

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

ANALYSIS OF THE MOST FREQUENTLY USED STARTUPS' VALUATION
METHODS AND THEIR MAIN DRAWBACKS: THE SWTICHO CASE

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Abstract (100 words maximum)

The main purpose of the thesis is to critically examine the most widely used valuation methods and to investigate the most effective tool for evaluating start-ups. The methodologies discussed are the discounted cash flow model the comparable method, and the venture capital method. Each method was applied to an Italian start-up called Switcho, with the goal of analysing its business model and assessing its evaluation. The results highlight that there is no ideal appraisal for start-ups, however the VC method gives more reliable results than the DCF model and comparable method.

Keywords

Business Model, Business Model Canvas, Entrepreneurship, Startup, Valuation Methods, Venture Capital

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Research Question and Methodology

The main purpose of the thesis is to critically examine the most widely used valuation methods and to investigate the most effective tool for evaluating start-ups. Taking this into consideration, the following research question will be addressed:

What are the main problems associated with startups' valuation using the most known published methodologies, and is there a valid and efficient approach that can overwhelm these issues?"

In order to provide a proper answer, the thesis is divided in four chapters. The first chapter has the aim of giving a general view of the topic, in particular addressing the fact that correctly valuing a start-up represents a central matter for both investors and funders. However, it is widely agreed among academics that the latter is a thorny issue: as highlighted by Professor Aswath Damodaran in his study "Valuing Young, Start-up, and Growth Firms: Estimation Challenges and Valuation Challenges", the most widely used methodologies in the realm of valuation, are based on assumptions that cannot be applied to young companies.

Moreover, given start-ups' challenges in computing their valuation and the high-risk factors at which are exposed, they have trouble in finding the necessary investments to develop their businesses. Venture capital firms emerged in 1970s and sought to fill the lack of funds for young and promising enterprises, becoming start-ups' major source of funding. VCs are attracted by investments with high growth opportunities that could pay above average returns. Hence, given the large presence of worthy intangible assets that allow firms to reach their full potential, start-ups represent interesting opportunities for VCs. The distinction between intangible and tangible assets represents a key factor that influences mature companies and start-ups' valuation. Indeed, the former are usually characterized by a greater presence of tangible assets which can be easily measured facilitating the valuation process. On the contrary,

start-ups present more intangible assets that provide greater opportunity for growth, which however, cannot be adequately quantified. The following two chapters describe the theoretical framework used to address the practical application. In particular, chapter 2 has the objective to underline start-ups' most important features and to explain the best techniques to increase their likelihood of success while decreasing that of failure. Successful start-ups are identified by a dynamic path based on the search of business assumptions, their validation, and their potential adjustment to every change in customers' tastes. This iteration process, called lean approach, is key to reduce start-ups' spending until it has been verified that their product is viable, and their business model is able to widely expand. As a result, start-ups could defer their funding need to when they will be able to obtain a higher valuation for their company and to negotiate better terms with VCs. Indeed, if founders have a limited knowledge of their industry or if information asymmetries and uncertainties are still too high, valuation will be negatively affected: investors will push for a low valuation to compensate the risk undertaken, resulting in low shares' price and high equity stake. Moreover, startups could increase their probability of success complying with the business model canvas which allows business models to be clear, meaningful, and instantly accessible. Indeed, the first causes of start-ups' failure are customers' lack and a not-profitable business model. Regarding Chapter 3, it has the aim to present the most frequently used valuation methods and to highlight their issues in evaluating start-ups. It focuses on the discounted cash flow model, the comparable firms' method and on the venture capital method. The fourth chapter addresses the practical application, with the aim of computing the valuation of an Italian start-up called Switcho. The methodology used includes the discounted cash flow model, the comparable method, and the venture capital method. Each model has been applied using the actual firm's financial statements and available data. Finally, several considerations were made about the results, underlying which is the most reliable method to value start-up.

Chapter 1- Why is valuing start-ups tricky?

Valuing start-ups is complex for a multitude of reasons. Indeed, the most widely used methodologies in the realm of valuation, are based on assumptions that do not apply to start-ups. For this reason, they either fail or they provide inaccurate results for revenues, growth rates, and discount rate's estimation. Moreover, the distinction between intangible and tangible assets represents a key factor that influence mature companies and start-ups' valuation. Indeed, the former are usually characterized by a greater presence of tangible assets which can be easily measured facilitating the valuation process. On the contrary, start-ups present more intangible assets that provide greater opportunity for growth but that cannot be adequately quantified. Given the difficulty of valuating start-ups' and the high-risk factors at which are exposed, they had trouble in finding the necessary investments to develop their businesses. Venture capital firms emerged in 1970s and provided to fill the lack of funds for young and promising enterprises, becoming start-ups' major source of funding.

1.1 Valuation Rationale

According to Koller, T., Goedhart, M., & Wessels, D. in their paper "Valuation: measuring and managing the value of companies" (2010), in an economic system, value is the primary factor of assessment. People invest with the hope that when they sell, the value of their investments will have raised enough to compensate for the risk they have incurred. Moreover, value is an extremely useful performance indicator since it considers the long-term interests of all parties in a firm, not only those of the shareholders. For instance, value is important for every stakeholder in those organizations which employ more people, providing higher customer and staff satisfaction, and bearing a greater weight of corporate responsibility than other competitors. Hence, as discussed by Miloud, T., Aspelund, A., & Cabrol, M. in their paper "Startup valuation by venture capitalists: an empirical study" (2012), correctly valuing a start-up is regarded as critical both by investors and funders. For the former, company's valuation

enables them to assess the amount of shares that they will receive in return for their investment. The latter determines the profitability of their funding and impacts their relationships with the entrepreneurs. On the other side, value is important for the founders since it motivates them and provides a meaning to the resources and efforts they put into their businesses. Furthermore, research has shown that valuation is vital because it combines the objectives of the entrepreneur and the investor and ensures equitable treatment while also decreasing possible causes of conflict between the two parties. As stated by Zacharakis, A., Erikson, T., & George, B. in their paper "Conflict between the VC and entrepreneur: the entrepreneur's perspective" (2010), considering the significant importance of valuation, the latter is typically a source of discussion between the start-up's founders and the potential investors and frequently undermines their relationship. Indeed, the major issue is that the goals of the entrepreneur and those of the investor are not aligned. On the one hand, the latter wants to get the best possible price of the firm' shares, spending as little as possible today in order to gain more return when selling later. In contrast, the entrepreneur is conscious of his disadvantage position and understands that he will take a risk selling his firm for a low price. As a result, he wants to collect the money he needs while minimizing the damage of being undervalued as much as possible. These two opposing viewpoints must be reconciled through the use of a tool that takes into consideration the conflicting interests of both parties. However, valuing a startup is a challenging process: this is because most current published methodologies - and hence the most widely used in the realm of valuation - are based on pre-requisites that are difficult to observe in start-ups.

1.2 Start-up VS established company

According to Paul Graham paper "Startup= growth." (2012), startups are dynamic, innovative firms which are generally in their early phases of development and are growth oriented.

On the other side, big corporations are hierarchical, stable, unflexible, and productivity oriented. Indeed, the ability of large corporations to expand and to grow in new markets appears to be very limited. Moreover, as stated by Inaki Pena (2002), the size and mindset of large corporations make disruptive innovation¹ nearly impossible to implement. For this reason, they prefer to expand through sustaining innovation². Another main difference between start-ups and big companies is the major presence of intangible assets in the former and tangible assets in the latter. Intangible assets, also known as intellectual assets, lack physical substance and include patents, goodwill, brand recognition, copyrights, and customer lists. According to Alem H. Yallwe and Antonino Buscemi in their paper “An era of intangible assets” (2014), these resources don’t produce worth and growth on their own, since companies need to bundle both tangible and intangible assets to produce cash flows and increase the overall efficiency. However, intellectual resources are the most desirable given their capacity to launch the firm’s expansion towards the achievement of its full potential. On the other hand, tangible assets are the physical resources owned by a company, such as its property, plant, and equipment. Given their actual existence, tangible assets can be easily measured, making it possible for them to be sold and converted into cash in case of liquidation. Companies in high-risk industries employ physical assets to give security to their investors who will be “protected” as long as the value of their tangible assets is higher than the level of risk undertaken.

Conversely, intangible assets cannot be quantified but have nonetheless a high value. Indeed, even if tangible assets provide safety to a corporation, intangible ones provide greater opportunities for its growth. Moreover, in a competitive market, intangible assets allow a firm to differentiate from its competitors given their more firm-specific nature, in contrast to tangible assets which are easily achievable. In particular, start-ups’ team features (industry knowledge

¹ Disruptive innovation refers to the process of launching new products into new markets for new clients.

² Sustaining innovation refers to the process of introducing new items that are variations of the company’s existing offerings.

and motivation), organizational capital (the firm's capacity to adjust rapidly to changes and implement effective strategies), and relational capital (the development of efficient networks and increased accessibility to key stakeholders), are valuable intellectual assets that appear to be strongly associated to entrepreneurial success (Heirman, A., & Clarysse, B. 2007). As stated by Glücksman, S. in the paper “Entrepreneurial experiences from venture capital funding: exploring two-sided information asymmetry” (2020), assessing the value of intangible assets is challenging even because investments in new firms are associated with asymmetric information (notably adverse selection and moral hazard).

To conclude, intangible assets' valuation is different and trickier compared to tangible assets' valuation. Consequently, given the higher presence of the former in startups and of the latter in already established companies, it is possible to state that to value start-ups is more challenging than valuing big companies.

1.3 The role of Venture Capital

Historically, given start-ups' high risk and challenges in computing their valuation, they had trouble in finding the necessary investments to develop their businesses. Moreover, the recent sovereign debt crisis that caused the reduction of available credit, in addition to the already unwillingness of banks to lend funds to new enterprises, have made it very complicated for them to access bank credit, creating concerns in many countries.

Venture capital firms emerged in 1972 with the foundation of Sequoia capital, one of the biggest VC's companies, who provided to fill the lack of funds for young and promising enterprises. In those years there have been very successful exits for VCs and the formation of some of today's most powerful corporations such as Apple and Microsoft.

As shown in Figure 1.1, venture capital companies have developed as a major source of funding since then and have been an important topic for several academic studies.

VC funding has boomed over the last decade

Deals with VC or CVC participation, Q1'09 – Q2'20 QTD (5/27/20)

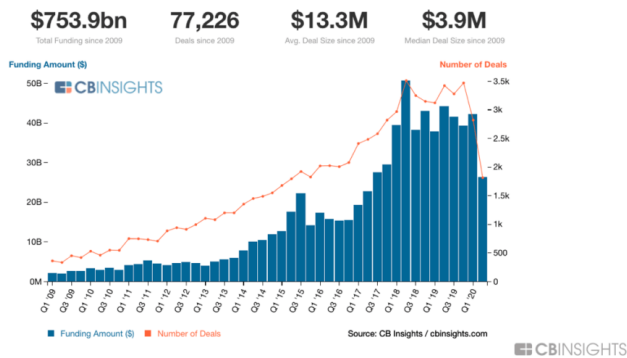


Figure 1.1: Evolution of VC funding from 2009 to 2020. *What is Venture Capital.* (2020). CBINSIGHT.

As defined by Wright M. and Robbie K, in their book “Venture capital” (2022), VC usually implies long term investments in risky enterprises with a high growth possibility made by professional investors in exchange for equity stakes. Venture capitalists’ main return is constituted by an eventual capital gain instead of interest or dividend return. Thanks to their long-term growth potential, start-ups are very interesting investments to VCs, who are attracted by above average returns. Indeed, despite start-ups’ high risk, rewards are huge when they are successful. Moreover, according to Paul Graham paper "Startup= growth." (2012), VCs choose to fund start-ups also because they are simple to oversee. Indeed, the entrepreneurs will not be able to earn benefits unless investors are enriched too. This is not the case in mature companies in which it’s easier for private firm’s managers to channel profits towards themselves while making the firm appear to be collecting few earnings (for example, by purchasing more expensive equipment from a vendor they are in business with). On the other side, entrepreneurs would like to receive VCs’ funding to reach a sustainable and fast growth. Indeed, having an outstanding idea is not enough to develop it, competitors will steal that innovation if the company doesn’t manage to expand it quickly enough. Hence, slow growth is especially harmful for a young company (Jeong J., Kim J., Son H., and Nam D., 2020). In addition to monetary investments, VCs provide substantial intangible assets including their knowledge and

network. The latter are especially important since often start-ups lack both financial resources and expertise that are crucial elements to expand their business. However, only a small percentage of start-ups have been successful in collecting VC funding, and the timeframe of receiving financing varies from the early stages of company development to the later stages. Startups go through 5 growth stages to develop their business, each of which necessitates specific effort and expertise. Since the resources obtained by VCs fulfil distinct needs, it is important to understand which are the assets that may improve start-ups' performance in a specific growth stage. Jeong J., et al in their paper "The Role of Venture Capital Investment in Start-ups' Sustainable Growth and Performance: Focusing on Absorptive Capacity and Venture Capitalists' Reputation" (2020), defined the main characteristics of each phase: in the Seed stage start-ups face a lack of expertise and have just developed their business model. Usually there is no product commercialization and entrepreneurs carry out research and experiments in order to validate their idea. Because of the high level of uncertainty, entrepreneurs typically seek funds from their personal resources or from friends and family. It is still too early to expect money from VCs, but they can collaborate with an incubator. In the Early stage the new business should be functioning and productive and is likely to take place two rounds of financing, series A and B. Entrepreneurs usually set goals to reach within the following round such as business development, scale-up and value generation. Because firms require management assistance to enable future growth, venture capital investment is more strategic than financial in this stage. The next stage is the Expansion one in which entrepreneurs invest in advertising and product development to establish more market presence. In the Later stage companies require additional financial resources to plan their subsequent stages such as exit (IPOs) and sales (M&As). The last one is the Exit stage in which companies engage in IPO or M&A procedures. The absence of resources in every growth phase drives entrepreneurs to seek VC funding.

1.4 Start-up valuation issues

According to traditional finance, every investment's value is obtained by discounting its future cash flows. However, when it comes to valuing a start-up, this basic concept of economic worth is the source of great challenges to financial valuation methodologies. The most prevalent valuation methods in corporate finance, such as the discounted cash flow method and the comparable approach, are based on rigorous assumptions and need information that new enterprises rarely have, like accounting data. According to Aswath Damodaran's 2009 paper "Valuing Young, Start-up, and Growth Companies: Estimation Issues and Valuation Challenges", new enterprises have common characteristics which create several valuation issues as discussed below.

New ventures have **limited historical data**, for instance their financial records might exist for just a few years or not exist altogether. The lack of data, which is critical to undertake potential comparisons with other firms and examine growth potential, creates issues in building a credible business strategy and in analysing possible future development. Moreover, it is very difficult to determine if start-up's earnings from current assets are a one-time event or if they are sustainable (even when market dynamics worsen), and to predict how sales will evolve if the company confronts new competitors or modifies its pricing scheme.

Start-up **earnings are typically low, absent, or negative**, making the investment's profitability forecast difficult to estimate and the valuation methods based on comparison with similar firms useless. Moreover, since costs are frequently related with running the business rather than producing income, their financial statements are even more difficult to interpret and presents huge financial liabilities. According to Mansfield in his article STARTUP STATISTICS – The Numbers You Need to Know (2021), only 40% of start-ups are profitable, while the others will either break even (30%) or keep losing money (30%).

Early-stage companies rely on private equity rather than public markets for funding. During the early phases, the founders, together with friends and family, provide nearly all the needed capital. As the performance's potential grows, so does the demand for more funding, and more capital is provided by angels and venture capitalists in exchange for equity stakes. However, these investors are unlikely to accept remuneration just for the firms' systemic risk, resulting in very high IRR. For instance, angels and VCs are also compensated for their value-added, the illiquidity risk they bear, and a correction for optimistic forecast.

Most start-ups fail during the first few years of operation. According to U.S. Bureau of Labor Statistics data³, more than 90% of start-ups fail. Of the latter, 20% fail within the first year of activity, and 70% during the 10th year. The article "Startup Failure Rate: How Many Startups Fail and Why?" written by Kotashev, K. and published in 2022, points out which are the main reasons of start-ups' failure. 56% of new ventures don't survive because of a lack of product-market fit. Indeed, entrepreneurs often spend time and effort to realize their business idea even if they are not sure that people will buy what they supply. Moreover, failure due to a weak founding team accounts for 18%, while failure due to run out of funding rates 16%.

Moreover, when a start-up raises additional fund, the earlier investors are exposed to dilution, meaning that their equity stakes are reduced as new VCs enter the company. For this reason, VCs frequently require and achieve protection against dilution in the form of first claims on free cash flows from operations and in liquidation, generally together with control or veto rights, allowing them to preserve their interests. As a result, these **variations in equity**

³ U.S. Bureau of labor statistics. (2021). Survival of private sector establishments by opening year. *Table 7* (https://www.bls.gov/bdm/us_age_naics_00_table7.txt)

claims may result in different equity costs for each one, causing major issues in discount rate computation.

Finally, most shareholders in a start-up are private investors, and their **stocks** are frequently kept in non-standardized units, hence they are **far less liquid** than publicly listed company shares. Since an asset's liquidity refers to how easily it may be exchanged on the market, and illiquid investments are considered to have lower value than more liquid ones, we can expect VCs to increase their IRR to account for this illiquidity.

As highlighted by extensive research in the entrepreneurial finance field, it has been observed that other elements that highly impact VC's investing strategies include the enterprise idea, founders, competitive advantage, and market opportunities. Hence, not only the financial estimates have a significant influence in the selection of start-ups. Besides company's features, start-up's valuations are also affected by market factors. Indeed, elements such as the industry attractiveness, (including its performance, presence of competitors, and the existence of differentiation) venture capitalist concentration, as well as especially advantageous investment rules, create large variances in average start-up's values. Moreover, the recentness and scale of previous exits in the same sector and the value of transactions closed by other investors, have an influence on future VCs' funding.

Another factor that influences value but is unrelated to start-up's characteristics is information asymmetry, defined as a "condition in which one party in a relationship has more or better information than the other party" (Akerlof, G. A. 1978). Indeed, the significant degree of uncertainty around a start-up's potential to make profits highlights the relevance of information regarding an entrepreneurial project's chances of success in a financing relationship. Information asymmetry includes the problem of adverse selection that occurs when it is believed that the founder knows more about the value of the enterprise than a hypothetical VC.

Lastly, entrepreneurs and management team's mindset, past professional activities, and skills are likely the most important variables influencing VCs investment choice. In their paper, "How Do Venture Capitalists Make Decisions?", Gompers et al. surveyed 885 VCs of 681 companies to get insight into how they make decisions. The result was that the management team was cited as a significant decision element by 95% of VCs and the most important element by 47% of VCs. Consequently, most of the common approaches often used to value publicly traded or large private enterprises either fail or produce inaccurate results.

Chapter 2 - Start-up business model: the theoretical framework

Steve Blank came up with the most common definition of a start-up, which has been frequently quoted in both industry journals and in scientific research: "A start-up is a temporary organization designed to search for a repeatable and scalable business model and it is not a small version of a big firm"⁴. Start-ups are characterized by ambitious growth objectives aimed at developing a corporation with considerable effects on either established markets or completely new businesses. Moreover, start-ups are identified by a dynamic path based on the search of business assumptions, their validation, and their potential adjustment to later versions of the business model. Start-ups' lifetime can be categorized into three main stages: initial phase (divided in seed and early-stage), growth, and maturity. In the first stage, the firm detects consumers problem, identifies demand, and finds its solution. As previously said, initially start-ups have scarce resources, hence they usually raise capital from external investors during different rounds. In the next phase, the company grows rapidly each month, while in the maturity stage the organization becomes very scalable. Entrepreneurs must go through several steps for their start-up to be successful: to begin with, they must explore a sector, then they must find a problem and search for its solution, afterwards they have to build a business model

⁴ Blank, S., & Dorf, B. (2012). The startup owner's manual: The step-by-step guide for building a great company. *K&S Ranch Publishing Inc.*

around this analysis and finally they must validate it. These essential phases are shown in Figure 2.1 and they will be explained in detail in the next sub-paragraphs.

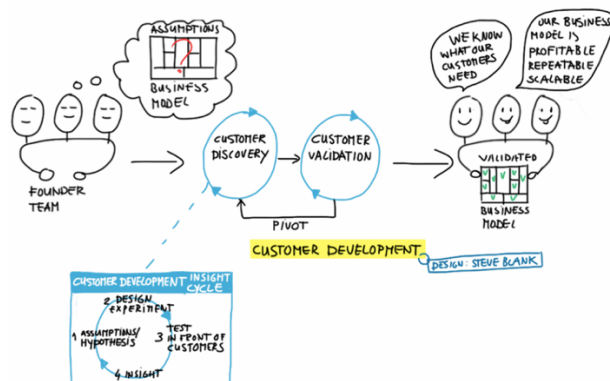


Figure 2.1: Essential phases for start-up development. Blank, S., & Dorf, B. “The startup owner's manual: The step-by-step guide for building a great company” (2020). John Wiley & Sons.

2.1 Lean Approach vs Waterfall approach

Quickly evolving market factors, digital innovations, and several other socioeconomic and corporate concerns impact how enterprises are managed. Different kinds of projects need different implementation approaches to be successfully completed. It is possible to distinguish between two main models: the classical waterfall process and the lean approach (introduced by Eric Ries in its book “The lean startup”⁵).

According to Sherman, R. in the paper “Waterfall Methodology” (2015), waterfall approach’s desired outcomes are clearly conveyed at the start of the project. Afterwards, the plan is designed integrally from start to end, including tasks, targets, and deadlines. The main objective is to carry out the project as closely as possible to the original one. According to Van Casteren, W. in the paper “The Waterfall Model and the Agile Methodologies: A comparison by project characteristics” (2017), the waterfall approach ensures consistency and stability, while establishing strategies and resources as needed. However, given that the original project will probably be inadequate in terms of future critical needs, one major issue is that this approach

⁵ Reis, E. (2011). The lean startup. New York: Crown Business, 27, 2016-2020

transfers risk forward in time, making the identification of eventual mistakes done in earlier stages and their resolution more expensive and difficult. Figure 2.2 shows the different phases of the waterfall approach.

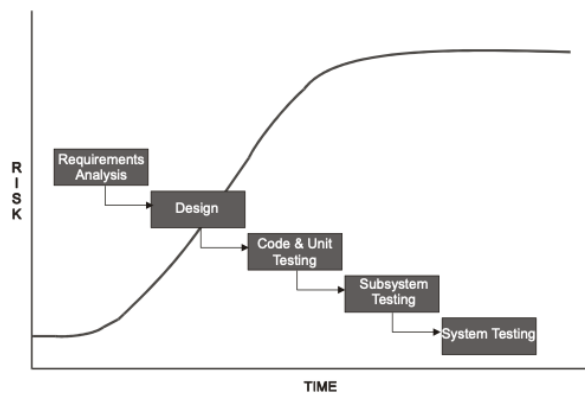


Figure 2.2: The waterfall development process. Kruchten, P. "From Waterfall to Iterative Development—A Challenging Transition for Project Managers" (2001). Rational Edge, Rational Software.

Since customers can send their feedback only when the final output is launched on the market, enterprises find out after months (or years) of development that clients are not willing to buy their products. The unavailability of customer insights leads to the development of unwanted outputs that causes a huge waste in terms of time and resources (Thesing, T., Feldmann, C., & Burchardt, M., 2021)

Moreover, the waterfall approach is expected to be inappropriate whenever needs are not appropriately determined or await to be changed during the development. For these reasons, the model is inclined to hide significant dangers until it is too late to do something about them.

On the other hand, the lean approach is an iterative, test-driven model according to which the project team develops several hypotheses about the major components of the business model (as shown in Figure 2.3). The main goal is to run a series of experiments about clients' impressions of the product to validate (or not) the most important hypothesis. This allows the enterprise to gather a huge amount of customer insights. These experiments are short-term cycle

and follow one after the other during the entire development plan, given that customers cannot identify specific requisites from the initial stages of the project.

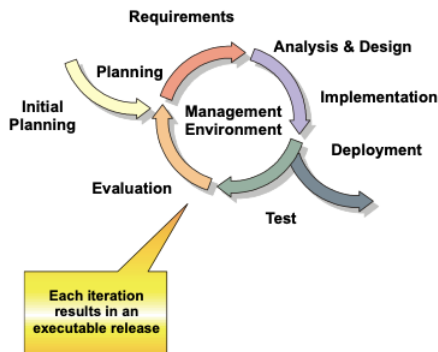


Figure 2.3: An iterative approach to development. Kruchten, P. "From Waterfall to Iterative Development—A Challenging Transition for Project Managers" (2001). Rational Edge, Rational Software.

One of the main advantages of implementing the lean approach is that the project could be enhanced during the process, allowing the enterprise to improve the product's characteristics before the following iteration. Moreover, the overall project's objective and its requirements are defined with few details, less obligations and on a short-term basis. The latter provides more flexibility to the project development and allows it to quickly respond to customers' changes in taste (Linhardt, D., 2016). Contrary to the waterfall approach, the lean model identifies risks from the beginning, enabling the firm to contrast them in an suitable and efficient way.

However, the lean approach entails a lot of planning because both the general plan and the subsequent plans (one for each iteration) are needed. Given that the approach involves continuous execution, innovation, and discovery, it could be hard for the project manager to decide on the number, period, and subject of each iteration. For these reasons, a well-structured and well-managed plan is essential for the enterprise to succeed.

Developing the lean approach is not suitable when the project cannot be divided into different parts because of legal or technical issues, if the costs for the iteration process are unacceptable

(like for the relocation of a manufacturing plant) or whether the organization is not able to achieve flexibility because of a different mindset.

2.2 The Customer Development Model

The creation of a new enterprise is a crucial point for the founders given that they have to contact investors, obtain financing, and validate their business models.

Even if every new firm faces risk and challenges, startups undergo more difficult situations since they must develop a new product or service under high uncertainty.

The business model addresses revenue-generating elements that arise from the firm's relationship with its environment, and since the latter is always changing, business model needs to be dynamic as well. Since the lean approach recommends a set of procedures to validate business models' elements through quick iteration cycles, it is the most suitable for start-ups (Silva, D. S., et al. 2020). The customer Development Model (CDM) was first introduced by Steven G. Blank in his paper "The Path to Epiphany: The Customer Development Model" (2005), and its main objective is to have a strong knowledge of consumers and of their concerns. This information enables entrepreneurs to deepen the focus on their product development, marketing, and sales operations. Moreover, CDM acknowledges that a start-up is a temporary organisation built to seek answers to questions on what constitutes a repeatable and scalable business model. Customer development is an important part of the lean approach and, according to Kruchten, P. in his paper "From Waterfall to Iterative Development—A Challenging Transition for Project Managers" (2001), consists of discovering and analysing consumers' needs, to find the best solutions to meet those demands, while also decreasing business risks through hypothesis testing. The main aim is interacting with customers from the early beginning in order to address their concerns or pain points and adapt the product idea effectively. Once

all business model assumptions have been validated via testing, it is possible for start-ups to build a company with a wider audience.

Once the start-up has identified its business model in the iteration process (it has understood its market, customers, product/service, channel, price, and so on), it proceeds to the execution phase. The first circle is the Customer Discovery, and it is focused on knowing clients' problems, preferences, and purchasing habits. Then, the Customer Validation's aim is to create a scalable business. The next step is Customer Creation, and it generates end-user demand and funnels it through the sales channel to expand the firm. Finally, Company Building focuses on scaling up the company and carrying out its business plan (Blank, S., & Dorf, B., 2005). Each stage is discussed deeply in the following sub-paragraphs.

The customer development model's stages are depicted as a circular path with recurrent arrows to show that every step is iterative and flexible, emphasizing its cyclical nature (Figure 2.4). Entrepreneurs are aware that their startups will experience failure multiple times before reaching efficiency; on the contrary many established companies do not allow for reversal since it is considered a failure.

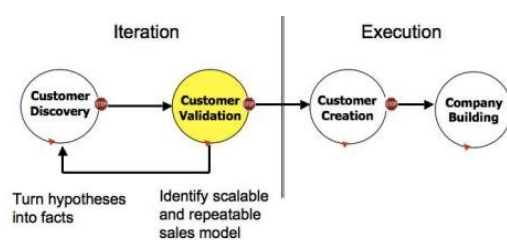


Figure 2.4: The customer development model's phases. Blank, S., & Dorf, B. "The Path to Epiphany: The Customer Development Model" (2005). *The Four Steps to the Epiphany*, 17-28.

The first step, customer discovery, begins with capturing the entrepreneurs' idea and translating it into a set of business model assumptions. Next, the company develops a strategy for testing clients' reactions and turning them into evidence. To do this, the founders must "get out of the building" to directly assess customers insights to each hypothesis, acquire information from

their opinions, and adapt the business model. For instance, engaging and listening to customers is the most successful way to thoroughly understand their issues and the product features that will fix their problems. All the insights gathered are critical to designing the product's distinctive features and to present a solid argument for clients to acquire it. In particular, customer discovery consists of two steps that take place outside the building. The first assesses the customer's perception of the problem as well as his/her desire to fix it. The problem should be substantial enough to entice a large number of clients that buy or engage with the product, which is introduced to the customers for the first time in the second phase. The aim is to find out if the product solves clients' demands well enough to attract a considerable number of people. Customer discovery is accomplished when customers strongly assert the importance of both the problem and the solution (perfect problem/solution fit). During customer discovery it is likely that business model assumptions are revised and updated. Indeed, failure is an expected event of every start-up's path.

Customer validation is necessary to prove that the start-up has a repeatable and scalable business model, able to reach the number of customers necessary to develop a successful firm (product/market fit). The company's capacity to scale is measured using quantitative and more rigorous experiments. The latter are called "test sales", which required customers to pay for the product or to become highly involved with it. The experiment's results are measured according to different types of business models: in a one-sided market, a positive result is measured by an increasing number of purchases. In a two-sided market, the active engagement of many customers will increase network effects. Moreover, during customer discovery the firm must create a sales roadmap for its team. However, if the founders find out that the business is not repeatable and scalable, they must go back to customer discovery and make new hypotheses to test it again. Customer discovery and customer validation verify the product's key components, detect buyers, establish the market, assess customers' perceptions and demand of the product,

set up selling prices and channel strategies. Moreover, the two phases constrain a start-up's spending until it has verified its business model and is able to expand. For instance, getting out of the building and testing the business model assumptions, requires relatively little costs.

Next, customer creation is the first step in the execution process. Its aim is to expand the business generating users demand and driving it through sale channels. In this phase, start-ups invest huge sums in marketing strategies in order to cultivate customer's desire. For instance, this process comes after customer validation in which the firm has figured out how to attract customers, therefore limiting the cash consumption. The process of acquiring customers differs depending on the type of firm. Some start-ups enter established markets as a low-cost player or by building a niche, others develop new markets in which there are no competitors. Each market strategy necessitates a unique set of client acquisition actions and expenditures. The shift from a start-up to a company centred on implementing a validated idea is called company-building. The firm switches its informal discovery-oriented team in formal, organized functions such as Marketing and Sales. Founders are now determined to grow their departments in order to expand the business.

2.3 The Business Model Canvas: the 9 building blocks

According to Qastharin, A. R. in the paper "Business model canvas for social enterprise" (2016), a business model is the logic according to which a company develops, delivers, and collects value. It identifies the products or services that the company intends to offer, its target market, and any estimated expenditures. The first causes of start-ups' failure are the lack of customers and a non-profitable business model. The latter fails when it solves an irrelevant customer need, if costs are greater than revenues, because of external threats or of an improper execution. For this reason, every business plan will be revised after the initial contact with consumers.

Business model canvas allows business models to be clear, meaningful, and instantly accessible. Its 9 building blocks are explained by Osterwalder, A., & Pigneur, Y. in their paper “Business model generation: a handbook for visionaries, game changers, and challengers” (2010), and are: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure (Figure 2.5).

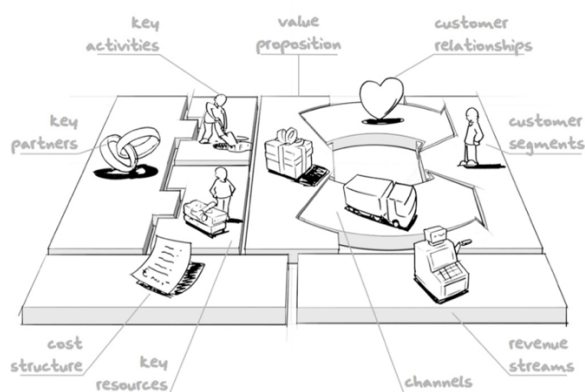


Figure 2.5: Business model canvas' building block. Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers* (Vol. 1). John Wiley & Sons.

To better serve consumers, a corporation may divide them into various segments based on common needs, habits, or other characteristics (customer segmentation). The firm should take a decision about which segments to serve and which to disregard. Once this decision has been taken, the business model may be carefully built to meet the demands of certain customers.

Customer groups are considered distinct segments when: their demands entail a separate offer, they are reached through distinct channels, need separate types of relationships, have significantly different costs, and purchase different features of the offer.

Customer segments may be generated in a multitude of different ways. For this purpose, the following criteria could be used: demographic, geographic and psychographic. The first one considers variables such as gender, age, religion, ethnicity, educational level, and salary. The

geographic criteria categorize consumers by location, such as nation, city, region, or distinguish them into rural or urban regions. The last one brings customers together who share the same lifestyle, social status, psychological attributes, habit, and expenditure, as well as the sought benefits. Moreover, also these factors should be considered while identifying consumer segments: level of need, budget, reach, market size and value. According to the first one, the bigger is the intensity of the need, the more clients will be attracted by the offer. Budget refers to the inclination of customers to pay for the company's product. The higher the need, the more eager buyers are to pay. Reach specifies the way in which customers are reached out underlining the most efficient one to deliver the product. Market size refers to the dimension of the market to serve and whether it is safe enough. Finally, value emerges if the customers segment that the company wants to serve is aligned with its mission.

When developing the right criteria, it is important to consider only those that are necessary to better identify the consumer, otherwise it only represents a waste of time and resources.

To know who your customers are, several interviews should be carried out, which are necessary to develop different persona archetypes. During the interview it is important to address the right questions and to deeply understand their feedback. One type of customer segment that can be served is the "Niche market", according to which the clients served belong to very small segments. The product's offer responds to highly specific qualities and demands since clients require a distinct and unique offer. In this approach, value propositions, distribution methods, and customer interactions are all carefully set by the requirements of that specific consumer segment. For the so called "segmented" customer segment, the company creates products and services for many groups that have small differences in their demands and preferences. Several value propositions, distribution methods, and client connections are developed in response to these minimal variances.

In contrast to the previous customer segment, the “diversified” one includes consumers with wildly disparate demands. In this case, the firm feels it is worthwhile to offer goods and services that meet the needs of diverse clients who do not have similar characteristics.

The “Multilateral platform” instead, serves two or more consumer groups. Such segments are often interconnected, which means that for a firm to succeed, both sides must be satisfied.

On the other hand, if the company doesn’t implement any customer segmentation, its business model is oriented to the “mass market”. According to the latter the firm’s products suit the demands of a vast portion of the public, so value propositions, distribution channels, and customer relationships are targeted for a large group of customers who share a need.

The second building block is the value proposition which refers to a specific bundle of products/services that meets a client need or addresses a customer problem. Indeed, its aim is to deliver value to a specific customer segment presenting a novel or disruptive offering or adding other features and benefits to an existing one. The value provided can be quantitative (like price) or qualitative (like design). Basically, customers choose one firm over another based on their Value Proposition.

To create more value for customers, companies should focus on different factors such as enhancing the performance of an existing product or deliver customized offers to specific customer segments while benefitting of cost advantages. Moreover, value is created thanks to “newness”, that occurs when value propositions address a completely new list of requirements that buyers were previously unaware of due to a lack of comparable offerings. This is frequently due to disruptive technology. Also, design is essential to add more value, for instance exceptional design could increase customers’ willingness to pay for those products. Furthermore, certain brand could increase customers’ value just because of their status.

Of course, another important factor to consider is price, for instance offering comparable value at a lesser price is a frequent strategy for fulfilling the demands of price-sensitive customer

segments. Value is increased also when the offer is able to reduce the risks that customers face when acquiring goods or services or when it reduces the costs of using the product. Finally, another option to add value is to make goods available to consumers who did not previously have access to them.

In order to determine whether a product meets the customers' needs and values it is necessary to use a tool called the "Value Proposition Canvas". It is made up of two parts: the customer profile and the value proposition (Figure 2.6). The first is divided in customer jobs, gains, and pains and it should be built for each customer segments (given that each customer segment has different characteristics). Customer jobs can be social, functional, emotional, and irrational and are the tasks that customers are attempting to do, issues that they want to solve, and demands that they wish to fulfil. Gains refers to the benefits that consumers need and would like to have. Finally, pains are the negative experiences that the customers encounter while doing the customer job. The value proposition is made up by gain creators, pain relievers and products & services. The first one outlines how the product/service generates customer gains, creating value to the customer. Pain relievers instead, explain how the product/service reduces the customer's pain. Finally, product & services refers to the company's products/services that generate benefit and value for the customers and alleviate their pain. The company's goal is to find a match between the value proposition and the consumer profile, that is achieved when the product/service offered by the firm relieves the pains of the customers and generate their gains.

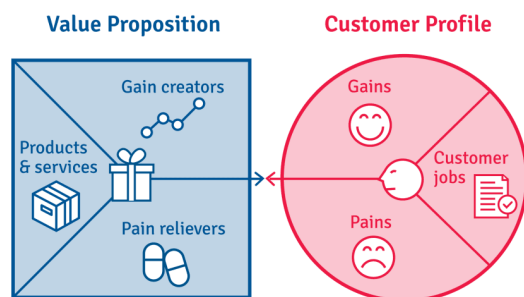


Figure 2.6: Value Proposition Canvas. Monkhouse, D. "How a value proposition canvas will give your business the edge" (2021). Monkhouse & Company.

The Channels building block outlines how a firm connects with and reaches out its Customer Segments to offer them a Value Proposition. Its main purposes are to allow customers to increase their knowledge of a company's offer, to buy certain products/services providing them with value proposition and post-purchase customer service. Channels can be either physical or virtual and they are compensated through commissions, sales' percentages or discounted pre-purchase. Moreover, a company can reach out consumers through its own channels, partner channels, or a combination of the two. The first one can be direct (such as in-house sales or Web site) or indirect (like retail outlets) and have higher profit, but it can be expensive to set up. Partner Channels are indirect and include wholesale distribution and retail. Even if the latter results in lower profitability, they allow the company to learn from its partners' strengths and to expand its scope. The aim is to integrate several channels, enhance customer experience and maximize revenues.

The Customer Relationships Building Block defines the connections that a firm entail with distinct Customer Segments and has a significant influence on the entire customer experience. There are numerous types of customer relationships that might occur between a company and a certain customer segment. The first is the personal one, according to which customers can communicate with a sales professional for their purchase choices or for the after-sales service. The essence of this relationship is human contact, and this can occur in person, over the phone or by e-mail. Secondly, dedicated personal assistance is the most expensive since it implies assigning a salesperson to a single client. It is the closest and most personal sort of connection, and it usually takes a long time to build.

On the contrary, the self-service relationship doesn't entail any direct relationships between the clients and the company. The latter gives to customers all the essential tools to help themselves. Automated service is similar to the previous relationship, however individual consumers and their traits can be recognized by automated systems allowing clients to access services that are

tailored to their needs. Furthermore, companies are increasingly relying on user communities to engage with consumers and establish relationships among participants. Many businesses have online communities where people can share information and help each other solve complications. Communities may also assist businesses in gaining a deeper understanding of their clients. Lastly, co-creation denotes the implication of customers in the products' design. For instance, several companies collaborate with customers to co-create value (such as customers' reviews or the development of new and creative goods).

Customer relationship plays an important role in customer acquisition, customer retention and increasing sales (Figure 2.7). The first one, is the process of persuading consumers to choose your company's products/services instead of the competitor's one. Companies invest a significant amount of time and money to assess the trade-off between the expanse of obtaining a customer (customer acquisition cost) and the value the customer gives to the firm (customers lifetime value). The demand creation can be costly or free: in the first case, the company make uses of Paid Media (such as advertising, Webinars, Email marketing and trade shows) while in the second case, the company uses Earned Media (such as social media, communities, publications in journals, conference speeches and public relations).

Customer retention refers to a company's long-term relationship with its customers. The more loyal the customers, the more consumers the firm maintains over time making the business more profitable. The company may employ several retention strategies to build long-term connections such as loyalty programs, product updates and customer satisfaction surveys. Finally, boosting sales aims at increasing customers' purchases employing different strategies including up-sell, cross-sell, un-bundling, and referrals. These tactics want to persuade customers to buy more company's products.

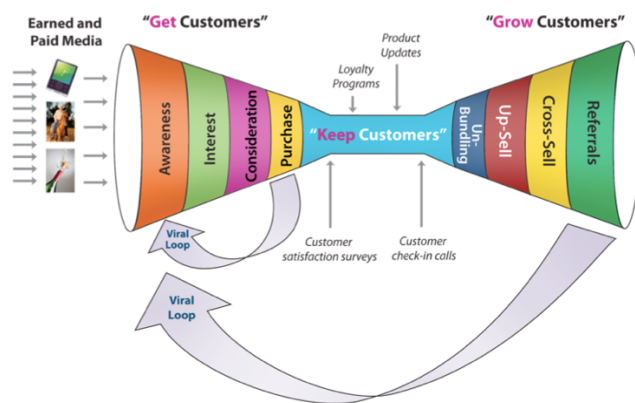


Figure 2.7: Customer relationship funnel. Blank, S., & Dorf, B. "The startup owner's manual: The step-by-step guide for building a great company" (2020). John Wiley & Sons.

The Revenue Streams Building Block represents the cash generated by the firm from each Customer Segment. In order to implement the right revenues stream for profit's generation, the firm must identify the true value a client is willing to pay for the product/service. It can be either one-time client transactions or repeated transactions that generate continuous revenues.

Then, the company can apply either a direct pricing or an ancillary pricing for each revenue stream. The first include asset sales (selling service, product, or software), subscriptions fee (selling recurring access to a service), pay-per-use (payments on a "per usage" basis, so the more the service is used, the more the users have to pay), advertising sales (revenues are generated by fees for publicizing services, products or brands), lending/leasing/renting (implies temporarily providing someone the exclusive use of a specific asset for a specified length of time in exchange for a payment), licensing (customers are granted authorization to utilize restricted intellectual property in exchange for licensing charges. It enables owners of intellectual property to gain money without having to create a product or sell a service), and brokerage fees (revenues derived from intermediation services between two or more parties, like credit card companies that collect a fee from each transaction between seller and customers). The ancillary revenue models include the referral revenue (generating cash from bringing traffic/customers to other websites or mobile apps), affiliate revenue (charging other

websites for sending customers to the connected site to make purchases), email list rental (renting your consumer's email to commercial partners), back-end offers (selling their existing traffic to a company that aims to monetize it and split the cash generated).

Moreover, it is possible to distinguish between the fixed and the dynamic pricing schemes. Within the fixed pricing it is possible to implement the cost + mark-up tactic which implies adding a mark-up to the cost of the product/service. However, the latter is not a strategic way to price since decision is driven by firm's economics rather than by customer insights. Secondly, the value-based tactic is employed when company bases its pricing on how much a customer feels a product is worth, however perceived value is subjective so it might be different among customers. Finally, volume-based pricing refers to a tactic that uses price's reductions for large orders. On the other side, dynamic pricing, refers to prices' changes with the purpose of maximizing margins and boosting sales opportunities. The latter includes negotiation (price is negotiated between two or more parties based on their bargaining strength and/or negotiating abilities), real-time market (the price is set dynamically determined by the supply and demand), auctions (the price is set by the result of a competitive bidding process), and yield management (the cost is determined by inventory's amount and the date of purchase).

The Key Resources Building Block refers to the most critical assets necessary to the company to develop and offer a value proposition, reach new markets, generate money, and retain connections with existing customers. Every business model needs specific key resources which can be physical (assembly plants, buildings, equipment, machinery, devices, and distribution channels are examples of physical assets), financial (to recruit critical staff, several companies require financial resources, such as cash and credit lines), intellectual (brands, exclusive expertise, copyrights and patents, sponsorships, and database services are all becoming increasingly vital components of a solid company strategy. Intangible resources are difficult to generate, but once created, they may be extremely valuable), or human (all firms need human

capital, but employees are especially important in some business models such as in knowledge-intensive and creative businesses). The company could develop the resources needed internally or acquired them from strategic partners.

The Key Activities Building Block refers to the most critical activities necessary to the company to develop and offer a value proposition, reach new markets, generate money, and retain connections with existing customers. Every business model needs specific key activities and usually the most important ones are production (activities related to creating, manufacturing, and delivering a product in huge volumes and/or of high quality), problem-solving (activities focused on developing innovative solutions to specific client challenges), platform (this key activity is critical to those companies that use network as a key resource and includes networks, matching platforms, and applications), and supply chain management.

The Key Partners Building Block refers to the set of suppliers and partners who enable the business model to be executed. Companies form alliances to offer a wider range of products/services, decrease risk, use capital in an effective way, have access to unique customer knowledge or unique resources and to enter in new markets. Moreover, partnerships are also important for optimization and economies of scale. Given that it is difficult for a corporation to control all resources and undertake all activities on its own, these kinds of partnerships are created to cut costs, and they frequently entail outsourcing or sharing infrastructures. For these reasons, alliances are becoming an essential component of many business strategies. The latter include strategic alliances between non-competitors or between competitors (coopetition), Joint Ventures, and buyer-supplier agreements to ensure reliable supplies.

All expenditures required to execute a business model are described in the Cost Structure.

Costs are incurred in the creation and delivery of value, the maintenance of customer relationships, and the generation of income. They should be kept to a minimum in any business plan. However, since low-cost structures are more critical for some business models than others,

it is possible to distinguish between cost-driven and value-driven cost structures. The first one strives to reduce expenses wherever feasible, trying to keep the leanest cost structure possible. Airlines with few add-ons, like Ryanair, are examples of cost-driven business strategies. The value-driven strategies are less focused on the financial impact of the business model, while relying on creating more value. Moreover, they are characterised by unique product offerings and high level of customized offers. This category includes luxury hotels, which have special services and facilities. Moreover, cost structures can be characterized by fixed costs (costs that do not change regardless of the quantity of outputs produced), variable costs (costs that fluctuate proportionately with the number of products or services produced), economies of scale (cost benefits that a company gains as its output grows: as production increases, the average cost per unit decreases), and economies of scope (lower costs as a result of a greater scope of activities, since different goods may be supported by the same marketing efforts or distribution network in a large corporation).

Chapter 3- Start-up valuation: the theoretical framework

Since the number of venture capital investments continues to rise across the world, investors consider valuing a startup accurately in order to be critical. The two primary challenges are the ways in which an entrepreneur values its startup when seeking for funding, and how venture capitalists estimate a potential business when making an investment decision. For both, the need of the entrepreneur and of the investor to recognize good solutions is essential. However, the major issues are that the goals of the entrepreneur and those of the investor are incompatible and that startups are difficult to value given some of their intrinsic characteristics.

In this scenario it is difficult to implement methodologies such as the Discounted Cash Flow Model and the Multiple Valuation method.

3.1 Pre-money valuation and post-money valuation

As previously said, startup's valuation is a complicated and contentious matter between its founders and potential investors. This assessment is critical to a firm's success or failure in a venture capital fundraising session.

As stated by Bower, M. in the paper “Understanding Pre-Money vs. Post-Money Valuation” (2021), a startup's valuation varies depending on when money is injected into the company's structure. For instance, the pre-money valuation corresponds to the firm's value before it receives funds, and it is best defined as the amount of money a business may be valued before it starts to attract funding. This valuation not only informs investors about the present worth of the company, but it also reveals the value of every issued stock. The post-money valuation refers to the firm's value after the injection of capital, hence it contains outside funding or the most recent capital inflow. An example can better explain the difference between the two: a venture capitalist wants to fund a startup that is worth 2\$ million with a 500\$ thousand investments. If the valuation is pre-money the firm is worth 2\$ million before financing, and 2.5\$ million after the capital injection. Instead, if the 2\$ million already include the investment, it is called post-money valuation and the firm is worth 1.5\$ million before the financing. Whether it is the former or the latter is essential to determine the investors' equity shares. Indeed, the latter is related to the amount of value assigned to the firm prior the investment. Using the previous example, if the company's pre-money valuation is set at €2 million, an investor who injects €500,000 will obtain a 20% equity stake. If the company's pre-money valuation is set at €1.5 million, this proportion rises to 25%.

The assessment of the pre-money value is a real challenge. Indeed, its computation is based on different variables and ratios that investors adjust in order to get a specific result, rather than on simple math equation. Because of the unstable nature of pre-money valuation, there are frequently intense discussions concerning specific guidelines. Exit value estimates, historical

cash flow, recent comparable offers, and business success are all considered relevant to assess pre-money valuation. Since it is very tough to value companies which have not already generated any income, the question of start-ups valuation is heavily debated.

3.2 The most frequently used valuation methods: pro and cons

The value of a firm is determined by its potential to produce a stream of earnings in the future. As a result, all valuation methods are focused on forecasting company's future profits and the significant milestones that it can achieve. These projections are based on market's characteristics, company's science and technology, and management's capacity to achieve the set objectives in the business plan.

Pablo Fernández, in his paper “Company Valuation methods. The most common errors in valuation” (2007), describes two of the most used approaches to value a company.

The first valuation model group consist of Cash flow Discounting-Based Methods. According to the latter, the company's value is equal to the sum of its forecasted future cash flows discounted at a rate proportional to the risk of those flows. Hence, it requires just two main inputs: a detailed forecast of the financial items related to the company's activities and the computation of a proper discount rate that takes into consideration risk and historical volatility. In particular, the discounted cash flow method has two significant variants, the free cash flow to the firm (FCFF) and free cash flow to the equity (FCFE). As explained by Damodaran in his research “Valuation approaches and metrics: a survey of the theory and evidence” (2005), the first intends to discount the entire firm's free cash flows at the firm's Weighted Average Cost of Capital (WACC), while the second discounts the total cash available to stakeholders using the cost of equity as a discount factor. The entire value of the firm may be calculated by adding the latter to the market value of the debt.

The second group comprised the relative valuation methods that involves the computation of multiples that are used to evaluate similar firms. For instance, the idea behind the multiple approach is that, when firms are comparable, it can be used to determine the value of one firm based on the value of another.

P/E, price-to-sales, EV/EBITDA and EV/Revenues are some of the most frequently used multiples. Moreover, less common valuation methods include the dividend growth model, liquidation value, substantial value, EVA and the CFROI model.

Even though according to several studies most CFOs employ either the DCF analysis or the multiple method, it is hardly ever debated on which one is the most used and effective valuation method for early-stage companies. In their paper, “How Do Venture Capitalists Make Decisions?”, Gompers et al. surveyed 885 VCs at 681 companies to get insights into how they value start-ups. They observed that 63% of VCs used the MOIC, also known as the TVPI multiple (total value to paid-in) and 42% used the IRR method that are key elements to apply the Venture Capital Method. They also came to the conclusion that NPV approaches are rarely employed (only 22% of VCs). Moreover, 9% of VCs do not employ financial measures while, 44% usually prefer to take intuitive judgements. Finally, 8% claimed they utilize other methodologies. Figure 3.1 shows the metrics’ split previously discussed.

	Stage			Industry		IPO rate		Fund size		Location		
	All	Early	Late	IT	Health	High	Low	Large	Small	CA	OthUS	Fgn
None	9 (1)	17*** (2)	1*** (1)	13 (3)	7 (3)	10 (2)	12 (2)	9 (2)	10 (2)	11 (2)	8 (2)	10 (2)
Multiple of invested capital	63 (2)	56*** (3)	71*** (5)	57** (4)	72** (5)	72* (3)	63* (4)	65 (3)	61 (3)	66 (4)	66 (3)	58** (3)
IRR	42 (2)	26*** (3)	60*** (5)	33 (4)	42 (5)	35 (4)	36 (4)	40 (3)	42 (3)	31*** (4)	49*** (3)	42 (3)
NPV	22 (2)	12** (2)	21** (4)	16** (3)	29** (5)	19 (3)	16 (3)	24 (3)	21 (2)	16 (3)	20 (3)	29*** (3)
Other	8 (1)	9 (2)	4 (2)	7 (2)	10 (3)	8 (2)	8 (2)	8 (2)	7 (1)	9 (2)	6 (2)	9 (2)
Number of metrics	2.1 (0.0)	1.8*** (0.1)	2.4*** (0.1)	2.0 (0.1)	2.0 (0.1)	2.0 (0.1)	2.0 (0.1)	2.1 (0.1)	2.0 (0.1)	2.0 (0.1)	2.1 (0.1)	2.1 (0.1)
Number of responses	546	238	90	130	88	136	152	243	306	156	217	195
Often make gut investment decisions	44 (2)	48* (3)	37* (5)	45* (4)	34* (5)	42 (4)	43 (4)	40* (3)	47* (3)	41 (4)	41 (3)	49** (3)
Number of responses	563	243	91	132	88	140	158	251	315	162	221	202

Figure 3.1: The most used methods by VCs to value start-ups. Gompers et al. “How Do Venture Capitalists Make Decisions?” (2020).

Only the VC method, DCF model and the comparable analysis, will be further considered for the sake of this research since they are the most chosen methods by investors. In the next subparagraphs the functioning of each method will be described, underlining the computation's strengths and weaknesses when evaluating a start-up rather than an established company.

3.2.1 Discounted Cash Flow model

As previously said, a firm is considered a cash flow producer and its value is given by the total of its cash flows discounted at a certain rate. The DCF method aims to determine the value of the firm to all investors, including both equity and debt holders who could estimate the current value of their investment based on the company's future forecasts. According to L. Peter Jennergren's paper "A Tutorial on the Discounted Cash Flow Model for Valuation of Companies" (2011), the model's key elements are:

- 1) The Free cash flow is computed using available historical data and considering only those assets and liabilities that are related to the operating activities of the firm. To assess the cash available to pay both debt holders and equity holders the formula below is used.

$$1) FCF = EBIT * (1 - \text{tax rate}) + \text{Depreciation} - \text{CapEx} - \text{Increase in NWC}$$

Where CapEx stands for Capital expenditures and NWC for net working capital.

- 2) Forecasting of future free cash flow is the next step. To do this, it is necessary to choose a projection period, which usually consists of 5-10 years of estimation, and to compute the terminal value. The latter represents the residual value beyond the projection period, considering the firm as an ongoing concern, and it is computed using an infinite discounting formula. Moreover, it is usually responsible for the majority of the entity's value. The one utilized in this research is the Gordon constant-growth formula according

to which free cash flows rise by a constant proportion from year to year after the projection period.

$$2) TV = \frac{FCFn * (1 + g)}{(WACC - g)}$$

Where g stands for the perpetuity growth rate and WACC for weighted average cost of capital as it will be discussed below. The forecasted FCF is based on the assumptions that drive its profitability, such as sales growth rates, operating margins, and working capital requirements. In order to establish a reasonable FCF, it is necessary to conduct an appropriate due diligence on the firm to have a better knowledge of its activities and industry. In this instance, company's performance track and management are required to supply the analysts with all relevant information. This technique eliminates potentially misleading premises, lowering the risk of biases regarding valuation. Moreover, 5-to-10-year period is deemed adequate for a company's full implementation of its planned operations, while at the same time guaranteeing that is used a credible starting point for determining the terminal value.

- 3) The last step consists in discounting the free cash flow using an appropriate discount factor. When determining an investment's net present value, the expected cash flows must be discounted at the opportunity cost rate, which is regarded as the return that might be received if an investment with a comparable risk is considered. This principle could be extended to a whole corporation. The one required to discount the free cash flow to both debt holders and equity holders it is the WACC (García, F. J. P., 2017). The latter is considered as the cost of financing the firm, including both internal (equity stakes) and external (debt) capital, as well as tax rate adjustments. Its formula is:

$$3) WACC = \frac{E}{(E + D)} * Re + \frac{D}{(E + D)} * Rd * (1 - t)$$

In which “E” is the market value of equity, “D” is the market value of debt, “Re” the cost of equity, “Rd” the cost of debt and “t” the corporate tax rate.

To conclude, the discount cash flow model equation is as follows:

$$4) DCF = \sum_{t=0}^T \frac{FCF_t}{(1 + WACC)^t} + \frac{TV}{(1 + WACC)^T}$$

The DCF is discounted to the present value and thus the enterprise value is obtained. The latter could be considered as the net cost of acquiring the firm’s equity, collecting its cash, paying all debt, and holding the unlevered business. Steven N. Kaplan and Richard S. Ruback in their paper “The Market Pricing of Cash Flow Forecasts: Discounted Cash Flow vs. the Method of Comparables”, compared the valuation of 51 companies obtained using both the DCF and comparable methods. According to their study the DCF method offers accurate value estimations showing strong links between the results obtained and the market valuations observed. Even if the comparable approach performed similarly on average, the DCF method was more consistent because its computations were closer to the actual values.

When it comes to start-ups, however, the DCF technique is challenged by both theoretical and estimating concerns. First, as explained by Damodaran (2007), to estimate the cash flows it is necessary to use the company's historical data. This input is usually absent in start-ups, making it difficult for potential investors to assess how revenues would perform if the macroeconomic context deteriorated, the firm's price policy changes or if it encounters additional competition. Moreover, costs incurred by young businesses to create future growth are frequently mixed together with those that produce present revenues, making it very difficult to differentiate the former expenses from the operating ones. Furthermore, earning’s evolution is also critical to compute, and since start-ups usually present losses or little operating earnings, to predict future

profit margins is challenging. Another important estimation to be computed is the quality of growth that is observed from past investments' return on capital. Because of the limited number of past investments in a young company, historical data is inadequate. Hence, most of start-ups' value will come from "growing assets" that emerges from the firm's future initiatives, but there is no assurance that they will be profitable. For all these reasons, the reliability of the business plan given to investors, which would contain cash flows and future revenue estimates, is likely to be undermined. Secondly, as previously stated, to determine discount rate is a crucial step to implement the DCF. To do this, it is necessary to compute the β , which is obtained from the linear regression of share prices against a market reference index⁶ for publicly traded businesses, and from the regression of earnings against a market reference index for private enterprises. Anyway, start-ups' profits do not adequately reflect a company's value since they are usually reinvested to boost expansion or are negative. Another issue is represented by the computation of the terminal value. Indeed, the latter accounts for a huge part of a start-up's valuation result, ranging from 90% to even more than 100% of its actual value. As a result, an inaccurate estimation of such a parameter will almost certainly result in severe valuation mistakes.

Finally, start-ups' reliance on bank loans' financing and the absence of existing bonds implies no bond rating to assess default risk and challenges in estimating interest coverage. These issues, as well as the lack of market valuations to weight the debt and equity to calculate the WACC, creates significant obstacles in adopting this approach for start-up valuation.

3.2.2 Comparable firms' method

The comparable method estimates the firm's worth based on the valuation of similar companies that are expected to have analogous future cash flows. Indeed, similar firms are a key

⁶ Like S&P500

benchmark to evaluate an entity's value, since it is assumed that they share essential financial attributes, business elements, performance metrics and sensitivity to market condition (Frei, P., & Leleux, B., 2004). Hence, to compute valuation, it is possible to examine a target firm's positioning in comparison to a peer group. To obtain the multiples, it is necessary to use different income statements' items such as sales, EBITDA and earnings.

In particular, the first step to assess a company's valuation using multiples is to choose the group of comparable companies based on their business features and target industry. Then, it is necessary to gather the essential financial data from the income statement and to determine the critical multiple (McClure, B., 2015). The most used ones are the EV/EBITDA, EV/Sales and P/E ratios where EV is the enterprise value (given by the sum of the equity value and the net financial position), P is the price of the company's stock, and E are the firm's earnings. The first two multiples are used to obtain the enterprise value, while the P/E ratio just delivers the equity value. The third step is to screen the comparable companies' list in order to filter the most suitable ones for the comparison. In particular, the emphasis is over similarities and differences in scale, growth rate, profitability, and leverage. The last step is to establish a value range for the target firm based on the results obtained with the different multiples. The ultimate valuation will be designed considering a small number of carefully chosen organizations.

Even if multiples are frequently used by scholars and academics to estimate company valuations, there is no consensus on the validity of the method and on which multiple is the most efficient. According to Steven N. Kaplan and Richard S. Ruback (1996), the comparable method increases predictive validity to the DCF model estimates, even if the latter offers already accurate value estimations. As a result, the authors propose to use evidence from both methods when comparable values are accessible.

Moreover, the comparable firm's method computes current company valuation by relying on present market situation. For this reason, it is often seen as more suited than methodologies that

measure intrinsic value (such as DCF analysis). Indeed, it reflects both a more precise and reliable economic environment and investors' financial preferences. Nevertheless, investors' irrational behavior might impact market trading levels as a result of their current and subjective market attitude, making the appraisal less reliable.

However, according to Damodaran (2009), also the multiple method is challenged by several factors when evaluating a startup. First, the need to scale all the valuation multiples to a common metric (such as earnings, EBITDA and sales) could be problematic for early-stage businesses. Indeed, EBITDA multiples and P/E ratios are difficult to estimate given the widespread presence of losses recorded by young companies. Moreover, sale multiples are difficult to compute since sales can be absent or negligible for those firms that have recently shifted to commercialization.

Secondly, the identification of the comparable peer group is not an easy task. For instance, when valuing an established company using the comparable method, usually similar firms are selected among the publicly traded ones. On the other hand, the appropriate comparison for a startup would be to other new firms within the same industry. However, these companies are rarely publicly listed and have no market value, so they would differ by risk, growth characteristics and cash flow. Finally, other major limits are the estimation of the best risky proxy and the evaluation of the right survival rate

3.2.3 Venture Capital method

The venture capital method was developed in 1987 by Bill Sahlman and it is used for start-ups valuation by almost all VCs. While the DCF focuses entirely on evaluating the intrinsic potential and uncertainty of the firms under consideration, the VC model considers the investor's viewpoint during the investment choice and the evaluation process.

According to Montani, D., Gervasio, D., & Pulcini, A. in their paper “Startup company valuation: The state of art and future trends” (2020), the method takes into account both the VCs’ return targets and their risk expectations. For instance, VCs’ main objective is to maximize their investment’s return over a specific time period (which usually ranges from 3 to 7 years). Investors realize their return when a liquidity event occurs, hence the subsequent fundraising round and the firm’s exit value are essential measures for VCs.

Given the illiquidity of investments in new companies, VCs could only benefit when selling their shares at a higher price than their initial purchase. Moreover, since to invest in startups is highly risky, VCs are compensated with high potential returns.

According to Sahlman’s article “A method for valuing high-risk, long-term investments: the Venture Capital Method” (2009), the model’s first step is to estimate the future earnings for a specific terminal year (5 to 7 years ahead) that usually coincides with the one in which the VC wants to sell or take the company public. Moreover, the forecast is generally based on a successful scenario in which the firm meets its sales targets and forecasted profits.

Secondly, it is necessary to compute the firm’s expected terminal value as the product between the forecasted earnings and the estimated P/E ratio. The latter is forecasted considering current multiples of similar enterprise (with regards to size, growth rate, risk and profitability) in the same sector. Alternatively, to obtain the terminal value of the entire business it is possible to multiply the forecasted sales by the estimated EV/Sales multiple.

Next, the estimated terminal value must be discounted at a specific rate of return that matches the IRR asked by the VC for that particular investment and time horizon. The result is an assessment of the actual total value that also corresponds to the highest price that the investor is willing to pay.

$$5) \text{ Equity Value at today} = \frac{\text{Estimated TV}}{(1 + \text{target IRR})^T}$$

The discount rate applied is substantially higher than the one employed for listed companies. Indeed, it is explicitly set to a high value to incorporate both the perceived business risk and the potential firm's failure. According to Gompers et al. (2020), the average required IRR is 33% for early-stage investments and 29% for late-stage investments (Figure 3.2).

	All	Stage		Industry		IPO rate		Fund size		Location		
		Early	Late	IT	Health	High	Low	Large	Small	CA	OthUS	Fgn
Average required IRR	31	33*	29*	34	33	30	30	28***	33***	31	30	31
	(1)	(2)	(1)	(2)	(2)	(2)	(2)	(1)	(1)	(2)	(1)	(1)
Number of responses	216	58	49	41	35	48	52	99	114	48	93	79

Figure 3.2: Average IRR across different start-ups' stages. Gompers et al. "How Do Venture Capitalists Make Decisions?" (2020).

In his paper "Valuing young, start-up and growth companies: estimation issues and valuation challenges" (2009), Damodaran also provides a table with the different required IRRs based on the company's several development stages. In particular, he reports 50-70% IRRs for the start-up stage and 40-60% IRRs early-stage investments (Figure 3.3).

<i>Stage of development</i>	<i>Typical target rates of return</i>
Start up	50-70%
First stage	40-60%
Second stage	35-50%
Bridge / IPO	25-35%

Figure 3.3: Average IRR across different stages. Damodaran A. "Valuing Young, Start-up, and Growth Companies: Estimation Issues and Valuation Challenges" (2009).

Hence, even if it is unclear what value these discount rates should take at different stages, it is widely assumed that they should reduce as the fund's holding time shortens. Indeed, early-stage firms may require larger IRRs given their higher chance of failure.

To explain the discount rates' higher percentages, Shalman (2009) states that it is due to the inclusion in their computation of business' risk, illiquidity premium, value added by VC, and correction for optimistic forecasts. Regarding the last point, entrepreneurs frequently provide business plans with overly positive expectations, which carries VCs to reduce the price through higher IRRs. Indeed, it is easier for the investors to employ this strategy rather than engaging in a discussion to rectify the optimistic prediction.

Finally, the present value obtained indicates the post-money valuation from which the initial investment should be subtracted to obtain the pre-money valuation.

The post money valuation is necessary to determine investors' equity stake of the company at which they are eligible in exchange for the funding provided.

$$6) VC \text{ equity stake} = \frac{\text{Investment provided}}{\text{Post money valuation}}$$

The process previously explained considers only one round of funding, however it is more likely that numerous rounds are necessary, with each of them leading the firm's ownership to be diluted for each previous investor.

Given the valuation issues in evaluating young enterprises, investors search for ways that appear to offer solutions. Many of them can be found when applying the venture capital method to value a start-up (Damodaran A., 2009):

- The VC method doesn't require the estimation of many financial items to be applied.

Indeed, it is often difficult for start-ups to estimate the intermediate items in a financial

statement and many companies only focus on revenues (or sales) and profits (or earnings) which are respectively the top and the bottom line.

- Start-ups' valuation are usually focused on a shorter time-period since their reliability decreases for longer time projections (5 to 7 years in the VC method compared to 5-10 years of the DCF method).
- Given the challenges in projecting cash flows for longer periods, evaluators rely on a mix of both intrinsic and relative valuation in VC model. Indeed, the exit value is assessed by multiplying the estimated sales or earnings (relative valuation) with a multiple (intrinsic valuation).
- Investing in a start-up is highly risky since, besides earnings' volatility and vulnerability to external factors, there is also the possibility that the company could fail. For these reasons, in the VC model discount rates account for all uncertainty, which results in a very high IRR for investors.

However, the method presents different weaknesses (Damodaran A., 2009). The first one arises from the dispute between investors and founders regarding earnings' forecast: since the increase in estimated earnings makes the company's valuation higher, entrepreneurs tend to inflate these numbers without considering the implications for subsequent investments. On the other hand, VCs would push for lower estimates to reduce the company's valuation while getting a bigger equity share for the same investment. As a result, rather than being the topic of accurate evaluation, the estimated valuation becomes a negotiation between the two parties.

Secondly, the multiples used to determine the terminal value are volatile and are likely to change through time, thereby lowering the prediction accuracy.

Lastly, an issue arises if EBITDA or sales multiple are employed to compute the estimated terminal value. Indeed, to discount the total value of the enterprise it is necessary to compute the overall cost of capital (rather than the cost of equity).

Chapter 4- Practical application: the Switcho case

This chapter addresses the thesis' practical application, willing to compute the valuation of an Italian start-up called Switcho. First, the latter is introduced, and its business model is analysed. Then, Switcho is valued with three different methods (DCF method, comparable method, and VC method) in order to assess which one is the most suitable one.

4.1 Company overview

Switcho is a Fintech Italian start-up founded in 2019. Its aim is to optimize household utilities' expenses suggesting personalized saving offers for electricity, gas, internet and mobile. Switcho's technology is based on an algorithm that first scans bills and information given by users during registration. Then, it shows the most convenient deals based on the users' current consumption and latest expenses. Finally, if more affordable offers actually exist, clients receive personalized savings estimates. In case of offers' activation, the dedicated team manages all the necessary bureaucracy to accomplish the switch. It results as a significant time saving for customers given the presence of infinite offers on the market and their lack of clarity. Moreover, it is also possible to use the app's function that allows customers to connect their bank account and receive intelligent savings proposals to optimize their expenses.

Switcho's platform is free for its users and is available both in desktop version and on iOS/Android AppStore. Moreover, it allows clients to not pay any fees for switching between providers, since it earns only through commissions from its partners. However, founders defined Switcho as an independent advisor which doesn't suggest any offer unless it effectively optimizes user's expenses (indeed, according to data on their website⁷, about 10% of their users are suggested to not change operator since they already have an ideal offer).

⁷ <https://www.switcho.it>

In 2022 the start-up has more than 120,000 Switchers enrolled on the platform and over 20M euros in users' estimated savings. Moreover, they achieve a 4.8/5 trust score thanks to user experience and customer care.

Switcho has raised more than 3M euros in funding, attracting private capital from investors (including institutional ones) and banks. In particular, in August 2021 it successfully closed a crowdfunding round achieving almost 2M euros which will be used to improve its proprietary technology, hire new talents, launch new services and expand its customer base.



Figure 4.1: Switcho Logo. <https://www.switcho.it>

4.2 Business Model analysis

According to Italian Regulatory Authority for Energy, Networks and Environment (ARERA), in the first quarter of 2022 a price increase of 131% in domestic electricity bills has been registered, and a 94% increase in the gas ones compared to the previous year. These increases are due to international growth in energetic raw materials' prices and in CO₂'s costs which have been worsened by the Russia-Ukraine conflict. In particular, annual bills raised on average by 200 euros for a four people family and they are expected to grow even more in the upcoming months (ARERA; 2022).

According to Switcho's founders (Marco Tricarico, Redi Vyshka and Francesco Laffi) there are different ways to decrease bills' amount: first, the online switch between two providers allows customers to access offers up to 30% lower than the retail prices thanks to the disintermediation of the distribution chain. Moreover, in some cases, moving from the regulated market to the free one could reduce bills' prices.

Switcho app is able to deal with these conditions and to propose users' ideal offers. Indeed, analyzing the current situation of each user, it ensures to find the best price for every individual case. Moreover, the households' market for energy, gas and mobile data is very complex and time-consuming given the elevated number of offers that are often unclear or difficult to find. In addition, bureaucracy discourages users from switching between providers because of its ambiguous procedure. Switcho solves both issues intervening in each phase of the "journey", from offers' research to their screening, and from the proposal of the best deal to users to the following bureaucratic implication.

According to ISTAT (Italian National Institute of Statistics), the average income per family in Italy is 2,600 euros per month, of which about 70% is dedicated to "necessary" expenses and only 30% is dedicated to other expenses and savings, with the purchasing power that has decreased by 4% from 1998 to 2018. Thanks to Switcho functionalities, its founders estimated that the app will allow users to save on average 293 euros per year.

In Italy, market's potential size is around €2.5 billion, of which at least 20% is immediately accessible through the online channel corresponding to a value of approximately €600 million value (Figure 4.2). Indeed, Switcho operates in the market related to several expenses, such as households, internet, and soon also in the one of car insurance and financial products. All of the previous are recording an increase in customers' propensity to change the supplier through the use of digital channels: the founders have estimated about 50 million switches per year just in Italy.

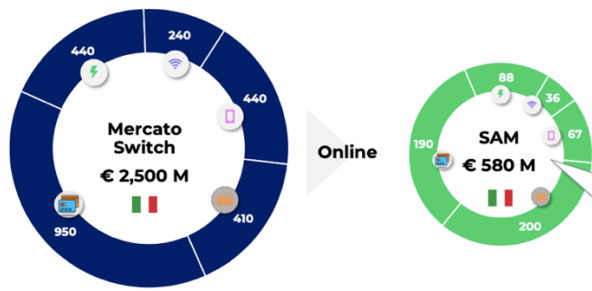


Figure 4.2: Total addressable market (TAM) and served available market (SAM). Switcho Investor Deck (2021).

Switcho's idea comes from families' need to save and control their expenses in an efficient and effective way, hence, its target are mostly families who would like to save both time and money. Moreover, given the high number of subscribers (more than 120.000 in 2022) it is possible to assert that the customer development model was properly executed. Indeed, the latter validates the presence of a customer segment with meaningful and quantifiable usage intentions. Moreover, as previously said, the app's aim is to offer a service that enables users to save and simplify the complex bureaucratic procedure, which can be defined as Switcho's value proposition. Indeed, it refers to a specific service addressing client problems and delivers value to specific customer segments thanks to its novel offering.

Its customers can interact and use the services through an application available both on IOS and on Android stores. For this reason, Switcho is classified as a digital company, hence, it is characterized by the exchange of information and services in real time and with very low transaction costs. On the app, clients have access to a reserved area in which they can connect their personal bank accounts and receive targeted saving tips based on their expenses (Figure 4.3).

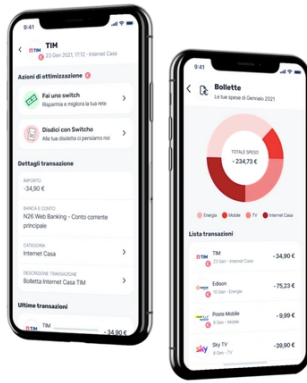


Figure 4.3: Switcho App. <https://www.switcho.it>

In addition to the digital platform Switcho owns another main asset: its algorithm. In particular, the latter is able to extract from any bill the necessary parameters for the comparison between the current rate and the new offer proposals. Once this reference cost has been obtained, it is multiplied by the annual volumes present in the bill and savings are. The new offers received by Switcho's partners are added manually in its databased after a scrupulous analysis. Finally, best deal' offers to customers take place automatically based on the previously estimated savings. Very high importance is given to customer satisfaction: the company seeks to maximize this feature by offering a tailored one-on-one customer service throughout the whole home buying process. This "premium" service creates a strong relationship with the customers that empowers the company's brand image and at the same time allows the firm to increase their new monthly switch. Among Switcho's key partnerships there are several well-known energy companies such as Eni Gas e Luce, E.ON, A2A, Engie, and Fastweb. Moreover, the start-up launched a partnership in 2021 with HYPE, an online bank, and is starting several other partnerships with larger banks. When the offer suggested is accepted by the client and the contract is activated, the start-up receives a commission from the supplier with which it has a partnership, while the service for the end user is totally free. After 18 months of activity Switcho reached around 40,000 users, converting more than 6,000 contracts. Total revenues in 2020

were approximately 160,000 euro, while in 2021 they were more than 700,000 euro (increasing by 337% in one year). On the other side, the required expenditures to execute Switcho's business model are mostly represented by Marketing and IT & Engineering costs which are necessary for the platform's development, creation and growth of a user base, maintenance of customer relationships, the generation of income and delivery of value.

In March 2019, the founders developed Switcho thanks to an initial funding collected from Cenciarini & Co, an investment bank specialised on start-up promotion, investment activities and financial counselling. Then, in August 2021 they successfully closed a crowdfunding round on the Mamacrowd platform, collecting almost 2M euros. The funds raised have been mainly used to support the growth of the company in three major areas:

- Marketing; investing in various media channels and strengthening the team lead to both a user base and a revenues' growth.
- Product development; expanding the developers' team allowed Switcho to continue innovating and launching new services with a positive effect both on sales and on its customer base.
- Corporate and Operations Team; defining a corporate structure enabled the start-up to drive growth more efficiently.

Figure 4.4 shows Switcho's product development path, initially focused only on the best deal's offer and the following "switch" procedure. However, it is nowadays evolving towards a fintech platform that manages all customer expenses. In particular, the founders want to introduce a cancellation functionality that allows users to remove unwanted expenses/services from their list of transactions. Its final goal is becoming an advanced personal finance tool with savings and investment actions.

For 2022, founders planned a possible expansion in America, France, Portugal, Spain and Poland.

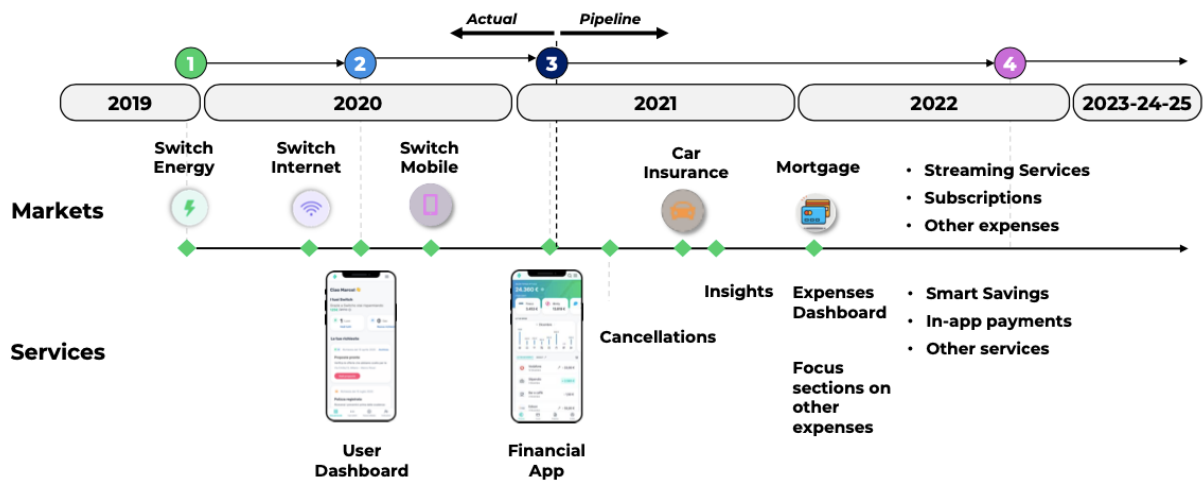


Figure 4.4: Switcho's product development. Switcho Investor Deck (2021).

Regarding the competitive landscape in the Italian market, it is populated by several indirect competitors as Switcho is a player with distinctive characteristics (Figure 4.5) and is able to capture a white space. Among rivals, one of the main groups is the one of “comparators” such as Facile.it and Segugio.it. Switcho differentiates from them thanks to its fintech-oriented approach, the end-to-end support during the entire process - even after the new contract’s activation -, and for independently carrying out all bureaucratic procedures. Moreover, it establishes partnerships with third parties for digital switches and its main goal is to ensure savings to users through a high degree of transparency.

The second main group is constituted by the Personal Finance Tool, which comprises of players such as Revolut and Fintonic. Unlike the latter, Switcho app allows users to execute the saving options directly on the platform. This gives greater solidity to the business model and allows Switcho to establish potential partners with the personal finance tools.

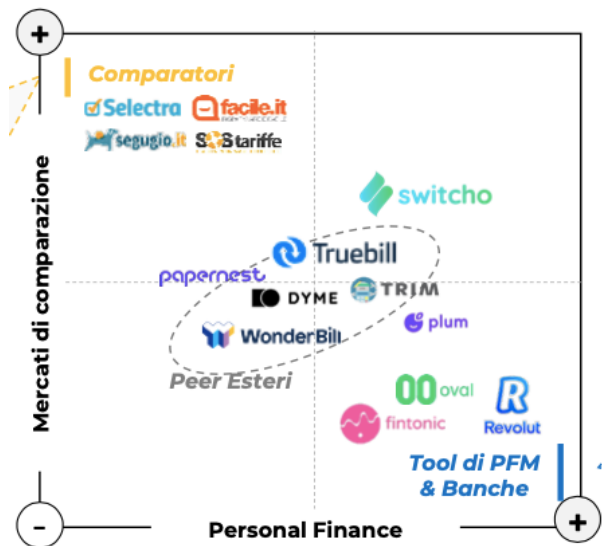


Figure 4.5: Switcho's competitors. Switcho Investor Deck (2021).

Finally, Switcho app could be defined as a platform whose primary function is to find, filter and match participants from the demand and the supply side and to facilitate transactions between them. Moreover, as the volume grows, the platform benefits from demand economies of scale (network effects) and from supply's economies of scale (production efficiency). The network effects can be direct (users on the same side of the market affect each other) or indirect (users on one side affect the users on the opposite side of the market) and those can be either positive (the utility of users increases the more the service or product is broadly used) or negative (the utility decreases). Switcho is a clear example of positive network effect, defined as the utility enhancement that a service gives to a user as a result of its widespread distribution. For instance, the app's value raises as more users use it: the increasing number of suppliers makes the platform more attractive to a growing number of potential customers.

This is called “positive feedback loop” and it implies that more supply attracts more customers, leading to an increased demand that in turn attracts more suppliers, which leads to increased output, and so on (Figure 4.6).

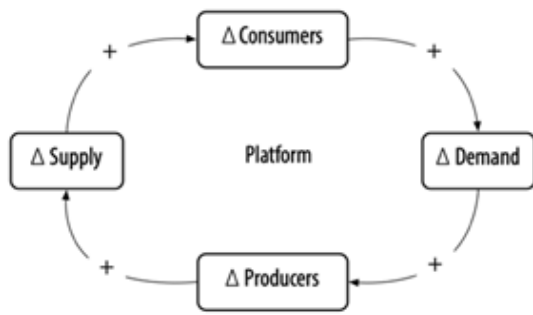


Figure 4.6: Positive feedback loop. *Meta-Platforms and Cooperative Network-of-Effects*, Samuel M. Smith, (2019).

Last but not least, the team has a great relevance, and it is made up by: Marco Tricarico, Switcho's CEO, who has more than 10 years prior experience in consulting firms. Redi Vyshka is the start-up's COO and has 5 years past experience in consulting. The last co-founder is Francesco Laffi who has 8 years' experience and has been a start-up's CTO in the past.

4.3 Switcho valuation

In the next subparagraphs three different methods have been applied for Switcho's valuation: the DCF method, the comparable analysis, and the VC model. Even if the results obtained vary consistently, it is possible to observe a common trend: the DCF and VC method's financial projections show a steady growth over the next 4 years (until 2025).

4.3.1 Discounted Cash Flow model

As previously said, the DCF method aims to determine the value of the firm to all investors, including both equity and debt holders, who could estimate the current value of their investment based on the company's future forecasts.

Since it is hard to estimate how each BS and IS' item will behave in the next years, the analysis has been performed considering only the most important financial statements' components rather than all the single items, and the FCFs have been computed using the formula below:

$$7) FCF_t = S_t * \frac{\{p_t - (a_t - a_{t-1}) + g_t * (p_t - a_t)\}}{(1 + g_t)}$$

Where S_t stands for sales in period t (obtained considering the previous year's sales ($t-1$) and the actual growth rate), a_t is the asset intensity ratio which effectively assesses a company's productivity, and it is computed through the ratio between the Net operating assets (NOA) and the actual sales. Then, p_t stands for profitability ratio which evaluates how well a firm creates both earnings and value for its shareholders and it is computed through the ratio between EBIAT and actual sales. Finally, g_t indicates the revenues' growth rate from the previous year to the actual year.

The first step for the analysis has been the estimation of the growth rate: analysing the IS of 2019, 2020 and 2021 it is possible to observe an exponential growth of operating revenues (from almost 8000 in 2019, to more than 600,000 in 2021). Therefore, it is reasonable to assume that this trend can be replicated also in the following years given the absence of known upcoming major socioeconomic changes in the firm's industry. In particular, start-up's entrance in mid-2021 into the car insurance's market would lead to an increase in customers' switches, raising the commissions received by the firm. In addition, different partnerships with small and medium sized banks have been scheduled by founders within the next years, which would enable the start-up to reach a wider audience.

In 2021, before the entrance of the start-up in the insurance and bank's markets, Switcho's market share was estimated by its founders to be 0.2% of SAM. The latter accounts for 580 million and is considered immediately accessible through the online channel (Figure 4.2). Car insurance companies account for 200 million, representing 34% of the market, while banks account for 190 million, representing the 32.7%. Considering the forthcoming Switcho's entry in the latter two industries, it is reasonable to estimate a market share in 2022 that grows

proportionally to the increase of the accessible market. For this reason, a 204%⁸ growth rate to the previous market share has been applied, which results in 0.61% market share in 2022.

Since the accessible market in 2020 was 190 million and the market share estimated by founders was 0.1%, the maximum potential revenues for the start-up in 2020 accounted to 190,000. However, the firm only realized 137,000, meaning 39% than the potential sales. Assuming that even in 2022 not every partnership with the providers will generate revenues from switches, the revenues' projection is computed considering the maximum potential revenues ($0.61\% \times 580 = 3.53$ million) and a correction factor equal to 39%, resulting in 2.165 million revenues (that indicates a revenues growth by 244% compared to 2021).

Between 2020 and 2021, a 357% growth rate for revenues has been observed, which compared to the one computed above (244%) has decreased by 32%. This percentage has been used to decrease revenues' growth in the following years. In particular, growth rate decreases in 2023 (167%), 2024 (114%), and 2025 (78%). The substantial growth rate is due to the high development phase in which Switcho is. Indeed, start-ups' early stage is characterized by huge growth that is going to flatten as time passes by. In particular, it has been assumed that revenues grow exponentially thanks to consistent investments in marketing and brand which will consequently lead to an increase in both market share and sales. Indeed, Switcho planned to reinvest a huge part of the funding raised during the crowdfunding round to increase customers' awareness through advertisement campaigns. Therefore, the EBTIDA break-even will occur in 2023, that is when marketing and product development's expenses will be offset by higher revenues. The next step was to forecast operating costs: in 2021, founders estimated to collect 2M from the crowdfunding round and they planned to reinvest the amount collected in product development (40% of 2M = 0,8M), marketing (40% of 2M = 0,8M) and other costs (20% of

⁸ $580/190-1$, where 190 is the immediate accessible market before Switcho's entry in car insurance and banks market ($580-200-190=190$)

2M = 0,4M). For instance, in 2022, it has been estimated an increase in costs of 1.930.562 €, equal to the amount effectively raised in the 2021 campaign. In the following years costs will continue to raise because of marketing, IT & engineering, B2B sales (costs of acquiring new clients) and personnel expenses. To compute the costs' growth from one year to the other, the average costs' changes from 2020 to 2021 have been considered (decrease by 65% in costs). From 2021 to 2022 (decrease by 33% in costs) that is 49%. As previously said, the latter has been applied to compute the constant costs' increase throughout the years, and this number has been found to be equal to 71%. It was indeed assumed that costs' increase will be lower compared to the ones in 2022, but still growing because of the start-up's development.

Having estimated future costs and revenues, it is possible to compute the profitability ratio: through the years 2019-2021 the latter was negative given the recent founding of the company that occurred in 2019. Indeed, it is common for a start-up to have a negative profitability ratio in its first phase. However, it improved very quickly thanks to exponential revenues' growth⁹ (357% more in 2021). In addition, it is important to underly that when the financial statement reports a net loss, EBIAT¹⁰ coincides with EBIT given the absence of taxes. It has been estimated that in the next years, the profitability ratio will increase following revenues' trend and will turn positive in 2024. Finally, in 2025 it will account to 24% meaning that the firm has a good operational efficiency and is able to produce high profits from its sales¹¹. According to Damodaran's report on profitability margin by sector, the average after-tax margin in Europe for software (system and application) is 15.33%. This means that Switcho's profitability ratio will probably be above average in 2025.

⁹ As previously said the profitability ratio is computed by the ratio between EBIAT and revenues.

¹⁰ $EBIAT = EBIT * (1 - \text{tax rate})$

¹¹ In particular, 24% profitability ratio indicates that the firm is able to generate 24 of profits out of 100 sales. The remaining 76 are costs.

The last factor needed to compute the FCF is the asset intensity: first it is necessary to obtain the NOA, which is the difference between all assets and all liabilities related to the business' operations¹² plus net property plant and equipment. As Switcho is a digital firm, higher investments in PPE are not necessary, thus having a low impact on its NOA. Moreover, the latter is positive given that NOOLTA + NOWC results in a positive outcome. This can be explained by higher accounts receivable compared to accounts payable. Indeed, the start-up offers a free service to its users and only gets paid by providers once the contract with the client is signed and the "switch" actually occurs. It is possible to assume that NOWC will increase with the same growth rate as revenues given that, according to Switcho's business model, as sales increase, accounts receivables and payables will also increase. Moreover, as sales grow, the start-up needs to employ more workers and thus to provide more infrastructures, increasing its PPE. The ratio between the two factors that grow at the same pace will result in a constant asset intensity¹³ that in this case is equal to 13.3%.

On the other side, from 2019 to 2020, the asset intensity is decreasing due to the growing revenues and the lower NOA. To conclude, it is important to highlight that a lower asset intensity is beneficial for the firm since it indicates that the start-up needs to commit less capital to run the business. If a company is capital intensive (high asset intensity), it must spend more on physical assets to generate revenues, while a non-capital-intensive firm commits less capital for its operation to run the business. Indeed, in digital companies, emphasis is on labour expenditure rather than on CapEx.

Other assumptions concern the tax rate which has been estimated by the founders to be 30%. Moreover, financial expenses are assumed to be constant since most of them refer to long term debt, which is unlikely to be repaid before 2025.

¹² NOA = NOWC (net operating working capital) + NOOLTA (net operating other long-term assets) + NPPE (net property, plant and equipment)

¹³ From 2021 to 2025.

Finally, depreciation and amortization are estimated to grow as PPE, and include mostly amortization (98% of PPE) rather than depreciation. Having estimated all the necessary variables, it is possible to apply the formula to obtain the FCFs.

Figure 4.7 shows the results of the assumptions and computations previously explained.

FORECASTED INCOME STATEMENT										
Items	%	2021	%	2022	%	2023	%	2024	%	2025
Return on sales	357%	€ 629,666.58	244%	€ 2,165,852.57	167%	€ 5,773,473.32	114%	€ 12,339,278.32	78%	€ 21,920,026.11
Total operating revenues	348%	€ 720,470.75	244%	€ 2,165,852.57	167%	€ 5,773,473.32	114%	€ 12,339,278.32	78%	€ 21,920,026.11
Total operating costs	207%	€ 1,392,414.56	139%	€ 3,322,976.56	71%	€ 5,670,580.09	71%	€ 9,676,709.41	71%	€ 16,513,073.35
EBITDA	-130%	€ (671,943.81)	-72%	€ (1,157,123.99)	109%	€ 102,893.23	2488%	€ 2,662,568.92	103%	€ 5,406,952.77
margin %		-107%		-53%		2%		22%		25%
D&A	-78%	€ 16,189.20	244%	€ 55,685.69	167%	€ 148,440.33	114%	€ 317,252.10	78%	€ 563,580.31
EBIT	-87%	€ (688,133.01)		€ (1,212,809.69)		€ (45,547.10)		€ 2,345,316.82		€ 4,843,372.46
Financial expenses	4%	€ (25,185.36)	4%	€ (25,185.36)	4%	€ (25,185.36)	4%	€ (25,185.36)	4%	€ (25,185.36)
Income before taxes	-86%	€ (713,318.37)		€ (1,237,995.05)		€ (70,732.46)		€ 2,320,131.46		€ 4,818,187.10
Tax on income	30%		30%		30%		30%	€ 696,039.44	30%	€ 1,445,456.13
Net Income	-86%	€ (713,318.37)		€ (1,237,995.05)		€ (70,732.46)		€ 1,624,092.02		€ 3,372,730.97
NOWC		€ 73,889.21	244%	€ 254,155.36	167%	€ 677,497.26	114%	€ 1,447,971.92	78%	€ 2,572,239.76
NOA		€ 83,652.04	244%	€ 287,736.39	167%	€ 767,013.59	114%	€ 1,639,289.48	78%	€ 2,912,104.53
PPE		€ 9,762.83								
Asset Intensity Ratio		13.3%		13.3%		13.3%		13.3%		13.3%
Profitability Ratio		-109%		-56%		-1%		13%		15%

Figure 4.7: Forecasted Income statement (2021-2025). Realized by the author.

Next, to apply the DCF method it is necessary to compute the appropriate discount factor. The one required to discount the free cash flow to both debt holders and equity holders is the Weighted average cost of capital (WACC), that is considered as the cost of financing the firm, including both internal (equity stakes) and external (debt) capital, as well as a tax rate adjustment. However, in this case, the method used requires the unlevered cost of capital rather than the WACC. Indeed, it has been used the adjusted present value method (APV method), which assesses the levered value of an investment by first computing its unlevered value and then adding the value of the interest tax shield, as in the formula below:

$$8) V_L = APV = V_U + PV(\text{interest tax shield})$$

The reason to apply the APV method lies in the fact that discounting the FCFs with the WACC implies assuming the market debt-equity ratio as constant, which is a special case. Indeed,

Switcho's E/V and D/V, which account for 82% and 18% respectively, cannot be assumed constant. However, it is reasonable to state that the latter will not change substantially for the following reasons: being a digital company, Switcho's need for physical assets is restrained, thus also limiting its debt's necessity. This implies that equity represents the largest part of the company's value, and it is possible to assume that the situation will not consistently vary in the following years. The APV method allows the overall risk of the firm to be independent from the level of leverage.

The first step is to discount the FCFs, previously computed using the start-up's unlevered cost of capital. To compute the latter, the following procedure has been applied: first, the Italian BTP's yield with 10 years maturity (on the 2nd of May 2022) has been considered as the risk-free rate (2.86%). As for the Italian total equity risk premium in 2022, it has been taken from Damodaran's website (6.42%), while the beta equity has been estimated as explained in the next paragraph. At this point, it was possible to apply the capital asset pricing model (CAPM) to compute the cost of capital¹⁴ of the company (5.9%). Regarding the cost of debt, it corresponds to the interest rate paid by Switcho on its financial obligations (4.36%). Moreover, the equity value to enterprise value ratio (E/V) and total debt to enterprise value ratio (D/E) were also calculated.

Having obtained all the necessary elements, it was possible to calculate the unlevered cost of capital, also called the pre-tax WACC (5.65%). Thus, in the computation the tax rate has not been included as in the WACC method. The results obtained are very similar to the cost of equity and cost of capital estimated by Damodaran for the European software: System & application industry. Indeed, the latter is equal to 5.22%, while the cost of equity is 6.57%.

For the beta equity's estimation, the following procedure has been applied: the first step implied the selection of four companies which operate in the same industry as Switcho (Software:

¹⁴ $Re = Rf + Rm \cdot Be$

System & application). Indeed, the start-up's direct competitors are not listed, making it impossible to compute the monthly return of their stocks. However, the screening has been performed considering not only the industry in which the firms operate, but also their market capitalization. Indeed, among all companies, only those with a restrained market capitalization and that were listed at least from 01/2019¹⁵ have been selected: Piteco (PITE.MI), WIIT (WIIT.MI), TAS tecnologia avanzata dei sistemi (TAS.MI), and Be Shaping the Future (BEST.MI). Moreover, also their asset intensity and profitability ratios have been considered, whose average (8% and 11% respectively) is very close to the ratios obtained for Switcho. This highlights their similarity to Switcho's business model and operations, making the results computed more reliable.

To obtain the equity beta, the monthly return of each firm's stock prices from 01/01/19 to 01/01/22 and those of the FTSE MIB¹⁶ have been calculated. Afterwards, the excel slope function was used, combining the monthly return of the stocks and those of FTSE.MIB, to obtain the equity beta. Subsequently, a rating was assigned to each company and it corresponded to a specific beta according to figure 4.8.

TABLE 12.3 Average Debt Betas by Rating and Maturity ¹⁵					
By Rating	<i>A and above</i>	<i>BBB</i>	<i>BB</i>	<i>B</i>	<i>CCC</i>
Avg. Beta	< 0.05	0.10	0.17	0.26	0.31
By Maturity	(BBB and above)	<i>1–5 Year</i>	<i>5–10 Year</i>	<i>10–15 Year</i>	<i>> 15 Year</i>
Avg. Beta		0.01	0.06	0.07	0.14
Source: S. Schaefer and I. Srebulaev, "Risk in Capital Structure Arbitrage," Stanford GSB working paper, 2009.					

Figure 4.8: Average Debt Betas by rating and maturity. Berk, J., and DeMarzo, P., "Corporate Finance global ed." Essex: Person Education Limited (2011).

It was not possible to find any evaluation of those companies on agency rating's reports. For this reason, ratings have been estimated during this analysis: when assigning the rating it is important to consider the riskiness of the firms, which is believed to be high in this case. Indeed,

¹⁵ At least 2 years to perform a more reliable analysis.

¹⁶ It has been considered the Borsa Italiana stock market index given that Switcho is an Italian start-up which is currently operating in the Italian market.

all companies have a medium/low market capitalization and a low share's price meaning that are deemed risky by the market. Moreover, they have been listed since few years being relatively young companies, therefore still in the process of developing their own market share and customer base. In addition, a rating assessment was found on [marketscreener.com](https://www.marketscreener.com)¹⁷ which assigns "C-" to Witt, "C-" to Best and "C-" to Piteco, confirming the risk hypothesis mentioned before. For these reasons, the beta debt used for the excel computation result from an average between the two riskiest ratings in the table (figure 4.8).

The next step was the calculation of the average beta asset of the comparables, starting from the companies' equity value and net debt, it was possible to compute the D/V and E/V ratios. Then, using the formula below, the beta asset for every firm was computed, resulting in an average beta asset of 0.59.

$$9) \text{Beta asset} = \text{Beta equity} * \frac{E}{V} + \text{Beta debt} * \frac{D}{V}$$

Lastly, the following formula allowed to calculate Switcho's equity beta, equal to 0.48 (in this case, D/V and E/V ratios are different from those used in the pre-tax WACC computation. Indeed, for the latter case the total debt has been considered, while in the beta estimation the net debt, which is negative).

$$10) \text{Beta equity} = \frac{(\text{Beta asset} - \text{Beta debt} * \frac{D}{V})}{\frac{E}{V}}$$

Beta equity is key since it assesses how sensitive the share price is to changes in the entire market, thus measuring the stock's volatility in relation to the market. Since Switcho's beta is

¹⁷ <https://www.marketscreener.com/quote/stock/PITECO-S-P-A-23194746/>

between 0 and 1, the underlying asset moves in the same direction as the benchmark but at a lower rate, meaning that the security is more stable.

The other factor to compute is the terminal value (TV) which corresponds to the residual value beyond the projection period, considering the firm as going concern and it is computed using the infinite discounting formula explained in chapter 3. The long-term growth rate assumed for the computation is 2.71%. The latter was estimated by [statista.com](https://www.statista.com)¹⁸ according to which the software market in Italy is expected to generate more than 7 billion revenues in 2022 and to reach 8 billion market volume by 2027.

At this point, the free cash flow previously computed, and the terminal value have been discounted using the pre-tax WACC, resulting in 59 million euro. The latter corresponds to the unlevered value of the firm which doesn't include the interest payments on debt.

Therefore, the last item to estimate is the PV interest tax shield, which is equal to the present value of the interest paid in year t times the company's tax rate. The discount factor used is the unlevered cost of capital, and the result obtained is approximately 34,000 euro.

To conclude the analysis, the latter results and the unlevered value of the firm have been summed up, obtained Switcho's total value (59.253.455 euro).

Figure 4.9 shows all the computations previously explained.

Timeline	0	1	2	3	4
FCFO	€ (722,446.05)	€ (1,416,894.03)	€ (524,824.30)	€ 769,445.87	€ 2,117,545.67
PV FCFO	€ (722,446.05)	€ (1,341,134.18)	€ (470,201.11)	€ 652,503.21	€ 1,699,699.81
PV TV					€ 59,401,085.29
PV FCFs	€ (722,446.05)	€ (1,341,134.18)	€ (470,201.11)	€ 652,503.21	€ 61,100,785.10
NPV	€ 59,219,506.97				
Interest tax shield	€ 7,555.61	€ 7,555.61	€ 7,555.61	€ 7,555.61	€ 7,555.61
PV interest tax shield	€ 7,555.61	€ 7,151.62	€ 6,769.23	€ 6,407.28	€ 6,064.69
APV	€ 59,253,455.40				

Figure 4.9: APV method. Realized by the author.

¹⁸ <https://www.statista.com/outlook/tmo/software/italy?currency=EUR>

Given the high uncertainty of future start-up outcomes, a sensitivity analysis was performed for different unlevered cost of capital and long-term growth (figure 4.10). Indeed, it shows how Switcho's valuation would vary with a change in one of the assumptions, holding the other constant. A range of +/- 1% to the unlevered cost of capital and +/- 1% to the long-term growth were applied.

From the results, it is possible to observe how the valuation is affected by the long-term growth. Indeed, almost all the discounted amount is constituted by the terminal value.

	Ru					
	€ 59,253,455.40	5.0%	5.65%	6.65%	7.65%	8.65%
Long term growth	2.00%	€ 59,124,976	€ 47,365,222	€ 35,695,503	€ 28,200,958	€ 22,987,885
	2.71%	€ 78,029,533	€ 59,254,334	€ 42,460,372	€ 32,518,869	€ 25,955,406
	3.71%	€ 139,950,780	€ 90,767,906	€ 57,530,143	€ 41,239,893	€ 31,581,801
	4.71%	€ 628,915,113	€ 189,410,185	€ 88,135,761	€ 55,893,588	€ 40,064,233

Figure 4.10: Sensitivity analysis. Realized by the author.

4.3.2 Comparable firms' method

As previously said, the comparable method estimates the firm's enterprise value or equity value based on the valuation of similar companies. The latter are identified considering their business features and target industry. According to Damodaran (2009), the need to scale all the valuation multiples to a common metric (such as earnings, EBITDA and sales) could be problematic for early-stage businesses. Indeed, EBITDA multiples and P/E ratios are difficult to estimate given the widespread presence of losses recorded by young companies. Moreover, sale multiples are difficult to compute since sales can be absent or negligible for those firms that have recently shifted to commercialization.

Secondly, the identification of the comparable peer group is not an easy task since the appropriate comparison for a startup would be to other new firms within the same industry. However, these companies are rarely publicly listed and have no market value, so they cannot be considered. For the purpose of this analysis, the competitors were chosen among the listed

companies on the Italian national stock exchange FTSE MIB. All the selected firms belong to the software (system & application) industry and have a medium-low market capitalization. This is because Switcho's business is carried out on an online platform, which could be considered as a software industry's activity. Moreover, being a start-up, it should not be compared with high scale companies. However, it is inevitable to consider companies that have much higher sales and revenues than the startup considered, due to their longer activity and greater stability.

In particular, the firms chosen are TAS tecnologia avanzata dei sistemi, BEST be shaping the future, Piteco and Wiit (further reasons for their selection have been explained in the previous paragraph). The first step was to collect all the necessary data to compute the multiples from their financial statements. For each multiple, an average value and the interval of maximum and minimum deviation from the mean have been calculated. The last step was to establish a value range for the target firm based on the results obtained with the different multiples.

The key multiples computed are the P/S (Price to sales ratio), P/B (price to book value ratio) and EV/Sales (enterprise value to sales ratio). In particular, given the fact that Wiit's Price to book ratio is an outlier, it has not been included in the average formula. By combining the three results with an average computation, the enterprise value achieved for Switcho is almost € 9.7M. Figure 4.11 shows the computations explained above.

	TAS	BEST	PITECO	WIIT	AVERAGE
EV/Sales	3.001	1.787	6.042	9.593	5.106
P/B	4.816	7.657	4.017	42.090	9.875
P/S	2.858	1.824	4.541	7.772	4.249

EV/SALES		
Sales	€	629,666.58
EV	€	3,215,063.35
POSSIBLE RANGE	€	1,125,268.72 € 6,040,700.46

P/S		
Sales	€	629,666.58
EV	€	1,646,834.88
POSSIBLE RANGE	€	706,821.43 € 3,012,459.69

P/B		
Book value	€	2,668,986.36
EV	€	24,300,607.53
POSSIBLE RANGE	€	9,883,681.59 € 103,571,176.87

AVERAGE EV	€	9,720,835.25
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Figure 4.11: Multiple Analysis. Realized by the author.

The aforementioned multiples have been selected to overcome one of the problems highlighted before. Indeed, Switcho has negative net income and EBITDA in 2021, and therefore it is not possible to consider these financial items for its EV computation.

4.3.3 Venture Capital method

Contrary to the DCF, the VC model accounts for venture capitalists' viewpoint during the whole valuation process. This is key because VCs will receive benefits from their investments only in the event of an IPO or of a M&A. Therefore, given that investments in start-ups are illiquid and highly risky, the model compensates VCs with elevate potential returns.

In order to obtain Switcho's enterprise value, the following computations have been employed: first, it was necessary to estimate the company's future revenues in the event of an exit. To do that, the projected revenues estimated in the DCF method in 2025 - equal to 21.9 million euro – have been considered. It is important to underline that the forecast is generally based on a successful scenario in which the firm meets its sales targets and forecasted profits.

Moreover, given Switcho's operating business, it is possible to say that, in the event of an exit, its potential bidders are banks, personal finance management tools (PFM), price comparison websites and private equity funds.

According to the VC method, the following step is to estimate an appropriate multiple from the current ones belonging to comparable firms. This has been done considering 5 companies among Switch's competitors which have been acquired in the last years by big corporations (Figure 4.12).

Target	Country	Acquirer	Announced	Firm Value (USD M)	FV / Revenue LTM multiple
 Stariffe		 Gruppo MutuiOnline	2020	30	3.0x
ValuePenguin 		 lendingtree	2019	92	6,3x
FINANZCHECK  .DE		 SCOUT24	2018	285	7,3x
 facile.it		 IEQT	2018	400	6,1x
 bgl		 CIP INVESTMENT BOARD	2017	2.526	3,8x
 money		 ZPG	2017	153	5,2x
				Min	3,0x
				Max	7,3x
				Avg.	5,3x

Figure 4.12: Similar start-ups' acquisition. Switcho Investor Deck (2021).

Their acquisition price has been approximately considered as their actual equity value. This is because in M&A the acquirer company has to buy 100% of the acquired firm's common shares. As a result, the Purchase Equity Value acts as a "minimum" for the purchase price in an M&A transaction. Next, through the ratio between the companies' equity value and revenues, the multiple for each company (Equity Value/Revenues) was obtained. The product between the estimated future revenues and the average multiple corresponds to the start-up's projected terminal value. Next, the latter value must be discounted at a specific rate of return that matches the IRR asked by the VCs for that particular investment and time horizon. Damodaran

(2009) provides a table with the different IRRs required based on the several company's development stages. In particular, he reports 50-70% IRRs for the start-up stage (Figure 3.3). For the purpose of the analysis, the chosen IRR has been 60% (an average between the 50% and 70%). The high rate is explained by several factors that occur when investing in start-ups, namely the business' risk, illiquidity premium, value added by VC, and correction for optimistic forecasts. The discounted result is an assessment of Switcho's equity value, which also corresponds to the highest price that the investor is willing to pay. It also indicates the post-money valuation. Finally, to obtain the enterprise value, it was necessary to sum the net debt to the equity value, resulting in above 18 million euros.

Figure 4.13 shows the computations previously explained.

<i>in million</i>	Equity Value	Equity Value/Revenues
SOS Tariffe	\$ 28.70	3.00
Value Penguin	\$ 105.00	6.30
Financzcheck.de	\$ 285.00	7.30
Facile.it	\$ 400.00	6.10
Money	\$ 153.00	5.20
AVERAGE	\$ 194.34	5.58
<i>Acquisition Price</i>		
SWITCHO'S EXIT IN 2025		
Revenues	€ 21,920,026.11	
TV	€ 122,313,745.72	
IRR	60%	
Equity value	€ 18,663,596.45	
Net debt	€ (1.03)	
EV	€ 18,663,595.43	

Figure 4.13: Venture Capital Method. Realized by the author.

Given the high uncertainty of future start-up outcomes, a sensitivity analysis was performed for different exit revenues and multiples (Figure 4.14). Indeed, this shows how Switcho's valuation would vary with a change in one of the assumptions, holding the other constant. A range of +/-

2 million to revenues (between 18 to 28 million) and +/- 1 to Equity Value/Revenues multiple (between 3.5 and 9.5) was applied.

From the results, it is possible to observe that in the worst scenario the valuation is almost equal to the one obtained with the multiple method (9.6 million euro), while on the other side, in the best scenario the valuation is much closer to the one achieved with the DCF method (40.6 million euro).

	REVENUE						
	€ 18,663,595.43	€ 18,000,000.00	€ 20,000,000.00	€ 21,920,026.00	€ 24,000,000.00	€ 26,000,000.00	€ 28,000,000.00
MULTIPLE	3.5	€ 9,613,036.08	€ 10,681,151.32	€ 11,706,555.83	€ 12,817,381.78	€ 13,885,497.02	€ 14,953,612.25
	4.5	€ 12,359,618.11	€ 13,732,909.13	€ 15,051,286.36	€ 16,479,491.16	€ 17,852,782.17	€ 19,226,073.19
	5.58	€ 15,325,926.71	€ 17,028,807.57	€ 18,663,595.33	€ 20,434,569.28	€ 22,137,450.14	€ 23,840,331.00
	7.5	€ 20,599,364.21	€ 22,888,182.57	€ 25,085,477.94	€ 27,465,819.28	€ 29,754,637.64	€ 32,043,456.00
	8.5	€ 23,345,946.24	€ 25,939,940.38	€ 28,430,208.47	€ 31,127,928.66	€ 33,721,922.80	€ 36,315,916.94
	9.5	€ 26,092,528.27	€ 28,991,698.19	€ 31,774,939.00	€ 34,790,038.03	€ 37,689,207.96	€ 40,588,377.88

Figure 4.14: Sensitivity analysis. Realized by the author.

4.4 The most appropriate start-up valuation method

Once Switcho has been valued according to each estimation method, it is possible to investigate the results achieved, and to highlight the hurdles faced to execute the analysis.

First, the DCF model was the most problematic one to implement. For instance, it required the estimation of each financial statement's item from 2022 to 2025, which is quite tricky for young companies. Because of Switcho's early stage, revenues and costs' growth have been assumed to be quite high through the years, even if following a decreasing trend.

Moreover, one of the most important assumptions is the long-term growth rate (g) observed from past investments' return on capital. However, because of the limited number of Switcho's previous investments, historical data was inadequate to accurately estimate it. Therefore, for the empirical analysis the software industry's CAGR from 2022 to 2027 provided by Statista in its research¹⁹ was used.

¹⁹ <https://www.statista.com/outlook/tmo/software/italy?currency=EUR>

From the result, it is possible to observe how the valuation is affected by g , since almost all the discounted amount is constituted by the terminal value. A deeper investigation, supported by the sensitivity analysis, revealed a huge value change depending on the long-term growth rate: the range of $\pm 1\%$ applied to g caused a massive variation of the valuation from 47 million to almost 190 million (considering the unlevered cost of capital constant and equal to 5.65%) and from 59 million to even 629 million when the R_u is fixed at 5% (Figure 4.10).

Ultimately, the valuation obtained with the DCF method is very high compared to the ones resulting from the other two methods.

Hence, given the high probability to undermine its forecasts' reliability (because of wrong assumptions) and its great dependence on terminal value, it is hazardous to consider the DCF method as fully reliable to value start-ups.

Regarding the multiple method, it manifested several problems regarding the comparable companies' selection and the multiples' choice. Indeed, the appropriate comparison for a start-up would be to other new firms within the same industry, with similar size, growth rate, risk, and profitability. However, because of low private companies' disclosure, there was a lack of Switcho's direct competitors' data. Hence, it was necessary to pick publicly listed firms²⁰ which were as similar as possible to Switcho. Nevertheless, it was extremely difficult to find companies, operating in different life phases, which have equivalent characteristics to Switcho. For this reason, higher importance when choosing them was given to the industry in which they operate: every company belongs to the Software: system and application' sector.

In addition, it was not possible to use EBITDA multiples and P/E ratios because of Switcho's negative EBITDA and Net income registered in 2021 income statement. Therefore, the multiple employed included two sales multiples (P/S and EV/S) and the Price to book ratio (P/B). Sale multiples could be less reliable because sales can be lower for firms, like Switcho, that have

²⁰ Listed on Milano stock exchange

recently shifted to commercialization, resulting in smaller outcomes than expected. On the other side, the P/B ratio delivers a much higher EV compared to the previous multiples. This is because Switcho's book value is more than 4 times its sales (2.7 million vs 0.63 million respectively).

The issues in employing some multiples and the variation of results achieved, makes the comparable method not fully reliable to value start-ups.

Comparing the two values obtained with the DCF model and the comparable method, the substantial difference between them is outstanding: 59.2 million and 9.7 million respectively.

This huge gap could be explained, on one side, because of the exponential sales growth and long-term growth assumed in the DCF model, which leads to an inflated result. On the other side, the already moderate multiples' average has been multiplied by Switcho 2021' sales, which are quite low because of its recent shift to commercialization, as previously highlighted.

Lastly, the VC method's result is 18.7 million which lies between the previous two. Indeed, the sensitivity analysis (Figure 4.14) shows that in the worst scenario the valuation is almost equal to the one obtained with the multiple method (9.6 million euro), while in the best scenario the valuation is much closer to the one achieved with the DCF method (40.6 million euro).

This finding supports the fact that the VC method is set up on more reliable assumptions, which leads to less "extreme" results on both sides. First, the multiple required to compute the terminal value has been obtained from actual similar firms (with regards to size, growth rate, risk, sector and profitability), picked among Switcho's direct competitors. It was possible to perform a more accurate selection given the irrelevant condition for them to be publicly listed.

In addition, to compute the terminal value, sales have been projected to 2025, resulting in a more realistic outcome rather than the one of 2021. These characteristics make it more reliable compared to the multiple analysis.

Furthermore, the VC method doesn't require the appraisal of several financial items, consistently differing from the DCF method. Since it is very hard for start-ups to accurately estimate the intermediate items in a financial statement, the VC can be considered more reliable than the DCF model. Finally, the high discount rate enables to correct the forecast for possible optimistic predictions which are usual in start-ups' valuation, together with a correction for business' risk, illiquidity premium, and value added by venture capitalists.

Returning to the research question, *"What are the main problems associated with startups' valuation using the most known published methodologies and eventually, is there a valid and efficient approach that can overwhelm these issues?"*, it is possible to assess that there is no proper and ideal appraisal for start-ups, however the VC method gives more reliable results than the DCF model and comparable method. More precisely, the latter are considered by practitioners and academics as the most efficient methodologies in valuing companies, however, if applied to start-ups, whose value drivers differ from those of a "regular" organization, they give either too optimistic or too pessimistic results.

Limitations and Contributions

The current study presents different major limitations: (i) the long-term growth rate's change by +/-1% has a crucial impact on the firm's ultimate enterprise value. For instance, when using DCF approach to assess Switcho's value, the terminal value weighs significantly more than the other FCF stream. (ii) Moreover, the beta used to compute the unlevered cost of capital is not correctly representing the market risk bore by investors when funding a start-up. Indeed, this approach should be used for firms that are exposed only to systemic risk, a requirement that does not apply in any manner to start-ups.

(iii) Furthermore, another major constraint can be found in the comparable companies' choice for the multiples technique. Indeed, there is no firm that completely fits Switcho's characteristics.

(iv) In addition, although 2021 is considered as the last year of COVID-19 pandemic, it is worth mentioning that the economic activities of the selected comparables and of Switcho itself could have been influenced either directly or indirectly. (v) Lastly, another limitation also lies in the fact that the analysis has been performed considering only one firm's valuation.

Overall, this thesis contributes to the existing literature about start-ups for different reasons: (i) it describes the most used assessment methods, clarifying the outstanding problems in start-ups' valuation, (ii) it presents a clear description of start-ups' business model and of venture capital ecosystem, (iii) it analyzes the investment dynamics and returns opportunities throughout time and regions.

Conclusion

According to Paul Graham's paper "Startup = growth." (2012), startups are dynamic and innovative firms which are generally in their early phases of development and are mainly growth oriented. Moreover, Steve Blank came up with the most common definition of a start-up, which has been frequently quoted in both industry journals and in scientific research: "A start-up is a temporary organization designed to search for a repeatable and scalable business model and it is not a small version of a big firm".

Since the number of venture capital investments continues to rise across the world, investors rightly consider valuing a startup to be critical. The two primary challenges are the way in which an entrepreneur values his/her startup when seeking for funding, and secondly how venture capitalists estimate a potential business when making an investment decision. For both situations, recognizing good solutions for the entrepreneur and the investor are essential. However, the major issues are that the goals of the entrepreneur and those of the investor are incompatible and that startups are difficult to value given some of their intrinsic characteristics. Given start-ups' challenges in computing their valuation and the high-risk factors at which they are exposed, they have had trouble in finding the necessary investments to develop their

businesses. Venture capital firms emerged in 1970s and provided to fill the lack of funds for young and promising enterprises, becoming start-ups' major source of funding.

VCs are attracted by investments with high growth opportunities that could pay above average returns. Hence, given the large presence of worthy intangible assets that allow firms to reach their full potential, start-ups represent interesting opportunities for VCs.

To offer high returns to VCs, start-ups must be very profitable. In particular, the latter are identified by a dynamic path based on the search of business assumptions, their validation, and their potential adjustment to every change in customers' tastes. This iteration process, called "lean approach", is key to reduce start-ups' spending until it has been verified that their product is viable, and their business model is able to expand widely. As a result, start-ups could defer their funding need to when they will be able to obtain a higher valuation for their company and to negotiate better terms with VCs. Indeed, if founders have a limited knowledge of their industry or if information asymmetries and uncertainties are still too high, valuation will be negatively affected: investors will push for a low valuation to compensate the risk undertaken, resulting in low shares' price and high equity stake. Moreover, startups could increase their probability of success complying with the business model canvas which allows business models to be clear, meaningful, and instantly accessible.

Therefore, correctly valuing a start-up represents a central matter both for investors and funders. However, it is widely agreed among academics that this is a thorny issue: as highlighted by Professor Aswath Damodaran in his study "Valuing Young, Start-up, and Growth Firms: Estimation Challenges and Valuation Challenges", the most widely used methodologies in the realm of valuation, are based on assumptions that cannot be applied to young companies.

In particular, the DCF technique is challenged by both theoretical and estimating concerns. First, as explained by Damodaran (2007), to estimate the cash flows it is necessary to use the

company's historical data, which is usually absent in start-ups. Furthermore, earning's evolution is also critical to compute, and since start-ups usually present losses or little operating earnings, predicting future profit margins is challenging. Another important estimation to be computed is the quality of growth that is observed from past investments' return on capital. Because of the limited number of past investments in a young company, historical data is inadequate. For all these reasons, the reliability of the business plan given to investors is likely to be undermined.

Furthermore, the comparable method is challenged by several factors when evaluating a startup. First, the need to scale all the valuation multiples to a common metric (such as earnings, EBITDA and sales) could be problematic for early-stage businesses. Indeed, EBITDA multiples and P/E ratios are difficult to estimate given the widespread presence of losses recorded by young companies. Moreover, sale multiples are difficult to compute since sales can be absent or negligible for those firms that have recently shifted to commercialization. In addition, the identification of the comparable peer group is not an easy task, leading to unreliable estimation.

On the other side, the venture capital method is used for start-ups valuation by almost all VCs, since it offers several solutions to significant valuations issues. Indeed, it does not require the estimation of many financial items to be applied. Moreover, since investing in a start-up is highly risky, the discount rates account for all uncertainty, which results in very high IRR for investors. Therefore, while the DCF focuses entirely on evaluating the intrinsic potential and uncertainty of the firms under consideration, the VC model considers the investor's viewpoint during the investment choice and the evaluation process.

The goal of this thesis was to assess which method is the most suitable for start-ups' valuation. Concerning this point, in the fourth chapter, each method was applied to an Italian start-up with the goal of assessing its evaluation. The firm is called Switcho and it is a Fintech start-up

founded in 2019 by three young men. Its aim is to optimize household utilities' expenses suggesting personalized saving offers for electricity, gas, internet and mobile. According to Italian Regulatory Authority for Energy, Networks and Environment (ARERA), in the first quarter of 2022 it has been registered a price increase by 131% in the domestic electricity bills, and by 94% in those of gas compared to last year. In particular, annual bills raised on average by 200 euros for a four people family and they are expected to grow even more in the upcoming months. Switcho app is able to deal with these conditions and to propose ideal offers to its users. Indeed, by analyzing the current situation of each user, the app ensures to find the best price for every individual case. Thanks to Switcho's functionalities, its founders estimated that the app would allow users to save on average 293 euros per year. In Italy, market's potential size is around €2.5 billion, of which at least 20% is immediately accessible through the online channel (corresponding to a value of approximately €600 million). Furthermore, Switcho has raised more than 3M euros in funding, attracting private capital from investors (including institutional ones) and banks.

The methods applied for Switcho's valuation are the DCF method, the comparable analysis, and the VC model. Even if the results obtained vary consistently, it is possible to observe a common trend. Indeed, in the DCF and VC method the financial projections show a steady growth over the next 4 years (until 2025).

However, comparing the two values obtained with the DCF model and the comparable method, the substantial difference between them is outstanding: 59.2 million and 9.7 million respectively. This huge gap could be explained, on one side because of the exponential sales' growth and long-term growth assumed in the DCF model, which leads to an inflated result. On the other side, the already moderate multiples' average has been multiplied by Switcho 2021' sales, which are quite low because of its recent shift to commercialization.

To conclude, what emerged from this research is that there is no proper and ideal appraisal for start-ups, however the VC method gives more reliable results than the DCF model and its comparable method. More precisely, the latter are considered by practitioners and academics as the most efficient methodologies in valuing companies, however, if applied to start-ups, whose value drivers differ from those of a "regular" organization, they either give too inflated or too undervalued results.

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