacks. This is why FCF is such an essential indicator in DCF, as it shows how good the company is.

There are two types of FCF, Unlevered Free Cash Flow or Free Cash Flow to the Firm (FCFF) and Levered Free Cash Flow or Free Cash Flow to Equity (FCFE). The first one, FCFF is the cash flow available to all equity and debt holders after all operating expenses, capital expenditures, and investments in working capital have been made. It is used in financial modeling

to calculate the Enterprise value of the firm. FCFE, on the other hand, is the cash flow available only to shareholders of the firm, which is calculated as cash from operations minus the capital expenditures plus net debt repaid or issued. (Corporate Finance Institute, 2023)

In the case of the DCF method, the most common indicator used is the FCFF, which can be calculated as the following:

$$FCFF = (1 - t) * EBIT + D\&A - CapEx - \Delta NWC \tag{2}$$

With:

FCFF: Free Cash Flow to the Firm

t: Corporate Tax Rate

EBIT: Earnings Before Interest and Taxes

D&A: Depreciation and Amortization

Capex: Capital Expenditures

ΔNWC: Difference in Net Working Capital

- *Terminal Value*

The DCF method usually splits the future into two periods, the near future and the "far in the future" period. The near-future period usually goes from the first 5 to 10 years of the model, while the rest of the future is part of the "far in the future" period. The near-future period is calculated using the FCFFs that have been explained in the previous section and discounting them to the present. On the other hand, the "far in the future" period is calculated using the Terminal Value, which considers the company to grow at a constant rate in perpetuity.

There are two different ways to calculate the Terminal Value, assuming that the company gets sold for a specific multiple or assuming that the company keeps operating indefinitely and summing up all its cash flows.

With the first one, the EBITDA of the first year of the "far in the future" period would be multiplied by a market average or estimated EBITDA multiple, which would give a total value of the company far into the future that needs to be discounted.

$$TV = EBITDA_t * Exit\ Multiple_{Peer's\ average} \tag{3}$$

With:

TV: Terminal Value

EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization

The second is based on the Gordon Growth or Perpetual Growth Method, which assumes that the cash flows keep growing far into the future, although their present value keeps shrinking because the discount rate is higher than the growth rate. Moreover, the Perpetual Growth Rate cannot be higher than the economy's growth rate since otherwise; the company would be growing more than the country's economy forever. (Gordon, 1959)

$$TV = FCF_T * \frac{1 + g}{WACC - g} \tag{4}$$

With:

TV: Terminal Value

FCF_T: Free Cash Flow of the last forecasted year

g: Perpetual Growth Rate of FCF

WACC: Weighted Average Cost of Capital

- *Weighted Average Cost of Capital (WACC)*

To properly value a company, the Free Cash Flows (FCF) need to be discounted to a present value to incorporate the time value of money accurately. The rate that is used to discount these FCF is the WACC, as has been explained before. The WACC contains the time value of money, the risk associated with the company, and the expected return from all stakeholders, including debt and equity holders of the business. As can be expected, startups have a higher discount rate as their profile is riskier than any mature business, which translates into a lower valuation. The WACC is calculated by summing the cost of debt plus the cost of equity multiplied by their respective weights.

$$WACC = \frac{D}{D + E} * (1 - t) * r_d + \frac{E}{D + E} * r_e \tag{5}$$

With:

WACC: Weighted Average Cost of Capital

D: Market Value of Net Debt

E: Market Value of Equity

t: Corporate Tax Rate

r_d: Cost of Debt

r_e: Cost of Equity

The Cost of Debt is the effective interest rate that the company pays annually on its debts. There is no need to calculate such an adequate rate, as it can be found in the company's financials.

The Cost of Equity represents the expected return that shareholders agree on considering the risk and the capital structure of the company. It is often used by the company to evaluate as well if a project or investment is pursued or not. (Sharpe, 1964)

The Cost of Equity is determined using the Capital Asset Pricing Model (CAPM), which includes several factors. The calculation contains the risk-free rate, the beta of the company, and the return of the market. The Risk-Free Rate of Return is the return of an investment without any risk. It is often calculated as the yield-to-maturity of the longest government bond of the country that the business operates in. The rest of the formula then includes the additional risk of the investment using the Beta and the Equity Risk Premium.

$$r_e = r_f + \beta_E(r_m - r_f) \tag{6}$$

With:

r_f: Risk-Free Rate of Return

β_E: Equity Beta or Levered Beta

$(r_m - r_f)$: Equity Risk Premium Coefficient

r_m: Expected Return on the Market

The β_E includes the return volatility of the company compared to the return volatility of the market. This is a measure of the systemic risk of the specific asset compared to the market. For instance, if the Beta is 1, it shows that the company is strongly correlated to the market. With a Beta higher than 1, the company would be more volatile than the market, and with a Beta lower

than one, less volatile. In the case of having a negative Beta, the correlation between the market and the company would be the opposite. (HEC Paris, Corporate Valuation, 2022)

$$\beta_i = \frac{Covariance\ (r_i, r_m)}{Variance\ (r_m)} \tag{7}$$

With:

β_i: Beta of the Stock

r_i: Return of the Stock

r_m: Return on the market

Alternatively, the historical Beta of the company can be obtained from several finance providers. However, in the case of private companies, this is not the case. To obtain the Beta in this case, it needs to be calculated using comparable public companies.

To correctly calculate the Beta using this last method, the average beta of comparable companies needs to be deleveraged as the WACC includes the leverage structure of the firm. This means that before calculating the average Beta, all betas need to be deleveraged.

$$\beta_U = \frac{\beta_L}{1 + (1 - t) * \frac{D}{E}} \tag{8}$$

With:

β_U: Unlevered Beta (Asset Beta)

β_L: Levered Beta (Equity Beta)

D: Market Value of Net Debt

E: Market Value of Equity

t: Corporate Tax Rate

After all the betas have been unleveled, the average can be calculated. Once the average has been obtained, this beta needs to be releveled using the capital structure of the company we are studying. As mentioned before, the capital structure that needs to be used in this case is different from the current capital structure of the company but the one that it wants to maintain in the long term. (HEC Paris, Corporate Valuation, 2022)

$$\beta_L = \beta_U * \left(1 + (1 - t) * \frac{D}{E}\right) \tag{9}$$

With:

β_U: Unlevered Beta (Asset Beta)

β_L: Levered Beta (Equity Beta)

D: Market Value of Net Debt

E: Market Value of Equity

t: Corporate Tax Rate

- *Enterprise Value*

Once all FCF and the discount rate have been calculated, the first can be discounted to the present value to calculate the enterprise value of the firm. The calculation comprises two parts; the first computes the sum of the FCF discounted during the "near future," and the second is the terminal value discounted to the present. The total value that this calculation gives is the total amount that an investor would have to spend to buy 100% of the company, including debt and cash.

$$EV = \sum_{t=1}^{T} \frac{FCF_t}{(1 + WACC)^t} + \frac{TV}{(1 + WACC)^T} \tag{10}$$

With:

EV: Enterprise Value

FCF_t: Free Cash Flow in period t

WACC: Weighted Average Cost of Capital

TV: Terminal Value

Lastly, to obtain the share price from the Enterprise Value, first, the Equity Value needs to be computed. The difference between these two is that the Enterprise Value represents the value of the entirety of the business for all stakeholders, while the Equity Value represents the value of the company only for shareholders.

Thus, to get from the Enterprise Value to the Equity Value, several items need to be added or subtracted. Although this list is extensive, considering Associates, Cash & Equivalents, Other Asset-like items, Financial Debt, Non-Controlling Interests, Preferred Shares, Debt-like Items, etc., for the sake of simplicity, in this study, only Net Debt is going to be considered. (HEC Paris, Corporate Valuation, 2022)

$$EqV = EV - (Financial\ Debt - Cash\ \&\ Equivalents) \qquad (11)$$

With:

EqV: Equity Value

EV: Enterprise Value

After the Equity value has been obtained, it can be divided by the number of shares outstanding to get the share price of the firm.

$$Share\ Price = \frac{Equity\ Value}{NOSH} \qquad (12)$$

With:

NOSH: Number of Shares Outstanding

Leverage Buyout

The Leverage Buyout (LBO) method is a relative valuation method that analyses the company to give a price of the company rather than an intrinsic valuation. This is because a Leveraged Buyout is a transaction where a company is acquired using mostly debt as part of the money used for the acquisition, which reduces the up-front cash needed by the acquirer. The debt can sum up to 70-80% of the transaction in some extreme cases. The acquirer, which is usually a Private Equity (PE) firm, operates the firm for a period of 3 to 5 years, intending to use their knowledge to create value. There are three main levers to create value in an LBO, EBITDA uplift, deleveraging, and the expansion of the multiple.

The first one consists of operationally optimizing the company so that the EBITDA increases from the first year until the exit year. The second one consists of using the available free cash flow to repay the debt on the company to increase the return of the PE firm at the exit. Lastly, the expansion of the multiple consists of growing the company organically, through acquisitions

or internationally, to increase the exit multiple compared to the entry multiple used to acquire the company. These three levers help create value and money for the PE, which is the primary goal of doing the transaction.

However, not all companies are eligible to be LBO candidates. Multiple attributes make a company a great candidate for an LBO in Private Equity. First and most important, the company needs to have stable and predictable cash flows that can be used to repay the debt during the period of the leveraged buyout. In the second place, the price paid by the company needs to be relatively low or undervalued, as this boosts the returns that the PE firm can obtain from the investment. Other essential attributes that a company should have been relatively low CapEx, a great management team, being part of a low-risk industry, and a solid set of assets that can be used as collateral to raise debt. (Breaking into Wall Street, Breaking into Wall Street, n.d.)

As one can imagine, these are not common attributes within startups, which shows, why the LBO analysis might not be the most suitable valuation method for a startup, as the risk that the business has would require higher interest from investors, which translates into a lower return for the PE firm, possible falling below their minimum expected return.

The first step to conducting an LBO model is to calculate the Purchase Price. It can be obtained using the current share price if the firm is public or from other analyst valuations and the premium paid by the acquirer, which can be obtained using an industry average of previous precedent transactions.

$$Purchase\ Price = Bid\ Premium * Current\ Share\ Price \qquad (13)$$

Using the Number of Shares Outstanding (NOSH) and the Purchase Price, the Equity Value at entry can be calculated by multiplying both terms.

$$Equity\ Value\ (entry) = Purchase\ Price * NOSH \qquad (14)$$

In the same way that in the DCF, using the Net Debt, the Enterprise Value can be obtained from the Equity Value of the company.

$$Enterprise\ Value(entry) = Equity\ Value\ (entry) + Net\ Debt \qquad (15)$$

Once the Enterprise Value has been calculated, the EBITDA multiple can be obtained using the EBITDA from year 0.

$$Entry\ Multiple = \frac{Enterprise\ Value}{EBITDA} \qquad (16)$$

The next step in the analysis is to agree on the assumptions of the model, which can have a significant impact on the result of the method. The first assumption to make is the split between cash and debt that the acquirer is going to use in the transaction. This split speaks about the risk that the acquirer is willing to take to obtain a higher return at the exit. A common way to define this split is through the leverage ratio (Debt/EBITDA), as it is one of the main ratios that investors will look at when agreeing to provide debt. Thus, by setting a maximum leverage ratio and using the current EBITDA, one can obtain the amount of debt that the company can bear. With the maximum level of debt that the company can maintain, the debt to be raised can be calculated considering the previous debt that the company had before.

$$Net\ Debt = Leverage\ Ratio * EBITDA \qquad (17)$$

The following assumption of the model is to define the type of debt that the transaction is going to use. Depending on the type of debt, the interest rates and annual repayments can vary from each other quite significantly. The variety of types of debt is quite large, from Senior Debt with E/L + 300 – 375bps to Structurally Subordinated Debt (Holdco Loans) with an all-in cost of 8.5 - 10.0% and bullet repayment at maturity. However, the most common structure in LBOs is to have a 30 – 50% of Senior Debt and Second Lien Loans, 10 – 20% Mezzanine Capital and Structurally Subordinated Debt, and 40 – 50% Equity. (HEC Paris, Corporate Restructuring, 2023)

The following step within the model is to define the Sources & Uses table to check where the funds come from and where they are going to be used. To do so, the Uses need to be defined first, considering the price paid and fees like advisory and financing fees. In the case of the price paid, whether the company is going to repay the existing debt or assume it also needs to be defined. The most common case considers that the acquirer will repay all existing debt. After the Uses have been filled, the Sources table needs to be calculated. First, the amount of debt raised needs to be summed up, and the difference between the Uses total amount and the debt raised will be equity. This way, if correctly calculated, the total amount of the Uses and the total amount from Sources need to be the same.

The last assumptions that the model needs to define are related to the exit hypothesis. First, the amount of investment years (most times between 3 and 5 years) must be decided. Then, the

exit multiple also needs to be set. The most common practice in modeling is to leave the exit multiple as the entry multiple, considering there has not been a multiple expansion. Lastly, using the EBITDA of the exit year and the previous assumptions, the exit Enterprise Value can be obtained.

Since the parameter needed to calculate the share price is the Equity Value, we need first to calculate the Net Debt at the exit. To do so, the Debt Schedule and the Cash Flows need to be projected. To project the Debt Schedule, all types of debt must be estimated with their annual repayments and interest expenses. Then, using all FCF available before debt repayment, if the beginning of the balance debt is positive, the FCF is used to repay the debt. Otherwise, any remaining FCF will be added to the cash deposits of the firm. Moreover, any debt repayments will always be made following the seniority hierarchy established by the conditions of the type of debt.

With the Debt Schedule, all cash flow can be projected into the future to get the exit year's Net Debt. Through the same calculations used previously in equation 11, we can then obtain the Equity Value of the firm at the exit.

The next step within the model is to obtain the Internal Rate of Return and the Cash-on-Cash multiples. These multiples are essential in LBO modeling, as they show the return that the firm will have, conducting the investment opportunity. The Internal Rate of Return (IRR) is a discount rate that makes the Net Present Value (NPV) of all cash flows equal to 0. It is used to estimate the profitability of potential investments. (Investopedia, 2023)

In Leverage Buyouts, the IRR only considers the cash flow from the exit year and the initial investment, as no dividends are paid during the investment period, and all extra cash is used to reduce the firm's debt.

$$0 = NPV = \sum_{t=1}^{T} \frac{C_t}{(1 + IRR)^t} - C_0 \qquad (18)$$

With:

NPV: Net Present Value

C_t: Net cash inflow during the period t

C_0: Total Initial Investment Costs

IRR: Internal Rate of Return

t: number of periods

The Cash-on-Cash (CoC) return is the rate of return that calculates the income earned on the cash invested (Investopedia, 2022). It is vital to take both multiples into account together, as the CoC might be very high if the period is long enough, as all debt will have been repaid, and maybe the EBITDA has grown significantly, but on the other hand, the IRR might be affected by the extended period, bringing the IRR down. Thus, a combination of relatively high multiples is optimal for Private Equity investing.

$$CoC = \frac{C_t}{C_0} \qquad (19)$$

With:

C_t: Net cash inflow during the period t (Equity at exit)

C_0: Total Initial Investment Costs (Equity at entry)

Finally, the share price of the firm can be calculated as a function of Equity Invested, Debt Raised, Agreed Equity Value, and the NOSH.

Comparable Companies

This method is different from the two previous valuations. In this case, Comparable Companies value a firm using a relative valuation; this is by using peer's multiples and ratios. This method aims to analyze how the market values similar companies like the company being studied and then use this market's view to give a valuation of the business. To do so, the peers used to analyze the market's view need to be selected appropriately. Several factors help screen comparable companies to have a similar profile to the studied firm. This criterion is composed of three main factors, Geography, Industry and Financials. The idea here is that all companies selected as peers should operate in the same market and industry and have similar figures in terms of financials, for instance, revenues between $1 billion and $10 billion.

Thereafter, once the companies have been selected, some relevant multiples and ratios need to be calculated. The most common ratios used in the financial sector are EV/EBITDA and EV/Revenue ratios. To calculate these ratios, the Enterprise Value of each peer need to be

computed and then divided by its EBITDA and Revenues of the year. After calculating the relevant metrics of each peer, the average ratios can be calculated. Using these ratios and the EBITDA and Revenue from the studied company, we can obtain the Enterprise Value of the firm analyzed. Finally, with the Enterprise Value of the firm, the share price can also be calculated by dividing it by the NOSH of the firm.

$$EV = (\frac{EV}{EBITDA})_{Comparable\ Companies} * EBITDA_{Firm} \qquad (20)$$

$$EV = (\frac{EV}{Revenue})_{Comparable\ Comapnies} * Revenue_{Firm} \qquad (21)$$

With:

EV: Enterprise Value

EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization

One of the shortcomings that this method has is that it needs to consider the ownership change costs, as it does not include the premium paid in a transaction. This can be misleading when valuing the price of a firm, as it is likely that any investor aiming to buy ownership of the company will have to pay a premium over the market's value to do so. (Breaking into Wall Street, Breaking into Wall Street, n.d.)

Precedent Transactions

Precedent Transactions is a similar method to Comparable Companies, as it is also a relative valuation method. In this case, the method aims to analyze how the market and other investors have valued similar companies and transactions in the past. Therefore, to analyze the market views, the transactions that need to be selected must be like the company studied. In this case, the screening that needs to be done follows the same criteria as in Comparable Companies with one extra factor. This factor is Time, as it is vital to consider the time value of money and understand that a transaction of $10 million in 1990 cannot be compared to a $10 million transaction in 2023 under the same conditions.

In the same way, as with the previous method, the ratios that are more commonly used in Precedent Transactions are EV/EBITDA and EV/Revenue, being the first the most popular. The rest of the model follows the same steps as the Comparable Company's valuation method.

Lastly, it is crucial to understand that although both methods are similar, Precedent Transactions covers the shortcoming of Comparable Companies. Since this method analyses past transactions, it includes the change in ownership costs which makes the valuation more accurate to the final price. However, in practice, there are only a few comparable data due to the impact of the time value of money and the consistent macroeconomic changes in the economy. (Breaking into Wall Street, n.d.)

Real Options

An Option is a financial derivative granted by the owner of the right but has no obligation to buy or sell the underlying asset at a predefined price and date. When entering a contract, sellers receive a Premium, which is a payment in exchange for granting the rights previously mentioned. There are two main types of options, a Call and a Put. A Call option gives the buyer the right to purchase the asset at a specified price and a designated period. On the other hand, a Put gives the buyer the option to sell the asset at a specified price and a designated period.

An opportunity to invest in a project or a company bears obvious similarity to an option, as both involve a right but not an obligation. The Real Options valuation approach aims to define a connection between the characteristics of a project and the factors that influence the value of the option. There are multiple options depending on the type of project or investment, the option to defer, expand, default, contract, or abandon.

If a project requires some expense to acquire or construct productive assets, this corresponds to the exercise or the strike price (X) of an Option. The value of the resulting asset corresponds to the underlying stock price (S), the length of time available before forfeiting the opportunity is analogous to the time to maturity (t), and lastly, the riskiness of the project is mirrored by the standard deviation of returns on the underlying asset (σ).

There are two models with the Real Option Valuation Method, using the Black-Scholes formula or a basic Binomial Model (Cox-Ross-Rubinstein). Both options are risk-neutral types of valuations following slightly different models.

- *The Binomial Model*

The Binomial Model considers that the outcome of investment only goes two ways, up or down. As the following *Figure 9* shows, period one to period two also has the same binomial

option to go up or go down. The upward case is denoted with a letter (u), and the downward case is denoted with a letter (d).
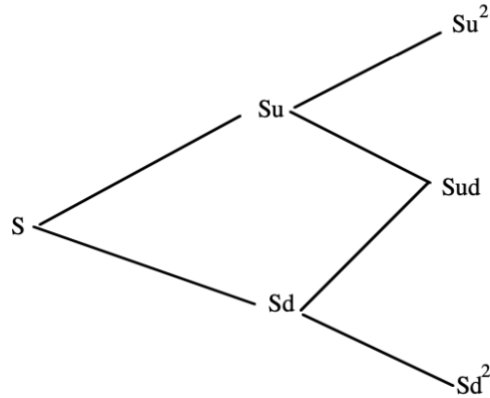
Figure 9: General Formulation for Binomial Price Path
Source: *(Damodaran, n.d.)*

The asset's price can move up (S_u) or down (S_d) with probability q and (1 - q), respectively. For the time period t=1, S can be calculated:

$$S = \frac{1}{1+r}\ (pS_u + (1-p)S_d) \tag{22}$$

With:

S: Financial Instrument

r: risk-free rate

S_u: Asset Price (up)

S_d: Asset Price (down)

$p = \frac{1+r-d}{u-d}$

$(1-p) = \frac{u-1-r}{u-d}$

Therefore, for the period of t = 2 or t = n:

$$S = \frac{1}{(1+r)^n}\sum_{k=0}^{n} Sn^k p^k (1-p)^{n-k} \max(0, u^k d^{n-k}S - E) \tag{23}$$

46

Finally, the Call value is calculated with the following formula:

$$C_{1u} = \max(S_{1u} - K, 0) \tag{24}$$

$$C_{1d} = \max(S_{1d} - K, 0) \tag{25}$$

- *Black-Scholes Formula*

The Black-Scholes model was developed by Fisher Black, Robert Merton, and Myron Scholes in 1973. The model was the first model to be used as a reliable mathematical model to calculate the theoretical value of option prices and remained one of the best calculation models. The model uses five factors to calculate the value of an option, the asset price, the strike price, the risk-free rates, expected volatility, and time to expiration.

S = Current value of the underlying asset

K = Strike price of the option

t = Life to the expiration of the option

r = Riskless interest rate corresponding to the life of the option

σ^2 = Variance in the ln(value) of the underlying asset

The value of the call can then be calculated as follows:

$$C = S * \phi(d_1) - K * e^{-rt} * \phi(d_2) \tag{26}$$

With:

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

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

The steps to calculate the value of the call are first to use the inputs of the Black-Scholes model to determine d1 and d2. Then, use d1 and d2 to calculate the cumulative normal distribution functions $\phi(d_1)$ and $\phi(d_2)$. The third step is to estimate the continuous time version of the present

value formulation ($K * e^{-rt}$). Moreover, lastly, estimate the value of the call using the Black-Scholes formula.

It is also important to mention that the model has certain limitations that need to be considered when implementing the model: (Bossard, 2023)

1. Underlying asset prices follow Geometric Brownian Motion

2. No arbitrage: A riskless portfolio can only earn the risk-free rate

3. The constant risk-free rate of return

4. Unlimited access to cash, i.e., can borrow or invest in any quantity at r'

5. Can buy or sell the underlying asset continuously, in any quantity, at market price

6. No penalty for short sales of the underlying asset

7. No transactions costs or taxes

In the case of Real Options, the valuation of a company can be done using the Black-Scholes model, creating an analogy between the Financial Option and the company. The stock price of the financial option (S) would be the equivalent of the Enterprise Value, and the Strike Price (K) would be the Debt to be repaid on the expiration day. The Underlying Asset's volatility (σ) would be like the Enterprise Value Volatility, the Time to Expiration (t) would be the Debt Maturity, and the Risk-Free rate (r) would be the interest rate. (Ovtchinnikov, Real Options, 2023)

Book Value

The Book Value valuation method, as its own name indicates, aims to value the company through its accounting books. In this case, the value of the company would be the difference between the sale of the assets and the payment of all liabilities.

$$Book\ Value = Total\ Assets - Total\ Liabilities \qquad (27)$$

There are several areas for improvement to this method. As it values the company through the book value, there are multiple cases where the market value and the book value differ, which translates into inaccuracies when calculating the share price. This is why this method is only used for some companies; for instance, it is used in the case of companies or startups with little to no revenue. Alternatively, following the traditional value investing theory of Benjamin Graham and

its evolution with Warren Buffet, where their investment strategies are primarily based on Book Value multiples rather than market values. (Greenwald, 2021)

Liquidation Value

The Liquidation Value method uses a very similar valuation method as the Book Value. In this case, the model estimates the realizable value of the asset's sale. In this case, the formula that would be used to calculate the Liquidation Value of the firm would be the same as in Equation 27, with some slight differences regarding the value of the assets or liabilities or not considering intangible assets.

This valuation methodology is mainly used in the case of bankruptcy, as investors want to evaluate what would be the value of the company once liquidated. In the same way, as with the Book Value, the valuation might be lower than any Market Value, but most importantly, in this case, it is because of the urgency to sell the assets. With a limited amount of time to sell or get rid of the company, the amount of money that one can obtain from the assets is lower than without a time limit. (Breaking into Wall Street, Breaking into Wall Street: Valuation, n.d.)

b. Non-Traditional Valuation Methods

When it comes to valuation methods used by traditional approaches, many challenges arise when applied to young, growing companies specializing in high-tech or early-stage entrepreneurship that operate mainly on intangible assets such as knowledge-based assets. This fact poses particular difficulty for entrepreneurs lacking a well-established reputation while attempting to convince venture capitalists (VCs) about providing them with financial capital; hence they are left with insufficient funding options because those methodologies focus heavily on existing earnings and tangible assets, excluding the very foundation these businesses are built upon.

Another significant challenge is determining future revenue growth estimates coupled with operating margins faced by such startups as their limited historical data makes it challenging to forecast future developments accurately due to missing consolidated operational margins making it challenging predicting future development accurately - made even more difficult considering these organizations present increased risks of business model failures resulting in costly expenses

associated with generating revenue amidst other costs like achieving high-growth rates which can be overwhelming to such businesses. Additionally, assessing the discount rate and terminal value becomes more complex. While the cost of equity and debt estimation is relatively straightforward for mature companies, private and small companies need more ability to regress stock returns with the market index, making it harder to determine the discount rate. Furthermore, determining terminal value poses an even greater challenge because it represents a significant portion of mature company valuations - this issue is compounded when startup revenue growth does not match their high-growth rates' corresponding need as low revenues make up startups' operating metrics.

Berkus

The Berkus Method is a valuation methodology that calculates the value of a company before its first revenue. The method was developed by a well-known angel investor and venture capitalist, Dave Berkus, in the 1990s. This method is an early-stage method that studies five crucial areas of a startup without relying on any financial forecasts. These five areas can have a value between $0 and $500,000 and are the following:

1. Sound Idea: This evaluates the business risk of the company's idea. The firm must evaluate the proprietary nature of the idea, how well-defined the future plan is, the scalability of the idea, its socio-political relevance, and the validation of the idea.

2. Quality Management Team: The second factor aims to evaluate the execution risk by analyzing how good is the management team, considering its experience or track record. With startups, this is a crucial factor, as it is also one of the most critical points for VCs, as it gives a sense of security to the startup.

3. Prototype: This factor evaluates the quality of the company's prototype. This checks that, indeed, the company can correctly develop its sound idea and that they have the tools to achieve its goal. This is because a good prototype will identify any issues before any waste of time, money, or resources.

4. Strategic Relationships: The fourth factor estimates the market risk for the company, analyzing the strength of the company's strategic alliances, partners, and suppliers. Strategic relationships enhance collaborations to achieve mutual benefits and economies of scale, leveraging their partner's experience or resources.

5. Product Rollout or Sales: The last one analyses the production risk and the company's relationship with its customer base. It analyses the go-to-market strategy that the company must launch its product. It considers the pre-launch and post-launch plan as well as how attractive the market size the company is trying to acquire.

The sum of all five factors gives the pre-money valuation of the company, which can have, according to the Berkus limits, a maximum value of $2.5 million. Since a maximum value of $2.5 million is too low for most startups, an adjustment must be made to be able to use it with more prominent companies. Therefore, to make this adjustment, the average size of similar startups can be calculated and then divided by the five factors, giving the new maximum value per factor.
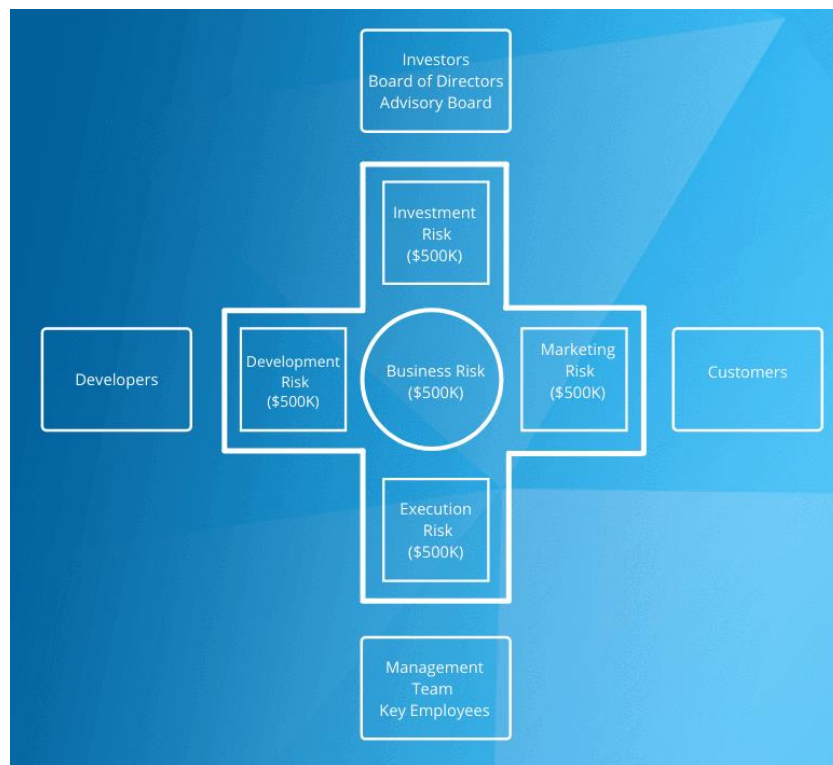
Figure 10: Startup Enterprise Valuation based on the Berkus Method
Source: *(Eqvista, 2021)*

First Chicago

The First Chicago method is a valuation method that combines market-oriented elements with fundamental analytical methods. It is mainly used in Venture Capital and in Private Equity companies to value early-stage startups.

The method consists in defining three different potential scenarios for the startup, Best-Case, Mid-Case, and Worst-Case. To define these three scenarios, a financial forecast of the revenues and EBITDA needs to be developed, although the metrics used can also be others depending on the interest of the investors. To do this forecast, the company and industry need to be researched in detail using a qualitative analysis of the market trends. This way, an estimation of the forecast and the scenario's probabilities can be defined.

The second step of the method consists of estimating the divestment price for each scenario using multiples of the forecasted metrics. These multiples are obtained using industry averages, which, when multiplied by the forecasted metrics, the Enterprise Value of each scenario can be attained. Then, the Enterprise Values need to be discounted. Usually, the WACC would be the correct discount factor to use here, as we are discounting the Enterprise Value; however, since the target company is an early-stage startup, it is assumed that the company does not have any debt. Therefore, instead of using the WACC, the model can use the cost of equity to discount the Enterprise Values.

Lastly, a weighted average of the present value of the Enterprise Values needs to be calculated using the weights defined for each scenario. This gives the final Enterprise Value of the company that can have subtracted the Net Debt to give the Equity Value of the startup. Moreover, in the same way, that has been calculated in all other methods, dividing the Equity Value by the number of shares outstanding, the share price of the company is obtained. (Venionaire Capital, n.d.)

Risk Factor Summation

The Risk Factor Summation (RFS) is a Pre-Money valuation method that aims to provide an investor with a valuation of the company by analyzing the risk the business is exposed to. It studies all the firm's known factors and the potential impact they can have on the business. Every

risk factor is weighted and summed up to get an overall result that allows the investor to compare the investment to other opportunities or projects. (Deshmukh, 2022)

The first step of the RFS method is to calculate an average company valuation obtained from similar or comparable companies in the same industry. The second part of the method consists of identifying all factors that contribute to the overall risk and weighting them with a proper amount for each factor. Each factor can get a weight between (-2) and (+2), being (-2) very high risk, (-1) high risk, (0) average risk, (1) low risk, and (+2) very low risk. There are 12 main factors that contribute to the overall risk of a startup:

1. Management Risk

2. Stage of Business Risk

3. Manufacturing Risk

4. Sales and Marketing Risk

5. Funding/Capital Risk

6. Technology Risk

7. Competition Risk

8. Litigation Risk

9. International Risk

10. Reputation Risk

11. Political, Regulatory, and Legal Risks (PRL)

12. Potential lucrative exit Risk

The third step is to define the value that each risk rating can get. In this method, the values are the following:

Rating	Risk Rationale	$ Adjustment to Pre-Money Valuation
+2	Extremely Positive Mitigation	Add $500,000
+1	Positive Mitigation	Add $250,000
0	Neutral	Add/Minus Nothing
-1	Negative Mitigation	Minus $250,000
-2	Extremely Negative Mitigation	Minus $500,000

Figure 11: Risk Factor Summation rating values

Then, each of the 12 factors is going to be weighted using the previous values. Every score is going to be summed up to get a total Risk Factor Summation. Lastly, to obtain the Pre-Money Valuation, the average industry value is going to be summed to the total risk factor summation. Once the Pre-Money Valuation has been obtained, it can be divided by the total number of outstanding shares to get the share price of the firm. (Eqvista, Eqvista, 2021)

Scorecard

The Scorecard valuation method, also known as the Bill Payne valuation method, is a relative valuation method where the analyzed company is compared to similarly funded startups. The Scorecard method compares these companies using different aspects, like the stage of development, business sector, and geographical region. This method is one of the favorite methods used by angel investors to decide if they will invest in a startup or not.

The method is desirable for angel investors, as the same way scorecards are used in sports to help fans, players, and team management break down the factors that led their team to win or lose, the scorecard method helps investors find the strengths and weaknesses of a business.

The first step of the method is to determine the average pre-money valuation using comparable companies within the same sector and region of the startup. Once this has been defined, the next step consists of comparing the target startup to similar companies using the scorecard. The main factors included in the scorecard are:

- Board, entrepreneur, the management team – 25%

- Size of opportunity – 20%

- Technology/Product – 20%

- Competitive Environment – 11.5%

- Marketing/Sales – 11.5%

- Need for additional financing – 6%

- Others – 6%

The previous weights are the average weights used by angel investors but can always be modified according to investor preferences. The quality of the management team is essential, as a good management team will work on fixing early issues that the startup will face. The second highest weight is given to the size of the opportunity, as scalability is essential to investors of the company.

To calculate the value of the company, each factor needs to be given a score. Scores are defined as a %, with a value of 100% being the average of the industry, a value between 0 – 99% below the industry's average, and a value higher than 100% being higher than the industry's average score. Then, by multiplying the scores and the weights, the factors can be obtained and then summed to get the total adjustment factor.

Lastly, the average pre-money valuation is multiplied by the total adjustment factor to give the Pre-Money Value of the target company. Thereafter, this value can be divided by the number of shares outstanding to get the share price of the company. (Eqvista, 2021)

Cost-to-Duplicate

The Cost-to-Duplicate method aims to value the company through the historical costs and expenses that the firm took to create the startup. For instance, from the point of view of the investor, he would not allow a higher valuation of the company than the aggregate sum of the costs that the company had to get to the current situation. It is also a proxy that recreates how much it would cost to recreate the same exact company from scratch.

The method is relatively straightforward. First, all costs and expenses need to be summed up since the creation of the startup. Once the "Cost-to-Duplicate" has been calculated, the current

Net Debt needs to be subtracted to obtain the Equity Value of the company. Finally, with the Equity Value, it can be divided by the number of outstanding shares to obtain the share price of the firm.

This method has two critical weaknesses, the first is that it ignores any future sales of the company, and the second is that it needs to consider the intangible assets that can be an essential part of some businesses. This is why this method might need to be revised in valuing a company at its current share price or value. However, by combining the outcome of this method with others like the Berkus or the Scorecard method, the result could be much more accurate and complete. (Medium, 2022)

Venture Capital

The Venture Capital method was developed by Professor Bill Sahlman at Harvard University in 1987. This method is one of the most common and valuable methods to value a pre-revenue startup. (Medium, 2014)

The valuation method consists of 6 different steps to obtain the pre-money valuation: (Wall Street Prep, n.d.)

1. Estimate the investment needed depending on the funding round targeted.

2. Forecast the Startup financials.

3. Determine the timing of exit (IPO, M&A, etc.)

4. Calculate the multiple at exit based on comparable companies.

5. Discount to Present Value at the desired Rate of Return.

6. Determine the Valuation and the desired ownership stake.

To Discount the Present value at the Desired Rate of Return, the Return on Investment first needs to be computed.

$$ROI = (1 + Desired\ Rate\ of\ Return)^{Timing\ of\ the\ Exit} \qquad (27)$$

Then, the average Exit Value can be divided by the ROI to obtain the Present Value of the Exit Value, which is the Post-Money Valuation. To get the Pre-Money Valuation, the Investment needed needs to be subtracted.

$$PreMoney\ Valuation = PostMoney\ Valuation - Investment\ Needed \qquad (28)$$

Then, the Investment Needed can be now divided by the Post-Money Valuation to get the VC Ownership:

$$VC\ Ownership\ (\%) = \frac{Investment\ Needed}{PostMoney\ Valuation} \qquad (29)$$

The new shares issued can be obtained using the following formula:

$$NOSH\ Issued = \frac{NOSH * VC\ Ownership}{(1 - VC\ Ownership} \qquad (30)$$

Lastly, the Share Price can be calculated by dividing the Investment Needed by the new number of outstanding shares (NOSH Issued).

The Venture Capital method is susceptible to the funding round and time horizon of the investment, as its outcome is highly dependent on the inputs of the model. For instance, the later the funding round is targeted, the more challenging it is to get a higher desired rate or return, as the risk of the company decreases while the company grows.

SECTION II – CASE STUDY: BUMBLE Inc.

1. Objectives and Scope of the Study

The objective of the following section is to apply all the valuation methods described in the first section using a case study. To do so, a startup is selected to show the uncertainty of startup valuation and how each and every method does it through a different set of inputs and factors.

The startup selected for the case study is Bumble Inc., the American online dating and networking application. Although the company is not in its early stages anymore, it has been selected, as it has experienced all phases of a startup, going through funding rounds to an IPO in February 2021. The company makes a great subject of study, as it is a fast-growing company with positive revenues but a negative net income in 2022, which makes it a good candidate for non-traditional valuation methods.

As Bumble is a public company that went through an IPO, the goal of the valuation is to obtain a range of values for its share price, to compare it to the price paid in the IPO, and to the current analysts' target share price. All financial information of the case study was attained on the 2nd of May, 2023.

2. Company Overview
a. General Overview

Bumble is an American company that operates in the online dating and networking application industry. The company was founded by Whitney Wolfe Herd in 2014. Wolf Herd was a VP of Marketing at Tinder, a company that she sued for sexual discrimination and harassment and settled for $1 million in September 2014. Right after leaving Tinder, she met with Badoo CEO Andrey Andreev and partnered with him to found Bumble Inc. She would serve as founder and CEO, and get 20% ownership, while Andreev would get the remaining 80% ownership after an initial investment of $10 million. The company's headquarters are in Austin, Texas, and has around 1,000 employees in 2023.

Bumble's main feature and disruptive strategy are based on its matching strategy. Users are presented with profiles of potential matches, giving them two options, to "swipe left" to reject a candidate or "swipe right" to show interest. In heterosexual matches, differentiating from all its

competitors, female users have the privilege of initiating contact with matched male users. As opposed to heterosexual matches, in all other matches, both individuals can initiate the conversation.

Bumble has been considered a "feminist Tinder" since its launch, a label especially promoted by its founder. She explains the concept behind the app and challenges the often pressured men must initiate conversations while women feel compelled to wait passively. Bumble aims to alleviate this pressure by empowering women to make the first move, which Wolfe Herd believes is a step towards embracing feminism.

Bumble reported around 40 million active users as of February 2021, with 49% of them using the app daily and 46.2% being females. The company generates revenues from monthly subscriptions, which offer a series of premium features, and also from the purchase of "coins" that allow in-app purchases.

b. Funding Rounds

As an experienced startup, Bumble has gone through multiple funding rounds. However, the company has not shared many of the raised amounts during all rounds. In October 2014, Bumble had its first funding round, a Venture Round, having Priyanka Chopra as the leading investor. Its second round was directly a Series A round in January 2020, as when the company was founded, one of the founders, Andrey Andreev, put $10 million as an initial investment, which funded the company's expenses until the Series A round. This round had as a leading investor the early-stage venture capital firm Accel.

However, two months later, in March 2020, Bumble had a second Venture Round with three investors, the venture capital firms Headline, Greycroft, and Able Partners. Lastly, in March 2023, Bumble had a Post-IPO Secondary funding round, this time disclosing the amount raised, which was $313.5 million. (Crunchbase, 2023)

c. Bumble Inc. Initial Public Offering

Bumble sold shares in its Initial Public Offering (IPO) on the 11th of February 2021. The shares were sold at $43, above its target range to raise $2.2 billion. The market capitalization of the company went up to $7 billion, as the company eventually sold 50 million Class A shares after raising the share offering several times. Initially, the company was aiming to sell 45 million at a price range of $37 - $39 per share. The IPO had Goldman Sachs and Citigroup as underwriters of the initial public offering.

In the prospectus, Bumble explains the use of proceeds. They planned to use a portion of the funds raised to purchase Common Units from Bumble Holdings, which would help repay the outstanding debts of the company under their Term Loan Facility and cover general corporate expenses. The remaining funds raised would be used to purchase or redeem equity interests from Bumble's pre-IPO investors.

On the other hand, Bumble also mentions some of the risks they considered to be the most relevant at the time:

1. **Dependency on Third-Party Publishers and Platforms**: The distribution, marketing, and access to the company's products rely on third-party publishers and platforms. If these third parties impose limitations, prohibitions, or changes to the terms of distribution, use, or marketing, it could have a significant adverse impact on the company's business, financial condition, and results of operations.

2. **Competitive Dating Industry**: The dating industry is highly competitive, with low switching costs and a constant influx of new products and competitors. Innovation by competitors has the potential to disrupt the company's business.

3. **User Retention and Engagement**: If the company fails to retain existing users and attract new users, or if users reduce their engagement level with the products or fail to convert to paying users, it could significantly harm the company's revenue, financial results, and overall business.

4. **Dependence on Third Parties**: Access to the company's products depends on various third parties, including mobile app stores, data center service providers, payment aggregators, and communication systems providers. If these third parties enforce

policies that limit or prohibit distribution or updates through their platforms, it could significantly impact the company's business, financial condition, and results of operations.

5. **Brand Value and Reputation**: The ability to expand the user base may be impaired if the company fails to maintain the value and reputation of its brands. Introducing changes to existing brands or products or launching new ones that fail to attract or retain users or generate revenue and profits can be detrimental.

6. **Cost-Effective Marketing**: The company's growth and profitability depend on attracting and retaining users through cost-effective marketing efforts, including social media presence, sponsorships, brand ambassadors, spokespersons, and influencers. Failure in these marketing endeavors can significantly harm the company's business, financial condition, and results of operations.
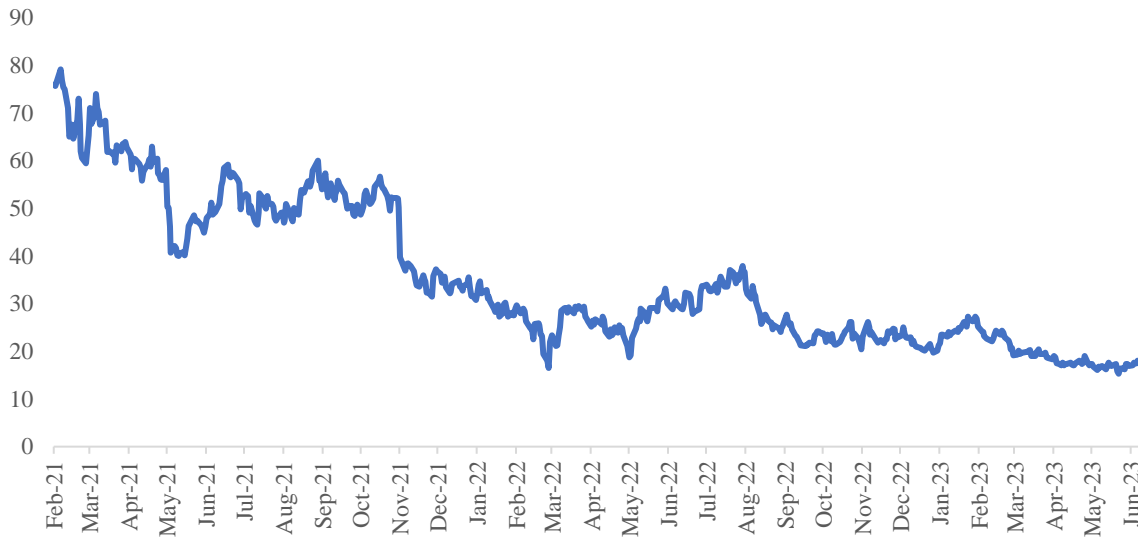
Figure 12: Bumble Share Price since IPO in $
Source: *(Yahoo Finance, 2023)*

As the above *Figure 12* shows, Bumble's share price spiked on the day of its market-opening to a price of $79.15 per share. In the following two months, the stock went back down to the price of $40.50 and has been going down since, with some fluctuations in the last two years.

3. Industry Overview

a. Overview

Bumble falls inside the online dating app segment within the Dating Services Industry. The Dating Services Industry consists of platforms that enable interpersonal relationships through Internet services. The idea is to provide users with a platform to connect with potential future partners. These services can cater to various relationship types, from one-time encounters to long-term commitments.

The industry has three main segments, the Matchmaking market, Online Dating, and Casual Dating segments. The first one focuses on dating services that employ mathematical algorithms to search for partners interested in long-term relationships systematically. Online Dating consists of an online platform like an app or a website where members can chat and flirt with other users. This segment is not only focused on long-term relationships but has a space for every type of relationship. Lastly, Casual Dating comprises online services geared towards establishing sexually oriented connections outside of romantic relationships. It allows its members to engage in casual dating.

b. Key Figures

Key data points used to analyze the dating industry include revenue figures (measured as Gross Merchandise Value or GMV), user numbers, average revenue per user (ARPU), and user penetration rate. These metrics primarily focus on business-to-consumer (B2C) services.

The global revenue forecast is expected to grow with a CAGR of 6% until 2027, going from a total market size of $6.78 billion in 2020 to $8.62 billion in 2027. Also, the leading segment within the industry is the Matchmaking industry followed closely by the Online Dating segment.
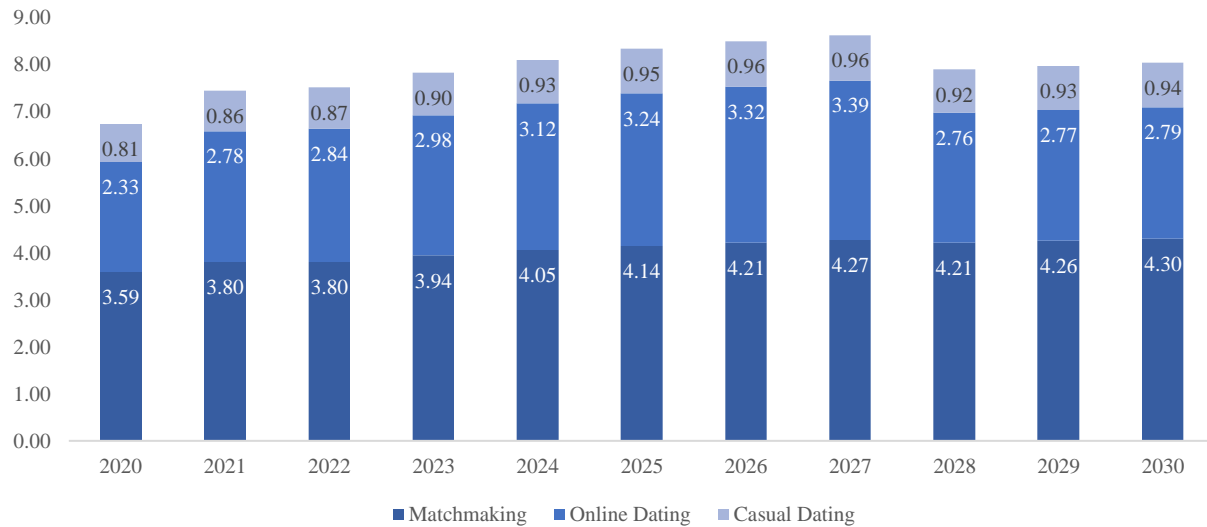
Figure 13: Dating Services Market Size by segment in $ Bn
Source: *(Statista, Statista, 2023)*

On the other hand, the number of users that correspond to each segment follows a different distribution. The segment with the highest number of users is Online dating, with 381.48 million in 2023, which accounts for 58% of the total number of users within the industry. Both Casual Dating and Matchmaking represent 25% and 17%, respectively, with 164.86 and 115.09 million users.
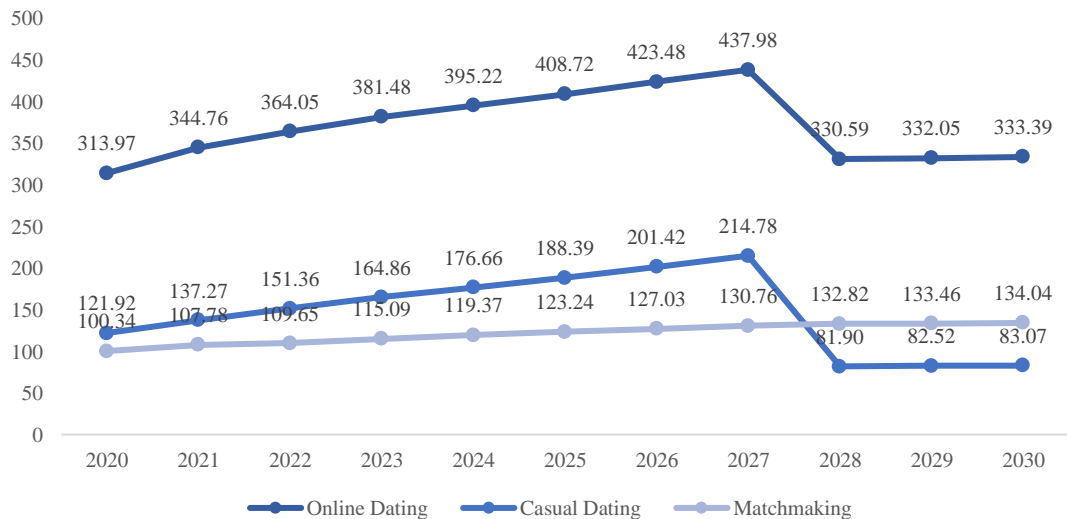
Figure 14: Number of dating service users worldwide from 2020 to 2030 in Mn
Source: *(Statista, 2023)*

The Online Dating segment has experienced a significant change in its average revenue per user (ARPU) in the last few years due to Covid-19. As the following *Figure 15* shows, the ARPU

fell to $7.05 per user in 2019 to later not only recover but increase to $8.06 per user due to the lifting of the Covid-19 restrictions. As it shows, 2021 is considered a peak year within the segment, which explains the decrease of ARPU in 2022 to then continue with a forecasted CAGR of 0.55% until 2025.
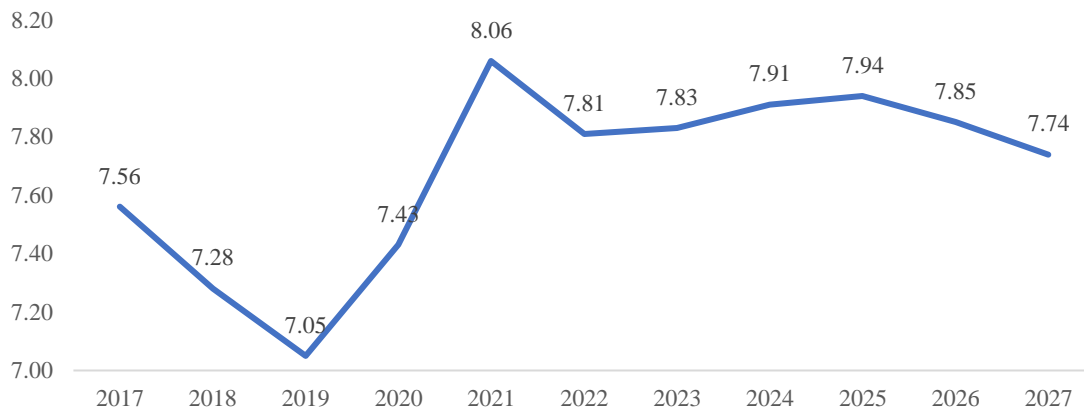
Figure 15: Online dating ARPU worldwide from 2017 to 2027 in $
Source: *(Statista, 2023)*

c. Geographical Markets

Online Dating apps and websites are present on all continents but have a more substantial presence in some specific markets. The highest revenue-leading country is the United States, with a revenue of $1.29 billion in 2022, followed by China ($268.6 million) and the United Kingdom ($184.6 million). This is why some of the biggest names in the industry are U.S. companies. However, the market competition depends widely on the geographical market except for the top players in the industry like Tinder, Bumble, Badoo, or Hinge, who are present in every continent.
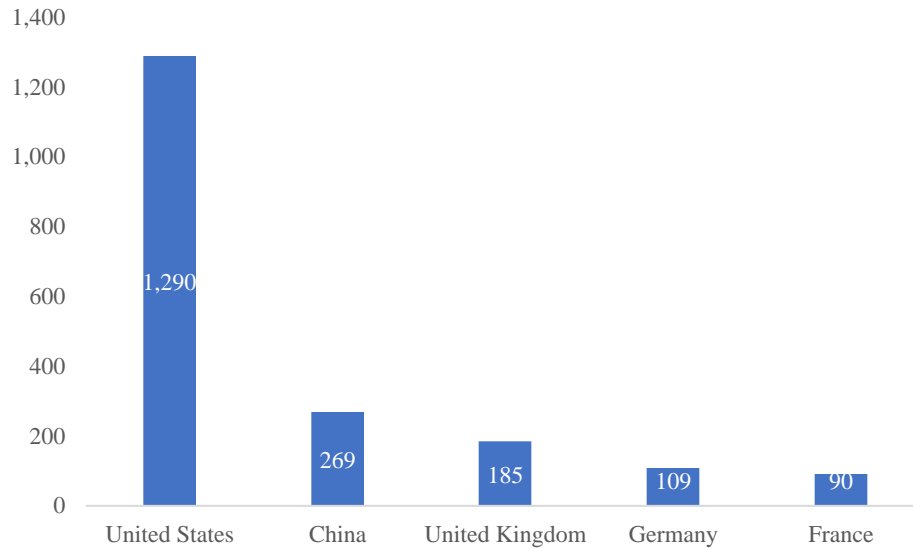
Figure 16: Leading online dating markets revenue as of 2022, by country in $ Mn
Source: *(Statista, 2023)*

d. Competitive Landscape

The Online Dating segment of the industry is an attractive market, which makes it a segment with a high number of competitors for Bumble. As mentioned before, just a few players operate worldwide, while most of them are focused on a geographical region tailoring their brand and app to the targeted customers. This section analyses some of the main competitors of Bumble within the Online Dating Segment.

- *Tinder*

Tinder is the most popular online dating app in the world. It was founded in September 2012 by Sean Rad, Jonathan Badeen, Justin Mateen, Joe Munoz, Whitney Wolfe Herd, and Chris Gulczynski. The American company was initially named "MatchBox", which was later renamed Tinder. In 2017 Tinder merged with Match Group for around $3 billion. Tinder was reported to have around 75 million active users in September 2021. The company operates worldwide, being present in more than 190 countries with more than 56 languages. (Tinder, 2023)

- *Badoo*

Badoo was founded by the Russian Entrepreneur Andrey Andreev in 2006. It is currently the 3rd most popular app in the world, operating in 190 countries with more than 47 languages, with headquarters in London, United Kingdom. In 2022 it will have around 318 million users, with

12 million active monthly users (Gitnux, 2023). Badoo was the first company to introduce the "swiping" concept in the app, which has been adopted by most of its main competitors, like Tinder or Bumble.

- *Hinge*

Hinge is an online dating app that was founded in 2012 by Justin McLeod. Originally named Secret Agent Cupid, it was later renamed Hinge in 2013. Unlike the other apps, Hinge does not use the "swiping" concept, as they consider it too superficial. Hinge brands itself as the "relationship app", encouraging users to showcase their personality and interests through thought-provoking prompts and detailed profiles. The company became wholly owned by the Match Group in 2019. Hinge had around 23 million active users in 2022 (HelpLama, 2023), currently operating in 20 countries. (Hinge, 2023)

- *Tantan*

Tantan is another online dating app founded in China in 2014 by Sophia Pan and Yu Wang. The company operates in Asia Pacific, with its headquarters located in Beijing, China, and has about 5 million active users in 2023 (Tantan, 2023). Tantan was acquired by Momo in 2018 for $600 million. (Crunchbase, 2023)

- *Grindr*

Grindr is an American public company founded in 2009 by Joel Simkhai in Los Angeles, California. The company is an online dating app targeted towards members of the LGBTQ community. In 2016 Grindr sold a 60% stake in the company to Kunlun Tech Co Ltd (formerly Beijing Kunlun Tech Co Ltd) for $93 million, who later acquired the remaining shares of the company for $152 million in 2018. The company had approximately 11 million active users in 2021 operating worldwide, excluding some sanctioned or restricted countries like China. (Grindr, 2023)

16%

9%

5%

5%

5%

4%

45%

2% 3% 3% 3%

■ Tinder ■ Bumble ■ Badoo ■ Hinge ■ Tantan ■ MeetMe ■ Plenty of Fish ■ MOMO ■ Soul ■ Grindr ■ Other
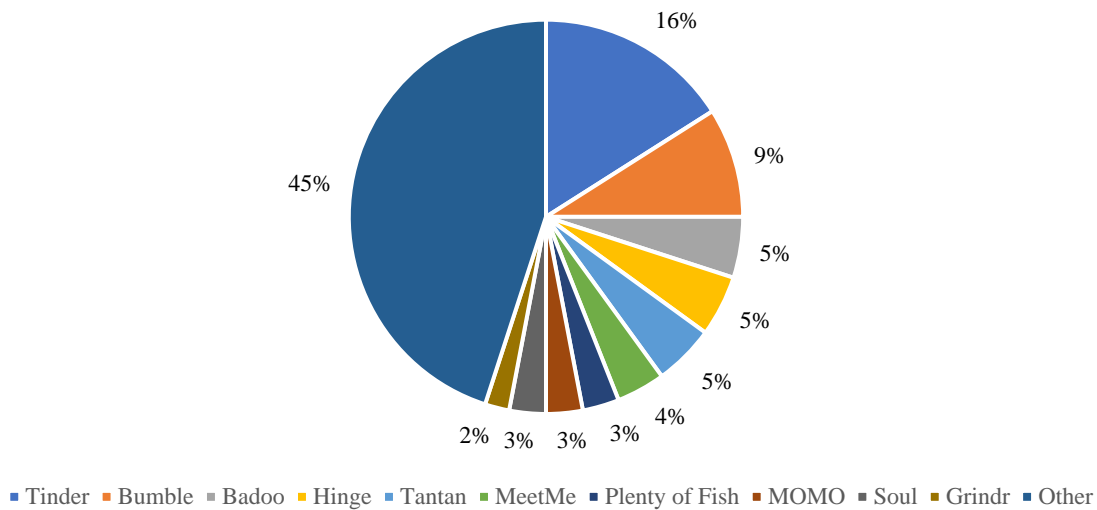
Figure 17: Brand market share of leading online dating services as in %
Source: *(Statista, 2023)*

As can be seen in the previous *Figure 17*, Bumble currently sits as the second company with the most significant market share in the world. It currently has 9% of the market, which is almost double that of Badoo's and Hinge's market share. However, Tinder is still the biggest company in the industry, with a 16% market share.

Worldwide, the Online Dating app segment is quite competitive, being very diversified. However, within the same country, the number of competitors tends to be lower as the company's success is highly dependent on its popularity in the country. Once a company has established its brand in one country, it is likely to stay as one of the top players.

e. Market Risks

While the Online Dating industry is an attractive segment, it is essential to be aware of some potential risks in the market. Some of the most common risks are:

1. Privacy and Security: Online Dating involves the use of personal data to interact with other users. There is a risk of privacy loss, identity theft, or being targeted by scammers. Users need to be careful when sharing personal information, and corporates holding the user's data also need to have security layers over the data so it does not get stolen or leaked.

67

2. Catfishing: Some platform users can create fake profiles or misrepresent themselves, leading to disappointment or emotional harm. It is crucial that Online Dating apps ensure verification of the profile to avoid bad user experiences.
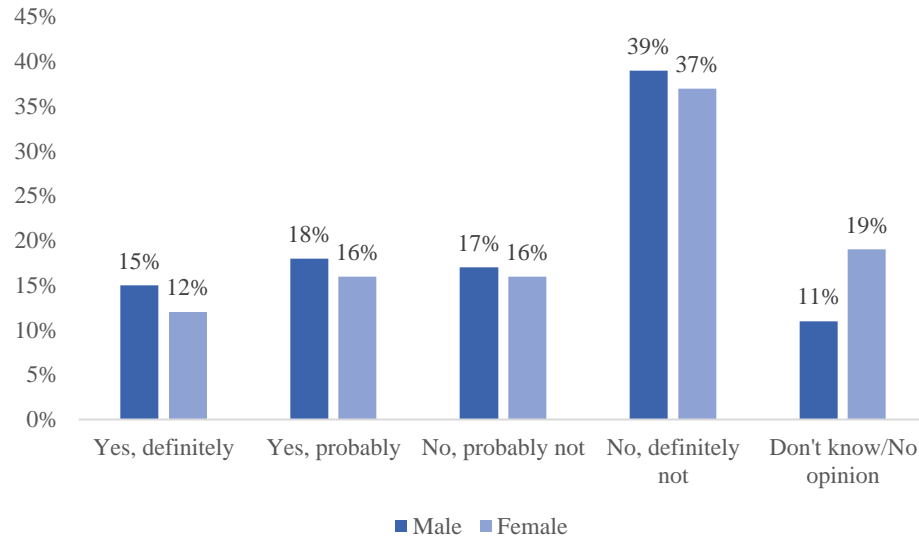
Figure 18: Adults in the US who think they have interacted with a catfish on social media in %
Source: *(Statista, 2023)*

Catfishing is an online scam where victims are lured into a relationship by means of a fake online persona. Catfishing is currently one of the most significant risks for any Online Dating app, as it affects the reputation and the safeness of the app. This is why companies like Tinder or Bumble need to spend many resources making sure that they manage to get all their users verified.
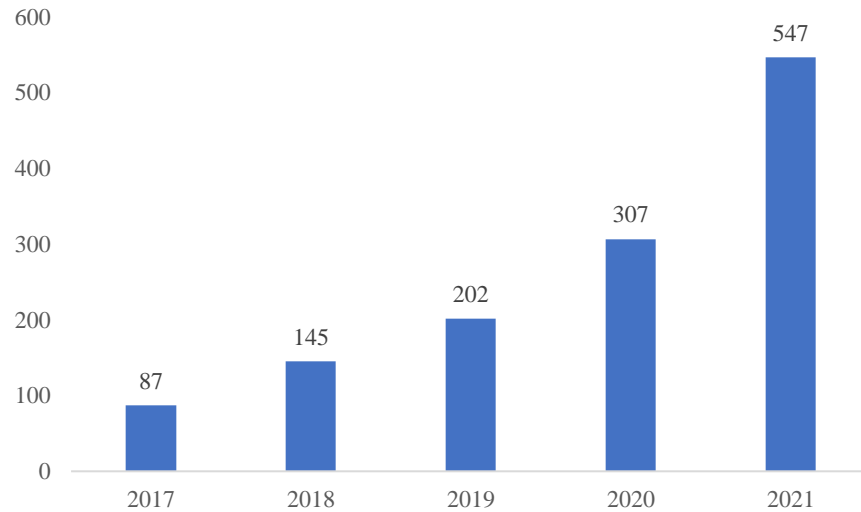
Figure 19: Losses from romance scams in the United States from 2017 to 2021 in $ Mn
Source: *(Statista, 2023)*

As the above *Figure 19* shows, there has been an increase of 500% since 2017, which means, on average, the victims of catfishing face a loss of $2,400. Thus, the importance of reducing catfishing has been very present for all players in the industry.

3. Addiction and Overdependence: The use of Online Dating can become addictive for some of its members, leading to excessive investment of time and energy. Thus, it is vital that the industry platforms keep this in mind reminding their users and talking about the risk by helping them with programs or limiting the use of the apps.

To mitigate these risks, it is advisable to use reputable dating platforms, be cautious when sharing personal information, and meet in public places when transitioning from online to offline interactions. Trust your instincts, engage in open communication, and seek support or guidance if you encounter any concerning situations.

4. Company Valuation

a. Traditional Valuation Methods

Discounted Cash Flow

The first step in the Discounted Cashflow method is to compute the unlevered Free Cash Flow (FCF). To calculate it, the analysis from 2023 to 2031 used estimated figures from Capital IQ on May 2nd, 2023. All the following numbers are in $ million.

	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
EBIT	**90**	**145**	**229**	**339**	**436**	**540**	**656**	**790**	**933**
(-) Taxes on EBIT	(23)	(36)	(57)	(85)	(109)	(135)	(164)	(197)	(233)
NOPAT	68	109	172	254	327	405	492	592	700
(+) D&A	(80)	(86)	(69)	(60)	(17)	(18)	(18)	(19)	(20)
(-) CapEX	(19)	(22)	(25)	(25)	(28)	(31)	(33)	(35)	(38)
(-) ΔWC	(50)	(64)	(67)	(104)	(97)	(108)	(116)	(122)	(126)
Unlevered FCF	**(81)**	**(64)**	**11**	**66**	**185**	**248**	**325**	**416**	**516**

Figure 20: DCF - Unlevered Free Cash Flow Calculation in $ Mn

Once Unlevered FCF has been calculated, the WACC needs to be computed using the cost of equity and the cost of debt. The cost of equity has been calculated using the CAPM formula, considering a risk-free rate of 3.44% (Damodaran, 2023), a Levered Beta of the company of 1.83 (Capital IQ, May 2nd, 2023), and an equity risk premium of 4.7% (Reuters, 2023). Regarding the Levered Beta, since Bumble is a public company, its levered beta can be publicly found; thus, there is no need to Unilever and reliever its peer's beta using the leverage structure of Bumble.

Risk-free Rate	3.4%
Beta Levered	1.83
Equity Risk Premium	4.7%
Cost of Equity	**12.0%**

Figure 21: DCF - Cost of Equity Calculation with CAPM formula

The cost of debt that has been used to calculate the WACC of the company is 8.3% (Reuters, 2023). Once both the cost of equity and cost of debt has been computed, the leverage structure of the company is the last figure needed to calculate the WACC. It is essential to mention that for the calculation to be accurate, the leverage structure that needs to be used is the leverage structure that the company wants to maintain in the long term.

Cost of Equity	12.0%
Cost of Debt	8.3%

Leverage	25.3%
D/(D+E)	20.2%
WACC	**10.9%**

Figure 22: DCF - Weighted Average Cost of Capital (WACC) Calculation

After obtaining the WACC of the company, the Terminal Value can be computed by using the Unlevered FCF of 2031, the company's growth rate for the long-term, and the WACC. Regarding the company's growth rate, a 2% growth rate has been considered as it is the average growth rate of the US economy for the last 200 years. It does not make sense to assume a higher value, as the company would grow more than the economy in perpetuity which is implausible.

Unlevered FCF$_T$	**516**
Growth Rate	2.0%
WACC	10.9%
Terminal Value	**5,940**

Figure 23: DCF - Terminal Value calculation with a growth rate of 2% in $ Mn

Once the Unlevered FCFs and the terminal value have been calculated, the values can be discounted to get the Enterprise Value (EV) of the company. The discount factor used is the WACC of the company, as it is the relevant discount factor for every unlevered FCF.

	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
Unlevered FCF	(81)	(64)	11	66	185	248	325	416	516
Terminal Value									5,940
Discount Factor	1.11	1.23	1.36	1.51	1.67	1.86	2.06	2.28	2.53
Disc. Unlevered FCF	(73)	(52)	8	43	110	134	158	182	2,552

Figure 24: DCF - Calculation of Discounted Unlevered FCF in $ Mn

As the last step, all discounted Unlevered FCF can be summed to give the Enterprise Value of Bumble. With the EV, the implied share value of the company can be computed using the amount of Net Debt and the Number of Shares Outstanding (NOSH). This calculation gives a final value of $22.1 per share.

Enterprise Value ($ Mn)	**3,062**
(-) Net Debt ($ Mn)	(20)
Equity Value ($ Mn)	**3,043**
NOSH (Mn)	138
Share Price ($)	**22.1**

Figure 25: DCF - Share Price calculation using the DCF method in $ Mn

After obtaining the value per share, it is interesting to do a sensitivity analysis to get a more accurate and realistic outlook of the method, as it is quite improbable to get the exact valuation per share considering the number of inputs and assumptions that the method uses is substantial.

		WACC				
		9.9%	10.4%	**10.9%**	11.4%	11.9%
	1.00%	23.8	21.9	20.2	18.7	17.4
	1.50%	25.0	22.9	21.1	**19.5**	18.1
g	**2.00%**	26.3	24.1	**22.1**	20.4	18.8
	2.50%	27.8	**25.4**	23.2	21.3	19.7
	3.00%	29.6	26.8	24.5	22.4	20.6

Figure 26: DCF - Sensitivity analysis of value per share with WACC and growth in $

The price per share obtained using the DCF method matched quite accurately the current price of Bumble shares. This is expected, as the company is not a high-growth startup anymore and has a reasonably stable estimated FCF.

Leverage Buyout (LBO)

For the Leverage Buyout valuation model, a period of 5 years has been considered. The model considers investing at the end of the year 2023 and exiting at the end of the year 2028. The first elements that need to be defined for the model are the entry hypothesis. To define the Entry Equity Value, the equity value has been calculated with the price per share of Bumble and the NOSH used in previous calculations, both on May 2nd, 2023. A Bid premium of 31% has also been considered the average premium used globally in the last two decades (BCG, 2022).

To get the Entry Enterprise Value, the estimated Net Debt of the company (Capital IQ, 2023) has been added to the Entry Equity Value. Using the estimated EBITDA in 2023 of Bumble, the Entry EBITDA multiple has been computed.

For the last entry hypothesis, the LBO debt capacity, the distribution of debt, and the fees have been defined as per the average figures of the last 20 years globally in M&A, considering the majority of M&A activity are LBOs (Bain Global Equity report, 2020).

Hypothesis	
Entry Date	31/12/23
Agreed Equity Value	2,443.8
Bid Premium	31%
NOSH	138
Entry Equity Value	**3,192**
Net Debt	20
Debt	619
Cash	600
Entry Enterprise Value	**3,211**
EBITDA	276
Entry Multiple	**11.6x**
LBO Debt Capacity	**6.5x**
% Bank Debt	*70%*
% High-yield Debt	*30%*
Advisory Fees	1.0%
Financing Fees	0.5%

Figure 27: LBO - Entry hypothesis in $ Mn

The next step in the model is to define the Uses and Sources of the LBO. These are calculated with the entry hypothesis mentioned in the Entry Hypothesis.

Uses & Sources	
Uses	
Entry Enterprise Value	3,211
Advisory Fees	32
Financing Fees	9
Total	**3,252**
Sources	
Bank Debt	1,257
High-yield Debt	539
Equity	1,456
Total	**3,252**

Figure 28: LBO - Table of Uses and Sources in $ Mn

The last assumptions within the model are the exit assumptions; in this case, the estimated EBITDA of 2028 (Capital IQ, 2023) has been used, and the Net Debt of 2028 has been calculated with the Debt Schedule table shared in detail below.

Exit Hypothesis	
Exit Date	31/12/28
EBITDA	781
Exit Multiple	11.6x
Exit Enterprise Value	**9,079**
(-) Net Debt	(1,775)
Exit Equity Value	**7,304**

Figure 29: LBO - Exit Hypothesis in $ Mn

Once the assumptions of the model have been defined, the FCF before debt repayment and the cash levels during the years of the investment have been computed. To calculate the cash at the beginning and the end of the period, the debt repayments have been used, which can be found in more detail in the Debt Schedule table. The interest from both Bank Debt and High-yield Debt has been calculated using the average spread per debt type and the current risk-free rates in 2023 (Bain Global Equity Report, 2020).

			2023E	2024E	2025E	2026E	2027E
Unlevered FCF			**(64)**	**11**	**66**	**185**	**248**
(-) Interests			(50)	(54)	(56)	(55)	(49)
(+) Debt Tax Shield	**25%**		13	14	14	14	12
FCF before Debt Repayment			**(102)**	**(30)**	**24**	**144**	**212**
Cash BoP			**600**	**600**	**600**	**600**	**600**
(+) FCF before Debt Repayment			(102)	(30)	24	144	212
(-) Bank Debt Repayment			102	30	(24)	(144)	(811)
(-) High-yield Debt Amortization							0
Cash EoP		600	**600**	**600**	**600**	**600**	**0**

Figure 30: LBO - FCF before Debt Repayment and cash levels calculation in $ Mn

Bank Debt							
BoP			1,257	1,359	1,389	1,365	1,221
Repayment			102	30	(24)	(144)	(811)
Interest	4%		(50)	(54)	(56)	(55)	(49)
EoP		1,257	1,359	1,389	1,365	1,221	409

High-yield Debt							
BoP			539	575	614	655	700
Repayment							
Interest	6.75%		(36)	(39)	(41)	(44)	(47)
EoP		539	575	614	655	700	747

Figure 31: LBO - Debt Schedule Table in $ Mn

As the last part of the LBO model, the returns of the investment are calculated. Calculating the amount of equity and debt remaining at the exit, the Internal Rate of Return (IRR) and the Cash on Cash multiple (CoC) have been computed.

Equity Invested	1,456
Equity at Exit	7,304
IRR	**38.1%**
CoC	**5.0x**

Figure 32: LBO - Internal Rate of Return and Cash on Cash multiple calculation

In the same way that in the DCF model, a sensitive table has been calculated, it is also calculated in the LBO model to offer a more accurate and reliable interval of values. In this case, the sensitivity analysis is done with the Exit Multiple and the Bid Premium.

		Exit Multiple				
		9.6x	10.6x	**11.6x**	12.6x	13.6x
	25%	34.2%	37.7%	40.8%	43.7%	46.4%
	25%	34.2%	37.7%	40.8%	**43.7%**	46.4%
Bid Premium	**30%**	31.8%	35.2%	**38.3%**	41.2%	43.8%
	35%	29.7%	**33.0%**	36.1%	38.9%	41.5%
	40%	27.7%	31.0%	34.0%	36.8%	39.3%

Figure 33: LBO - Sensitivity Analysis of IRR with Exit Multiple and Bid Premium

Lastly, using the outcome of the sensitivity analysis, and part of the assumptions, the share price of the company has been calculated with a minimum and maximum price according to the model.

	Min	Max
IRR	**33.0%**	**43.7%**
Equity at Exit	7,304	7,304
Equity Invested	1,752	1,191
Debt Raised	1,796	1,796
Agreed Equity Value	2,685	2,255
NOSH	138	138
Share Price ($)	**19.5**	**16.4**

Figure 34: LBO - Minimum and maximum share price in $

Despite the model offering a highly accurate share price of Bumble, the LBO model might not be the best to value the company. This is because an LBO mainly creates value for the investor through multiple expansions, EBITDA uplift, and deleveraging. In this case, the deleveraging of the debt used at entry is small, as the Net Debt outstanding at the end of 2028 is considerable, and none of the Bank or High-Yield Debt gets fully repaid. This is due to having low FCF for debt repayment since the company still needs to produce more FCF, i.e., having negative FCF in the first two years of the investment. This implies that the company is at an early stage for an LBO, as it is still growing and does not have significant and stable Cash Flows.

Comparable Companies

The Comparable Company valuation is a relative valuation model. The reliability of relative models relies on the number of similar companies in the market. Sometimes it is challenging to find similar companies, as they should operate in the same geography and industry and have similar financials.

The industry of social media, especially within dating apps, is narrower and more open. However, seven comparable companies have been found.

Description		Market Data			Financial Data (2023)		
Company Name	Country	Share Price	Market Cap ($ Mn)	EV ($ Mn)	Sales ($ Mn)	EBITDA ($ Mn)	Net Income ($ Mn)
Bumble Inc.	**The U.S.**	**17.8**	**2,372**	**3,437**	**1,060**	**276**	**50**
Match Group, Inc.	The U.S.	36.0	10,047	13,415	3,189	925	362
Spark Networks SE	Germany	1.0	26	126	188	13	(44)
The Meet Group, Inc.	The U.S.	N/A	N/A	N/A	256	40	16
Match.com Europe Limited	The U.K.	N/A	N/A	N/A	10	10	10
Sunfun Info Co., Ltd.	Taiwan	5.7	126	115	60	10	8
Ziff Davis Inc.	The U.S.	70.1	3,314	3,658	1,391	457	64
Grindr Inc.	The U.S.	6.1	1,066	1,422	195	58	1

Figure 35: Comparable Companies - Peer's, Market, and Financial data in $ Mn

Nonetheless, as can be seen in the peer's table, The Meet Group and Match.com Europe are private and thus not accurate for the model. The same happens with Spark and Sunfun, as they are both based in Germany and Taiwan, respectively, which also means they will not be considered as they operate in a different geography. Lastly, the size of financials from Grindr needs to be higher to be considered an accurate, comparable company.

Therefore, the companies that have been considered in the analysis are Match Group and Ziff Davis. When calculating the multiples of the comparable companies, the average and median of all peers have been calculated, as well as an accurate average only including the selected accurate peers.

Description	Valuation			
Company Name	EV/Sales	EV/EBITDA	P/Sales	P/E
Bumble Inc.	**3.2x**	**12.4x**	**2.2x**	**47.6x**
Match Group, Inc.	4.2x	14.5x	3.2x	27.8x
Spark Networks SE	0.7x	9.5x	0.1x	-0.6x
The Meet Group, Inc.				
Sunfun Info Co., Ltd.	1.9x	11.8x	2.1x	15.8x
Ziff Davis Inc.	2.6x	8.0x	2.4x	51.9x
Grindr Inc.	7.3x	24.6x	5.5x	1184.1x
Average	**3.3x**	**13.7x**	**2.7x**	**255.8x**
Median	**2.6x**	**11.8x**	**2.4x**	**27.8x**
Accurate Average	**3.4x**	**11.3x**	**2.8x**	**39.8x**

Figure 36: Comparable Companies - Peers multiples

After calculating the accurate average of the peers, the valuation of the company's shares can be done using multiples.

Multiple Used	EV/Sales	EV/EBITDA	P/Sales	P/E
Implied Enterprise Value	3,625	3,109	2,953	2,006
Net Debt	20	20	20	20
Implied Equity Value	3,605	3,090	2,934	1,986
Share Price ($)	**26.2**	**22.5**	**21.3**	**14.4**

Figure 37: Comparable Companies - Share price range in $

As can be seen in the prices computed by the model of comparable companies, the range of prices is accurate considering the current share price of Bumble. One of the main weaknesses of this model is that it does not account for any innovation within the business model or other types of competitive advantage towards other peers. However, in our case study, the range of values obtained is very close to the actual price, which could potentially imply that the market views Bumble as an average company compared to its peers.

Precedent Transactions

The next valuation is another type of relative valuation. In this case, the model considers similar deals that have happened in recent years within the same industry and company size. However, the Online Dating industry has few precedent transactions that are similar to Bumble. The only two examples that could be used are Grindr Inc. in 2020 and Hyperconnect in 2021. However, Hyperconnect operates only in Asia, which would make it an actual precedent transaction. Lastly, Hinge is currently a competitor of Bumble, yet when it was acquired in 2019 was much smaller, and the transaction details needed to be disclosed. Information on these three deals can be found in Appendix 5.

Therefore, since there are not enough relevant peers to value Bumble using the Precedent Transactions method, the method has been omitted in the summary of valuation and the football field section.

Real Options

In the case of Real Options valuation, the method or model used is the Black & Scholes method. In this case, for the valuation, a period of 8 years is assumed, as it is the average duration of Bank and High-Yield Debt (Bain Global Equity Report, 2020). Thus, the period of study goes from 2023 to 2031. For the volatility, the base case used has a volatility of 58.73%, as is the average volatility of the last 180 days (Alpha Query, 2023). The risk-free rate used is the same as in previous models, but it has been adjusted to continuous time.

Variable	Symbol	Value
Enterprise Value	S	3,436.80
Outstanding Debt	E	619.20
Debt Maturity	t	8
Volatility	s	58.73%
Risk-free Rate (Discrete)	r	3.44%
Risk-free Rate (Continuous)	r'	3.38%

Figure 38: Real Options - Assumptions from the model

Using all the assumptions previously stated, all the components of the model can be calculated using the Black-Scholes formulas.

Valuation	
d_1	2.03
d_2	0.36
$\Phi (d_1)$	0.98
$\Phi (d_2)$	0.64
Equity Value	3,060
NOSH	138
Share Price ($)	22.2

Figure 39: Real Options - Share price valuation in $

To be more precise and give a range of values depending on the volatility used for the model, a sensitivity analysis has been computed to see how the share price changes with the volatility used.

Volatility	t	S	PV(X)	Share Price ($)
38.73%	8	3436.8	619.2	21.67
48.73%	8	3436.8	619.2	21.91
58.73%	8	3436.8	619.2	22.24
68.73%	8	3436.8	619.2	22.62
78.73%	8	3436.8	619.2	23.00

Figure 40: Real Options - Sensitivity Analysis of the share price with Volatility

As the analysis shows, the share price is not that sensitive to changes in volatility, which increases the quality of the valuation given. The share price is also quite close to the current share price of the company valuing it higher than the current market and within the range of the broker's target prices.

The Real Options model is valuable in assessing uncertainty and is particularly useful for valuing startup companies, where uncertainty is often a significant aspect of their business. Although Bumble is no longer in its initial startup phase, it still needs some uncertainties. Despite experiencing revenue growth and positive net income in 2021, the company encountered financial challenges in 2022 due to the aftermath of the COVID-19 boom.

Book Value

The Book Value valuation method is a straightforward calculation. The values used are the estimated financials from 2023 (Capital IQ, 2023). Using the total assets and the total liabilities, the book value and, thus, a price per share can be computed.

Total Assets	3,859
(-) Total Liabilities	(1,271)
Book Value	**2,588**
NOSH	138
Share Price ($)	**18.8**

Figure 41: Book Value - Share price valuation

It is surprising that the share price obtained with the Book Value method is very close to the actual value of Bumble, especially being higher. Usually, this method should give a lower valuation, as the model needs to consider the potential of the business model. However, in this case, the company has quite a lot of equity compared to the amount of liabilities they have, which is the main reason why the share price is this high.

Liquidation Value

The Liquidation Value method is like the previous one. However, in this case, the model considers the company is close to bankruptcy and values the share price with a hypothetical bankruptcy of the company. The exact financial estimates have been used for the calculations without using intangible assets, as the company would be liquidated in a short period.

Total Assets	3,859
(-) Intangible Assets	(1,530)
(-) Total Liabilities	(1,271)
Liquidation Value	**1,058**
NOSH	138
Share Price ($)	**7.7**

Figure 42: Liquidation Value - Share Price Calculation

In this case, the share price is relatively lower than the actual share price of the company and from the value of the Book Value method. This is expected, as the number of intangible assets of the company is relatively high. This also shows that this method is more suitable for a company close to distress rather than a startup like Bumble with some uncertainty but somewhat stable financials in the last few years.

b. Alternative Valuation Methods

Berkus

With the original Berkus method, the maximum valuation that can be reached is $2.5 million. Since the valuation of Bumble is much higher than $2.5 million, adjustments have been made to make the method more accurate. To calculate the valuation of Bumble using the Berkus method, ten companies that have a similar profile to Bumble have been used. These companies have had their IPO in the last few years, had high growth, and have a business model based on technology. Using their market cap, an average market cap has been calculated. This value has been divided into the five factors of the Berkus method.

Company Name	IPO Year	Market Cap
C3.ai	2020	9,600
Lyft, Inc.	2019	3,189
Fiverr International Ltd.	2019	1,119
InMode Ltd.	2019	2,814
Robinhood Markets, Inc.	2021	7,598
Cvent Holding Corp.	2020	5,300
Crowdstrike Holdings	2019	6,600
Zoom Meetings	2019	9,200
Farfetch	2018	5,800
Dropbox, Inc.	2018	9,200
Average		**6,042**

Figure 43: Berkus - Average Market Capitalization calculation in $ Mn

As the *Figure 43* shows, the average market cap obtain is $6,042 million. This average market cap can be divided into five factors, which give a value of $1,208 million per factor. Since this number is very close to $1,000 million, the number has been rounded down.

Number of Factors (Berkus)	5
Factor's Maximum Valuation	1,208
Rounded Factor's Maximum Valuation	**1,000**

Figure 44: Berkus - Factor's valuation calculation in $ Mn

Once the rounded maximum valuation per factor has been obtained, the valuation of Bumble can be calculated. To do so, the five factors (Sound Idea, Prototype, Quality Management Team, Strategic Relationships, and Product Rollout or Sales) need to be defined within a range between $0 million and $1,000 million. For the first factor, the value that has been established is $750 million, this is because the company's idea is based on an already existing social network, but the approach taken by Bumble is unprecedented, trying to solve some of the issues that other social dating apps have. For the prototype, the company has already proven to have an app that works well, and that achieves to showcase the principal idea of the startup. Thus, the valuation of the second factor has been defined as the maximum value of $1,000 million. The third factor has also gotten the maximum valuation of $1,000 million as the management team has a successful track record within the industry and an excellent reputation even before starting the company. In the fourth factor, the company has gotten a value of $750 million, as although it has excellent relationships with clients and collaborations with big companies (Netflix collaboration in 2023),

its relationship with other competitors is not the best, as competition worldwide is fierce. Lastly, the product rollout factor has gotten a value of $500 million as the factor aims to show the financial risk of the company. The value of $500 million has been chosen since, although Bumble has managed to increase its revenues recurringly since launching, they are less consistent with its profitability, losing money two out of the four years they have been operating.

Factor	Range	Valuation
Sound Idea	$0 - $1,000 Mn	750
Prototype	$0 - $1,000 Mn	1,000
Quality Management Team	$0 - $1,000 Mn	1,000
Strategic Relationships	$0 - $1,000 Mn	750
Product Rollout or Sales	$0 - $1,000 Mn	500
Equity Value		**4,500**
NOSH		138
Share Price ($)		**29.1**

Figure 45: Berkus - Share Price Calculation in $

The share price obtained using the Berkus method is much higher than the current price of Bumble and other share prices obtained through traditional methods. One reason that could explain the difference in the share price is the fact that this method is more suitable for younger companies, where growth still needs to be present. Furthermore, the fact that Bumble's peer relatives cannot be from the same industry could have affected the valuation, as there is not enough information within the industry alone.

First Chicago

The First Chicago method starts by defining three different scenarios for the startup. In this case, these three scenarios are Best-Case, Mid-Case, and Worst-Case. In our study, the probabilities and the financial forecasts have been obtained using market research and broker reports (Capital IQ, 2023). However, in the case of the Worst-Case scenario, both Revenue and EBITDA have been defined as 0, as the online dating industry is a very competitive industry, and if a number of players establish themselves as the top players, it is likely that they are going to stay that way. This means that in the Worst-Case scenario, Bumble would not be a winner, making any profit and eventually failing.

Scenario	Upside	Base	Downside
Revenue (2031E)	3,737	3,566	0
EBITDA (2031E)	1,232	1,176	0
Probability	20%	60%	20%

Figure 46: First Chicago - Scenarios Definition in $ Mn

The second step of the model is to calculate the Enterprise Values of each scenario. In this case, the multiples used are EV/Revenue and EV/EBITDA since they are the most common metrics used to value companies. The value of these multiples has been obtained in the calculations of the Comparable Companies' method. By multiplying these multiples by the financial forecast of the previous *Figure 46*, the Enterprise Value of each scenario can be calculated, which then is discounted to a present value. The discount factor used in this study has been the WACC instead of the cost of equity. This is because most startups studied using the First Chicago method are very early-stage, meaning they do not have debt. Whereas in our case, Bumble does have debt, which implies that the correct discount factor to be used would be the WACC rather than the cost of equity. Therefore, the WACC value used has been the WACC calculated in the DCF method.

		Upside	Base	Downside
EV/Revenue	*3.3x*	12,507	11,933	0
EV/EBITDA	*13.7x*	16,850	16,077	0
Average		**14,679**	**14,005**	**0**
WACC	*10.9%*	2.28	2.28	2.28
Present Value		**6,432**	**6,136**	**0**

Figure 47: First Chicago - Present value calculation of the Enterprise Value in $ Mn

Once all Enterprise Values have been discounted to the present value, the weighted average Enterprise value is calculated, giving a value of $4,968 million. By subtracting the Net Debt, the Equity Value of the firm can be obtained and then divided by the number of shares outstanding to give a share price of the company of $36.

Weighted Enterprise Value	**4,968**
Net Debt	20
Equity Value	**4,949**
NOSH	138
Share Price ($)	**36.0**

Figure 48: First Chicago - Share Price calculation in $

Risk Factor Summation

The Risk Factor Summation valuation method starts by calculating an Average Pre-Money Valuation of the Industry. Since, in the Berkus method, this has already been done, the same average is going to be used for this model.

Assumptions	
Average Industry Valuation	6,042
Number of Factors	12
Adjustment to Pre-Money Valuation	504
Rounded Adjustment to Pre-Money Valuation	500

Figure 49: Risk Factor Summation - Assumptions of the model in $ Mn

The next step within the model is to rate every factor that affects the overall risk of the startup. The Management risk of Bumble is shallow, as the company's management team has much experience in the industry, having a CEO (Whitney Wolfe Herd) that founded Tinder, one of the most prominent players in the industry and a big competitor of Bumble. Her reputation is excellent, and her team is full of experience and knowledge of the industry.

In the case of the Stage of the Business Risk, the company has low risk, as it has stable and growing revenues and userbase. However, the risk is not very low since it has yet to reach the stability of positive net income. Regarding Sales and Marketing risk, the company has a high risk, as although its revenues grew in 2021 and 2022, after 2021, which was a boom year for Bumble after Covid-19, the company decreased its net income from $317 million to a loss of $80 million, this implies, that Bumble has yet to prove in the following years, that it can continuously produce positive profits and 2022 was just one bad year.

Technology risk represents a small potential risk for Bumble. As every player in the industry uses the same type of app, any slight difference that makes an app's interface more attractive than another one radically changes the preference of the average user. This translates into a small potential risk for Bumble.

One of the most significant risks that the company presents is the Competition Risk. Since the online dating app industry is a very competitive industry, every player in the market fights to take over the market. This makes competition extreme for Bumble, which represents a high risk for the company.

Lastly, the Reputation Risk that Bumble has is relatively high risk. This is because the experience that the users have when using the company's app depends highly on the same users. This represents a loss of control over the reputation of the company, which could affect the brand's name in case of any bad user experiences. Any other risk factor of the model is considered an average risk compared to any other player in the industry.

Risk Factor	Rating
Management Risk	2
Stage of Business Risk	1
Manufacturing Risk	0
Sales and Marketing Risk	(1)
Funding/Capital Risk	0
Technology Risk	(1)
Competition Risk	(2)
Litigation Risk	0
International Risk	0
Reputation Risk	(1)
Political, Regulatory, and Legal Risks (PRL)	0
Potential lucrative exit Risk	0
Total	**(2)**

Figure 50: Risk Factor Summation – Risk factor scores

Lastly, to complete the valuation, the total risk factor summation can be multiplied by the rounded adjustment pre-money valuation of the model's assumptions and added to the average industry pre-money valuation. With the pre-money valuation of the company, it can be divided by the number of shares outstanding to give a share price of 36.6$.

Valuation	
Average Industry Pre-Money Valuation	6,042
Adjustment to Pre-Money Valuation	(1,000)
Pre-Money Valuation	**5,042**
NOSH	138
Share Price ($)	**36.6**

Figure 51: Risk Factor Summation - Share price calculation in $

Scorecard

The Scorecard method starts by determining the average pre-money valuation of the industry, which is the same calculated in the Risk Factor Summation method and other previous methods. Therefore, the value given to the average pre-money valuation is going to be the same obtained in the Berkus method.

The second part of the method consists of determining the scores given to every factor of the scorecard. The weights of each factor have been set to the average used by angel investors (Eqvista, Eqvista, 2021). In the case of the management team and the size of the opportunity, both factors have been given a higher-than-average score, as they have a solid and experienced team, and the potential scalability of the business is very high. On the other hand, the product, competitive environment, and others have an average score since Bumble does not have any flaw or competitive advantage in these factors. However, marketing, sales, and the need for additional financing have a lower score since, despite the company having steady growth in sales, it still has not managed to produce stable net income, which implies that it might still need to increase its sales and to do so, it might need some additional financing.

Comparison Factors			
Factor	Weight	Score	Factor
Board, entrepreneur, the management team	25%	120%	0.30
Size of the Opportunity	20%	110%	0.22
Technology/Product	20%	100%	0.20
Competitive Environment	12%	100%	0.12
Marketing/Sales	12%	80%	0.09
Need for Additional Financing	6%	90%	0.05
Other	6%	100%	0.06

Figure 52: Scorecard - Comparison Factors

To get the value of the company shares, the factor scores need to be summed up to get the total adjustment factor. This factor can then be multiplied by the average pre-money valuation to give the Pre-Money Value of Bumble, which in this case is $6,290 million. Lastly, to obtain the share price of the company, we can divide the Pre-Money Value by the number of outstanding shares, which gives a share price of $45.7.

Valuation	
Average Industry Pre-Money Valuation	6,042
Total Adjustment Factor	1.04
Pre-Money Value	**6,290**
NOSH	138
Share Price ($)	**45.7**

Figure 53: Scorecard - Share price calculation in $

Cost-to-Duplicate

The Cost-to-Duplicate method tries to replicate the total cost of creating the same company from zero. In the case of Bumble, seven types of costs have been used to account for the overall costs that the company has had since its creation. These seven expenses are Marketing Expenditure, R&D Costs, Capital Expenditure, Net Rental Expenditure, Selling Expenditure, General & Administrative Costs, and Cash Acquisitions. The method has considered the costs since the company's creation in 2018 until the estimated costs of Bumble in 2023.

Expenses	2018A	2019A	2020A	2021A	2022A	2023E
Marketing Expenditure	85	130	148	175	208	275
R&D Expenditure	38	39	51	106	98	101
Capital Expenditure	8	10	12	14	16	22
Net Rental Expenditure	6	6	4	5	4	4
Selling Expenditure	94	143	164	212	249	304
G&A Expenditure	129	61	84	152	192	169
Cash Acquisitions	0	0	2,838	0	70	0
Total Relevant Expenditure	358.9	389.3	3,299.9	663.1	836.9	874.7

Figure 54: Cost-to-Duplicate - Bumble's expenses from 2018 in $ Mn

Once the total relevant expenditures per year have been calculated, they can be summed up to total the cost-to-duplicate the company. Then, the net debt of Bumble can be subtracted to give the total Equity Value, and lastly, by dividing it by the number of shares outstanding (NOSH), the value of the share price can be obtained.

Cost-to-Duplicate	**6,423**
Net Debt	20
Equity Value	**6,403**
NOSH	138
Share Price ($)	**46.5**

Figure 55: Cost-to-Duplicate - Share Price calculation in $

As *Figure 55* shows, the share price of the Cost-to-Duplicate method is $46.5, which is much higher than its actual price. There are multiple factors to be considered here; the first one is that the method, as explained before, does not consider intangibles, which would probably move the price even higher. However, on the other hand, the industry where Bumble operates, the online dating app industry, is a very competitive market. This implies that Bumble has been continuously trying to acquire a high market share to be considered the top player or one of them to make profits and become a sustainable company. Moreover, to do so, it has had to expense a large amount of money on marketing and selling expenditures, which account for a 66% of all expenditures.

For these reasons, the share price of Bumble using the Cost-to-Duplicate method is only partially accurate, as it does not account for several factors that play a crucial role in the development of Bumble.

Venture Capital

The Venture Capital method starts by defining the model assumptions of the Investment Needed, the Time Horizon of the Investment, Desired Rate of Return from the VC, and the Number of Shares Outstanding (NOSH). In this study, the Investment Needed has been defined as $200 million, as it is the approximate sum raised in Bumble's Series A. The timing of exit has been set as four years, and the Desired Rate of Return is 25%, as it is the average ROI expectation in VC (UpCounsel, n.d.). Last, the number of shares outstanding is the same number of shares used in every other valuation method.

Initial Assumptions	
Investment Needed	$200 Mn
Timing of Exit	4
Desired Rate of Return (VC)	25.0%
Shares Outstanding	191 Mn

Figure 56: Venture Capital - Assumptions of the model

The second step of the valuation method is to forecast the financials of the startup. In this case, since this forecast has already been done for previous valuation methods, the summarized outcome can be found below. More details on the forecast can be found in Appendix 1

Financials Forecasts (2026)	
Revenue	1,795
EBITDA	529
Net Income	265

Figure 57: Venture Capital - Financials Forecast until 2026 in $ Mn

The next step in the model is to calculate the exit multiples. In this case, the two multiples used are EV/REVENUE and EV/EBITDA multiple, as these are the most commonly used multiples in comparable companies. Both multiples have been extracted from the average values calculated in the Comparable Companies' method. Using these multiples and the previous numbers, the exit value of the startup can be calculated. To simplify, an average of both outcomes has been calculated.

Multiple Used	Ratio	Exit Value
EV/Revenue	3.3x	6,007
EV/EBITDA	13.7x	7,227
Average		6,617

Figure 58: Venture Capital - Multiple and Exit value calculation in $ Mn

Lastly, as the last step of the valuation, the Pre-Money Valuation and the share price need to be computed. To obtain the Pre-Money Valuation, first, the Post-Money Valuation has been calculated using the ROI. Then, by computing the VC Ownership and the new number of NOSH Issued, the Share Price of the Startup is calculated.

Valuation	
Return On Investment	244%
PV of Exit Value (Post-Money)	2,710
Pre-Money Value	2,510
VC Ownership	7.4%
NOSH Issued	15
Share Price ($)	13.1

Figure 59: Venture Capital - Share Price calculation in $

c. Output: Football Field

After the obtention of Bumble's share price using every valuation method, a comparison can be made to obtain insights and a more precise range of values for a bid price. In order to make such a comparison, the Football Field tool can be handy and visual. In order to have a proper comparison with all methods whose output did not produce a range of values, the share price obtained has been multiplied by 85% and 115% to give a certain safety margin.
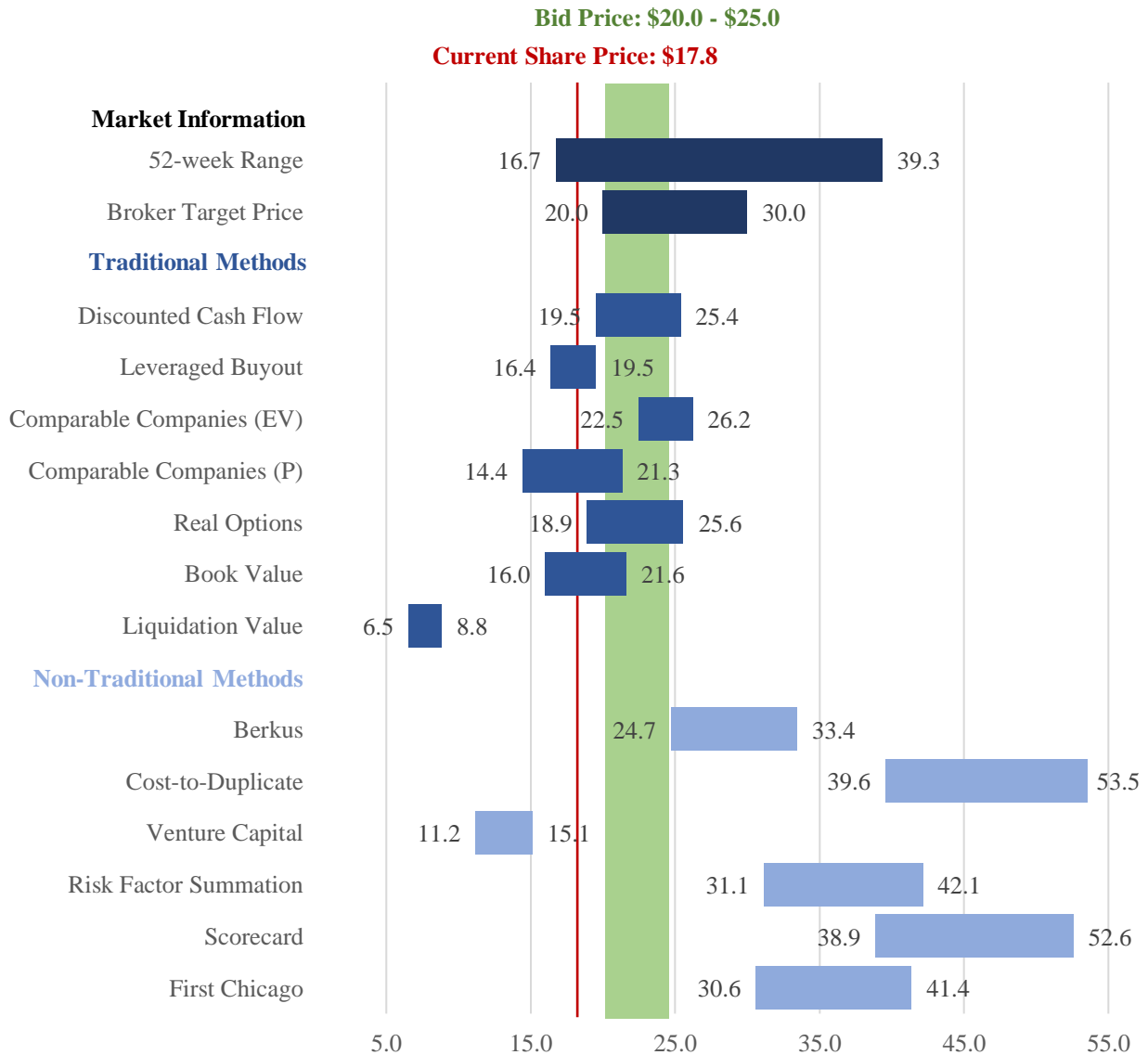

Figure 60: Football Field - Bumble's share price comparison in $

The first two lines of the Football Field correspond to the 52-week Range of Bumble's share price and the Broker's Target price in 2023, which has been obtained from several analysts' broker reports. Refer to Annex 4 for more information.

The following seven lines are dedicated to all traditional methods used. As *Figure 60* shows, the DCF gives an average value within the market's views and slightly above the current target price. This can be because the DCF takes into account the projections and potential of the company. The LBO method gives a slightly lower range of values, having the current target price within its limits. However, it gives a lower valuation than the market, as an LBO requires high expected returns and thus high stable cash flows, which the company still needs to get. The third and fourth lines represent the valuation method of Comparable Companies, using the Enterprise Value and Price multiples, respectively. Both methods value the company's similarity to the market, with the one using Price multiples giving a vaguely smaller valuation. The Real Options method, which is an essential method, as it values the future uncertainty of the company, also gives a share price within the market view of Bumble. Lastly, the Liquidation method does value the company at a much lower number, which is as expected due to the time constraint of selling the remaining assets of the company. However, the Book Value method gives an average share price value of $18.8, which is within the market's view and higher than the current share price. This means that Bumble could be an exciting company for value investors, only the value of the company's assets is higher than the current market valuation. Overall, the traditional methods are in line with the market valuation of the company, although being at the lower end of the range.

On the other hand, the non-traditional methods value Bumble with a much higher share price. For instance, the Cost-to-Duplicate and the Scorecard method value Bumble at a higher price than the market views. In the case of the Cost-to-Duplicate method, this could be due to the large amount of marketing and selling expenditures that the company has gone through since it was founded. This is a highly present cost in the Online Dating industry, as Bumble itself explained in the prospectus of its IPO in 2021. The Online Dating industry is very dependent on bringing and retaining users within their platforms in order to increase revenues. Instead, the Scorecard method values the company at such a high share price due to the quality of its management team and also the size of the opportunity, as Bumble is the second most significant player worldwide. The Risk Factor Summation gives a smaller valuation than the previous methods but is still slightly above

the broker's target price and in the upper end of the market's 52-week range. This is because although it considers the quality of the management and the stage of the business in its valuation, it also includes the competition risk that Bumble has, as the industry is highly competitive, and there is a risk of disruption by any player that brings innovation to the segment. The First Chicago method gives a similar valuation as the Risk Factor Summation, with an average share price of $36. However, the Berkus method does give a valuation that is at the upper end of the brokers' target price, which is within the range of the market's view. Lastly, the Venture Capital method values the company at an average price of $13; this is much lower than the market's view of Bumble and can be explained by the expected return of Venture Capital. Since the returns that the VC funds expect are pretty high, and the company has already gone through an IPO, the growth that Bumble has been through in the first few years cannot be maintained in perpetuity, which makes it quite challenging to produce the returns that VC expects. Thus, the only way VC funds would invest now would be by buying at a significant discount.

Valuation Method	Minimum	Width	Maximum	Average
Current Share Price				**17.8**
Market View				
52-week Range	16.7	22.6	39.3	28.0
Broker Target Price	20.0	10.0	30.0	25.0
Traditional Methods				
Discounted Cash Flow	19.5	5.9	25.4	22.1
Leveraged Buyout	16.4	3.1	19.5	18.0
Comparable Companies (EV)	22.5	3.7	26.2	24.3
Comparable Companies (P)	14.4	6.9	21.3	17.9
Real Options	18.9	6.7	25.6	22.2
Book Value	16.0	5.6	21.6	18.8
Liquidation Value	6.5	2.3	8.8	7.7
Non-Traditional Methods				
Berkus	24.7	8.7	33.4	29.1
Cost-to-Duplicate	39.6	14.0	53.5	46.5
Venture Capital	11.2	3.9	15.1	13.1
Risk Factor Summation	31.1	11.0	42.1	36.6
Scorecard	38.9	13.7	52.6	45.7
First Chicago	30.6	10.8	41.4	36.0

Figure 61: Output Model - Share price ranges of every valuation method in $

Considering the most reliable methods of valuation and the football field, which are the Discounted Cash Flow, Leveraged Buyout, Comparable Companies, Real Options, and the Berkus method, a reasonable Bid Price for Bumble would be around $20 to 25$ per share. This range of values is also in line with the 52-week range of the company and the analysts' target prices.

CONCLUSIONS

In conclusion, this thesis has explored a number of startup valuation methods and the different results obtained from them. Every method has shown dependency on investor expectations and initial assumptions. Thus, when valuing a startup, it is crucial to use valuation methods that fit better every type of investor.

This thesis has also highlighted the limitations of traditional valuation methods and the need for alternative valuation methods for specific stages of a company. These non-traditional valuation methods have proven to be helpful and accurate in specific situations. However, they can yield significantly different results.

The points above have been extracted from the Bumble Inc. case study, which has provided some insightful and valuable information for analysts and investors. Moreover, it has shown the importance of using a customized approach and considering a series of factors in order to assess the value of the startup accurately. The case study has shown that Bumble may be undervalued at the moment, with a valuation range of $20 - $25 per share, while the current share price stands at $17.8 per share.

It is also important to acknowledge that in the same way that this study has yielded a range of values for Bumble, every investor should never consider an absolute measure of a company's value exclusively. Instead, they should consider a combination of valuation methods that fit their assumptions and expected returns in order to get an optimal result.

Ultimately, this thesis contributes to helping stakeholders make informed decisions when valuing a startup venture. Acknowledging the limitations of traditional valuation methods, exploring alternative valuation methods, recognizing the sensitivity of these approaches to their assumptions, and finally, sharing a relevant case study, like Bumble's share price assessment.

APPENDIX 1. INCOME STATEMENT

Income Statement	2021A	2022A	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
($ Mn)											
Revenue	765.7	903.5	1,060.5	1,261.0	1,471.4	1,794.9	2,096.1	2,433.9	2,795.1	3,174.1	3,565.6
Growth (%)		18.0%	17.4%	18.9%	16.7%	22.0%	16.8%	16.1%	14.8%	13.6%	12.3%
EBITDA	207.2	226.9	276.3	343.7	414.8	528.5	670.5	781.2	897.7	1,021.4	1,175.7
Margin (%)	27.1%	25.1%	26.1%	27.3%	28.2%	29.4%	32.0%	32.1%	32.1%	32.2%	33.0%
D&A	107.1	101.4	79.8	86.4	68.7	60.5	17.1	17.6	18.3	19.2	20.3
% of Sales	14.0%	11.2%	7.5%	6.8%	4.7%	3.4%	0.8%	0.7%	0.7%	0.6%	0.6%
EBIT	(135)	(103)	90.4	144.9	229.3	339.2	435.5	539.8	655.6	789.7	932.9
Margin (%)	(17.6%)	(11.4%)	8.5%	11.5%	15.6%	18.9%	20.8%	22.2%	23.5%	24.9%	26.2%
Interest Expense	(26)	(25)	(23)	(22)	(21)	(19)	(20)	-	-	-	-
% of Net Debt	(1.3%)	(1.3%)	(1.1%)	(1.1%)	(1.0%)	(0.9%)					
EBT (Excl. Excep)	(149)	(111)	62.9	112.7	213.2	318.4	416.0	551.3	670.4	808.4	956.3
Margin (%)	(19.5%)	(12.3%)	5.9%	8.9%	14.5%	17.7%	19.8%	22.7%	24.0%	25.5%	26.8%
Taxes	466.9	31.0	(13)	(25)	(57)	(54)	(77)	(102)	(124)	(149)	(177)
Taxes (%)	313.1%	28.0%	20.7%	22.6%	26.7%	16.9%	18.5%	18.5%	18.5%	18.5%	18.5%
Net Income (Excl. Excep)	317.8	(80)	49.8	87.2	156.3	264.7	339.1	449.4	546.5	659.0	779.6

Source: Capital IQ as of 02/05/2023

APPENDIX 2. BALANCE SHEET

Balance Sheet	2019A	2020A	2021A	2022A	2023E
($ Mn)					
Cash & Equivalents	57	128	369	403	513
Receivables	104	108	81	79	141
Prepaid Expenses	3	6	11	9	16
Other Current Assets	5	9	8	11	20
Total Current Assets	**170**	**251**	**470**	**501**	**690**
Net PP&E	30	29	41	32	32
Goodwill	0	1,541	1,540	1,580	1,580
Intangible Assets	10	1,815	1,719	1,551	1,530
Other Long-Term Assets	0	2	7	29	28
Long Term Assets	**41**	**3,386**	**3,308**	**3,191**	**3,169**
Total Assets	**210**	**3,637**	**3,777**	**3,693**	**3,859**
Current Liabilities	**122**	**241**	**176**	**212**	**241**
Long-Term Debt	0	821	623	619	621
Long-Term Leases	10	6	22	14	14
Other Non-Current Liabilities	49	485	486	394	395
Non-Current Liabilities	**59**	**1,311**	**1,131**	**1,027**	**1,029**
Total Liabilities	**181**	**1,553**	**1,307**	**1,239**	**1,271**
Equity	**30**	**2,084**	**2,470**	**2,454**	**2,588**
Total Liabilities & Equity	**210**	**3,637**	**3,777**	**3,693**	**3,859**
Check	*OK*	*OK*	*OK*	*OK*	*OK*

Source: Capital IQ as of 02/05/2023

APPENDIX 3. CASH FLOW ELEMENTS

Cash Flow	2021A	2022A	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
($ Mn)											
Capital Expenditure	(14)	(15)	(19)	(22)	(25)	(25)	(28)	(31)	(33)	(35)	(38)
% of Sales	*(1.8%)*	*(1.7%)*	*(1.8%)*	*(1.8%)*	*(1.7%)*	*(1.4%)*	*(1.3%)*	*(1.3%)*	*(1.2%)*	*(1.1%)*	*(1.1%)*
NWC	294	290	340	404	472	576	672	780	896	1018	1143
Change in WC	284	(4)	50	64	67	104	97	108	116	122	126
% of Sales			*4.7%*	*5.1%*	*4.6%*	*5.8%*	*4.6%*	*4.5%*	*4.1%*	*3.8%*	*3.5%*

Net Debt	2021A	2022A	2023E	2024E	2025E	2026E
($ Mn)						
Net Debt	253.8	222.4	19.6	(239.5)	(545.7)	
% of Sales	*33.1%*	*24.6%*	*1.8%*	*(19.0%)*	*(37.1%)*	*0.0%*
ND/EBITDA	*1.2x*	*1.0x*	*0.1x*	*(0.7x)*	*(1.3x)*	*0.0x*

Source: Capital IQ as of 02/05/2023

APPENDIX 4. OTHER INPUTS

Share Price

	Share Price	Date
Current Share Price	17.76	2/5/23
NOSH (Mn)	137.60	2/5/23

	Min	Max
52-week range	16.74	39.33

Source: Capital IQ as of 02/05/2023

Current Target Price

Broker	Date	TP
Deutsche Bank	1/5/23	22.00
KeyBanc	1/5/23	25.00
Jefferies	25/4/23	26.91
Goldman Sachs	21/4/23	27.66
UBS	12/4/23	20.00
Susquehanna	24/3/23	30.00
Morgan Stanley	20/3/23	21.00
Citigroup	18/3/23	27.50
Evercore	1/3/23	27.00
SMBC	23/2/23	29.00
	Min	**20.00**
	Max	**30.00**

Source: Broker Reports

Other Assumptions

Taxes	25%
Risk-free Rate	3.44%

Source: Refinitiv, 2023

APPENDIX 5. PRECEDENT TRANSACTIONS

Date	Target Company	Target Country	Bidder Company	Bidder Country	Bidder Type	Deal Value	Sales	EBITDA	EV/Sales	EV/EBITDA
2021	Hyperconnect	South Korea	Match Group, Inc. / MG Korea Services Limited	U.S.	Strategic	1,725	192	21	9.0x	84.1x
2020	Grindr Inc.	U.S.	San Vicente Acquisition LLC	U.S.	Financial	1,422	105	27	13.6x	52.7x
2019	Hinge	U.S.	Match Group, Inc.	U.S.	Strategic	n.a.	5	n.a.	n.a.	n.a.

Source: Capital IQ as of 02/05/2023

BIBLIOGRAPHY

Visible.vc. (2018). *Visible.vc*. Retrieved from The Understandable Guide to Startup Funding Stages: https://visible.vc/blog/startup-funding-stages/

New Nordic Ventures. (2022, January). *LinkedIn*. From How increasing interest rates % may impact startup valuations $: https://www.linkedin.com/pulse/how-increasing-interest-rates-may-impact-startup-valuations-/?trk=organization_guest_main-feed-card_feed-article-content

Euribor-rates.eu. (2023, June). *Euribor Rates*. From Euribor-rates.eu: https://www.euribor-rates.eu/en/current-euribor-rates/4/euribor-rate-12-months/

Upcounsel. (2023). *Upcounsel*. From Startup Valuation: Everything You Need to Know: https://www.upcounsel.com/startup-valuation#:~:text=Is%20Startup%20Valuation%3F-,Startup%20valuation%20is%20simply%20the%20value%20of%20a%20startup%20business,in%20which%20that%20business%20belongs.

Damodaran, A. (2009). Valuing Young, Start-up and Growth Companies: Estimation Issues and Valuation Challenges. In *Econometrics: Econometric & Statistical Methods - General eJournal.* NYU Stern School of Business.

Corporate Finance Institute. (2023). *Corporate Finance Institute*. From Unlevered Free Cash Flow: https://corporatefinanceinstitute.com/resources/financial-modeling/unlevered-free-cash-flow/

Corporate Finance Institute. (2023). *Corporate Finance Institute*. From Free Cash Flow (FCF): https://corporatefinanceinstitute.com/resources/valuation/fcf-formula-free-cash-flow/

Sharpe, W. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk. *Journal of Finance*.

HEC Paris. (2022). *Corporate Valuation.*

Breaking into Wall Street. (n.d.). *Breaking into Wall Street.*

HEC Paris. (2023). *Corporate Restructuring.*

Fernando, J. (2023). *Investopedia*. From Internal Rate of Return (IRR) Rule: Definition and Example:
https://www.investopedia.com/terms/i/irr.asp#:~:text=The%20Bottom%20Line-,The%20internal%20rate%20of%20return%20(IRR)%20is%20a%20metric%20used,determine%20which%20is%20the%20best.

Kenton, W. (2022). *Investopedia*. From Cash-on-Cash Return in Real Estate: Definition, Calculation: https://www.investopedia.com/terms/c/cashoncashreturn.asp

Breaking into Wall Street. (n.d.). *Breaking into Wall Street: Valuation.*

Grant, M. (2022). *Investopedia,* . From What a Startup Is and What's Involved in Getting One Off the Ground: https://www.investopedia.com/terms/s/startup.asp

Baldridge, R. (2022). *Forbes*. From What Is A Startup? The Ultimate Guide: https://www.forbes.com/advisor/business/what-is-a-startup/

Sendpulse. (2023). *Sendpulse*. From What is a Startup: Types and Ideas: https://sendpulse.com/support/glossary/startup

Pratt, M. K. (2023). *TechTarget*. From What is a Startup Company?: https://www.techtarget.com/searchcio/definition/startup

Kolosok, A. (2017). Definition of Startup Projects, Main Problems and Prospects of Development .

Startup Savant. (2022). *Startup Savant*. From What Are the Different Types of Startups?: https://startupsavant.com/types-of-startups

Faster Capital. (2023). *Faster Capital*. From The history of startups From early days to today : https://fastercapital.com/content/The-history-of-startups--From-early-days-to-today.html

BCG. (2019). *BCG*. From The 2019 M&A Report: Downturns Are a Better Time for Deal Hunting: https://www.bcg.com/publications/2019/mergers-and-acquisitions-report-shows-downturns-are-a-better-time-for-deal-hunting

Shepherd, M. (2023). *Foundera*. From Crowdfunding Statistics: Market Size and Growth: https://www.fundera.com/resources/crowdfunding-statistics

Quantic. (2021). *Quantic*. From Series A, B, C, Seed | Startup Funding Rounds Expert Guide: https://quantic.edu/blog/2021/02/19/series-a-b-c-seed-startup-funding-rounds-expert-guide/

Hekkert, C. (2023). *Zeni*. From Debt Financing For Startups: When And How To Get It: https://www.zeni.ai/blog/debt-financing-for-startups#:~:text=%E2%80%8D-,What%20is%20debt%20financing%20for%20startups%3F,pays%20it%20back%20with%20interest

Blank, S. (2013). *Startap: nastol'naya knyha osnovatelya [The founder's desk book].* . Dorf.– M. : Al'pynaPablysher [In Ukrainian].

Ovtchinnikov, A. (2023). *Risk-Neutral Valuation.* HEC Paris.

Damodaran. (n.d.). *The uValue Companion: A Handbook on Valuation.*

Bossard, O. (2023). *Black-Scholes Model.* HEC Paris.

Ovtchinnikov, A. (2023). *Real Options.* HEC Paris.

Greenwald, B. C. (2021). *Value Investing: From Graham to Buffet and Beyond.* Wiley Finance Series.

Sarath. (2021). *Eqvista*. From BERKUS VALUATION METHOD FOR STARTUPS: https://eqvista.com/berkus-valuation-method-for-startups/

Visible VC. (n.d.). *Visible VC*. From Valuing Startups: 10 Popular Methods: https://visible.vc/blog/startup-valuation-methods/#:~:text=The%20Cost%2Dto%2DDuplicate%20Approach,all%20the%20expenses%20at%20hand.

Medium. (2022). *Medium*. From What is the Cost-to-Duplicate Startup Valuation Method?: https://medium.com/@fro_g/what-is-the-cost-to-duplicate-startup-valuation-method-7c888c96c4f0

Cameron, S. M. (2014). *Medium*. From Startup Valuations: The Venture Capital Method by Bill Payne: https://medium.com/@SNPX/startup-valuations-the-venture-capital-method-by-bill-payne-9fa2e87f823c

Wall Street Prep. (n.d.). *Wall Street Prep*. From Understand the Venture Capital Valuation: https://www.wallstreetprep.com/knowledge/vc-valuation-6-steps-to-valuing-early-stage-firms-excel-template/

UpCounsel. (n.d.). *UpCounsel*. From Venture Capital ROI Expectations: https://www.upcounsel.com/venture-capital-roi-expectations#:~:text=Return%20on%20Investment%20Ranges,-The%20risk%20of&text=The%20National%20Bureau%20of%20Economic,25%20percent%20return%20on%20investment.

Deshmukh, S. (2022). *Data Katalyst*. From 2022 Risk Factor Summation Valuation: What, Why, How, Advantages and Disadvantages: https://www.datakatalyst.com/post/2022-risk-factor-summation-valuation-what-why-how-advantages-and-disadvantages#:~:text=Conclusion-

,What%20is%20the%20Risk%20Factor%20Summation%20Valuation%20Method%3F,o verall%20value%20of%20a%20company.

Eqvista. (2021). *Eqvista*. From RISK FACTOR SUMMATION METHOD: EVERYTHING YOU NEED TO KNOW: https://eqvista.com/risk-factor-summation-method/

Eqvista. (2021). *Eqvista*. From SCORECARD VALUATION METHOD EXPLAINED: https://eqvista.com/scorecard-valuation-method-explained/

Venionaire Capital. (n.d.). *Venionaire Capital*. From Venture Valuation - First Chicago Method: https://www.venionaire.com/first-chicago-method-valuation/#:~:text=The%20First%20Chicago%20Method%20is,valuation%20of%20dyna mic%20growth%20companies.

Capital IQ, . (2023). *Capital IQ*. From Bumble Inc. - Capital IQ: https://www.capitaliq.com/CIQDotNet/company.aspx?companyId=331389951

Statista. (2023). *Statista*. From Dating services revenue worldwide from 2020 to 2030: https://www-statista-com.ezproxy.hec.fr/forecasts/891138/eservices-dating-services-online-revenue-by-segment-worldwide

Statista. (2023). *Statista*. From Number of dating service users worldwide from 2020 to 2030, by segment: https://www-statista-com.ezproxy.hec.fr/forecasts/891146/eservices-dating-services-online-user-by-segment-worldwide

Statista. (2023). *Statista*. From Online dating average revenue per user (ARPU) worldwide from 2017 to 2027: https://www-statista-com.ezproxy.hec.fr/forecasts/891150/eservices-dating-services-arpu-by-segment-worldwide

Statista. (2023). *Statista*. From Revenue of leading online dating markets worldwide as of 2022, by country: https://www-statista-com.ezproxy.hec.fr/statistics/1358059/global-revenue-largest-online-dating-markets/

Tinder. (2023). From About Tinder: https://www.tinderpressroom.com/about

Gitnux. (2023). *Gitnux*. From The Most Surprising Badoo Statistics And Trends in 2023: https://blog.gitnux.com/badoo-statistics/#:~:text=Badoo%20has%20over%2012%2C000%2C000%20active,platform%2 0on%20a%20monthly%20basis.

Hinge. (2023). From Hinge Help Center: https://hingeapp.zendesk.com/hc/en-us

HelpLama. (2023). From Hinge Revenue and Users Statistics 2023: https://helplama.com/hinge-revenue-users-statistics/#:~:text=Hinge%20annual%20revenue%20in%202022,%24197%20million%20revenue%20in%202021.

Crunchbase. (2023). From Tantan - Crunchbase: Company Profile & Funding: https://www.crunchbase.com/organization/tantan

Tantan. (2023). From Tantan: https://tantanapp.com/en/about

Grindr. (2023). From Help Center: https://help.grindr.com/hc/en-us

Statista. (2023). From Brand market share of leading online dating services worldwide as of October 2022: https://www-statista-com.ezproxy.hec.fr/statistics/1362156/global-dating-services-market-share/

Statista. (2023). From Share of adults in the United States who think they have ever interacted with a catfish on social media as of January 2022, by gender: https://www-statista-com.ezproxy.hec.fr/statistics/1293366/us-adults-who-have-interacted-with-catfish-by-gender/

Statista. (2023). From Reported losses from romance scams in the United States from 2017 to 2021: https://www-statista-com.ezproxy.hec.fr/statistics/1362095/us-romance-scams-losses/

Crunchbase. (2023). From Bumble - Funding, Financials, Valuation & Investors: https://www.crunchbase.com/organization/bumble/company_financials

Yahoo Finance. (2023). From Bumble Inc. Stock Historical Prices: https://finance.yahoo.com/quote/BMBL/history?period1=1613001600&period2=1687219200&interval=1d&filter=history&frequency=1d&includeAdjustedClose=true

Berre, M., & Le Pendeven, B. (2012). *Startups, Growth, and the Macroeconomic Environment: Valuation and Business Cycles.*

Black, B. (2023). *The Dating Debate—MTCH and BMBL Previews Ahead of 1Q23 Print.* Deutsche Bank.

Khajuria, S. (2023). *Evercore ISI - Bumble Inc.* Evercore.

Carpenter, C. A. (2023). *Online Dating (MTCH/BMBL).* J.P. Morgan.

Koenig, S. (2023). *Bumble, Inc. (BMBL).* SMBC NIKKO SECURITIES AMERICA, INC.

Patil, S. (2023). *Bumble Inc.: Execution Continues in the Face of a Toughening Macro.* Susquehanna Financial Group.

Easy Cap Raise. (2023). *How is startup valuation affected by inflation?* From Easy Cap Raise: https://easycapraise.com/blog/effect-of-inflation-on-startup-valuation/

Indeed. (2022). *Indeed.* From What Are the 8 Startup Growth Stages?: https://www.indeed.com/career-advice/career-development/startup-growth-stages

Riani, A. (2020). *Forbes.* From 3 Key Milestones Every Entrepreneur Can Reach Before Making The First Hire: https://www.forbes.com/sites/abdoriani/2020/02/08/3-key-milestones-every-entrepreneur-can-reach-before-making-the-first-hire/?sh=4a1c53024ffc

Indeed. (2022). *Indeed.* From The 4 Stages of Business Growth (Plus Tips): https://www.indeed.com/career-advice/career-development/stages-of-business-growth

Indeed. (2023). *Indeed.* From How To Scale a Business for Sustainable Growth in 7 Steps: https://www.indeed.com/career-advice/career-development/how-to-scale-a-business

Indeed. (2022). *Indeed.* From 5 Types of Funding for Businesses: https://www.indeed.com/career-advice/career-development/types-of-funding

Indeed. (2022). *Indeed.* From 30 Tips To Help Your Startup Business Succeed: https://www.indeed.com/career-advice/starting-new-job/startup-business-tips

Nowshin, N. (2023). *Sifted.* From 10 types of startup funding: https://sifted.eu/articles/types-of-startup-funding-explained

Attar, A. (2023). *The VC Factory.* From The VC Factory: https://thevcfactory-platform.com

Vernimmen, P., Quiry, P., Dallocchio, M., Le Fur, Y., & Salvi, A. (2022). *Corporate Finance: Theory and Practice.* John Wiley & Sons, Ltd.

Amazon. (2021). *Amazon.* From Our Carbon Footprint: https://sustainability.aboutamazon.com/environment/carbon-footprint

Marr, B. (2023). *Forbes.* From The Future Of Business: 8 Trends For Startups To Watch: https://www.forbes.com/sites/bernardmarr/2023/04/25/the-future-of-business-8-trends-for-startups-to-watch/?sh=24961d9e389b

Howarth, J. (2023). *Exploding Topics.* From Top 11 Startup Trends (2023-2026): https://explodingtopics.com/blog/startup-trends

Exploding Topics. (2023). *Exploding Topics.* From DNA Nudge: https://explodingtopics.com/topic/dna-nudge?period=120

Partech. (2020). *Partech*. From The Partech Africa Report is here, and it's the best yet with US$2.02 B raised!: https://partechpartners.com/news/2019-partech-africa-report-here-and-its-best-yet-us-2-02-b-raised/

Statista. (2023). *Statista*. From Capital invested in startups related to sustainability in Asia from 2018 to 2021: https://www-statista-com.ezproxy.hec.fr/statistics/1322670/asia-capital-invested-in-sustainability-related-startups/

Statista. (2023). *Artificial Intelligence: in-depth market analysis.* Statista.