

## A Review of Models for Valuing Young and Innovative Firms

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### **ABSTRACT**

*Determining the value of a firm is one of the most complex in financial management. When the business in question is technology oriented and new, this difficulty is further increased. The lack of adequate past data, a high degree of uncertainty about its future success and the lack of positive cash flow makes this task harder.*

*Entrepreneurs usually use savings of their own or family and friends to establish the business. When these resources are inadequate, they resort to raising funds from angel investors or venture capital firms. In such situations, the most important challenge an entrepreneur faces is to determine the value of the venture.*

*This study shows why traditional approaches to determining the value of businesses are not suitable for young and innovative ventures. It indicates which approaches should be utilized for these types of ventures and it highlights the appropriate techniques for determining their value.*

**JEL Classifications: G32, M13**

**Keywords:** Valuating start-ups, business valuation, discounted cash flow method, venture capital method

### **1. Introduction**

Valuing a firm is difficult, and if the firm is a young, innovative, and technology intensive company, valuation becomes more difficult. Application of classical valuation techniques is not appropriate, due to reasons such as, the enterprise does not have adequate past data, it is not yet profitable, and uncertainty about its future success is high (Schootbrugge, Wong, 2013).

In addition to the difficulty of valuing a newly established enterprise, there are not many studies, because of an inability to obtain reliable data and a high level of uncertainty in envisioning the future. When we look at our country, there are only a few studies on this subject.

Why is valuing an enterprise or a venture necessary? Valuation of a firm is performed because of various reasons, such as obtaining the required funds with appropriate conditions, getting new partners on board, merging with another firm, acquiring another firm, or going for an initial public offering (IPO).

Valuation is difficult. However, valuing an enterprise that has a history is easier than valuing a new venture. Making predictions, based on its past performance, about the future success of a firm that has reached a certain maturity level is relatively easy. However, valuing a new venture, particularly a technology intensive one, is considerably more difficult. It is not an easy task to make forecasts about the extent to which young and innovative entrepreneurs will gain acceptance in the market, or at what speed they will grow. Since the possibility for these types of ventures to realize their investments through the sources they have generated is quite limited, most of the time their external financing needs are high (Lam, 2013). Finding external funding for young ventures at their seed stage is quite unlikely, due to the very high risk associated with their businesses. For ventures that have left their seed stage behind, the chance of being financed by angel investors and venture capital firms increases.

In developed countries, the venture capital sector, which supports business ideas even at the concept level and assumes an important role in turning innovation into entrepreneurship, have made rapid progress. Similar developments are also observed in developing countries, particularly after the 1980s. The biggest challenge that ventures face, when negotiating with venture capital firms, is what their share in the company will be in return for the investment they will receive.

A fair valuation for a venture becomes the most critical topic of the negotiation stage for entrepreneurs. A fair valuation is very important for investors who will invest in these types of companies and the founders of the companies alike (Festela, Wuermseherb, Cattaneoc, 2013). An unrealistic valuation gives rise to problems between investors who invest in the venture and the founders of the firm.

This study concentrates on how to value young, innovative, and technology intensive firms. Before elaborating on valuation methods, we will dwell upon the life cycle and financing stages of ventures. Because the risk level and the financing need of each stage are different, these stages are very important in valuations.

## **2. Financing Stages of Ventures**

A venture faces different financing alternatives at different stages of its life cycle. The financing stages of an enterprise are usually grouped as: early stage financing, expansion financing, and bridge financing (Wilson&Silva, 2013;Metrick&Yasuda, 2011). Depending on the stage that the venture is at, the size and risk of the financing need and the characteristics of the investors who will provide these funds will differ.

### **2.1. Early Stage Financing**

#### **2.1.1. Seed Financing**

If a venture is at the idea or concept stage, this stage is called the seed stage. At this stage, a fundamental idea is developed, a vision is defined, and necessary analyses are performed. The seed stage is also called the pre-commercialization stage. At this stage, in which the validity of the business idea is tested, basic research has been completed, but a commercial entity has not become official. At the seed stage, entrepreneurs usually need relatively little capital to make feasibility studies, develop prototypes, assess the potential in the market, protect the intellectual property, and research other aspects of the business idea. Since uncertainty is high at this stage when the enterprise is not officially established, financing is secured from the entrepreneurs' own savings, and if these savings are not adequate, from family members, relatives, or

friends. At this stage, raising capital from professional venture capital firms is mostly not possible (Hofstrand, 2013).

At the end of the seed stage, the entrepreneur makes a decision about whether or not to establish an enterprise. Since many ventures are unable to achieve enough motivation and capital at this stage, they are terminated before moving on to the next stage.

### **2.1.2. Financing Stage Before Market Entry**

When the seed stage has been successfully left behind, and a decision is made to set up an enterprise, the pre-market entry stage is reached, and the enterprise is established. Here, the important point is to have a business plan that describes how to set up the enterprise, and provides details of how it will operate.

Usually, the first step in this stage is to have the enterprise gain legal entity status. This legal entity status will define the extent of the operations of the enterprise. Subsequently, the founders of the enterprise can search for a place where operations will be carried out, and finalize space assignment. Often, at this stage, the management team of the enterprise is formed. Together with the newly formed management team, the entrepreneurs work to complete the development of distribution and marketing relationships, as well as elements of the supply chain of the enterprise.

The financing requirement at this stage is relatively higher than at the seed stage. Therefore, entrepreneurs at this stage resort to meeting their capital needs from venture capitalists. Equity or equity-like investments into ventures which generate new technologies or ideas and have development potential, are called venture capital, and people or institutions that provide venture capital are called venture capitalists. In this financing and investment model, in which there is a high risk against high return expectation, both the entrepreneur and the venture capitalist that provides capital to this venture gain high returns, if the risk taken turns into success.

The capitalists who provide their funds to ventures to which they have no family or friendship connection are called angel investors or business angels. The European Business Angel Network (EBAN) defines a business angel as an “Investor who directly invests his or her own capital in seed or early stage firms that have no family connection.” Instead of angel investors, venture capital funds can be accumulated in venture capital firms (such as venture capital investment trusts and funds), and can be channeled to ventures by these companies. In such a circumstance, venture capital turns into a more professional and institutional structure. Fundamentally this model is based on partnership. On the one side of the partnership are entrepreneurs, who try to bring new technologies or ideas into action, and on the other side of the partnership are the venture capitalists, who analyze the business ideas of these entrepreneurs, develop confidence in the possibility that these ideas can turn into successful investments, and therefore finance the entrepreneurs.

At the pre-market entry stage, entrepreneurs raise more capital from venture capital firms than from angel investors (Kreamer, 2011). Despite the fact that it is difficult to obtain reliable information about angel investments, recently conducted studies in the U.S.A. have shown that the total volume of angel investments in the last decade is close to the investment volume of venture capital firms. It has been observed that a similar situation is also valid for many of the countries in Europe. Angel investors outnumber venture capital firms in investments, and they make investments in younger ventures, and with smaller amounts (Metrick&Yasuda, 2011).

Because angel investors use their own capital, they can be more flexible, and assume higher risks. In addition, since angel investors were usually entrepreneurs themselves in the early stages of their lives, and they try to support the young entrepreneurs in the fields in which they have expertise, they can be helpful to entrepreneurs, not only with capital, but also with other aspects.

### **2.1.3. Startup Financing Stage**

The startup stage is also known as the market entry stage. The most salient feature of this stage is to start production and sales, and the servicing of products in the market. Startup stage financing involves the working capital required in the period between the time that pre-establishment financing is completed and the time when the enterprise starts its operations, plus financing for all the losses incurred during the set up process, and funds allocated for unexpected problems during the establishment phase. Since this involves less risk than seed stage financing, venture capital firms, along with angel investors, are also interested in this stage.

### **2.1.4. First Stage Financing Phase**

First stage financing is also known as the rampancy stage, and it is the last phase of early stage financing. The most important feature of it is that production and sales ramp up. Ramping up an enterprise through increased sales is an indicator of success, because it means that the business model of the company has gained acceptance in the market, and the company has moved into profitability. If the venture reaches profitability at the startup stage, or if it has sound indicators that it will reach profitability in the rampancy stage, more and more venture capitalists will be willing to finance this stage.

## **2.2. Expansion Stage Financing**

### **2.2.1. Second Stage Financing Phase**

This financing follows the first stage financing, and provides the necessary working capital for the growth steps of an enterprise, in which it produces and distributes its products, and has increasing receivables and inventories. Despite the fact that the venture has made progress, there might be situations that show that the company cannot yet be profitable. Changes in products or services, or additional investments might be needed to expand the market. The role of the venture capitalists at this stage can be more strategic. In addition, a company at this stage needs some managerial support. The financial and managerial support of the venture capitalist makes an important contribution to overcoming the problems.

### **2.2.2. Third Stage Financing Phase**

This phase is a phase in which the enterprise, that has continuously increasing sales volume and profitability, realizes quite a dramatic growth. The funds at this stage are used for capacity expansion in factories, market research, working capital, or developing a more advanced product.

## **2.3. Bridge Financing**

When the enterprise reaches a level where it can undertake an initial public offering (IPO), the financing provided to the company to carry out its activities until the IPO is called bridge financing. Bridge finance is made available for enterprises which will go for a public offering in six months to one year. At this stage, enterprises take the form of more stable companies, and expected returns for the investors fall accordingly. Depending on the risk of the venture, the expected returns for venture capitalists differ. Based on empirical studies, the table below presents the expected returns of venture capitalists from their investments (Sahlman, 2003).

<b>Stages</b>	<b>Expected Rate of Return</b>
Pre-market entry stage	80%
Startup stage	50%-70%
First stage financing phase	40%-60%
Second stage financing phase	30%-50%
Bridge financing stage	20%-35%

### 3. Valuing Young and Innovative Ventures

Determining the value of a firm is one of the fundamental topics of finance. In finance theory, the economic value of any investment is calculated based on the present value of future cash flows to be obtained from that investment. If the subject of the investment is a firm, the value of this firm is calculated taking the future cash flows to be obtained into account. There are many different methods used in company valuation. Each method has its own pros and cons. The appropriate valuation method should be determined depending on the company, the characteristics of the economy, and the sector in which the company operates.

Many of the studies in the literature have investigated which factors venture capitalists attach importance to when they are making investments. Table 1 below, from a wide ranging study, presents the importance ranking of venture capitalists when they make investments (Ge, JM Mahoney, JT Mahoney, 2015) As can be seen in Table 1, the highest ranking has been achieved by the characteristics of the entrepreneur(s), and this was followed by the size of the market and the features of the product. As the research established, the characteristics of the entrepreneur are extremely important for a venture to be successful. In order to understand why some ventures become successful, while many others fail in the same conditions and in the same field of activity, one should look at characteristics of the entrepreneur.

<b>Key Factors</b>	<b>Points</b>
1. Quality of management	4.5
2. Size of the market	3.8
3. Product quality	3.7
4. Growth rate of the market	3.5
5. Competition	3.5
6. Market entry conditions	3.4
7. Life stage of the venture	3.2
8. Sector the venture is in	3.0

**Table 1: Relative Importance of Key Factors Affecting the Value of a New Venture**

In this study we will deal with the methods that can be used in determining economic value of young and technology intensive ventures, as well as points that should be taken into account when implementing these methods.

In the literature, four main classical company valuation methods are used in the valuation of young and technology intensive ventures: **Discounted Cash Flows Method, Method Based on Multiples Based Valuation, Net Asset Value Method, and Venture Capitalists' Method**, which is so-called because it is used by venture capital firms.

However, none of these methods is sufficiently adequate in the valuation of a young and technology intensive venture. In the above-mentioned methods, it is assumed that capital markets are efficient (Lv, X. & Qian, K. 2012). Factors such as inefficient markets, ventures having only a very short operational history,

and limited amount of financial data enhance the information asymmetry between the entrepreneur and potential investors. In addition, investments to be made in these ventures are long term investments, and they are not very likely to exit these investments within a very short period. Young ventures have intangible assets rather than tangible assets. Because of these reasons, valuation of these ventures becomes more difficult.

### **3.1. Discounted Cash Flows Method (DCF)**

In the DCF method, first, future expected cash flows are estimated. Then, the value of the company is found by calculating the present value of these future cash flows. While discounting the future cash flows to the present, a discount rate (expected rate of return), which is determined with respect to the risks of these cash flows, is used. In valuation of new and technology intensive ventures, some adaptations should be made in the classical DCF method. With these adaptations, we observe that DCF is widely used in the valuation of young and innovative ventures (Jennergren, 2008; Jiménez&Pascual, 2008)

The problems that arise when using this method for new ventures are as follows: Because of the high risk, the first problem is in determining the discount rate to be used in discounting the future cash flows to the present. The second problem is that there are multiple investment stages, and the investor is given the right to retract from the previously determined new investments.

Determination of future cash flows that the young and technology intensive ventures will generate is very difficult. In these types of ventures, it seems impossible to obtain positive cash inflows until the technology gains acceptance in the market. It is observed that in young ventures, after the cash flows become positive, they rapidly increase. However, depending on the features of the technology, it is not an easy task to forecast how long this increase will continue, and whether other firms will enter the market. Therefore, when engaging in forecasts, one should be more careful, and make predictions by taking different scenarios into account.

In technology intensive ventures, there are different risks at different stages of the life cycle. While risk is higher in the early stages, it tends to be lower in later stages. Due to changing risk levels, it is not appropriate to discount the cash flows to the present day by using a constant discount rate, as in the classical DCF method. Therefore, if a valuation is based on the DCF method, risks of every stage should be taken into account, and discount rates should be differentiated accordingly.

### **3.2. Multiples Based Approach**

In multiples based valuations, the value is calculated by using the sector the company is in, or the data of another comparable company. It is a widely used approach, as it is an easy valuation method. The most frequently used multiples are price/earnings ratio, market value/book value ratio, earnings before interest, depreciation, and taxes (EBITDA), and free cash flows. This method assumes that there are comparable firms to the firm for which the valuation will be conducted, and that these firms are fairly valued by the market. These multiples are usually obtained from publicly traded companies. As the efficiency of the capital markets increases, the drawbacks of using this method decrease.

Let us assume that the after tax profit of the company for which the valuation will be performed is known, but because it is not traded on a stock exchange, its market value is unknown. The possible market value of the company can simply be calculated by multiplying the after tax profit of this company by the price/earnings ratio (this ratio shows how many times more the market value is than the earnings of the firm) of comparable firms that are traded on the stock exchange, or of the sector the company is in.

The problems encountered when valuing new enterprises based on multiples are as follows:

- First, many of the young ventures have not yet made a profit.
- Second, it is difficult to find firms that can be used as a reference for, or are comparable to, these types of venture.
- Third, even when a group is used as a reference, it is open to discussion as to what extent this group is appropriate for comparison.

### 3.3. Net Asset Value Approach

In the net asset value approach, the value of the firm is calculated by deducting the debts from the assets on the balance sheet. This approach is not an appropriate approach in valuing young and innovative ventures, because the value of these types of firms is based on intangible assets, rather than tangible assets. Therefore, a valuation based on the balance sheet values of particularly young ventures is not an appropriate approach.

### 3.4. Venture Capital Method (VCM)

Since this method is the most frequently used in practice, it is called VCM. This method combines the DCF and the Multiples methods. In this method, a valuation is performed based on the amount of investment the venture capitalist will make, what the expected rate of return from the investment is, and when the investor will exit from the investment (Sahlman, A. W. 2015).

By way of example, let us assume that a venture capitalist considers making \$2,500,000 investment in a young venture, expects to get 40% return, and hopes to exit from the investment after 5 years. The value of the venture, and the capital shares of the investor and the entrepreneur are calculated as follows:

Future Value of the Investment =  $(1 + \text{Rates of Return Required})^{\text{year}} \times \text{Investment Amount}$

Future Value of the Investment =  $(1 + 0.40)^5 \times 2,500,000$

Future Value of the Investment = \$13,445,600

Now, we need to calculate the value of the enterprise at the end of the fifth year. For this, we will need to estimate what profitability level the company will reach in five years' time. After the profit is determined, the value of the venture in year five is calculated by using price/earnings or price/sales ratios of a comparable firm that has similar characteristics to the venture, or the ratios of the sector the venture is in. If we assume that the net earnings of the venture in the fifth year is 1 500 000 €, and the price/earnings ratio of the comparable firms is 12, in such a case:

Value of the Venture =  $12 \times 1,500,000 \text{ TL} = \$18,000,000$

The share of the venture capitalist will be calculated by taking the value of the venture into account. And this is simply calculated by Future Value of the Investment / Value of the Venture. Following our figures:

Share of the Venture Capitalist =  $13,445,600 / 18,000,000 = 74.7\%$

Because this method is easy to apply it is very frequently used in practice. To the extent it is possible to find an entrepreneurial firm it will also be possible to come up with fair valuations.

## 4. Conclusion

In the literature, there are many methods for valuing a firm. However, as we mentioned above, none of the methods is sufficiently adequate to determine the real and fair value of a firm. While a method can give a more accurate result for some firms, it may not give as accurate a result for other firms. Appropriate methods need to be utilized based on the characteristics of the firm for which the valuation will be performed, and of the sector and the country the firm is in. Likewise, valuation should take into account the structure of the financial system, the envisioning abilities of the people who perform the valuation, and the special

conditions of the venture that has capital needs. For this reason, valuation is a partly scientific and partly artistic practice (Hudson, M. 2015).

The DCF method is the most comprehensive method in valuation. However, when using this method, different discount rates that are commensurate with different stages of the venture should be used to discount future cash flows. In order to come up with a more accurate value, it is advisable to value the venture by using more than one technique. In valuations where more than one method is used, taking an average of these different methods by assigning a higher value to the method which is deemed most appropriate for the venture will give better results.

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