

**An innovative valuation method for scalable newcos:  
The BizPlace model**

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September 2018

## Introduction: why value values?

Value is the determining dimension of measurement in a market economy. People invest with the expectation that when they sell, the value of each investment will have increased by an amount sufficiently above its cost to offset the risk they have taken. This applies to all types of investments, be they bonds, derivatives, bank accounts or company shares, venture capital investments not excluded (Koller, Goedhart & Wessels 2010). Correctly valuing a start-up is therefore considered a crucial aspect by investors, since the value of the entity first allows us to determine the percentage of shares they will receive in exchange for their capital contribution, which then drives the overall profitability of their investment and ultimately influences their relationships with the founders. Furthermore, the valuation is essential also for the entrepreneurs because it drives their motivation and gives a meaning to the resources and efforts they put into their companies. Moreover, research has shown that the valuation is important because it aligns the ambitions of the entrepreneur and investor, helps the company's structure and assures a fair treatment (Clercq et al. 2006) whilst also reducing the sources of potential conflict between the entrepreneur and the investors (Zacharakis, Erikson, and Bradley 2010). Given the key role valuation plays, it is usually at the heart of every negotiation between the founders of the company and potential investors (Miloud, Aspelund and Cabrol 2014), but it is also the most misunderstood part of the investment process and often the cause of conflicting debates that deeply undermine the entrepreneur-investor relationship.

The main problem lies in the fact that there are conflicting objectives between entrepreneur and investor. On the one hand, the investor is interested in obtaining at the highest possible discount the shares of a company that he knows to be in a position of economic disadvantage. So, he is interested in paying as cheap as possible today in order to earn more significantly when selling in the future. Conversely, the entrepreneur is aware of his position of disadvantage and he knows he is risking to cheaply sell his company today. Thus he wants to get the money he needs, trying to minimize the damage as best as he can.

These two contrasting positions need to be mediated through a tool that takes into account, on the one hand, the characteristics and the intrinsic problems of the start-up evaluation and, on the other hand, the prerogatives of the venture capital investor.

In the light of the above, this paper aimed to focus on a critical analysis of the most widespread methods of evaluating start-ups and on the proposal of a new methodology: The BizPlace model.

## Valuation issues and valuation challenges

The analysis of the studies and thoughts of various scholars such as Damodaran (2009), Gompers and Lerner (2000), Gonzalez (2017), Le Merle (2015), Sanders and Bovie (2004), Binks (2012), Elnathan and Gavious (2010) has allowed us to identify the intrinsic problems of start-ups' appraisal in:

1. the absence of historical data;
2. the lack of revenue and/or presence of negative profits;
3. the dependency upon private equity which causes under diversification concerns;
4. the uncertainties related to the ability of survival of the company;
5. the presence of multiple claims on equity; and
6. the illiquidity of its shareholdings.

And to break down the prerogatives of VC investors into:

7. market conditions in which the venture capitalists operate;
8. information asymmetry with respect to financial statement information and business potential;  
and
9. the investment dilution issue, the so-called "Divergence".

Moreover, emerged some technical problems related to the implementation of traditional methods in the context of start-ups. In particular, the following points were highlighted:

10. Issues in the determination of Beta;
11. Difficulties in dealing with equity multiples versus enterprise value multiples.

## The most widely used start-up valuation models: main strengths and weaknesses

Researches conducted by Bancel and Mittoo (2014), Gompers, Gornall, Kaplan and Strebulaev (2016) showed that to evaluate investments, venture capital investors are heavily reliant on IRR and multiples but do also use DCF methods sporadically. In particular, they determined that the most popular methods among VCs are cash-on-cash multiples (63% of the sample) and IRR (42% of the sample) which are the basis to apply the so-called Venture Capital Method. In addition, they confirmed that DCF methods are rarely used (only 22% of the VCs of the sample). Simultaneously, 9% of VCs and 17% of early-stage investors are said to not use financial metrics, which conforms

with anecdotal evidence. Moreover, slightly less than the majority of VCs conceded that they made gut decisions concerning investment regularly, in particular amongst the early-stage, IT and smaller VCs. Finally, 8% said that they use other valuation methods than DCF, Relative Valuation and IRR/Cash-on-Cash models. Among those methods, the so-called Berkus Method assumes a particular relevance. This method was developed by Dave Berkus in the mid 90's in response to the need of VC investors to avoid financial forecasting in the valuation of early stage companies since they are difficult to measure and with poor predictive capacity. Other variants of the Berkus Method are the Scorecard method and the First Chicago method. For the purpose of this paper, only the VC method, the DCF analysis, the Relative valuation models and the Berkus method has been further taken into consideration, as they have proven to be those repeatedly preferred by the VCs.

In the context of start-up valuation, applying methods such as the Discounted Cash Flow Analysis – of which one of the fundamental characteristics is the determination of the Cost of Capital (or equity), and therefore of the *Beta* to be correctly implemented – seems extremely complicated. This is because the Capital Asset Pricing Model (CAPM), the mathematical formula used to determine the *Beta*, can only be correctly applied if the perfect diversification of the so-called "marginal investor" (a person who has many shares in the company, which are traded on the market regularly) is assumed. This model, in other words, can only be applied to those companies that are only affected by systemic risk (market risk) and not by the so-called diversifiable risk. In a start-up, this condition is not applicable in any way. Furthermore, in the case of listed companies, Beta is derived from the linear regression of share prices against a market reference index (i.e. S&P500) and, in the case of private companies, from the regression of profits against a market reference index. Profits, however, do not always accurately display the value of a company. This is even more true in the case of start-ups that re-invest almost all their monthly cash flow to accelerate growth. Finally, as stated above, they often do not have historical data of a sufficient duration to give a reliable sample for statistical calculation. Therefore, although the DCF retains some relevance in the world of start-up valuations by virtue of its focus on determining the intrinsic value of the company, which protects it from distorting effects linked to contingent market sentiment and the irrationality of investors, it is poorly applied in practice.

Valuation methodologies based on relative valuation models are also often difficult to apply due to the complex identification of comparable companies and the consequent scarcity of data available to proceed to the core of the valuation (Damodaran, 2009). Moreover, using multiples on companies whose current operations do not provide much in terms of tangible result (revenues are usually very small and earnings are negative), may lead to significant undervaluation problems. Another disadvantage of this method is that it is based on assumptions already described as unsuitable for the

evaluation of start-ups such as, for example, the complete diversification assumption of the companies used in the sample. Despite what has been written so far, the multiple evaluation techniques retain their appeal in the field of evaluations for their simplicity of application and their close link with market sentiment, which, in certain circumstances and to some specific actors, reflects better than any other tool the actual company's valuation and the investor's investment tendencies.

The Berkus method, although it is very flexible and user friendly is no longer applicable once the company is in revenues, since after that point in time appraisal models based on the forecasting of such revenue become more reliable.

The Venture Capital method, in its most common application, assumes that the target company can be sold at a certain price 'X', after a certain number of years 'Y', generating a return on the investment 'Z'. If 'Z' (also called IRR or target ROI) is usually identified depending on the growth phase of the start-up analyzed; and 'Y' varies between 5-7 years, the 'X' parameter is difficult to determine as it is based on a gamble made by the VC firm itself, unrelated to more detailed financial evaluations such as the determination of cash flows in a given time interval. Moreover, "Z", due to the fact that there is no community of thought among scholars on which values should be assigned according to the cases taken into account and since there is no defined methodology to calculate a unambiguous value, often becomes a matter of negotiation and dispute between the parties, ending up in representing a double-edged sword for both rather than a useful tool dedicated to shed light on the fair value of the company considered. Lastly, this parameter which does not account for differences across regions and sectors is not able to explain the observable discrepancies among start-up valuations backed by venture capitalists operating in different markets. However, the Venture Capital method maintains its leading role as start-up valuation appraisal tool thanks to its consideration of the investor's perspective in the investment decision-making and evaluation process.

## Objective of the paper and methodology

The goal of this paper is to present an innovative newcos valuation model (The BizPlace model) that may be solid from a theoretical perspective (therefore, the least subjected to the arbitrariness of the assumptions or theoretical bias in its application) but at the same time capable enough to correctly represent a fair company valuation when applied to real investment cases in different sectors and in different growth stages and to take into account the different perspectives at stake between entrepreneur and investor.

In order to do this, firstly the aforementioned start-ups' valuation issues, both those arising from the intrinsic characteristics of the company and of the investors, will be reviewed and for each of them the solutions offered by the BizPlace model will be presented. Secondly, a study will be carried out in order to determine which model best suits the different stages of the start-up lifecycle.

The main findings of the above analysis will be then summarized in two synthetic ratings taken from the medical doctrine and adapted to the start-up valuation context:

- Specificity (this parameter represents the suitability of the model progressively analyzed for digital-start-ups in different growth phases);
- Sensitivity (this parameter takes into account the strengths and the weaknesses of the different valuation methods analyzed, where the weaknesses represent the appraisal issues not overcome by the various models).

The terms "specificity" and "sensitivity" are taken from the medical doctrine and represent the first the ability to effectively circumscribe within a group of elements those that are of interest, the second the ability to correctly predict the presence or absence of the phenomenon of interest in the elements analyzed. In other words, having a low specificity implies a wider applicability of the test; on the other hand, having a high sensitivity implies a higher precision in the estimates that derive from such a test. In medicine, a high specificity often corresponds to a low sensitivity and vice versa. In our case, having a result with high sensitivity and high specificity will mean having a model that is both widely applicable (in different phases of life to different start-ups) and equally effective in determining the result (strengths and weaknesses of the method greater than any weaknesses).

In other words, scoring high in both tests will determine a digital new-cos valuation model that is solid from a theoretical perspective (therefore, the least subjected to the arbitrariness of the assumptions or theoretical bias in its application) but at the same time capable enough to correctly represent a fair company valuation when applied to real investment cases in different sectors and in different growth stages.

## Sensitivity analysis

Proceeding with order, these were the problems that emerged in the application of the traditional methods analyzed above and the related solutions proposed by the BizPlace model:

- 1. No history.** Starting with the company's own challenges, the first problem faced was the one related to the difficulties of drawing up a credible business plan due to the absence or unrepresentativeness of the historical performance of the company analyzed. As previously discussed, some methods rely on the own company's historical data for determining its growth rates and for the calculation of its future cash flows. One of the models mentioned which makes extensive use of these estimates is the DCF. Critics of this method when applied to start-ups argue that it is a waste of time trying to determine items in a business plan that have very little chance of being confirmed over time, because of the speed with which these companies must adapt to the continuous and sudden changes in the competitive and commercial scenario in which they operate. However, "while it is understandable that analysts, when confronted with the myriad of uncertainties associated with the evaluation of start-ups, look for shortcuts, there is no reason why they cannot be evaluated in a systematic and detailed manner" (Damodaran, 2009). This is the logic which drives the BizPlace model too. Obviously the target here are companies that, even though they have been in business for a very short time or have not yet been launched on the market, have a clear business model and have already defined the strategic-commercial choices to be made in the short to medium term. Therefore, the minimum condition to proceed with such an analysis will be to work on companies that have at least tested their product/service on the market (even if for limited periods of time and even without actually having launched it yet) and that have identified the essential growth drivers of their business, at a strategic and commercial level. If this minimum requirement is met, then the estimation process can begin. There are two different ways to proceed with the implementation of the BizPlace model: the first is to follow a "top-down" approach, which starts from the analysis of the total market and proceeds with the estimate of the company's revenues and earnings; the second (called "bottom-up") takes into account the structural limits of the business and then works with its capacity constraints to determine the number of products/services that can be sold and consequently derive earnings, margins and cash flows from these units. The model then links the projections, deriving from the application of one of the two approaches, to business metrics tested by the company and validated by the market, following a scalar approach for determining their specific revenue funnel. The assumption behind this methodology is the existence of specific drivers of growth of the company, i.e. factors on which assumptions about the positive or negative results of the company's development are determined. These drivers can be, for example, the number of contracts opened for commercial purposes in a given time horizon for an I.O.T. start-up that sells B2C products/services through an off-line distribution network, or the number of monthly orders that the sales team of a cleantech start-up manages to obtain for the sale of its B2B product to private

companies and Public Bodies. More often, digital start-ups have as their main, and sometimes unique, driver of growth the increase of their community of users. In fact, it is the users who generate value for these companies: making transactions on a marketplace, buying products on an e-commerce, generating data that can be analyzed and resold to third parties, subscribing to periodic services. Once these drivers have been identified, the revenue funnel of the start-up and the business metrics that influence it can be determined. Metrics are parameters that indicate the cost of stimulating a given growth driver. In the digital world, for example, a fundamental metric is the so-called CPA (cost per activation), or the cost in terms of marketing required to obtain an action (transaction, subscription, purchase, etc.) within the platform of the start-up. So if the growth driver were the number of users within the app who subscribe to the premium membership, the reference CPA would be the cost per subscription of the associated marketing campaign. E.g. CPA = €5; Marketing campaign = €1,000; Number of premium membership = 200. There are at least as many metrics as there are layers in which a given revenue funnel is articulated. Usually for the digital world, they coincide with the so-called "A.A.A.R.R.R. funnel" or "pirate funnel". The initials indicate respectively: Awareness, Acquisition, Activation, Retention, Referral, Revenue. The benefit of adopting such an approach derives from anchoring the growth drivers of the start-up to metrics tested and validated in the market and no longer randomly estimated by the entrepreneur. Therefore, through this approach, we try to make up for the lack of historical reference data for the estimation of reasonable growth rates of the company, providing an alternative calculation no longer based on the past, but on the present. Another great pro is that almost every start-up can find its metrics at a low budget and in a reasonable amount of time, even those which have not launched their product on the market yet, may test the market response with a pre-sale campaign months before the actual production takes place. In addition, while carrying out these tests it is not uncommon for start-ups to find useful insights about their product and their target customers' expectations and needs along with a more comprehensive understanding regarding which ones are the best performing marketing channels for their goals. Lastly, the reliability of these tests may be further increased by cross-checking the start-up's own results with the average market data or with that of the closest competitors. For what has been my experience in BizPlace, these metrics represent a strong instrument on which to base estimation of future performance of the analyzed company, with very few cases diverging more than 50% from the initial estimate.

- 2. Small or no revenue, operating losses.** The second issue intrinsic to young companies was related to the modest numbers which usually characterize their financial statements. The fact that the financial statements of start-ups show little or no income and are usually characterized by

negative profits makes the valuation models based on the analysis of comparable companies meaningless. The Comparable Company analysis and the Venture Capital Method record particularly penalized results. The BizPlace model, which needs multiples to calculate a prospected Terminal Value by the time the analyzed start-up will likely be sold or listed, overcomes this issue by focusing on the forwarded financials of the company rather than on their actual results. There are several reasons for this: firstly, what the start-ups demonstrate today is probably not a good indication of their ultimate potential; secondly, the multiples that can be used as a sample, whether from previous sales transactions or from the current price on the stock market, are presumably multiples of companies at more advanced stages of the lifecycle than the company being analyzed. Therefore, using prospective financial data (5 to 7 years from now) could realistically make the comparison between companies more meaningful, both in terms of growth rates and financials.

- 3. Dependency upon private equity.** The third appraisal issue for start-ups was related to the under-diversification which characterizes almost every young company's equity investor, especially in their first years of activity. The assumption that is broken is that related to the marginal investors in the company who, according to the CAPM, should be fully diversified. The question is whether and how these investors may demand compensation for at least a portion of the company's specific risk. The answer provided by the BizPlace model is the same firstly suggested by the economist Aswath Damodaran (Valuing young, start-up and growth companies: estimation issues and valuation challenges. Stern School of Business, New York University, 2009) and then formalized by other scholars such as Peter Butler, Gary Shurman and Andrew Malec (Practical evidence and theoretical support for total beta. A professional development journal for the consulting disciplines, 2011): to account for the absence of diversification dividing the market beta by the correlation with the market (the factor  $r$  of the regression) to get a scaled up version of beta (also called "total beta") that captures all the risk of being in a specific business, rather than just the market risk. This total beta will be much higher than the market beta and the resulting cost of equity will reflect not only the systemic market risk but also the differentiable risk that could not be eliminated by an investor who is fully invested only in one or few businesses. The BizPlace model employs total beta in the computing of the discount rate that is applied to the Terminal Value identified by the analysis of multiples described above.
- 4. Many do not survive.** The uncertainty linked with start-ups' survival makes it difficult to establish whether the firm analyzed will ever become a stable growth entity and consequently it compromises the calculations on the firm's terminal value. As previously discussed, the latter usually accounts for a significant portion (it is not unusual for more than 100%) of the overall

current value of a start-up and therefore, it is critical to account for it in the valuation process. Rather than adjusting the discount rate to account for this probability of failure or to calculate the terminal value as the probability composed of two different scenarios (a positive one for success and a negative one for failure), the BizPlace model proposes an alternative solution. The concept behind it is linked to the actual return of the venture capitalist, who is not only influenced by the probability of survival of the start-ups held in the portfolio (Table I), but also and above all by the probability that the latter will increase their value over time so as to generate a positive return for the investor once they are acquired or listed on the market (Table II and Table III). With an example, the concept will become clearer: let's imagine that we have performed a careful analysis of the growth prospects of a start-up in the ICT sector and that we have calculated a terminal value on these prospects, through the analysis of comparable companies in the same sector. This terminal value, we assume a value of 30 million euros, represents the forecasted value of the start-up analyzed in X years from now, where X represents the average holding period in the investment portfolio of the venture capitalist. Therefore, as seen in table 40, five years for an M&A exit and seven years for an IPO. For the purpose of the example, let's imagine that the ICT company in question believes it can be acquired by a big player in the sector, so let's consider five years as the horizon of the analysis. For a correct calculation of the terminal value so determined, we should take into account the probability of failure of this start-up for the holding period considered. Referring to table Table I and assuming that the start-up in question has been in business for 2 years, the probability of failure is 26.4%, i.e. the difference between the probability of surviving 2 years (67.5%) and the probability of surviving 7 years (41.1%). So, in our case, the expected TV (as opposed to the forecasted one) is 22.080 million US dollars ( $\$30 \text{ million} * (1 - 26.4\%) + \$0 * 26.4\%$ ). However, the probability for the investor to have his exit realized at a terminal value of 30 million euros is not only linked to the probability that the company will go bankrupt or stay alive, but to the probability that that company actually falls within that percentage of companies that not only survive, but manage to complete their growth plans and get a buyer in the horizon of the plan considered. This case study, as it is easy to see, is a small subset of the companies that manage to remain in business. In particular, according to the analyses performed on the returns of VC and angels funds in the USA and other regions of the globe by Davide Prencipe of the European Investment Fund in 2017 (Table II and Table III), we can have a more accurate estimate of our expected TV. Assuming that the ICT start-up analyzed receives an investment of \$100K from a US VC fund, the expected TV should be calculated as follows:  $\$30 \text{ million} * 27\% + \$100\text{K} * 1 * 17\% + \$0 * 56\% = \$8.117 \text{ million}$ . A value therefore quite different from the \$22.080 million that resulted after the simple calculation of the risk of failure. The pros

of this approach are a better alignment with the VC investor's expectations and a more effective computation of the existing differences in the likelihood and in the value of exit returns, and consequently in the valuations of start-ups, depending on the investor's geographical area of reference.

Table I - Survival rate of new establishments, 1994 – 2015 (US Labour of Statistics, 2017)

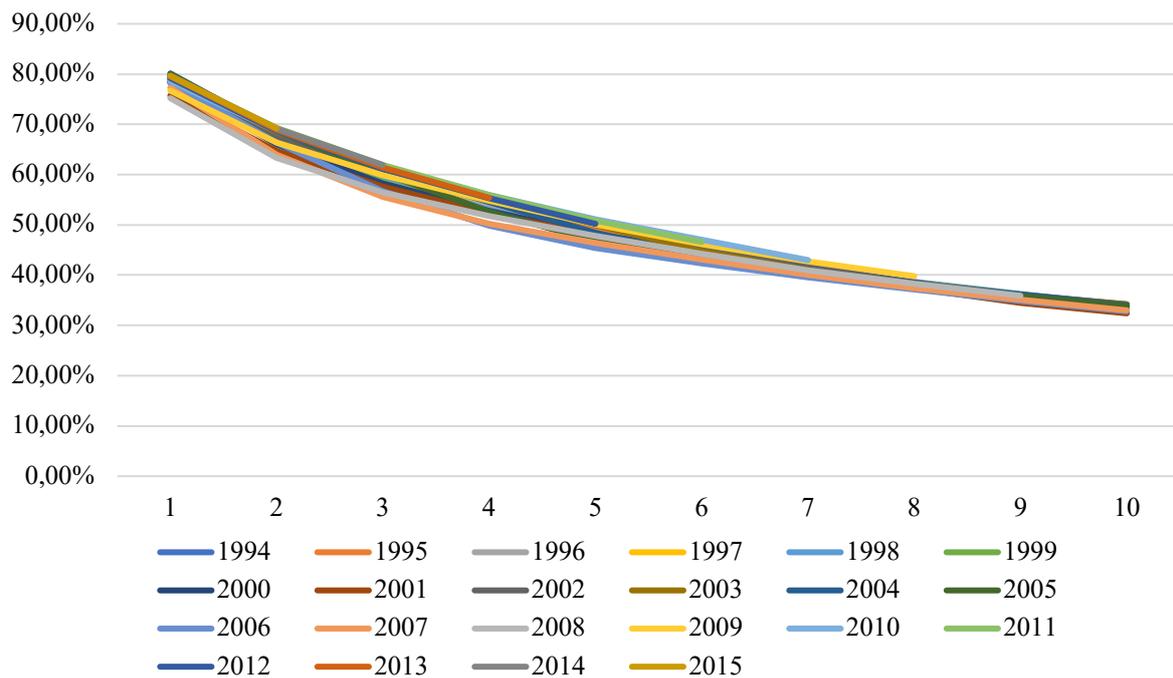


Table II - Distribution of the exit return class, unweighted CoC multiples, by sector (Prencipe, 2017)

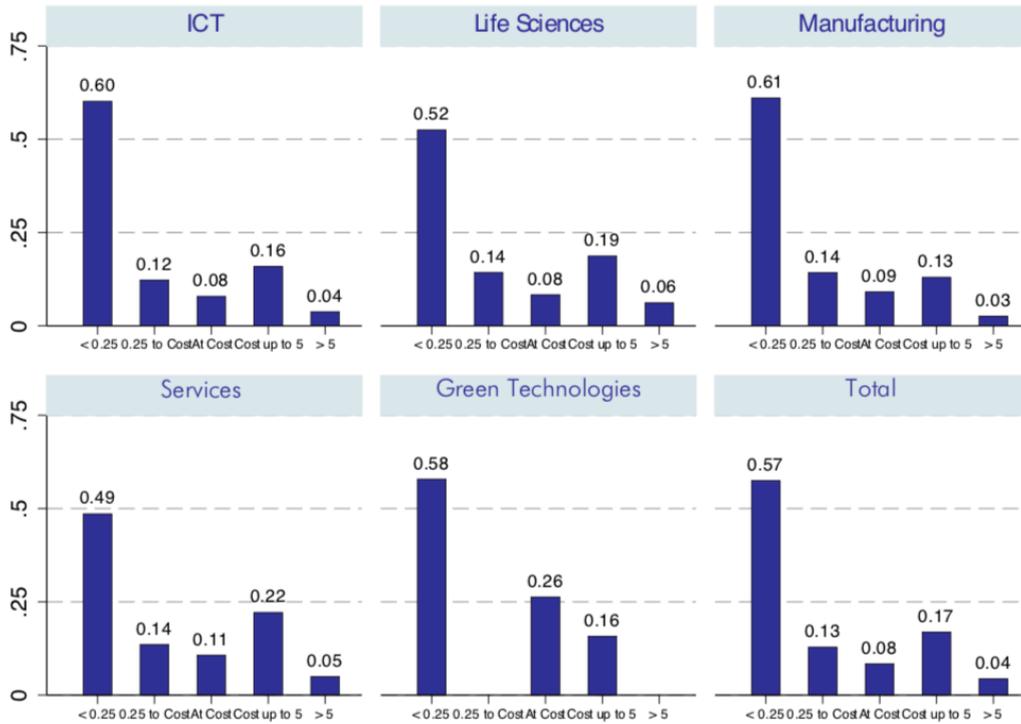
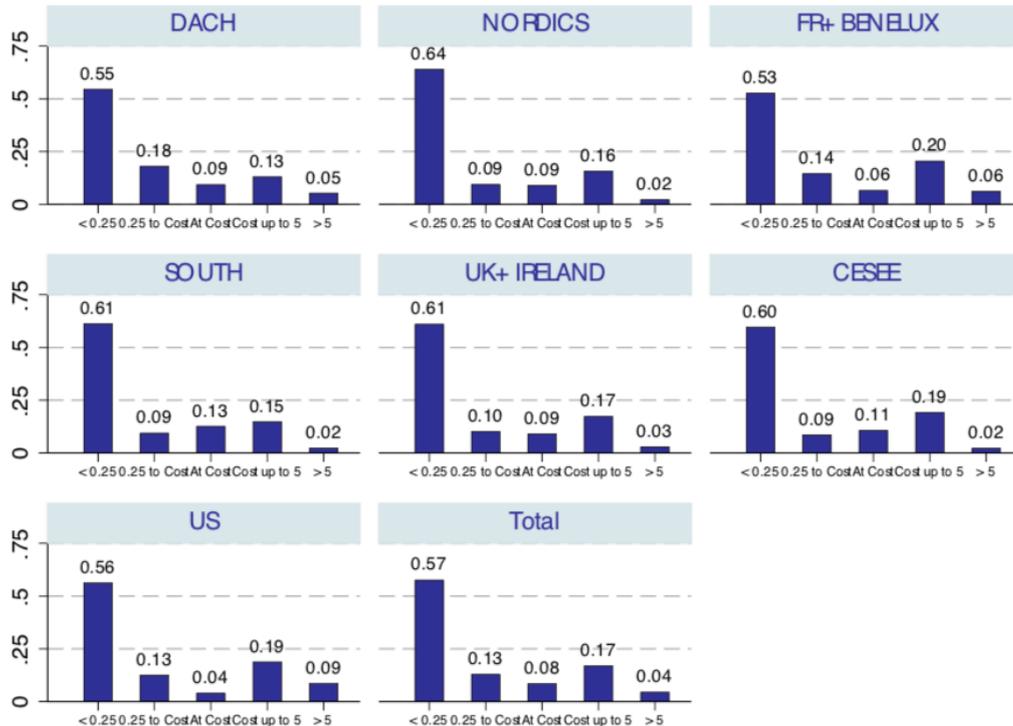


Table III - Distribution of the exit return class, unweighted CoC multiples, by region (Prencipe, 2017)



**5. Multiples claims on equity.** To protect their interests, VC investors often demand and obtain protection against dilution eventuality in the form of first claims on free cash flows from operations and in liquidation, usually with control or veto rights attached to it that allow them to have a say in the start-up’s actions. In order to correctly apply the BizPlace model, there are two possibilities to be taken into consideration: rights to the cash flows generated by the start-up in liquidation and control rights, whether they are veto or protection rights, to specific events. The simplest way to account for liquidation rights is to compute the probability that the firm will be liquidated at a specific point in time (5.8 years on average according to table IV), assessing the likely value of the equity claims on the firm in liquidation and to discount that amount to the present. In order to account for control rights on the value of the investor’s equity, one must analyze the impact and the probability associated with the single cases in which these rights could influence the value of the investor’s shareholding. Then, the value arising from this computation has to be discounted back to the present as seen previously in the case of liquidation rights.

Table IV - Years from vintage to exit for EIF-backed VC investments, by exit outcome (Prencipe, 2017)

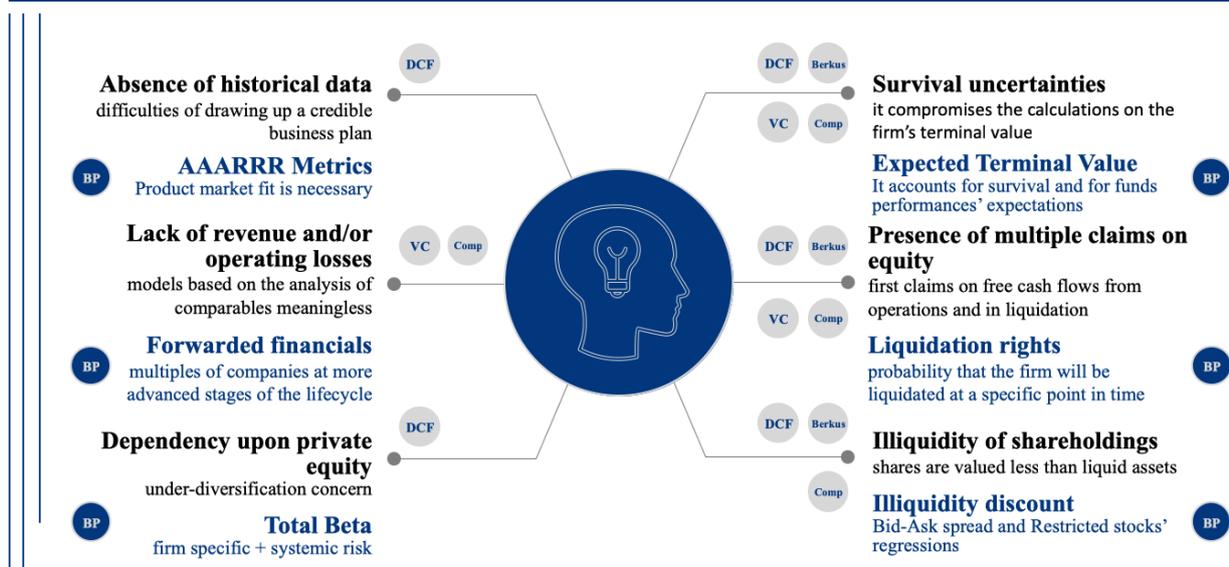
Exit Outcome	Average Time to Exit	Median Time to Exit	St.Dev.	N
In Portfolio	5.7	4.0	4.2	1523
Write-off	4.9	4.2	3.1	705
Liquidation	5.8	5.5	3.3	779
Acquisition	4.9	4.3	3.3	448
IPO	7.1	7.0	3.3	109
Total	5.5	4.5	3.7	3564

Note: 28 investments made by non-European EIF-backed VC funds were dropped. The data was computed by counting the number of days between first investment and exit date and further converting back to years.

**6. Investments are illiquid.** The fact that equity owners in a start-up are often private investors and the shares they own are usually held in non-standardized units implies that those shares are much more illiquid than the shares of publicly traded companies. Consequently, and intuitively, start-up shares are valued less than otherwise similar investments that are sold more easily. There are several ways analysts use to convert illiquidity into a value discount (Damodaran, 2009). The most frequent are: the use of a fixed discount that does not vary across sectors; the estimation of an illiquid discount which is a function of the private business taken into account; and the use of a discount rate adjusted for illiquidity. The BizPlace model follows the second approach which, on average, implies a smaller discount for relatively larger (at least as measured by revenues) and healthier firms (with positive earnings being the measure of financial health) and therefore permits to account for differences in the considered businesses. In particular, the model takes as reference

the studies conducted by professor Silber (1991) on regression of restricted stocks (securities issued by a listed company, but not registered with the SEC, which may be sold to investors through private placements, but which may not be resold on the open market for a period of at least two years), which showed a positive correlation between higher discounts and companies with relatively lower revenues and negative earnings, and professor Aswath Damodaran (2005), who considers the bid-ask spread observed in publicly traded stocks as a form of illiquidity which may be also estimated for private businesses through a regression which relates bid-ask spread in public stocks to firm-specific variables (including revenues, profitability and trading volume). Both regressions provide useful indications to determine the right dimension of illiquidity discounts to apply to the Terminal Value of the start-up analyzed before discounting it to the present.

### Valuation issues and valuation challenges: start-ups' intrinsic issues



7. **Market conditions.** Moving to the issues relating to the investor’s characteristics, the first concern is the one related to the different market conditions in which they operate that may influence the overall venture capitalist performance. Typically, the tax system, the potential of the market in terms of propensity for innovation and number of technological "early adopters" and the active presence or not of the State in the investments, are identified as the determining factors for the development of a fervid ecosystem of venture capital. Fervent in the sense that it allows operators to be remunerated by their investments and companies to achieve their goals. Empirical evidence of this existing difference among venture capitalist investments return may be observed in the results of the study conducted by Prencipe in 2017 (Table II and III): although

the percentages of start-ups that fail or are liquidated are consistent between one country and another (where the maximum range recorded is 4%, 73% of the Nordics region compared to 69% of the U.S.), there is a strong difference in the upside potential obtained by the funds depending on their geographical presence (where the maximum range is 11%, between the U.S. that have a 28% overall positive results and the South region with a number of positive events equal to 17%). It is also worth remembering that the latter are the determinants of the success or otherwise of the fund's entire investment activity, since their actual contribution to the whole investor's returns amounts to more than 50-60%. It is therefore crucial to have a system that takes into account these returns differences between one ecosystem and another. The BizPlace model, as was previously analyzed, takes into account such heterogeneities in the adjustment of the Terminal Value determined from the multiples analysis on the forecasted financials of the company. That "forecasted" value becomes an "expected" one after being adjusted for regional differences.

- 8. Information asymmetry.** Another aspect with which venture capitalists are particularly concerned is the possible information asymmetry between them and entrepreneurs. Independent due diligence in this context become fundamental to mitigate information asymmetry, especially for those companies that do not yet have certified financial statements and a consolidated track record on which to base their growth projections. In such circumstances, testing and analyzing the metrics generated under the AAARRR framework can help reduce start-up uncertainty and provide a basis for comparing the information provided by the company. Other aspects that can help reduce information asymmetry include checking the company's licenses and patents, personally testing the company's innovative solutions, and gathering feedback from any company customers.
- 9. Divergence.** Another problem affecting venture capital investors is what Villalobos (2007) calls "Divergence", i.e. the difference, caused by dilution, between the growth of the company's value and the corresponding shares held by the investor. Villalobos argues that this discrepancy affects, even for successful companies, at least from 3 to 5 times the original value of the shareholding. To take this factor into account, it is therefore critical to know the average number of rounds necessary for a start-up to undergo an M&A operation rather than an IPO and to assess the impact of every single capital increase on pre-existing shareholders' participations. According to Pitchbook (Table V), one of the most relevant financial information provider for the venture capital industry, in Europe it takes, on average, 2.8 rounds to exit through IPO and 1.8 to exit through M&A, while in U.S. it takes 4.4 rounds and 2.8 rounds respectively. If we divide the average number of years needed to reach an exit (5 - 7 years) with the average number of rounds needed to reach that exit (2- 5 rounds), we get the average number of years between financing

rounds. For example, on average it takes 4.9 years and 2.8 rounds to exit through M&A in the U.S., so on average there are about 21 months (1.75 years \* 12) between each financing round. The BizPlace model uses these estimates, together with the calculation about the actual financial needs of the company analyzed, to determine the number of rounds needed to achieve a given exit strategy, the timing of these rounds and the dilution of the initial investor between rounds. The analysis can be said to have been successfully concluded if the dilution effect falls within the divergence interval identified by Villalobos. These figures are consistent with those reported by CBinsights (2018) in an analysis of more than a thousand tech companies that carried out a round between 2009 and 2010 in the United States (table VI).

Table V – Average number of rounds to exit (Pitchbook, 2014)

	North America	Europe	South America	Asia	Africa	Mean	Median
IPO	4,4	2,8	1	2,2	3	<b>2,68</b>	<b>2,8</b>
M&A	2,8	1,8	1,9	1,8	1,5	<b>1,96</b>	<b>1,8</b>

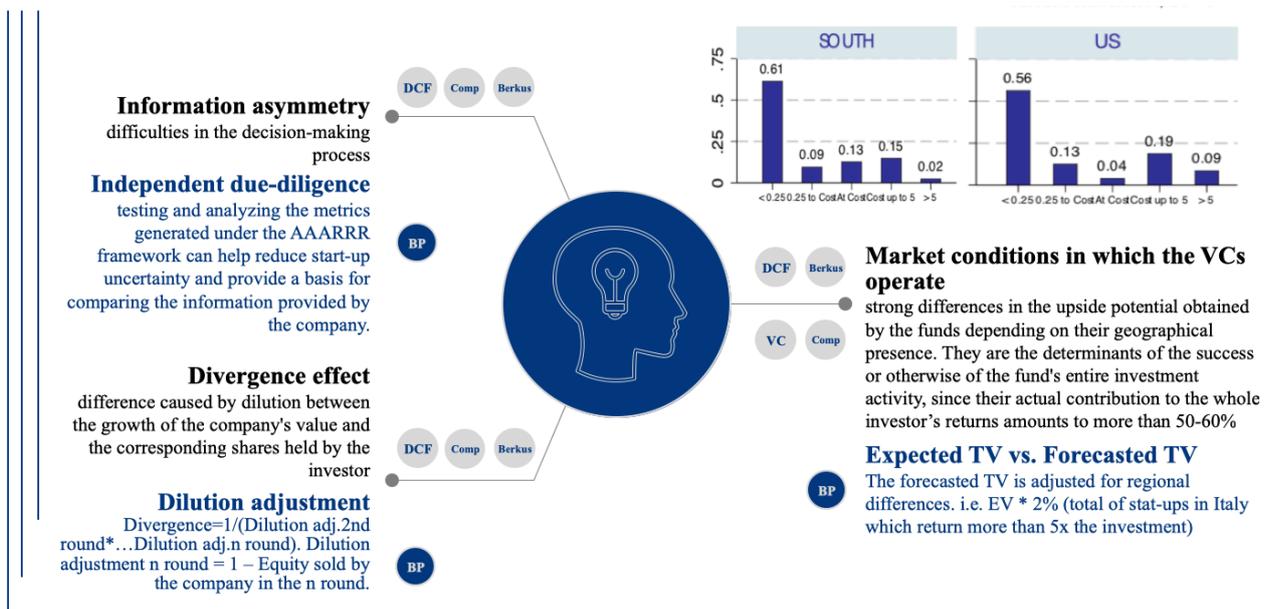
Table VI – Average # of months between financing rounds of tech companies in U.S. (CBinsights, 2018)

	Count	Percentage (from vintage)	Percentage of Original	Average Amount (\$M)*	Median Amount (\$M)	Average Months In Between	Median Months In Between
Original Round	1027	-	-	0.75	0.50	-	-
Follow-On 1	411	40%	40%	4.68	3.92	20	17
Follow-On 2	232	56%	23%	12.18	9.00	21	19
Follow-On 3	90	39%	9%	26.61	18.00	18	17
Follow-On 4	34	38%	3%	93.93	38.57	16	15
Follow-On 5	9	26%	1%	205.65	100.00	11	9



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## Valuation issues and valuation challenges: investors' prerogatives



**10. Beta estimation.** During the course of the paper, reference has been made on several occasions to the need to discount the terminal value determined by the analysis of multiples to the present. The discount rate used is the cost of equity, appropriately adjusted to include, in addition to the systemic risk of the market, the specific risk of the company. The total cost of equity thus determined is given by the following formula:

$$Total K_e = r_f + Total \beta(ERP)$$

Where  $Total K_e$  is the Total Cost of Equity;  $r_f$  is the risk free rate;  $Total \beta$  is the market beta divided by the correlation with the market; and  $ERP$  is the Equity Risk Premium (i.e., the difference between the market premium and the risk free rate). As previously discussed, the beta of the formula (and therefore the total beta) in the case of start-ups cannot be estimated either through the regression of share prices versus a market index, or through the regression of profits versus a market index. The obvious reason is that in the first case there would be no share prices to be used in the calculation, as these companies would not be listed, and in the second case the profits, if not negative, would not constitute a relevant sample in order to obtain a statistically significant regression. However, even if the analyzed start-up was not listed, there may be other companies operating in the same business that may have passed the early stage start-up phase and entered the stock exchange. The BizPlace model, as also suggested by Damodaran (2009) in his paper about young companies' appraisal, uses the beta of these companies to arrive at an estimate

of the market risk associated with being in that business. In practice, this will mean taking an average of the regression betas across listed companies, and unlevering it to get the beta of the business.

$$\text{Unlevered } \beta \text{ for sector} = \frac{\text{Average Regression } \beta \text{ for listed companies}}{\left(1 + (1 - \text{Tax Rate}) \text{Average Market } \frac{D}{E} \text{ Ratio for sector}\right)}$$

This unlevered beta there will be then adjusted for under diversification dividing it by the average correlation with the market of the listed companies in the sample.

$$\text{Total Unlevered } \beta \text{ for sector} = \frac{\text{Unlevered } \beta_{\text{listed companies in the business}}}{\text{Correlation with } \beta_{\text{listed companies in the business}}}$$

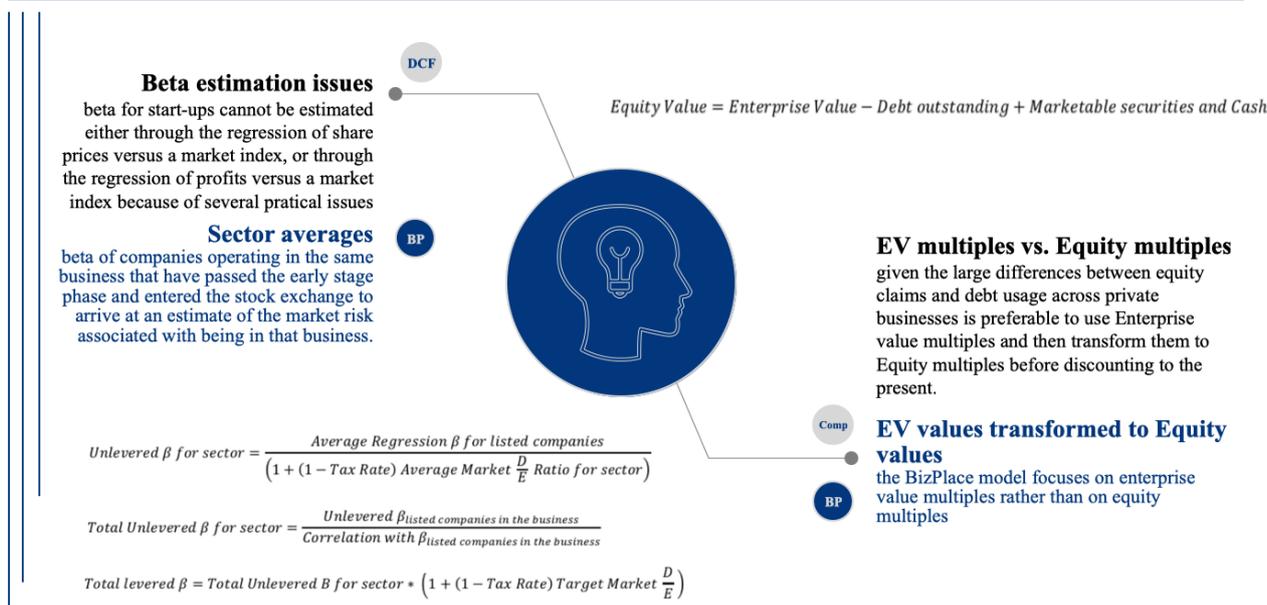
Finally, this total unlevered beta will be re-levered for the target D/E ratio of the start-up analyzed to get its total levered beta.

$$\text{Total levered } \beta = \text{Total Unlevered } \beta \text{ for sector} * \left(1 + (1 - \text{Tax Rate}) \text{Target Market } \frac{D}{E}\right).$$

**11. Equity multiples vs. Enterprise Value multiples.** Multiples are classified into equity multiples (where the value of equity is scaled to earnings or book value) and enterprise value multiples (where the value of the business is scaled to operating profit, cash flows or book value of capital). Given the large differences between equity claims and debt usage across private businesses, the BizPlace model focuses on enterprise value multiples rather than on equity multiples. In other words, firstly, it values the entire company and then obtains the value of the equity by subtracting debt outstanding and adding marketable securities and cash. This step is mandatory since in the model the discount rate used is an equity discount rate. Consequently, the terminal value has to be an equity terminal value.

$$\text{Equity Value} = \text{Enterprise Value} - \text{Debt outstanding} + \text{Marketable securities and Cash}$$

## Valuation issues and valuation challenges: other technical problems



The main findings of this analysis are summarized in table VII.

Table VII – Sensitivity analysis score (Weaknesses)

Valuation issues	Berkus method	DCF analysis	Venture Capital method	Comparable analysis	BizPlace model
No history	○	●	○	○	○
Small or no revenues/ operating losses	○	○	●	●	○
Dependent upon private equity	○	●	○	○	○
Survival uncertainties	●	●	●	●	○
Multiple claims on equity	●	●	●	●	○
Investments are illiquid	●	●	○	●	○
Divergence	●	●	○	●	○
VCs' market differences impact returns	●	●	●	●	○
Information asymmetry	●	●	○	●	○
Beta estimation issues	○	●	○	○	○
EV multiples vs. Equity multiples	○	○	○	●	○
<b>TOT. Weaknesses</b>	<b>6</b>	<b>9</b>	<b>4</b>	<b>8</b>	<b>0</b>

The comparative analysis performed in table VIII shows instead how the BizPlace model integrates in its approach, on the one hand, the intrinsic characteristics of the analyzed start-up (sector risk, growth prospects based on tested business metrics, D/E target ratio) and, on the other hand, the

prerogatives of the venture capital investor (returns on exits influenced by the reference market, holding period of 5-7 years, dilution problem) along with the prevailing market sentiment (multiples method for determining terminal value).

Table VIII – Sensitivity analysis score (Strengths)

Valuation Pros	Berkus method	DCF analysis	Venture Capital method	Comparable analysis	BizPlace model
Intrinsic valuation	○	●	○	○	●
Investor's perspective	○	○	●	○	●
Market sentiment consideration	○	○	●	●	●
Ease of application	●	○	○	●	○
<b>TOT. Strengths</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>

The resulting strengths and weaknesses is then summed up to compute a sensitivity synthetic rating (table IX).

Table IX – Sensitivity analysis score (Strengths and Weaknesses)

Valuation models	Strengths	Weaknesses	TOT.
Berkus method	1	6	-5
BizPlace model	3	0	3
Venture Capital method	2	4	-2
Comparable analysis	2	8	-6
DCF analysis	1	9	-8

### Specificity analysis

Finally, in order to determine the specificity synthetic rating, is taken into consideration the different start-up’s funding stages corresponding to as many start-up lifecycle phases, and for each of them an attempt is made to establish which models might be the most suitable and effective:

1. **Pre-seed:** This stage coincides with an embryonic stage of the business, in which the entrepreneur has not yet officially-established a commercial enterprise and where there is high uncertainty related to its start-up’s future business model. At this stage, as empirical evidence suggests, the

only applicable model is the Berkus method which does not need any specific calculation to be implemented.

2. **Micro-Seed:** At this stage the enterprise is established. The start-up must now find its product-market fit and develop a business plan that outlines, in significant detail, the organization of the company and its operational setup. Here, the start-up may be in the condition to test its business idea and to validate it in the market in order to gather useful data to either adjust what it is doing or to continue on the road mapped out. The BizPlace model and the Venture Capital Method therefore may have their first application. However, in many cases, the Berkus method still works.
3. **Seed (or Start-up stage):** This stage, also known as the market entry stage, is when the product is released onto the market and sales begin. The risk at this stage is greatly reduced, but not totally overcome. Typically the company experiences very small revenues and negative earnings. The most suitable models therefore are the BizPlace and the Venture Capital ones.
4. **Early Stage (Series A and B):** The start-up should now be operational and profitable. Although the BizPlace model and the Venture Capital Method can still be correctly applied, valuation methods based on multiples and cash flow analysis (DCF) become common.
5. **Later Stage (Series C,D, etc. and bridge financing):** During the later stages the start-up raises financings to strengthen its balance sheet, to achieve profitability through more operating capital, to finance an acquisition, to further support product development or to prepare itself for exit via an IPO or an acquisition. At this stage hard data are now available; e.g. predictable revenue, backlog and EBITDA. Typical investors are no longer venture capitalists but high yield funds, Private Equity and banks, thus valuation methods based on multiples and DCF are the most appropriate.

Table X summarizes the results of this specificity analysis.

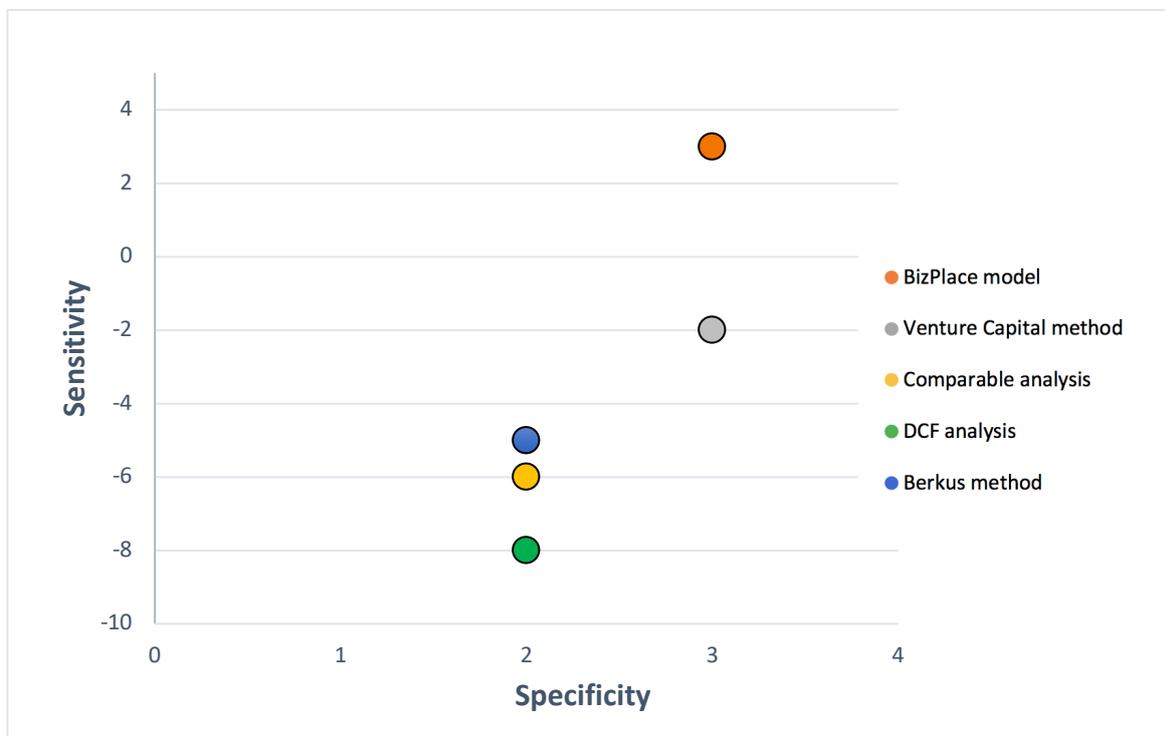
Table X – Specificity analysis score

Valuation models	Pre-Seed	Micro-Seed	Seed (Start-up Stage)	Early Stage	Later Stage	TOT.
Berkus method	●	●	○	○	○	2
BizPlace model	○	●	●	●	○	3
Venture Capital method	○	●	●	●	○	3
Comparable analysis	○	○	○	●	●	2
DCF analysis	○	○	○	●	●	2

### The results of the analysis

The two ratings are then put together (table XI) to permit a better visualization of the results of the analysis. What emerged is a qualitative representation of the suitability and theoretical solidity of the most widely used start-up valuation methods, where the BizPlace model performs best under both the parameters used in the study.

Table XI – Specificity - Sensitivity analysis



### Conclusion: the model at a glance

The BizPlace model aims to determine a "fair valuation" that mediates between two naturally conflicting positions: on the one hand, that of the entrepreneur and the characteristics of his business and on the other hand, the one of the investor with his prerogatives and his performance targets.

The first step is the identification of the business growth drivers, i.e. the elements characterizing the company's scalability.

The second step is the determination of the metrics that influence these drivers, for example the CPA and the CPC. The latter can be the result of market tests carried out by the company, historical averages observed in the months of activity or researches and studies on competitors. These metrics are then used to make a projection of the financial results of the company at 5 or 7 years depending on what is its most likely exit horizon (5 years in the case of M&A; 7 years in the case of IPO).

The prospective results determined by this projection (in particular revenues and EBITDA), expression of a "best case scenario", are then used to determine the "forecasted Terminal Value" of the company through the study of sector multiples and a selection of comparable companies (filtered by belonging to the business of the start-up, growth rate of revenues and market size).

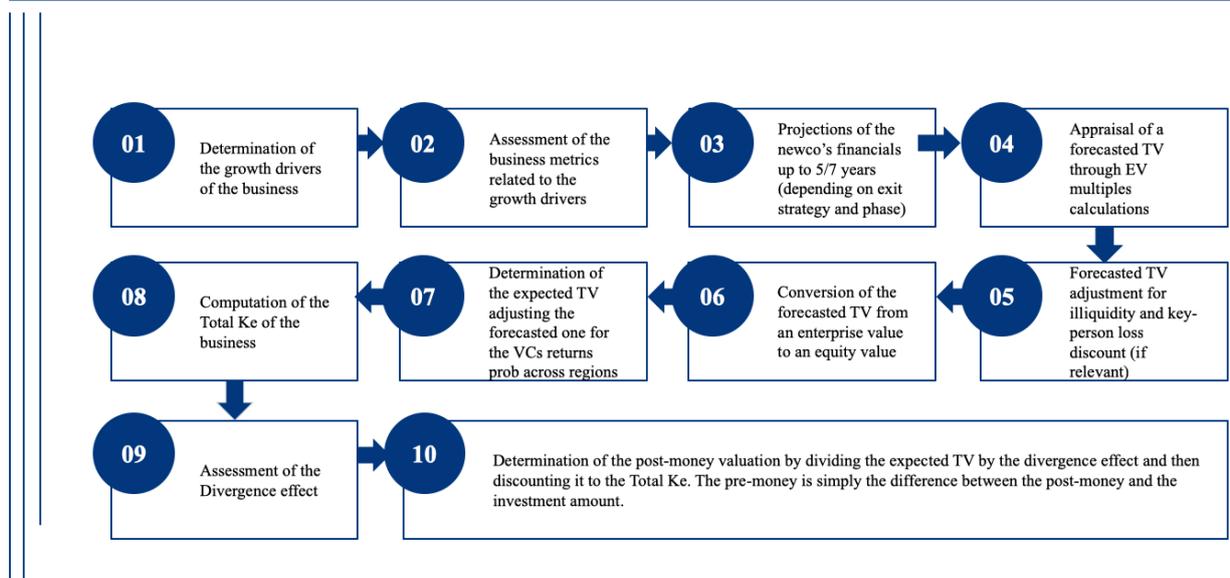
The next steps are to discount the value thus determined for certain factors such as: the illiquidity of the company, the impact of a hypothetical loss of a key person of the company on the business, distance from the average margins of the sector, and convert this value from "Enterprise Value" to "Equity Value" ( $\text{Equity Value} = \text{Enterprise Value} + \text{Cash and Marketable Securities} - \text{Outstanding Debts}$ ).

Finally, in order to correctly represent the prospective value of the company analyzed, this value must be transformed from a "forecasted" to an "expected" value, weighing it on the expected probability of venture capital investors to obtain the amount invested according to the geographical areas in which they operate rather than the sectors in which they invest (This weight are based on a study of the European Investment Fund, "Principe 2017" on a sample of more than 2700 international start-ups financed by operators in the VC sector).

The output is the expected prospective value of the project analyzed, which will then be adjusted by a dilution factor (or "divergence"), which makes it possible to determine the expected percentage of equity due to the investor following future investment rounds, and discounted at the present time at the company's total cost of equity ( $\text{Tot. Ke} = \text{Risk free rate} + \text{Total Beta levered} * \text{Equity Risk Premium}$ ) appropriately calculated to include the specific risk of the company and not only the systemic market risk.

The value thus determined represents the company's post-money valuation. The pre-money is simply the difference between the post-money valuation and the investment request (e.g. post-money valuation = € 2.5 million; funding need = € 500K; pre-money valuation = € 2.0 million).

## The BizPlace model at a glance



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