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STARTUP VALUATION
A descriptive analysis of the Italian Market

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«Le fiabe sono più che vere: non perché ci dicono che i draghi esistono ma perché ci dicono che i draghi possono essere sconfitti». G. K. Chesterton

INDEX

ABSTRACT	8
CHAPTER 1 STARTUP INTRODUCTION	10
1.1 STARTUP DEFINITION	10
1.1.1 The concept of engine of growth	11
1.2 HOW STARTUP BORN: FROM THE IDEA TO THE COMPANY	11
1.2.1 The business idea	11
1.2.2 The business opportunity	12
1.2.3 The business plan	12
1.3 STARTUP “INNOVATIVE” NUMBERS IN ITALY	14
1.3.1 Definition of Innovative Startup and advantages	14
1.3.2 Data about innovative Startup in Italy	16
CAPITOLO 2 STARTUP FINANCING	20
2.1 STARTUP LIFE CYCLE	20
2.1.1 Bootstrapping or pre seed phase	20
2.1.2 Seed phase	22
2.1.3 Creation stage or early stage	23
2.2 FINANCING PHASES FOR STARTUP	25
2.3 FINANCIAL ACTORS	27
2.3.1 Incubators and accelerators	27
2.3.2 Business Angels	28
2.3.3 Venture Capitalists	29
2.3.4 Private equity	30
2.4 STARTUP SOURCES OF FINANCING: EQUITY VS DEBT	30
2.4.1 Internal sources of financing	30
2.4.2 Debt financing	31
2.4.3 Equity financing	33
2.4.4 Convertible debt financing	34
2.5 CROWDFUNDING	35
2.5.1 Equity Crowdfunding	36

CAPITOLO 3 STARTUP VALUATION.....	41
3.1 STARTUP VALUATION METHODS	41
3.1.1 The Discounted Cash Flow method.....	42
3.1.2 The multiple approach.....	45
3.2 ALTERANTIVE VALUATION METHODS.....	48
3.2.1 The Venture Capital method.....	48
3.2.2 The First Chicago Method.....	51
3.2.3 The Real Options method.....	52
3.2.4 Qualitative methods: Berkus method and Scorecard method.....	55
CHAPTER 4 DESCRIPTIVE ANALYSIS ON ITALIAN VALUATIONS AND FINANCING ROUNDS OF STARTUPS	59
4.1 METHODOLOGICAL APPROACH AND RESEARCH METHOD.....	59
4.2 DATA ELABORATION	63
4.2.1 Box Plot Analysis	65
4.3 DATA RESULTS	69
4.3.1 Scatter Plot Analysis.....	69
4.3.2 Data distribution analysis	72
4.3.3 Krustal-Wallis H.....	78
4.3.4 Pre seed results	81
4.3.5 Seed results.....	85
4.4 ANALYSIS ON THE EQUITY CROWDFUNDING SAMPLE	93
4.4.1 Software vs hardware based Startups	94
4.4.2 B2B vs B2C Startups.....	98
4.4.3 The size of the companies	102
4.5 CONCLUSIONS.....	106
CAPITOLO 5 BIBLIOGRAFY	109
CAPITOLO 6 APPENDIX	112

Table index

Table 1: source Report Camera di Commercio	16
Table 2: Author elaboration of Report Camera di Commercio.....	17
Table 3: source Report Camera di Commercio	17
Table 4: author elaboration of source (Desaché, 2014).....	47
Table 5: source author elaboration	53
Table 6: Author elaboration of (Payne, 2011).....	57
Table 7: source: (Payne, 2011).....	58
Table 8: Luche srl comparable companies	62
Table 9: Equity Crowdfunding valuations features.....	72
Table 10: Italian Private Funded valuations features	74
Table 11: International companies valuations features	75
Table 12: normality tests for Italian Equity Crowdfunding companies	77
Table 13: normality tests for Italian Private Funded companies.....	77
Table 14: normality tests for Italian Private Funded companies.....	77
Table 15: Pre seed samples Valuations	81
Table 16: Pre-seed round of financing	83
Table 17: Italian Equity Crowdfunding and Italian private funded companies seed valuations... 85	
Table 18: number and mean of ranks	86
Table 19: Statistics of the Krustal-Wallis test.....	86
Table 20: Italian Equity Crowdfunding and Private seed round of financing.....	88
Table 21: number and mean of ranks	89
Table 22: Statistics of the Krustal-Wallis test.....	89
Table 23: Italian companies divided by sectors	90
Table 24: Number and mean of ranks	91
Table 25: Statistics of the Krustal-Wallis test.....	91
Table 26: number and mean of ranks	92
Table 27: Statistics of the Krustal-Wallis test.....	92
Table 28: software and hardware seed valuations.....	95
Table 29: number and mean of ranks	96
Table 30: Statistics of the Krustal-Wallis test.....	96
Table 31: Software and hardware based seed round of financing.....	97
Table 32: number and mean of ranks	97

Table 33: Statistics of the Krustal-Wallis test.....	98
Table 34: B2B and B2C Equity Crowdfunding Seed Valuations	101
Table 35: number and mean of ranks	101
Table 36: Statistics of the Krustal-Wallis test.....	102
Table 37: Statistics of the Krustal-Wallis test.....	102
Table 38: Statistic of Krustal Wallis test for Total Assets	104
Table 39: Statistic of Krustal Wallis test for Net Equity.....	104
Table 40: Statistic of Krustal Wallis test for Total Assets	104
Table 41: Statistic of Krustal Wallis test for Net Equity.....	104
Table 42: number and mean of ranks	105
Table 43: Statistics of the Krustal-Wallis test.....	105
Table 44: number and mean of ranks	106
Table 45: Statistics of the Krustal-Wallis test.....	106

Figure index

Figure 1: source (Kesim, 2015).....	20
Figure 2: source Slides Strategy and Marketing, Vittorio Chiesa.....	24
Figure 3: source https://hoteliyo.com/early-stage-funding-sources/	26
Figure 4: source https://hoteliyo.com/early-stage-funding-sources/	29
Figure 5: source (Consob, 2016)	37
Figure 6: source Crowdfunding Buzz	
Figure 7: source Crowdfunding buzz	40
Figure 8: source Damodaran’s Dark Side of Valuation	44
Figure 9: source Damodaran’s Dark Side of Valuation	46
Figure 10: Box plot, crowdfunding Pre-seed valuation	66
Figure 11: Box plot, private Pre-seed valuation.....	66
Figure 12: Box plot, International Pre-seed valuation	66
Figure 13: Figure 4.5 Equity crowdfunding seed.....	69
Figure 14: Italian Private Seed	70
Figure 15: International seed Companies.....	71
Figure 16: Equity Crowdfunding seed valuation distribution	72
Figure 17: Italian Private Funded seed valuation distribution	74
Figure 18: International Companies seed valuation distribution.....	76

ABSTRACT ENGLISH VERSION

The aim of this master thesis is to give to the readers an overview of Startups, referring not to the first phases of the life cycle of any company, but to the entities that through a scalable and repeatable business model aims to grow rapidly on the market. Indeed, in the first chapters of the literature review is presented the Startup's complex environment, their different life cycle phases, the financing sources in the hands of the founders and the models of valuation used by investors in order to assess the value of these companies. The chapter about valuation is the main part of the literature and per each methods are pointed out the limitations of using it in the Startups' field, mainly due to the extensive use of not consistent financial information coming from the balance sheets of the companies. The sources of data considered in the literature review are papers from Scopus and Web of Science and information coming from books about Startups.

In the second part, a descriptive analysis about the Italian Market is conducted, considering Startups, which ask pre-seed and seed rounds of financing. It is taken for the analysis a sample of 55 Startups, which were able to successfully collect pre seed and seed rounds through Equity Crowdfunding in Italy. The aim is to assess the average valuation of Startups, which ask these type of rounds of financing in Italy. Then, it is considered a second sample composed by Italian companies, comparable with the Startups of the first one, with the objective to demonstrate that comparable Startups receive on average the same valuations. Then, the Italian Market is compared with International Companies, which operate in the same sectors, but in different countries. In the last part, two qualitative features of Startups are tested in order to understand if they have an impact on the values of pre-money valuations or not; the conclusions of the tests are in support of the hypothesis.

The aim of this thesis is not to develop a new model for valuing Startups, but to understand the average in the Italian market, if comparable companies get same valuations and test the impact of some qualitative features. This is only a first step from which other analysis can start in order to verify other characteristics, which can influence the valuation or consider for the analysis all the kind of rounds of financing asked by Startups.

ABSTRACT ITALIAN VERSION

Lo scopo di questa tesi è dare ai lettori una panoramica sulle Startups, riferendosi non alle prime fasi del ciclo di vita di qualsiasi azienda, ma alle entità che, attraverso un modello di business scalabile e ripetibile, puntano a crescere rapidamente sul mercato. Nei primi capitoli della letteratura, infatti, viene presentato il complesso ambiente delle Startups, le diverse fasi del ciclo di vita, le fonti di finanziamento nelle mani dei fondatori e i modelli di valutazione utilizzati dagli investitori per valutare il valore di queste società. Il capitolo sulla valutazione è la parte principale della letteratura e per ogni metodo sono indicati i limiti del suo utilizzo nel campo delle Startup, principalmente a causa dell'ampio uso di informazioni finanziarie non coerenti provenienti dai bilanci delle società. Le fonti di dati considerate nella letteratura sono principalmente papers di Scopus e Web of Science e informazioni provenienti da libri di testo su Startup.

Nella seconda parte, viene condotta un'analisi descrittiva del mercato italiano, considerando le Startups che chiedono finanziamenti di tipo Pre-Seed e Seed. Per l'analisi è stato preso in esame un campione di cinquantacinque Startups, che sono state in grado di raccogliere con successo round Pre Seed e Seed attraverso l'Equity Crowdfunding in Italia. L'obiettivo è quello di ottenere la valutazione media delle Startup che richiedono questi livelli di round di finanziamento in Italia. In seguito, è stato considerato un secondo campione composto da società italiane, comparabile con le Startups del primo campione, allo scopo di dimostrare che le aziende comparabili ricevono in media le stesse valutazioni. Quindi, il mercato italiano è stato confrontato con le società internazionali, che operano negli stessi settori, ma in diversi paesi. Nell'ultima parte, vengono testate due caratteristiche qualitative delle Startup per capire se queste hanno un impatto sui valori delle valutazioni Pre-Money o meno; la conclusione dei test sono a supporto dell'ipotesi.

Lo scopo di questa tesi non è quello di sviluppare un nuovo modello di valutazione di Startup, ma di capire la valutazione media nel mercato italiano, se aziende comparabili ottengono le stesse valutazioni e testare l'impatto di alcune caratteristiche qualitative. Questo è solo un primo passo da cui possono partire altre analisi per verificare altre caratteristiche che possono influenzare le valutazioni oppure considerare per le analisi tutti i tipi di round di finanziamento di una Startup

CHAPTER 1

STARTUP INTRODUCTION

1.1 STARTUP DEFINITION

«“A Startup is a (new) company working to solve a problem where the solution is not obvious and success is not guaranteed.”»¹.

A Startup is an entity (not only a new company, but also a group of people) which through a scalable and repeatable business model aims to grow rapidly on the market. This type of company may not be technological, may not look for external capitals or for an exit strategy, but only aims to grow fast; the other things are consequences². The word “Startup” has a completely different meaning than “Start-up”: it identifies a temporal situation, the starting point of the life cycle of every company, so it can be considered as the birth of any business reality as a bar or a restaurant. Therefore, the main difference between a Startup and a traditional business is the scalability of the business model and its repeatability: the growth of the business in term of clients and volume is not proportional to the resources invested and the business model can be repeated in different periods and places without significant changes³.

The growth of a Startup, which is the main attraction for the investors, has different metrics according to the industry in which the company operates (crunch rate, lifetime value, cost of client acquisition...), which are all different from the “revenues”, very important for the traditional companies⁴. This concept will be discussed later in the chapter regarding the life cycle phases of a Startup. If we accept that the growth and scalability are the identifiers for a Startup we understand that all the consequences as level of technology, investment and strategy must be functional to growth itself.

¹ Neil Blumenthal, cofounder and co-CEO of Warby Parker

² Paul Graham

³ <https://www.economyup.it/glossario/startup-definizione/>

⁴ Source is an article from Tip Ventures: <https://tip.ventures/IT/blog/3199/startup-o-start-up-trova-le-differenze1>

Indeed, in order to meet these features, Startups are mainly high-tech companies, based on software because they are easily produced and reproduced; therefore, technology-oriented projects have the greatest potential of growth. Startups are mainly located in major urban centres in order to increase rapidly the number of clients and overcome the limitation of local market (Marina Klacmer Calopa, 2014).

1.1.1 *The concept of engine of growth*

As we said, Startups have to acquire significant customer base or market share, in a relatively short period. The “engines of growth” is a concept that helps Startups to understand, how the business is growing according to the customer use of your product or service: they make the company grow faster than a normal company does (Ries, 2011). There are different types of engine of growth:

- Sticky engine of growth: aims to retain customers for the long term thanks to unique product design, superior memorable experience and product innovation;
- Viral engine of growth: aims to growth customer base thanks to word of mouth;
- Paid engine of growth: aims to attract customers through advertising. The sources of advertising are not the traditional ones, because too expensive and Startups have limited financial resources;

1.2 HOW STARTUP BORN: FROM THE IDEA TO THE COMPANY

Not all the ideas become companies and not all companies reach success, creativity and innovation are not enough to turn an idea into a successful Startup. The idea is only the first step, and then it is important to evaluate if the idea can exploit a market opportunity and to translate the future strategy in an enterprise’s language: the business plan. (Advance, 2001)

1.2.1 *The business idea*

In order to be “business” an idea must generate profits; otherwise, it is not possible to turn it into an enterprise. There are different sources of ideas:

- New benefits: performing an old function for customer, but in a new and improved way;

- New technology: Use a new technology that provides the basis for a new product or services idea;
- New market: provide the customers with a product/service new to them (Ries, 2011);

Many Startups begin from an idea that they think could be interested for customers, they spend time working on product or service without asking feedbacks and opinions from potential customers and in the end they fail. This happens because a successful idea exploits a business opportunity.

1.2.2 *The business opportunity*

To exploit a business opportunity means understand if the idea could generate profit on the market and if it provides a solution, which is perceived as interesting from the potential customers. In order to evaluate this, some factors have to be taken into account:

- Marketing factors: analyse which are the problems that the Startup is trying to solve, if these problems are real and which are the market needs satisfied. Then, focusing on the Startup solution: analyse how this solution solve the problem, how it works and if it is better than the existing ones;
- Competition: understand the current competitive system in terms of direct competitors and substitute products, and how it will evolve in future. Find the competitive advantage⁵ of the solution and if it is sustainable in time;
- Economics: define the target market for the solution and its size. Determine the investments necessary to reach the market and the expected return on the investment
- Management: focus the attention on the team its composition, backgrounds and role necessary in order to develop the offer;

1.2.3 *The business plan*

The business plan is the translation of all the previous information into an enterprise's language; it represents the starting point in order to ask for external capitals. The redaction of the business plan

⁵ Competitive advantages are conditions that allow a company or country to produce a good or service at a lower price or in a more desirable fashion for customers.

http://www.investopedia.com/terms/c/competitive_advantage.asp

involves the whole company and it has to specify, in quantitative terms, the objectives of the Startup and their compatibility with resources (technological, financial...), which the company has or would like to have, taking into account the competitive system of the target market. The main objectives of the business plan are:

- Describe the company's strategy and the objective of the entrepreneur;
- Identify the mission of the company, the resources to exploit and objectives to reach, in order to achieve the vision of the company;
- Describe the current economic situation and make an hypothesis about future, using data coming from the Balance Sheet, Profit and Loss account document and indexes of financial analysis;

A business plan reliable for future investors, must disclose information about the production process of the product/service, the sources of the offer, the marketing strategies, description of plant and current resources, information about the team and a description of strengths and weaknesses of the company using the SWOT analysis. The management could also conduct a sensibility analysis: consider the output of the Startup according to different situations. In the Anglo-Saxon tradition, the business plan has this structure:

1. Executive Summary (short version of the entire business plan);
2. Organizational profile of the company;
3. Market and competitors;
4. Product and service;
5. Marketing plan;
6. Operative plan (production, investments and timing);
7. Economic and financial prospect;

1.3 STARTUP “INNOVATIVE” NUMBERS IN ITALY

In 2012 was introduced in Italy the Law 221/2012 also known as “Decreto Crescita 2.0”, in order to foster the birth and growth of new innovative enterprises with high level of technology.

This Law introduced, in the Italian legal order, a new type of enterprise, the “Innovative Startup” with a large regulatory corpus, which gives it advantages during the all life cycle, without any limit in term of industry or entrepreneurs’ age.⁶

1.3.1 Definition of Innovative Startup and advantages

“Le startup innovative sono società di capitali di diritto italiano, residenti in Italia ... che rispondono a determinati requisiti ed hanno come oggetto sociale esclusivo o prevalente lo sviluppo e la commercializzazione di prodotti o servizi innovativi ad alto valore tecnologico”⁷.

The above definition come from the Law 221/2012 and defines as Innovative Startups Italian companies, resident in Italy, which have as main goal the production, development and commercialization of innovative products and services characterized by an high level of technology. In order to be an Innovative Startup, companies must satisfy some requirements:

- They are new grounded companies or anyway they have been grounded less than 5 years ago (not before the 18/12/2012);
- They have their Headquarter in Italy, or in another country member of the European Union or a country adhering to the agreement on European Economic Space, but with a plant or a brunch in Italy;
- Starting from the second year of life of the Startup, the total value of annual production is not higher than € 5m;
- They do not pay dividends to shareholders;
- They have as main business goal, the development, production and commercialization of innovative products and services with high level of technology;

⁶ Source: La policy nazionale a sostegno delle startup innovative, Ministero dello Sviluppo Economico, 2017

⁷ Source: <https://www.opstart.it/equity-crowdfunding-info/start-up-innovativa-definizione/>

- They are not the result of a merger, corporate split or a divestiture of a corporation or corporate branch;
- One of the following requirements must be satisfied:
 - The R&D costs are equal or more than the highest value between total value of production and annual costs;
 - The labour force is for one third composed by PHD, or two third have a second level bachelor degree;
 - The company owns a registered patent or it is the owner of a registered original calculator program. (Crupi, 2017)

If companies satisfy these requirements can be considered Innovative Startups and so, they have access to a large set of advantages, which foster their growth. Here there is a summary of concessions⁸:

- Exempt form cameral and stamp duty: Startup won't pay the annual duty to the "Camera di Commercio" and stamp duty for any fulfilment to be made at the Registry of Companies;
- Flexible corporate management: the Act of Constitution of innovative Startups created in the form of SRL companies may include categories of shares that do not attribute voting rights or attribute them to a non-proportional share of the participation;
- Leaseback facilitations: in the event of systematic losses, start-ups have a special scheme for reducing the share capital;
- Labour: possibility of hire workers with advantageous contracts for the company. The company can also decide the fixed and variable part of the salary (according to some limits);
- Remuneration using equity participation tools: workers can be paid using stock option, therefore with equity participation tools and the Startup can pay suppliers with work for equity;
- Tax credit for the recruitment of highly qualified staff: concessions for Startup, which hire highly qualified staff: tax credit equal to the 35% of the total cost incurring for hiring with open-ended contracts;
- Tax incentives for investments in Startups for both private and juridical entities;

⁸ Source: La policy nazionale a sostegno delle startup innovative, Ministero dello Sviluppo Economico, 2017

- Introduction of Equity Crowdfunding: Startups can raise capital online through authorized online platforms;
- Simplified, free and direct access to the Small and Medium Enterprises Guarantee Fund Startup, a government fund that facilitates access to credit through the provision of bank loan guarantees;
- Ad hoc support in the internationalization process of Startups by the ICE Agency: includes legal, corporate, tax, real estate, contractual and credit assistance, free hospitality at major international fairs and events, and activities aimed at fostering innovative start-ups with potential investors for phases of early stage capital and expansion capital;
- Fail-fast: Introducing procedures to make the process start-up faster and less heavy in case the startup does not take off;

1.3.2 Data about innovative Startup in Italy

The last available data about Innovative Startups come from the report of “Camera di Commercio” of the 30th June 2017. According to the report, the companies registered in the special section of Innovative Startups are 7394, 514 more than in the end of May.

Numero, dimensione startup e società di capitale			
	1° trim 2017	2° trim 2017	variazioni in % 1° trim 2017 / 2° trim 2017
N. startup	6.880	7.394	7,47
N. società' di capitale	1.604.802	1.623.359	1,16
Capitale sociale totale dichiarato dalle startup	349.480.572 €	373.536.162 €	6,88
Capitale sociale totale dichiarato dalle società'	3.135.218.457.427 €	3.056.912.221.746 €	-2,50
% startup sul totale società' di capitale	0,43	0,46	n.d

Table 1: source Report Camera di Commercio

The table 1 gives an overview about the number of Innovative Startups in Italy until the second quarter 2017 and data about their share capital. It indicates that there is a growth of 7.47% of the number of Startups compared to the data of the previous quarter. The total value of the share capital is 373.6 million euros, with a mean value of 50,519 € per company and it grew with a rate of almost 7% compared to the previous quarter. The percentage of Startups on total capital companies is increased but, 0.46% in absolute term is a low value; however, considering specific sectors, Startups are a high percentage on the total. For instance, according to the report, the 26.2% of Italian

companies, with the economic activity classified with the Adecò code “Ricerca e Sviluppo” are Innovative Startups.

	4° Quarter 2016	1° Quarter 2017	2° Quarter 2017	Variation 4°/1°quarter	Variation 1°/2°quarter
Number of Startups	6.745	6.880	7.394	1,96%	7,47%
Share capital declared by Startups	351.162.180 €	349.480.572 €	373.536.162 €	-0,48%	1,16%
% Startup on total capital companies	0,42	0,43	0,46	n.d	n.d

Table 2: Author elaboration of Report Camera di Commercio

From the table 2 is clear that the trend of growth of the number of Startup and percentage Startup on total companies is positive: also in the first quarter of 2017 there is a growth of both terms compared to the last quarter of 2016, but the increase is lower. The result is a positive trend, but the lower growth in the first quarter of 2017 can be explained by the fact that 800 startups, in the end of 2016, lost their title of Innovative Startup. This because in December 2016 a “transitory period”, which was introduced to protect Startups born before the “Decreto Crescita 2.0”, ends. It explains also, why there is a decrease in the value of share capital declared in the first quarter 2017.

Distribuzione per settore economico				
COMPARTO	Dettaglio principali DIVISIONI	2° trim 2017		
		n. startup	% startup del comparto sul totale del territorio	% startup su totale società di capitale del comparto
Agricoltura e attività connesse	TOTALE	45	0,61	0,26
Attività manifatturiere, energia, minerarie	C 26 Fabbricazione di computer e prodotti di elettronica e ott...	250	3,38	3,30
	C 27 Fabbricazione di apparecchiature elettriche ed apparecchi...	151	2,04	1,80
	C 28 Fabbricazione di macchinari ed apparecchiature nca	263	3,56	1,24
	TOTALE	1447	19,57	0,63
Costruzioni	TOTALE	93	1,26	0,04
Commercio	TOTALE	299	4,04	0,09
Turismo	TOTALE	42	0,57	0,04
Trasporti e Spedizioni	TOTALE	24	0,32	0,06
Assicurazioni e Credito	TOTALE	11	0,15	0,04
Servizi alle imprese	J 62 Produzione di software, consulenza informatica e attività...	2281	30,85	8,62
	J 63 Attività dei servizi d'informazione e altri servizi infor...	660	8,93	3,10
	M 72 Ricerca scientifica e sviluppo	1028	13,90	26,16
	TOTALE	5220	70,60	1,40
Altri settori	TOTALE	182	2,46	0,27
Non Classificate	TOTALE	31	0,42	0,01
Totale complessivo	TOTALE	7394	100,00	0,46

Table 3: source Report Camera di Commercio

Analysing the industry distribution (table 3), the 70.6% of Innovative Startups offers services to other companies, the most diffused are: 30.8% software production and computer consulting, 13.9% activities in the R&D and 8.9% information services activities. Another 19.6% operates in the manufacturing industry especially in the production of computer and electronics hardware. Only the 4% of Startups operates in trade. Looking at the percentage of Innovative Startups compared to the total of share capital companies, it is higher than the average in the manufacturing and service industry. The most relevant data is that the 26.2% of Startups operating in R&D are Innovative Startups; this is an expected result, because these companies are focused on technological products and services, so R&D investments must be relevant.

In terms of geographical distribution, in absolute value the Lombardia is the region with the highest number of Startups (1,694) the 22.9% on the total, the majority concentrated in Milan (1160). At the second place, there is Emilia Romagna (10.9%) and then Lazio (9.7%), Veneto (8.6%) and Campania, the first of south Italy (7.4%). The geographical distribution is strongly conditioned by the presence of incubators, infrastructures that offer services to the development of Startups; they are mainly located in the north of Italy. (Crupi, 2017)

The data available about investments in Italian Startups, until September 2017, show a decrease compared to the 2016. From January to September 2017 the total amount of collected capital is 93,8 million euros, the 30.9% less than the first nine months of 2016 (135,8 millions).

This strong decrease come from weak second and third quarters and from the months of July and August, where were not registered any relevant operations. This negative trend was not forecasted, because the first quarter started with a higher amount compared to the one in 2016, 38.7 million euros corresponding to an increase of 42% compared to the previous year.

The main difference is not only in the number of operations, but on the values of the rounds: considering the first six months of 2017, the mean value of a round has been reduced from 2.4 million to 1.9 million.⁹

The data about 2016 are strongly different; indeed, the total amount raised during the year was 180 million euros, 82 million more than the year before (2015). However, the gap between the other

⁹ https://www.agi.it/economia/startup_italia_investimenti_giugno_2017-1924487/news/2017-07-03/

countries in Europe is big: in 2016 the England's investments in Startups were 7.8 billion euro, 2.7 in France and 1.6 in Germany.¹⁰ This gap come from the slow increase in the market of venture capital: the number of investors is too small in order to compete with the other European countries. Indeed, one of the biggest investment round (MotorK with 4.5 million) come mainly from international investments.

For what concern the distribution of capital raised by the Innovative Startups in 2016, the majority of it goes to the ICT "Information and Communication Technology" sector, followed by Clean tech and energy and Life Science. (Crupi, 2017).

A study conducted by "wired.it", which collect information coming from the main incubators in Italy¹¹, assess that in 2016 a lot of investments were made in artificial intelligence; therefore in all smart services in different sectors like Fintech and E-health and big data analysis. Other markets, which attracted many capitals, were Virtual Reality and the Mobile sector.

¹⁰ Data coming from an article of AGI: https://www.agi.it/economia/startup_italiane_investimenti_satispay-2206630/news/2017-10-02/

¹¹ <https://www.wired.it/economia/start-up/2016/12/27/investimenti-startup-2017-trend/>

Capitolo 2 STARTUP FINANCING

2.1 STARTUP LIFE CYCLE

Startups are complex companies; however, these entities have their life cycle, which was well described by researches in the last years (Salamzadeh, 2015). A good proxy of the main phases of a Startup life cycle is presented in the paper (Kesim, 2015), which divided it into three main stages: bootstrapping stage or pre seed stage, seed stage and creation stage.

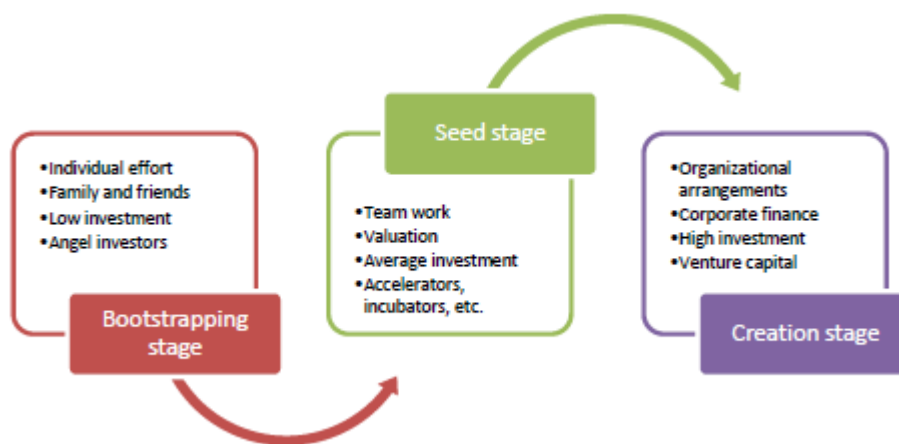


Figure 1: source (Kesim, 2015)

Other authors consider different phases, for instance (Maurya, 2012), has defined three phases with different names: problem/solution, product/market fit and scale up , but they can be reconnected to the above division. By collecting information from different papers and internet articles it is possible to describe these stages and the metrics which characterized them.

2.1.1 Bootstrapping or pre seed phase

This is the first stage in the lifecycle of Startup and the entrepreneur needs to undertake the first activities in order to transform his idea into a profitable business. In this stage, the risk and uncertainty is very high and the founder continues to work on his business idea, starting to create a team and

asking capitals from family members and friends. In this phase, the entrepreneur develops a feasible offer, which tries to solve a significant customer problem as well as he identifies the target market, partners, distributors and competitors. What is important is to develop a solution, which is aligned with the customer needs, something customers are willing to pay for. In order to achieve this result, the entrepreneur must create a clear business model: it is going to define the value proposition of product/service, the target clients and the channels to reach them; a good tool, which can be implemented, is the business model canvas¹² (Ries, 2011). The next step is the redaction of a business plan, the most important document in order to attract capitals coming from external sources.

In the pre-seed stage, there is not a complete version of product/service, but what is available is a first version: the Prototype, which will be modified later according to the feedbacks of customers. Some useful financial metrics in order to evaluate the company in this stage are the Cash Burn rate and the Cash runway. The first one indicate how much fund the Startup spend every month and the second one how many months the fund could sustain its activities; these metrics are used because there are no revenues. The team is another metric that gives value to a Startup: investors prefer to invest into companies led by a group of people with all the necessary skills for running the business, which are impossible to find into a single person. If they have already competences in the world of Startups and in the reference industry, the valuation increase. (Tarek Miloud, 2014).

The purpose of this stage is to position the venture for growth by demonstrating product feasibility, team building and management, and customer acceptance. (Paschen, 2016)

In this phase, the funding needs are mainly for R&D, creation of prototype and product testing, generating the business plan and preparing the lunch of the venture¹³.

Here what is financed is mainly an innovative idea, indeed the level of risk and uncertainty is high, and the main investors are family & friends, incubator, business angels and crowdfunding (this will be further explained later).

¹² The Business Model Canvas is a strategic tool of Business Design, which use a visual approach in order to show how a company creates, distributes and captures value. www.businessmodelcanvas.it/business-model-canvas/

¹³ <https://www.marsdd.com/mars-library/concept-stage-of-company-development-funding-investors-risks-and-expectations/>

2.1.2 Seed phase

After the pre seed stage, the founder enters into a new stage, which is the seed stage. At this point, the entrepreneur and his team are certain about the feasibility of the idea and the credibility of the business model to deliver the offering to an attractive target market. The new objective is to test and analyse different metrics to determine the extent to which the new product address specific customer issues (product/market fit stage) (Marina Klacmer Calopa, 2014). This is done by turning the prototype into a minimum viable product.

The Minimum Viable Product (MVP) is the version of a new product, which allows the team to collect the maximum amount of validated learning about customers with the least efforts (Ries, 2011). The features of an MVP are just enough characteristics in order to represent the idea; in general, it is a small or cheaper version of the product. The main goals of an MPV are: test the hypotheses, gather feedbacks in order to discover mistakes early, test potential customer's willingness to pay, reduce waste of time and resources in case something has to change, get the product to early customers as soon as possible and set the basis for the final and other products.

Thanks to the MVP, the Startup enters into the last step of this stage, the customer validation: attempt to market the product, evaluate potential market size, perceived value (price), and how to effectively communicate the value. (Ries, 2011).

In the seed stage, the founder seeks for some support mechanism and infrastructures such as accelerators, incubators, small businesses development centres in order to accelerate the internal growth. In this stage, many Startups fail, because they could not find any support and, in the best case, they turn into a low profit company with a low rate of success. On the other hand, those who succeed in receiving support have a higher chance of becoming profitable companies. (Kesim, 2015).

As in the pre-seed phase, Cash Burn Rate and Cash Runway can be used as financial metrics, because the Startup still generates very small revenues. However, in this phase it is possible to evaluate the first version of a product or service offered to the market.

What is important for the Startup is to demonstrate to the investors that customers like the solution and there is a possibility to penetrate the market, this is the so called “Traction”¹⁴. A useful metric, which can be used to evaluate this important parameter, is the Daily Active Users (DAU) to Monthly Active Users (MAU) ratio¹⁵: it measure the stickiness of the product, so how often people engage with the product. The DAU is the number of unique users who engage with the product in one day, instead MAU is the same, but it considers a time window of one month. The ratio between them is the proportion of monthly active users who engage with the product in a single day. This gives an idea about the number of active users and therefore a proxy of revenues growth of the company, which is impossible to understand only looking to the value of revenues, which are very small. Making the hypothesis that a company in this phase has a web site, another useful metric is the “Activation rate”, which measures how many visitors are engaging with the Startup website or app. It can be defined in different way according to the type of business like number of clicks, time on website, downloads... It gives as result information about how interesting is the product or service and it measures the first experience of a new potential customer/ visitor on the web site.

In the seed phase, external resources are mainly required to build products for prospective customers to test, hire employers, manage operations, establish the market and execute the marketing plan for commercial launch, so in order to cover the initial expenses of the business. (Paschen, 2016).

In this phase, the main investors who are willing to undertake the risk are Angel Investors and Venture Capitalists, those who possess technical knowledge in the industry and they will be described in detail in the next chapters.

2.1.3 Creation stage or early stage

The creation stage occurs when the company sells its final products, enters into the market and hires first employers (Salamzadeh, 2015); so this phase starts when the company had finished, with success, the customer validation step and it has become an efficient and profitable entity. Here the company generates stable income and eventually converts it into profit if it gets revenues above the breakeven point; the Startup activities focus on scaling operations, processes and systems in order to

¹⁴ Source: <https://www.ideastartup.it/startupzionario/>

¹⁵ Source: <https://www.geckoboard.com/blog/ultimate-startup-metrics-guide-5-kpis-vcs-recommend/>

remain profitable but preferably to grow and earn above the average economic return on the resources employed (Paschen, 2016).

In this phase, the financial metrics used to evaluate the company change, indeed the Startup starts to approach the breakeven and turn to profit. Here the main financial metrics to consider are similar to the ones used for traditional companies: revenues, which gives a measure of the growth rate of the company, costs which gives an idea about the efficiency of the company and profits. (Ries, 2011). Indeed the financial objectives of the Startup is the revenue growth and cost efficiency.

In this phase, the company requires a higher size of funds, because these are the most important inputs in order to foster the growth of the Startup. The investments are used to increase the penetration in the market and acquire a solid base of clients for the next phases; here the Venture Capitalists start to invest millions in the company (Crupi, 2017).

At the end of this phase, the organization of the firm is formed and ends the Startup lifecycle, the company start to grow fast and approach the other traditional stages; in the figure below (figure 2) the Early stage phase can correspond to the three phases described above.

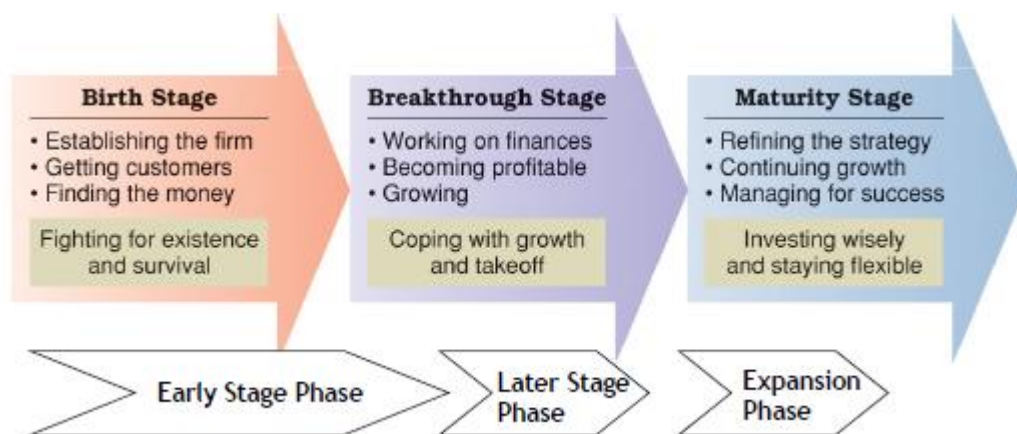


Figura 2: source Slides Strategy and Marketing, Vittorio Chiesa

After the Early stage phase, the company has passed the breakeven point and it focus its attention to increase profitability and work on finances. The company is ready to “scale up”, increase the total value of production to a value between 50,000 and 100,000 euros per month and enter into the maturity stage, where it continues to growth with a lower rate, refine its strategy and manage it in

order to reach success. The operations start to execute the routines defined by the business model; the focus is shifted to management.

If the founder is not ready to scale up and prefers to sell the company to other investors can do it, for this reason it is important to have a clear “Exit” strategy, sell the company to others who can invest enough capitals to manage the growth of enterprise. (Crupi, 2017). The Exit strategy is fundamental for all the investors who invest equity capitals into the Startups, because the exit is the only sustainable return form, universally recognized in venture capital investment; it can be not only in the form of acquisition, but also in the form of Initial Public Offering.¹⁶

2.2 FINANCING PHASES FOR STARTUP

The primary function of an entrepreneur is starting new profit-seeking business ventures, he starts with a good and innovative idea, but what he needs most is money; the equity is the most important problem to solve for all entrepreneurs. (Jeiena Stankeviciené, 2010). Small ventures with strong capital support are much more likely to succeed than those that are capital deficit (Brzozowska, 2008).

In a Startup, the assets are very well known, so the entrepreneur has to find the same amount in shareholder equity and liabilities. It is very important to collect the right amount of money that a Startup needs. Ideally the company needs to collect capital in order to operate for at least six months or more without further financial resources, because the objective is to go on with the scheduled activities without interruptions due to lack of capital; the entrepreneur can calculate it looking at the Cash Flow Statement (James A. Swanson, 2003).

A Startup is not able to get all funds it needs in only one round of financing, there are different types of rounds according to the life cycle of the company: pre-seed round, seed round and A series and other series of rounds; the more you “climb the ladder” the more increase the value of money collected.

In particular, these different phases are characterized by (figure 3):

¹⁶ Source: <https://tip.ventures/IT/blog/3199/startup-o-start-up-trova-le-differenze1>

- **Pre-Seed:** here the investor brings capitals to the company in the trial phase, when a product does not exist, the formation of the company has not taken place and what is financed is an innovative idea. The risk level is the highest and for this reason, the amount of capital collected is no more than 100,000 euros. The funds come from family/friends/fools, grants and / or crowdfunding and incubators.¹⁷
- **Seed round:** The funding comes when the company has prototypes and collect feedbacks and validating the idea from the customers. The level of risk is still high because it is not certain the future of the business and investors need competences in the field. In the Italian market, this phase is characterized by an amount of funds collected between 100,000 and 500,000 euros. The funds come from the same sources of pre-seed plus a new actor: the Business angel.
- **Series A:** in series A and other following series, the entrepreneur looks for funds in order to finance an existing business, but which needs to be lunch and growth fast. Here the phases of design and trial are completed so the investor does not need technical competences in the field. In this phase, Startups are joined by Venture Capitalists and the investments rounds are higher than 500,000 euros¹⁸.

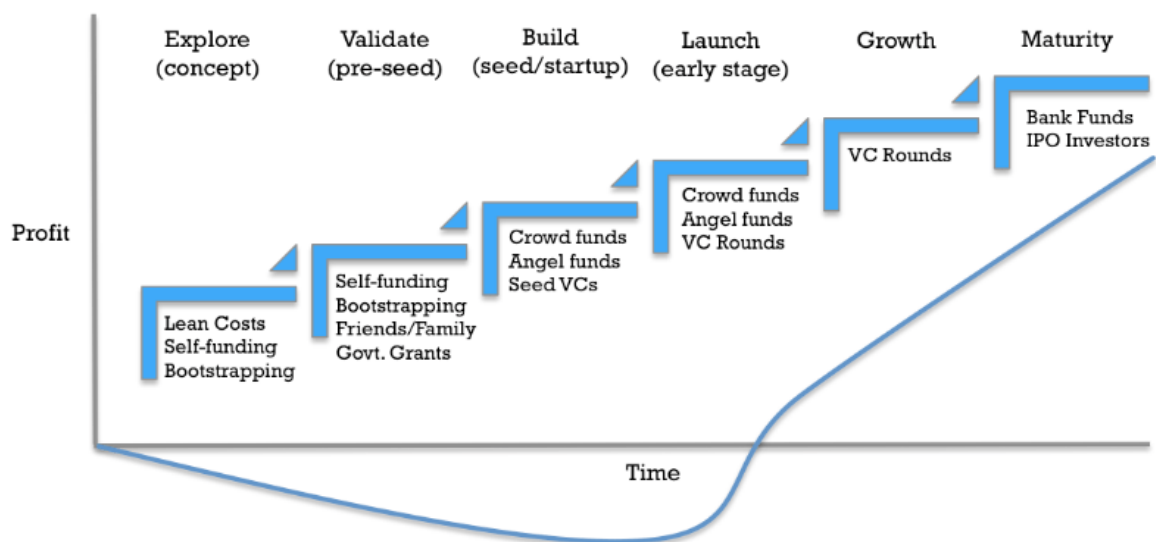


Figure 3: source <https://hoteliyo.com/early-stage-funding-sources/>

¹⁷ Source: <https://www.ideastartup.it/startupzionario/>

¹⁸ Source of information: slides Marketing and Strategy, Vittorio Chiesa

In financing Startups, the previous round influences the next one, so if the founder is able to get a first substantial amount it is important to perform well also in the next round, otherwise there will be problems with previous investors (Mendelson, 2014). This happens because when a Startup asks for equity capital the most important value to take into account is the Valuation of the company (I will discuss it in detail in the next chapter): this value affects the amount of share of capital to give to new investors in exchange of funds. If a Startup gets a lower valuation in the next round, the previous investors will be diluted more, they will lose stake of ownership of the company.

2.3 FINANCIAL ACTORS

"Institutional Investment in Risk Capital" means one medium to long-term investment in the capital of small and medium-sized unlisted enterprises, with high potential profitability that, through an asset strategic support, organizational management and financial support to the activity of the company, it aims to increase its value and to realize a high capital gain on disposal (AA.VV, 2005).

A bank's contract like a medium-long term loan cannot satisfy, in the early phases of life cycle, the needs of a Startup, which generates cash flow after some years. It is important to find other financial tools like the Institutional Investments, which are able to foster the economic growth of the company.

For this reason, in the different financing rounds of the Startup, there are some actors, which contribute with their funds to the company development. Now they will be described more in details.

2.3.1 *Incubators and accelerators*

In the first phases of birth of a new venture, some specialized infrastructures intervene in order to support financially and managerially the Startup, these entities are Incubators and Accelerators.

Incubators are operators specialized in financing ideas and entrepreneurs, providing a range of services, which go beyond the only managerial support. The financial amount provide is not high, because the main focus is on providing work spaces where the companies can start first activities, help in writing the business plan and search for new investors for the next phases; their main objective is give companies room to growth (Cohen, 2013). The main services offered by an incubator are access to physical resources like offices and informatics labs, administrative support as a secretarial

service and strategic-management support like help in the redaction of the business plan and preparation of the entrepreneur for his first contacts with investors. Startups in general pay a monthly fee to the incubator.

The accelerator supports the new venture with mentoring, physical spaces where operate and services to foster its growth. The accelerator helps the company to define its business model, use metrics, prepare the seed round, create the prototype and make first test on the market¹⁹: they speed up market interaction in order to help Startups to adapt quickly and learn. The main differences between incubators are that accelerators programs have a shorter duration (three months), the Startups receive mentoring and support in groups and accelerators take an equity stake in the ventures participating in the programs (Brad Feld and Jason Mendelson, 2011).

2.3.2 Business Angels

Business angels are entrepreneurs, ex owners or ex managers, in general wealthy people who have financial means, a good network and a good management knowledge to be used in Startups. They decide to invest funds into new business ideas in exchange of an equity stake, and they are characterized by informal search and investment selection (this is why they are also called Informal Venture Capitalist).

The main difference between Venture Capitalist is that they invest their own money and not those from third people, this influence the way these actors invest because they are responsible only for themselves. Indeed, for his reason, they are more available to invest in risky projects, but with an amount of money lower than Venture Capitalist (in Italy no more than 200,000 euros (Crupi, 2017)). Another difference is the investment selection because they do not analyse in details business plans, but they decide where to invest according to their instinct (Advance, 2001). As Venture Capitalists, what they offer to a new venture is not only their financial support, but also they give to the Startup their managerial knowledge to reach success, their experience and network in the industry and specific knowledge in different field like tax and legal sectors.

¹⁹ Source: <https://www.ideastartup.it/startupzionario/>

2.3.3 Venture Capitalists

The Venture Capitalist, as explained before, finances new ventures in the development and first expansion phases, when the business has already been created, providing funds to its launch and growth in the market. In exchange to the capitals invested, these entities take a stake of ownership in the company and their objective is to support the growth of the Startup, help it to increase its value, in order to get a profit when shares will be sold (generally in 4 or 6 years) (Advance, 2001).

They invest from 500,000 euros and more in the so called round A, into new ventures with high growth prospects, already validated by the market and with high level of technology. (Crupi, 2017).

The Venture Capitalist monitors continuously the Startup's performances thanks to some members who have seats in the Board of Directors of the company.

The main difference between Business Angels is that these entities are professional investors they professionally manage funds and invest not their own money, but third parties capitals. This influence their investments decisions, which need to be sophisticated: they do not base decisions on impressions, but on analysis of business plans, because they have to report their decision to the participants of the fund. Like the Business Angel, the task of the Venture Capitalist is not limited to contribution with financial resources, but it helps the entrepreneur in the daily management of the company. The mission is to support the entrepreneur economically and managerially with knowledge, experience and other services in order to foster the growth of his business idea.

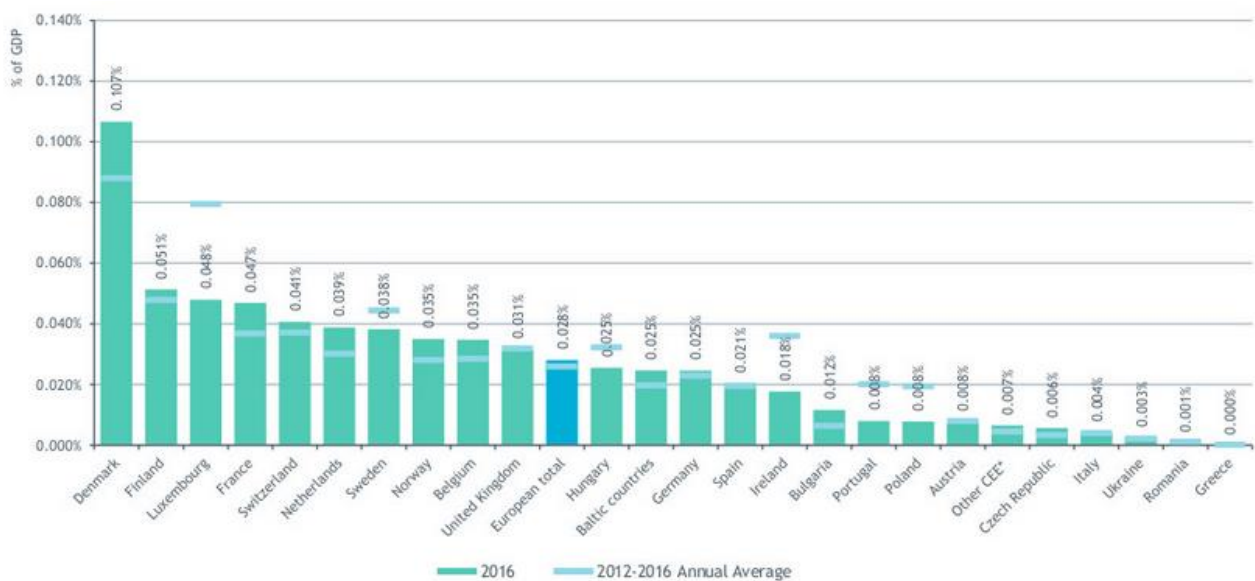


Figure 4: source <https://hoteliyo.com/early-stage-funding-sources/>

Venture Capitalists play a key role in the development of new venture and in their survival to the next phases, but in the Italian market the value of investments, as percentage of GDP, from these actors is lower than the average of the main European countries.

2.3.4 Private equity

The Private Equity is a financial activity through which an institutional investor take shares of a target company buying it from existing shareholders or subscribing new ones, then giving capitals to the company. The funds from Private Equity come in the last phases of the life cycle of a Startup and are used for illiquid and long-term investments.

The Private Equity is in general a fund like the Venture Capitalist, but the main difference is that the first one usually acquire the majority control of an already mature company.²⁰

2.4 STARTUP SOURCES OF FINANCING: EQUITY VS DEBT

One of the most important step in starting an entrepreneurial venture is to ensure an adequate financing source, in his research (Arthenon, 2012) demonstrated that multiple factors influenced the decision of a Startup funder about the financing sources to use. They can be divided in different categories: internal sources, equity, debt, convertible debt and new form of financing.

In this chapter are described the main sources of funding for Startup divided by category with their pros and cons, in order to understand when and why an investor would use a type of source instead of another.

2.4.1 Internal sources of financing

Sometimes it is good for the Startup, especially at the beginning, to be funded independently, without third party investments: this is called bootstrapping. Bootstrapping (Worrell, 2002) is possible when the founder has a certain income at the beginning and use it to finance is business idea:

²⁰ Source: <https://www.ideastartup.it/startupzionario/>

the entrepreneur is able to use this source only if the company does not require a big investment at the beginning and if there are no third party financial investments to be covered. The main advantage is that the entrepreneur has the full control of the company, but the con is that he can be in isolation and if he has lack of experience, he cannot receive help from expert partners.

An informal external source, which can be considered still internal, are family, friends and fools (3F). Before the entrepreneur start to ask formal external capitals he can collect money from people who are close to him (informal source of financing); they are considered “fools” because they invest capitals when there is nothing but an idea, knowing that there is a high level of mortality in Startups in the starting phase.

The main advantage is that the entrepreneur gets a greater amount of capital than what he can pool alone and he understands that there are people willing to take the risk of investing in his business idea. The drawback is that there could be disagreement between family and friends in case the project fails in the end. (Marina Klacmer Calopa, 2014).

2.4.2 Debt financing

The sources of debt financing covers commercial banks, commercial finance companies, leasing companies, state and local Government Lending Programs, trade credit and Consortiums (Jeiena Stankeviciené, 2010). Many entrepreneurs are familiar from their previous life experiences with bank loans, which can be considered as one of the oldest formal financial sources. The main feature of a loan or, in general, of debt financing is that lenders do not have rights to intervene in the management of the company, to tell the founder how to run its business. This can be considered as the main pro of this source of financing, especially for entrepreneurs interested in keeping the full control of the company. If the debt is repaid on time and as scheduled, the entrepreneur does not have to answer to investors and he can increase the Startup’s credit rating, making it easier to borrow in the future (Oranburg, 2016).

Usually young people found new venture and they have problems to get loan because they have lack in properties or collaterals²¹ needed for the agreement. (Marina Klacmer Calopa, 2014).

²¹ Collateral is property of the borrower that can be seized if the borrower does not repay the loan.

One of the main drawback of debt financing is that Startups, in early phases, have a low amount of cash flow and this makes it difficult to pay interests every months; moreover in the first period of a new venture is better to reinvest the small profits in order to foster the growth of the business (Oranburg, 2016). If a company is not able to repay the debt when it is due, the loan automatically become a Not Performing Loan and the Startup risks of going in bankruptcy.

Banks ask entrepreneurs to fulfil some covenants: these are conditions that must be met while the loan is outstanding. For instance, these requirements can include maintaining a minimum level of assets, not taking other debts, sending periodically information about financial results or prohibition against using money for some activities. (Booth, 2014). All these requirements reduce the freedom of the founder and this is why debt financing is undertaken not in the first phases of the life cycle, but when the company is able to provide collaterals and get favourable contracts.

Now there is a new lending industry based on debt financing: the so-called peer-to-peer (P2P) lending, which does not use a traditional bank; it is part of the new form of financing. This new source is performed through a platform, which is an intermediary that puts in communication customers interested in a loan and investors who select the loan in which participate on the platform.

This is how it works: the Startup creates a profile and sends financial information to the platform in order to obtain a rating (correspondent to different interest rates charged), than it starts to request funds and potential lenders can contribute with a fraction of the amount requested. If the borrower attractiveness is enough, he can collect the entire loan amount and when the loan is fully funded, the cash will be available to the borrower. The probability to obtain the cash needed is higher than other debt financing sources because the borrower's request is visible to thousands of people, not just a few banks. There are some disadvantages: the interest rate charged to the borrower can be higher than traditional banks in order to attract lenders and there is little assurance that the borrower will repay the debt.²²

These alternative (nonbank) lenders are important for start-ups because many banks are unlikely to fund a start-up that does not have sufficient collateral to guarantee a loan (Oranburg, 2016).

²² Source: <http://www.investopedia.com/terms/p/peer-to-peer-lending.asp>

2.4.3 Equity financing

The sources of equity financing cover private investors (business angels), institutional venture capital firms, merge and acquisitions, strategic investor and corporate venture capitalists and overseas investors (Jeiena Stankevicienė, 2010). The equity is a share of a business, so through this source of financing the entrepreneur is selling pieces of his company in return for outside investments (Oranburg, 2016); on the other hand, the outside investors become shareholders of the venture, gaining rights and privileges that lenders do not have.

As shown in the previous chapter, the main actors who collect shares of a company in exchange for funds are Business angels, Venture Capitalists and Private equity in last phases. Raising money through equity financing requires public disclosures of the securities issuance and a value for the company, in order to assess the correspondent percentage of ownership for the new investors, which invest in the round of financing.

The main advantage of equity financing is that for Startups there is no loan that must be paid back and so there is no risk of bankruptcy as a result of failing to repay investors. The Startup has the flexibility to invest the capitals in growing the business, because equity investors are flexible about being repaid. Indeed, they are entitled to a share of the total value of the company and so they share the business risks with the entrepreneur and have similar incentives to grow the business and increase the value of the company (Dent, 1992). Another advantage is that professional equity investors will bring to the company not only funds but also their valuable experience, skills and networks; equity investors are more than money.

One of the con of this source is that the equity investor become co-owner of the company, so they would control the entrepreneur so that he behaves in the interest of the investors (getting a board seat). The founder may lose control over when to liquidate the business and exit the market, because equity investors, usually, will push for an exit after 8-10 years from their initial investment in order to get a higher return from their investment at liquidation date. (Oranburg, 2016). Another con is that typically equity investors receive preferred stocks²³ and not common stocks, this give them the right to be paid first in liquidation or merger, the right to receive dividends before the common ones and at a higher

²³ Source: <http://www.investopedia.com/terms/p/preferredstock.asp>

yield and they can have also the right to block certain transactions such as another debt or equity financing.

In conclusion, equity financing is not for a founder who demands complete control over its company, but for the ones who are open-minded about the business model and their role into the new venture. (Oranburg, 2016)

2.4.4 Convertible debt financing

The convertible debt financing is a hybrid between debt and equity. It is a loan with a low interest rate, because the objective is not to earn money from interests, but to convert the debt into equity upon an event (in general the next equity financing of the company). Usually, Startups receive capitals through this source of financing in the first phases of the life cycle, because it is relatively quick, cheap and does not require the company to be evaluated.

The main advantage of convertible debt is that it is a quick and cheap method (Oranburg, 2016). This because it is a very simple instrument, which does not require discussions about board seats, protective provisions, liquidation preferences and other complex terms as equity financing. Until the capitals are converted into equity, the noteholder is not a shareholder and so he is not entitled of any special rights and, on the other hand, convertible does not require the strict covenants requested by debt agreement (Levine, 2012). This source of financing eliminates the problem of evaluating a new venture in its first phases because the note will not be translate in equity until the next equity financing.

The main disadvantage of the convertible note is the uncertainty of what the founder will receive in the end. In general, the noteholder will gets better rights than the new investors (joining the company in the next equity round) and will pay the same or less than the new investors will, when the notes will be converted into equity. So how much the noteholder will pay for the conversion depends on the valuation of the company at the next equity round and so it is not certain the amount that the Startup will receive in the end.

One of the main new form of financing is Crowdfunding, and in the next chapter, it will be described in detail, especially the Equity Crowdfunding, which is important for the purpose of the research.

2.5 CROWDFUNDING

Crowdfunding, in Italian “finanziamento della folla”, refers to a new financial mechanism which, through the web, collect capitals from the crowd (Fregonara, 2013). Through this collective collection of funds, the fundraiser²⁴ obtains the amount he needs in order to finance his project or Startup. The intermediary between the two actors (fundraiser and crowd) is no more the bank, but an online platform, which, after evaluating the idea and documents from an entrepreneur, opens a campaign to raise capitals. Crowdfunding draws inspiration from the idea of microfinance and crowdsourcing (Morduch, 1999): the sum of many small contributions can become relevant and significant; its development was possible only thanks to the web revolution and the diffusion of the social media across the world.

The Crowdfunding has spread across the world developing different models, which differ from one another for the type of return obtained by the financier. The main categories are reward, donation and equity based. The lending based is a fourth category, which was already addressed in the chapter before in the P2P lending.

- Reward based: this crowdfunding is based on rewards and it is the most diffused in Italy and in the rest of the world. Those who donate to this type of crowdfunding project do not receive any financial interest in the product. (Sheik, 2013)

The web investor will receive, for his participation to the campaign, a symbolic reward like limited edition or a discount for the purchase of the product, something with a lower value than the donation. In general, the investor wants to receive an advantage on the product or service object of the campaign. Therefore now, is a common practice for the promoter of a project to ask the financial support from the crowd in order to develop, design and produce a new product, offering as a reward the same product at a lower price than the launch price²⁵.

- Donation based: this type of crowdfunding collects capitals for no-profit projects for which there is not a reward or interest for the contribution of the crowd (Fregonara, 2013).

The funds received are essentially a grant given for a specific purpose, but without the expectation of a specific return for the founder. The donation based is used especially for

²⁴ The person who ask funds from the crowd

²⁵ Source: <https://www.opstart.it/equity-crowdfunding-info/>

the realization of philanthropic, political or cultural initiatives. It is also used for the so-called civic or social crowdfunding.

The last category, the equity crowdfunding, will be addressed more in detail because the successful equity crowdfunding campaigns in Italy are part of the final analysis.

2.5.1 *Equity Crowdfunding*

The Equity Based crowdfunding is the latest model and is the only one to be regulated by the Italian regulations (Consob). (Piattarelli, 2013). In Italy, according to this model, on one hand the Innovative Startups and PMI²⁶ could ask funds from the crowd in order to develop its business, on the other hands the founders will receive shares of the company. The investor who choose to invest using an online equity crowdfunding platform, become a co-owner of the company; thanks to the ownership of shares, investors obtain rights on the company as the right to receive dividends.

This is the most interesting model because it represents an alternative to the traditional financial channel, which are difficult to access by Startups. Indeed, Equity Crowdfunding has many analogies with an Initial Public Offering, due to its feature to address the public and not only institutional investors, so it can be considered as the first approach to financial markets. The main characteristic is, as the other crowdfunding models, the high number of investors who could be interested in the project, unlike what happens with an institutional investor (Tonella, 2014).

Italy was the first country in the European Union to promulgate a specific regulation for equity crowdfunding. The process start the 18th October 2012 with “Decreto Crescita bis” and it had completed the 26th June 2013 with the Consob approval. The main features of an Equity Crowdfunding operation, in Italy, can be summarized in (Consob, 2016):

- The offer, for an amount lower than 5,000,000 € can be proposed to third party investors through an online platform. This activity is reserved to banks or investment entities, which do not need a specific authorisation and other entities authorized by Consob.

²⁶ Described in detail in the law: Decreto Legge 3/21015 “Investment Compact” <http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2015-01-24;3!vig=>

- The online platform must disclose to the investors the information about Startups, according to the Consob standards. The Consob will not approve the specific information, but this information has to include the business plan of the company, the curriculum vitae of promoters, the specific risks and financial documents.
- The investors, before subscribing to the offer, must look at the features and risk of the offer, in order to undertake a “conscious investment”. The money amount, collected by the campaign that is going to the Startup, is held in an investment bank
- The financial tools offered by the online platform can be subscribed only with cash by the new investors and this give rise to a tax incentive for them.
- Professional investors, incubators or banks must subscribe a share of the capital increase, equal or higher than 5%.
- The non-professional investors have special protections like the right to revoke the investment.

Figure 5 represents the scheme of an Equity Crowdfunding operation, where two other main actors are the consultant for the investor who explains the opportunity and risks of the operation and the consultant of the Startup, who helps it to disclose the documents needed for the campaign.

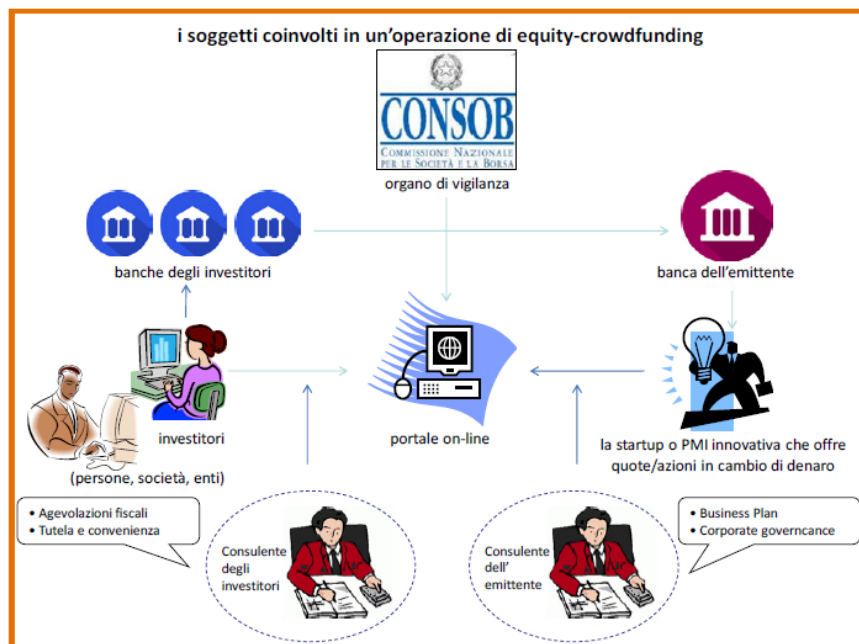


Figure 5: source (Consob, 2016)

A new venture interested in an equity crowdfunding campaign will have to get in touch with an online platform, prepare some operating activities like making a short video presentation, set up a marketing campaign, write a robust business plan and deliberate the increase in capital at an extraordinary shareholders' meeting. However, before doing this it is important to understand if this source of financing is in line with the phase of life cycle of the company (Paschen, 2016).

There is not an only one "right moment" for the equity crowdfunding, because it differs according to each Startup, but in general when the new venture is ready to launch the new product or service or when it starts to gain the first revenues are the more appropriate moments for a campaign. In these phases (which can be identified by the seed and creation stages), the founders are sure about their business idea and ready to present it to third parties.

However, as we will see from data, there are also campaign for the pre-seed stage, when there is only an innovative idea and a prototype, but what is important is an effective business plan, which support the idea.

As for the previous sources of financing, also for the Equity Crowdfunding there are some pros and cons to be considered. Regarding the pros is possible to summarize them in this list:

- Fast track²⁷: From the setup of the offering to the closing, the timing is around six months.
- Low cost: the operation's costs are low, transparent and linked to the success of the campaign. They are the commission asked by the online platform (success fee), bank charges and other costs like the one for the video making and the consultant.
- Focus on business: it is like a public offer, so the contact with new investors do not shift the focus of the management from the business.
- Market validation: a success of the campaign represents a market test about the interest of the market on the offer
- Valuable network: the network build thanks to the online campaign brings value to the company. The new investors could turn into future clients, suppliers, workers and collaborators.
- Shareholders: as in the case of Business angels, the new investors can bring to the company their knowledge and experiences in order to support the development of the company.

²⁷ Source Consob

- Rating upgrade: the market validation after the success of the campaign, increase the rating from the traditional commercial banks and facilitates access to additional sources of funding.
- The wise of the crowd: some scholars as Schwienbacher (Schwienbacher, 2010), because for them finding solution of problems among many people is better than among few investors.
- Another author (I. Pais., 2014) find another pro of equity crowdfunding: it can be the step between business angels and venture capitals,

The cons of this new source of financing are:

- Commitment: Equity crowdfunding is an extraordinary operation (collection of risk capitals) affects capital and administrative rights of the ownership structure of the company.
- Disclosure: Public disclosure of many documents as business plan, company's strategies and patents (even if these are under protection of EU legislation)
- Promotion: In order to reach the round of investment target it is important the support of marketing and communication like creation of web communities and interviews, which are further costs for the company.
- Corporate governance: the company have to be ready to manage the transition from a low number of shareholders to a high number. This can create the need for control bodies and minority protection clauses.
- Entrepreneurial maturity: the entrepreneur has to be ready to ménage all the shareholders : he must be more transparent with all investors about milestone, projects and objectives and also he has to deliver periodically financial documents
- Platform: risk about the malfunction of the platform, for instance it can default and the company loses its campaign or risk of cyber attack
- Cons for investors: First, the equity crowdfunding campaign is not a liquid investment because does not exist a secondary market for Startups. Second, there is a prohibition about giving dividends of Startups in the first years; all resources must be reinvested. (M.L Vitali, 2013)

2.5.1.1 Italian Equity Crowdfunding data

In Italy from 2014 and 2017, 69 successful campaigns were made through 19 authorized online platforms. There is an increase in the number of campaign across the year and a decrease of the percentage of failure of the campaign: in 2014 on 10 campaigns, 6 failed (60%), instead in 2016 on 28 total campaigns only 9 failed (32%), for 2017 there is still a decrease, but the year is not over.

In the figure 6 is clear that there is a positive trend for money collected each year, looking at 2015 (1,766,000 €) and 2016 (4,363,000 €) there is an increase of 147. 9% in the second year.

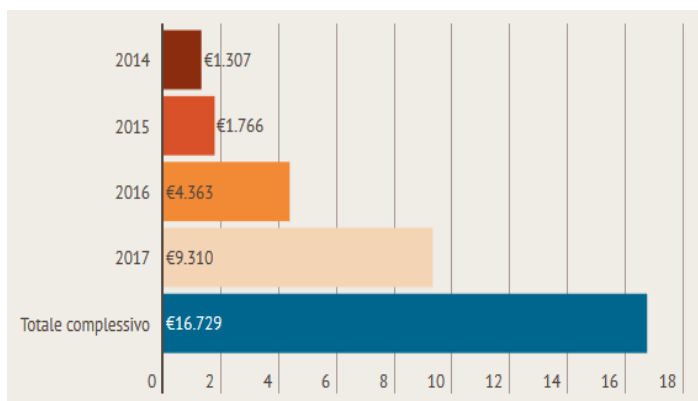


Figure 6: source Crowdfunding Buzz

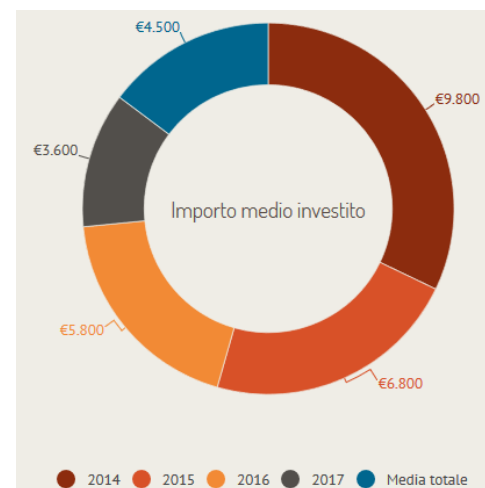


Figure 7: source Crowdfunding buzz²⁸

The increasing amount of capitals collected each year is related to the increase in the number of campaign and the number of investors who choose to invest in equity crowdfunding. Indeed, the number of investors increase a lot each years: 134 in 2014, 261 in 2015, 747 in 2016 and 2596 in 2017 for now. The average investment per investor is decreasing across the year, because in order to reach the round target, in each campaign there are more investors, and so each one invest in average a lower amount compared to the previous years.

The Italian market of Equity Crowdfunding will be further analysed in the second part of the research.

²⁸ <http://www.crowdfundingbuzz.it/risorse-crowdfunding/equity-crowdfunding-in-italia-infografica/>, values are in thousands of euros

Capitolo 3

STARTUP VALUATION

3.1 STARTUP VALUATION METHODS

The definition of the value of a Business Idea is one of the most important step for the creation of a new venture, but also the most complex (Advance, 2001). In order to obtain an external source of financing it is not enough to have a brilliant business idea or high entrepreneurial attitudes, but is necessary to test the financial viability of the business model and its future profitability. The valuation of the company is important for the entrepreneur because it sets a value to the efforts and resources he puts into his new ventures, but also for the investors. Indeed, for investors like business angels and venture capitals the value of the Startup determines the proportion of the shares they receive in return for their investment (Tarek Miloud A. A., 2012). The pre-money valuation of a company is the value of an enterprise before new money is injected (James A. Swanson, 2003) and is calculated as:

$$Pre\ money = \frac{Investment\ round}{\% \text{ of total shares received}} - investment\ round$$

Therefore, the pre money valuation of the company is important because if the investor knows it and how much he wants to invest into a new venture, he finds out the percentage of ownership of the company he will get after the investment. The valuation aligns the ambitions of the entrepreneur and investors and it helps structure and assure a fair treatment (Dirk De Clercq, 2006)).

However, how is possible to calculate the value of a Startup?

The valuation of a company is a process with the aim of finding an estimate of the real value through one or more specific methods. Indeed, it is necessary to find out some computational elements and metrics in order to evaluate the business, politics and strategy of the new venture. There are different valuation methods, which can be divided into two main category:

- Traditional valuation methods: a direct valuation method “The Discounted Cash Flow” method and the indirect one based on relative valuation: “The multiple approach”
- Alternative valuation methods: these methods are able to consider also qualitative information about the company, which have an impact on the value of the venture; generally, these methods are used by venture capitalists. The methods considered are the venture capital method, the first Chicago model, the real option method and other qualitative methods like the Berkus method.

Evaluate Startups is far more complex and difficult than evaluate mature companies, indeed new ventures have a low level of revenues, negative cash flows in the first phases and limited information about future economic and financial performances. The Startups usually operate in innovative sectors, which are in their initial life cycle phases and this makes it difficult to find comparable companies. All these Startups features are limitations for these methods and they will be addressed for each method after a description of how to use it.

3.1.1 *The Discounted Cash Flow method*

As Aswath Damodaran said (Damodaran, 2009) “The intrinsic value of a cash flow generating asset is a function of how long you expect it to generate cash flows, as well as how large and how predictable these cash flows are”. This method is based on the assumption that the value of a company depends on the financial results (cash flows) which the enterprise is able to generate in a given time period; so there is a relationship between results and value of the company. According to the discounted cash flow, the value of the company is equal to the sum of cash flows produced in a given period properly discounted by a discount rate. The most common version of this method is composed by two terms: a first part equal to the sum of discounted cash flows for a period of analysis, “the explicit period” (in general 4 or 5 years easier to forecast) and a second part, which represent the discounted cash flows after that period (terminal value). (Arnaboldi Michela, 2015).

The equation is:

$$DCF(0) = \sum_{t=0}^T \frac{CF_t}{(1+K)^t} + \frac{TV}{(1+K)^T}$$

Where the members of the equation are:

- DCF(0) is the value of the company at time 0
- CF are the cash flow at year t
- K is the discounted factor
- TV is the terminal value, which is the discounted value for cash flows from T+1 to infinite.

Looking at the equation, as Damodaran said, the value of the company depends on how long it generates cash flows, the size of those cash flows and their risk or predictability (discounted factor). For a company with a stable activity, in order to have an idea about the value of cash flows in the explicit period is necessary to look at the Business Plan of the company. Then, using data about past performance, the strategy and the firm evolution in the market and future sales it is possible to have an idea about future generation of cash flows. (Desaché, 2014).

The terminal value is the most difficult to evaluate because it refers to the subsequent period in which cash flows are more difficult to forecast and the company could reach a steadier state (reach maturity) and so a decrease its growth rate (Arnaboldi Michela, 2015).

The discounted rate used to discount cash flows each year is the company's average cost of capital or WACC. It is the weighted average of the cost of equity K_E (what the company has to remunerate to the equity holders) and market cost of debt K_D after tax (how much it costs to finance the company through debt).

$$WACC = K_E \times \frac{V_E}{V_D + V_E} + K_D \times (1 - \tau) \times \frac{V_D}{V_E + V_D}$$

Where V_D is the market value of debt and V_E is the market value of the equity of the company, instead τ is the margin tax rate. The cost of equity capital for the shareholders is calculated using the Capital Asset Pricing model²⁹. According to this model, the return on a given stock for shareholder is equal to the return of a risk free investment plus a premium linked to the stock and the non-diversifiable risk:

²⁹ Sharpe, William F. (1964). "Capital asset prices: A theory of market equilibrium under conditions of risk", *Journal of Finance*, 19 (3), p 425–442

$$K_e = R_f + \beta \times (R_m - R_f)$$

Where R_f is the risk free rate, R_m is the weighted average of all securities returns on the market and β is the correlation between the security and the market return.

3.1.1.1 Limits in case of Startups

The goodness of the results achieved depends on the input of the model and so on the ability to obtain trusted future cash flows. In the explicit period, the cash flows are identified looking to past results and the Business plan. In case of Startups, there is not a history because it is by definition young, and even if there is, past results are not representative of the company future earnings. This because at the beginning of their lives Startups incur losses because their revenues are not enough to cover fixed costs; even if they start to generate revenues their losses increase because they have to cover a larger demand without having enough volume to compensate it. Only when they are able to sale enough they reach the breakeven point, therefore for these reasons it is impossible to use past performances to forecast future cash flows (Damodaran, 2009). Furthermore, it is difficult to use the method when there are negative cash flows. The DCF is not able to take into any indications about the profitability of “growth assets”, the assets that the firm will acquire with future investments, which in case of Startups have a huge weight on its valuation. Figure 8 shows the evolution of revenues and earnings among first phase of life cycle.

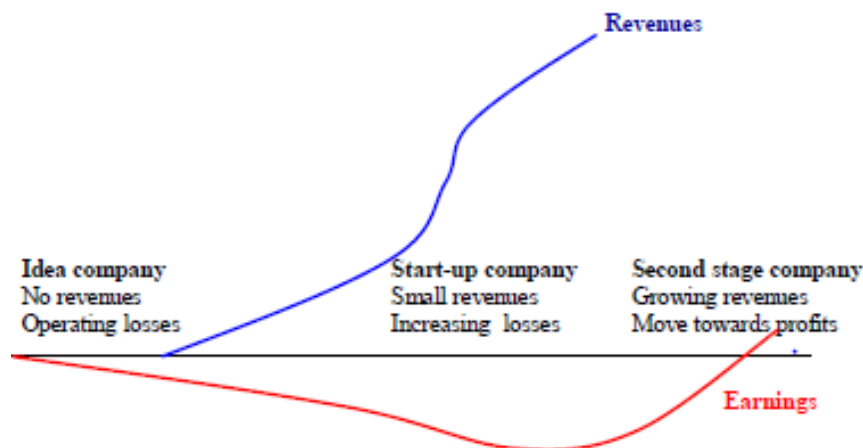


Figure 8: source Damodaran's Dark Side of Valuation

Furthermore, the DCF is not flexible enough to evaluate Startups, which are flexible by nature, indeed this model is not able to take into account future options, which the company is going to evaluate after the investments have taken place.

Another con about DCF is that for standard companies the most of company's value is embedded in its terminal value, which are the cash generated when the company reach maturity. The problem for Startups is that is difficult to estimate when the company will reach maturity and how it will be like when it does. (Desaché, 2014).

Finally, there are problems also with another factor, which play a huge role in DCF, the discounted factor. In particular, the problem is in the computation of the unlevered β , which is the correlation between the Startup's stock and the market return. For not listed company, the β is calculated looking at comparable listed companies, in the same sector with the same growth rates and margins, the unlevered β of the company will be the average between comparable β adjusted considering equity ratio and tax rate of the target company (Arnaboldi Michela, 2015). The matter with Startups is that it is very difficult to find listed comparable companies, because listed companies have different growth rate (maturity stage) and the activities performed will be different because Startups operate in innovative markets. (Desaché, 2014).

Due to these limitations, it is possible to conclude that the DCF is reliable if applied to mature companies, but have many problems for Startups because it cannot take into account flexibility and some qualitative and intangible elements, which can have an impact on the valuation of a new venture.

3.1.2 *The multiple approach*

According to this method, the target company is compared with other similar listed ones with the idea that the value of the target company should be in line with the one of comparable (Arnaboldi Michela, 2015). Therefore, the starting point is to find comparable listed companies for which is easy to evaluate the Enterprise Value (equity plus net debt³⁰) and the Equity Value, then the multiple is the ratio between the value of each comparable company and a parameter that could be easily extracted from each comparable company's balance sheet. The method has the objective to determine the value of the company in relation to specific business variables. The multiple could be estimated as:

³⁰ Net debt = debts - liquidity

$$Multiple_i = \frac{Value_i}{Parameter_i}$$

Where the value can be enterprise or equity values and the most common parameters are sales, EBIT and EBITDA for EV and the price earnings ratio (P/E) for equity value. The parameters are periodical performances or other balance sheet terms and they have to be compatible with the numerator. In figure 9 are summarized the main steps of the method:

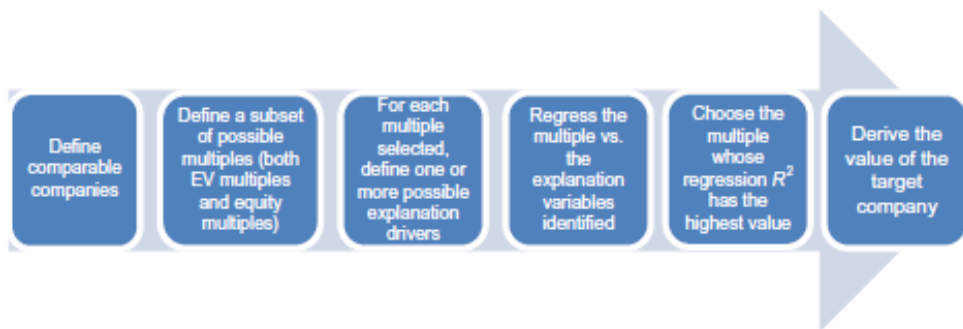


Figure 9: source Damodaran's Dark Side of Valuation

After having identified a subset of significant multiples is necessary to find value drivers for each one in order to explain the variance among the multiples of the different companies. Then using a regression between multiples and value drivers it is possible to choose the most significant multiple looking at the higher R^2 . After identifying the best multiple and knowing the target company indicator (EBIT, EBITDA...), it is possible to estimate its value. (Arnaboldi Michela, 2015).

The Venture Capitals use this method considering the future performances of the company, in order to get a potential valuation range to which some discounts and premiums will be applied. (James A. Swanson, 2003).

3.1.2.1 Limits in case of Startups

The relative valuation method is a simple method, but for Startups has some limitations regarding the choice of comparable companies and multiples. Multiples can be used only if comparable companies have some features in common with the target Statup. In the table (4) below are summarized the characteristics needed according to the most used multiples:

Multiple	Condition of use
Sales / Revenues	Same growth rate, same margins, same tax rate, same investment policy
EBITDA	Same growth rate, same risk, same tax rate, same investment policy
EBIT	Same growth rate, same risk, same tax rate
P/E	Same growth rate, same risk , same financial structure, positive earnings

Table 4: author elaboration of source (Desaché, 2014)

In order to have a reliable valuation is important, for every parameter, a comparable company with the same growth rate of the target one, but it is very unlikely that listed companies will have the same growth rate of a new venture, mainly because they are in different phases of life cycle. Therefore, also their investment policy will be different.

Another key factor is the market risk: comparable and target companies have to be subjected to the same market risk. Startups operates, in general, in new and innovative sectors, which are in a different life cycle phase than the traditional ones, so they will be under different risk conditions. (Desaché, 2014). In the same way also the financial structure of the Startup is problematic which is an important factor for the P/E multiple. Indeed, Startups are mainly financed by equity sources of financing like Equity Crowdfunding, Business Angels Venture Capitalists and convertible bonds too because they will be converted into shares. Whereas, listed companies have more debt in their balance sheet because they meet the requirements of banks' contracts.

Damodaran (Damodaran, 2009) considers another limitation, which is related with the multiples themselves: in Startups EBIT, EBITDA and other factors used, as parameter, can be negative, leading to a meaningless multiple for the valuation. Only revenues / sales are always positive, but too low to give a trustable valuation for the company.

Because of the limitations listed before, traditional methods could be applied only taking into account the features of new venture in their first phases of life cycle. Traditional methods, if used in a context of high development and changes are not able to consider the more qualitative and intangible elements which affect the value of a Startups.

These are not the main models for the valuation used by Venture Capitalists and experienced investors, indeed they use more the alternative ones, which will be presented in the next chapter.

3.2 ALTERNATIVE VALUATION METHODS

These methods are able to consider qualitative and intangible elements, which affect the value of the company. The models that are going to be described in this chapter are:

- Venture capital method;
- First Chicago Method;
- Real option methods;
- Qualitative methods;

Venture Capitalists and new investors mainly use the alternative methods when they invest risk capitals into a Startup. The idea is to identify a future period for the valuation, not the present one, when the company will reach an economic and financial stability. This could be found considering unique or different scenarios with their probability of occurrence, and then the result will be discounted to the present value. (Cioli, 2005).

In the computation of the value, they consider also some qualitative aspects like an analysis on the management of the company in order to increase or decrease the value of the company (James A. Swanson, 2003). The discounted rates used by Venture Capitalists are usually high; indeed, they are between 30% and 60% annual. This is due to the different level of risk of the investment, which depends on risk of the industry in which the Startup is going to operate, management skills and burn-rate³¹ level needed to start activities.

3.2.1 *The Venture Capital method*

This method was created by Harvard Professor Bill Sahlman in 1987 and is one of the most popular methodologies for valuing pre-money valuation of ventures. The Venture Capital method is a very pragmatic method, which is focused on the main objective of investors: the return they will get from their investment in a limited period (generally 3-7 years) (Desaché, 2014). This is a logic position

³¹ It determines the survival time of a company before it needs further capitals source: Investopedia

because investing into a Startup is not a liquid investment; the only way to get a return is to sell back the shares at a higher valuation at the exit date.

In order to get the value of the company first, it is identified an exit price for the investment and then it is discounted to the present post money valuation of the company taking into account time and risks the investor takes.³² Therefore, this method is more focused on the final value of the company when the investor is going to “exit” and the expected return of the investor.

Here there is the basic calculation:

$$\text{Return on investment (ROI)} = \frac{\text{terminal value}}{\text{post money valuation}}$$

$$\text{Post money valuation} = \frac{\text{terminal value}}{\text{Anticipated ROI}}$$

The terminal value indicates the exit price of the company within 3-7 years. In order to compute this value Venture Capitalists can consider other publicly traded companies or other companies in their portfolio like in the comparable approach. The main difference with the comparable approach is that in this case the comparable is used not to get the value of the company, but to understand future growth rate, margins and the potential of the market (Desaché, 2014). Another way is to apply the multiple approach, therefore find out the future value of the company considering the proxy of future value of the parameters of the Startup and the ones of comparable listed companies³³; for instance it is possible to use the P/E ratio at the exit date. In this last case, the value of the company will be computed considering the earnings on the terminal value year (for ex. 3 million €) and the average multiple P/E among comparable companies (for example 15x), obtaining a terminal value of 45 million €. ³⁴

The anticipated ROI is the discounted rate use to get present post money valuation of the company. It represents the return the Venture Capitalist will expect to get at the exit taking into account risks, time and resources invested. In general, this value is computed considering that in a portfolio 9 out

³² Source: <http://www.venturevaluation.com/en/methodology/valuation-methods>

³³ Source: <http://www.angelpartnergroup.com/2015/12/22/la-valutazione-di-una-startup-e-il-venture-capital-method/>

³⁴ Source: <http://blog.gust.com/startup-valuations-101-the-venture-capital-method/>

of 10 investments fail or do not get a return which fully compensate the investment³⁵. For this reason, they ask for investment, which are able to offer a return between 10 and 20 times the investment over 6 years (Desaché, 2014). This correspond to a discount rate of 40% - 60%, much higher than those applied traditionally in the DCF methods. This high value of discount rate is one of the most criticized element of this method. The Venture Capitalists justify it due to the low level of liquidity of the investment, their provision of services, experience, management skills, network to the company, which have to be evaluated at the exit and the need to compensate the high level of mortality of Startups in first phases.

Then the value of the company can be further adjusted considering an analysis of the management, indeed if the quality of team is high and it is able to deliver results the valuation can be increased.

Then, in order to compute the pre-money valuation of the company, the venture capital subtracts the round of investment from the post-money valuation.

3.2.1.1 Limits in case of Startup

The Venture Capital method suffers some limitations as the traditional methods do, especially when they have to get variables or make projection for future performances of the company.

Like in the relative valuation method, it is difficult to find out comparable companies, which will be used to forecast future trends of company's performance in order to evaluate its terminal value or to compute multiples for the same purpose. The choice of comparable companies remain subjective and this could lead to errors in the valuation process.

Damodaran points out also another con of this approach: focusing on future revenues and earnings lead to a conflict of interest between entrepreneur and investors. Indeed, the Startups will try to push up these numbers (in their business plans) without really the need to make the investment necessary to obtain them and, at the same way, investors will try to push them down (Damodaran, 2009). Furthermore, the entrepreneur could propose a comparable company for the multiple, which could be rejected by the investor, because the resulting multiple will lead to a too high price. (Desaché, 2014)

³⁵ Source: <http://www.angelpartnergroup.com/2015/12/22/la-valutazione-di-una-startup-e-il-venture-capital-method/>

Damodaran said that this approach suffers from another big limit, which is the high discounted rate used in the valuation method (Damodaran, 2009). He demonstrates that the target rate of return asked by Venture Capitals are far higher than the ones that they actually obtain. According to his research, they ask for 40% and 60% in the first stage of the life cycle, but Venture Capitalists actual returns are far smaller. In his research for the returns of venture capitalists in 2007 in comparison with NASDAQ, he gets that they obtain 8.50% after 3 years, 8.80% after 5 years, 16.60% after 10 years and 16.90% after 20 years. What is clear is that the rate of returns, which are required from investments, are not delivered in reality. Indeed, these high discounted rates are often used for matter of negotiation (Janet Kiholm Smith, 2011). Entrepreneurs present always business plan in which the venture performs as planned, but not always is this the case. If the investor is interested in a project, but he wants to compensate for the optimistic projections of the entrepreneur can use a higher discount rate.

3.2.2 The First Chicago Method

Sahlman and Scherlis developed the so-called “First Chicago Method” in their article “A method for valuing high risk long term investments: the venture capital method” (Scherlis, 1987) and it can be considered as an evolution of the standard Venture Capital Method.

This method differs from the previous one because it considers a low level of discounted rate, in general the same of the one obtained by the CAPM plus a premium for illiquidity and the terminal value is computed as an average between three values coming from three different scenarios. The three considered scenarios have a weight related to their probability of occurrences and as result, the terminal value of the company is a weighted average (Desaché, 2014).

In general these alternative scenarios are:

- An “optimistic” scenario for the forecast of sales of the company
- A second scenario defined as “realistic” which considers a lower level of development
- A third scenario, the “pessimistic” one, which consider the worst possible situation, for instance the bankruptcy of the company.

The main advantage of this method is that it requires thinking about different scenarios of the business and so it forces to forecast how the business could evolve in the future. As a result, the

estimation of the terminal value is more prudent because it considers also a possible pessimistic scenario and so it gives a more realistic value.

It has a higher level of flexibility compared to the previous methods because it can consider in the three scenarios different options that the company can undertake in the future.

However, this method suffer from the same problems of the Venture Capital Method and from other problems. The main con is that it is a very judgemental approach, mainly due to the weights of probabilities given to the different scenarios, which are decided considering the point of view of the Venture Capitalist and so it can lead to a not accurate valuation of the company.

3.2.3 The Real Options method

Kester in the 1984 was the first one who proposed the real options term, now it is commonly used in order to provide an analogy between potential projects and financial options (Arnaboldi Michela, 2015). The definition of financial option: it is the right but not the obligation to buy (call option) or sell (put option) an underlying asset at a specific price in the future called strike price. At the expiration date of this financial contract, the option will be exercised if the market price of the asset is higher than the strike price in case of call option and lower in case of put option.³⁶ At the same way for real option the company will undertake an investment or a project in the future, if the market conditions are favourable or not.

This method as the advantage to take into account the flexibility component of Startups and the different possible strategic decisions of the management in the future. Analysts believe that it is important consider the cash flow generated by a company today, but also the different strategic choices of the management, which bring value to the company. For this reason, the real option method evaluate the value of a project or a company considering future opportunities, which come from decisions of the management. Any investment opportunity of the company can be seen as a call option because the firm has the right but not the obligation to invest in it (Arnaboldi Michela, 2015).

³⁶ Source: slides of Financial lab by Giancarlo Giudici

According to the real option method, the value of the Startup is equal to a portfolio of call options (Cioli, 2005). Amran and Kulatilaka (Kulatilaka, 1998) have identified in their resources different types of real options, which are choices of the management:

- Growth option: a firm can invest today, but if the result is good can invest again in the future increasing the revenues
- Sequential development option: the start of a project can lead to the option to develop further interrelated projects in parallel or sequentially, which increase revenues.
- Option of abandon: if the project does not work the management can cease the project during its life
- Exchange option: flexibility of the project for example decide about which is the primary source of energy of a plant
- Extension or reduction option: the management can reduce or increase the size of the project, for instance when you buy a plant you can make a further investment to build an extension in order to increase its productivity (Desaché, 2014).
- Learning option: wait to implement the project until new information arrives
- Waiting option: flexibility about the time period in which you can launch the business.

The parallelism between the components of financial options and real options is (table 5):

REAL OPTION	FINANCIAL OPTION	NOTATION
PV of the project or investment cash flows	Value of the underlying asset	S
Investment to make the project	Strike price	X
Possible delay of the decision	Time to maturity	T
Time value of money	Risk free rate	r
Risk of the project	Volatility of the underlying return	σ

Table 5: source author elaboration

Applying the Black and Sholes formula the result is that for a project which requires an initial investment equal to X, with a PV of cash flow equal to S, maturing in time T years, with volatility σ and the risk free rate r, the value of the real call option is³⁷:

$$C = S \times \Phi(d_+) - X e^{-rT} \times \Phi(d_-)$$

Where Φ is the cumulative distribution of the Gaussian function and

$$d_+ = \frac{\ln\left(\frac{S}{X}\right) + \left(r + \frac{\sigma^2}{2}\right) \times T}{\sigma \times \sqrt{T}}$$

$$d_- = \frac{\ln\left(\frac{S}{X}\right) - \left(r + \frac{\sigma^2}{2}\right) \times T}{\sigma \times \sqrt{T}} = d_+ - \sigma \times \sqrt{T}$$

In conclusion, the total value of an enterprise is equal to the sum of the discounted cash flow, which the current activity of the company is able to provide and the implicit value brought by the strategic option, which the management can undertake in future.

3.2.3.1 Limits of the Real option method

One of the main limitation of this method come from its parallelism with financial options, which are based on some hypotheses, which are difficult to apply on real option. Indeed, the main assumptions under financial options are (Arnaboldi Michela, 2015):

- Portfolio division: the investors with financial options can divide the investment money in portions as desired. Instead, real options are discrete and so if a company realize only a percentage of an investment it will not get the same percentage of the results
- Market tradability: financial options are traded on the market where there are comparable information; instead, real options are not traded and there are not market comparable alternatives. Indeed, one of the condition to apply the Black–Scholes

³⁷ Source: slides of Financial lab by Giancarlo Giudici

formula is to consider a tradable underlying asset at any time and without cost in order to have an arbitrage opportunity in case of mispricing (Desaché, 2014); instead, Startups are mostly not easy to trade unless they are listed

Real options are far from the concept of perfect information, which is the basis for asset pricing theory. Another problem with this method is that it can lead to an over valuation of the company in case the investor considers some advantages, coming from the future real options, directly into the discounted cash flow computation of the current activities of the company; therefore he may consider twice this positive effect.

Pascal Quiry³⁸ (Desaché, 2014) explains how this method is theoretically correct because it adjusts the traditional discounted cash flow considering also the flexibility and values coming from the future strategic decisions of the management, however, it fails for two reasons. First due to its complexity, because not all investors are familiar with the complicated mathematician formulas of financial options and second because it is difficult to evaluate all the possible future scenarios (especially the negative one that are not always considered by the entrepreneur in the business plan) and their probability of occurrence.

3.2.4 *Qualitative methods: Berkus method and Scorecard method*

Qualitative methods are used in order to calculate the pre money valuation of a company considering some qualitative factors of the company. These factors have a weight or a reference value and, without using precise mathematician formulas, are able to give a proxy of the value of the company. The two methods most used are the Berkus method and the Scorecard one.

“The Berkus model” was published in 2001 in the popular book “Winning Angels” and Dave Berkus, co-founder of the Tech Coast Angels in Southern California, developed it.³⁹

The idea of this investor is that only one on twenty companies are able to meet the revenues projections in their planned periods. Therefore, he considers not a future proxy of cash flows, but a

³⁸ Pascal Quiry is a professor of Corporate Finance in the HEC Paris Univeristy

³⁹ Source: <https://berkonomics.com/?p=2752>

valuation based on five key drivers, which affect the risk faced by new venture. To each of these components the investor has to give a value from 0 to 500,000⁴⁰ dollars and the resulted pre-money valuation is given by the sum of these five values. Obviously, in order to be applied outside the USA market, the range must be changed according the country market conditions. This method can be used only before the company has the first revenues and so for early stage ventures.

The five parameters considered are⁴¹:

- The Startup has an innovative idea that provides value with an acceptable product risk
- There is a prototype, which reduces technology risks
- The Startup has or plans for a quality management team which reduces the risks in execution
- There are strategic relationship which reduces competition risk
- There are product rollout or sales plans, which reduces the production risk

The main pro of this method is that it is very simple, easy to apply and flexible because the investor can decide which parameter is the most important in the Startup valuation. The cons is that the method is too much subjective and for this reason can give only an idea about a possible valuation according to the preferences of the investor. Furthermore, the model might not consider some key parameters, which are important in the sector where the Startup is going to operate. For instance, the characteristics of the competitive environment, the level of competitive differentiation of products or the level of intellectual properties; if they are important in the business sector, they have to be considered in the valuation of the Startup.⁴²

The second method considered is the “Scorecard method” also called Benchmark method; the angel investor Bill Payne developed it as a way to value the pre-money valuation for Startups by comparing them with other ventures in the same region and business sector.⁴³

⁴⁰ At the beginning, the value was between 0 and 1/2 million dollars, then in 2008 Berkus updated the model changing the range (0-500,000 dollars) in order to obtain a valuation more aligned with the new market conditions.

⁴¹ Source: <https://www.angelkings.com/startup/the-berkus-method>

⁴² Source: Valuations 101: The Dave Berkus Method

⁴³ Source: <http://worthworm.com/valuation-methods-spotlight-on-the-scorecard-method/>

The objective of this model is to compute the valuation of the target company by adjusting the average valuation of recently funded comparable companies (Payne, 2011).

The first step of the Scorecard method is to determine the average pre-money valuation of Startups, which are in the same life cycle of the target one and operate in the same business sector and region. In general, this division is done because the pre-money valuation varies according to the economy and competitive environment of the region; however, in most regions the pre-money does not vary significantly from one business sector to another.

The second step is to determine the pre-money valuation of the target company using the Scorecard method, which consider these adjustment factors (table 6):

Comparison factor	Weight
Strength of the management team	0-30%
Size of the Opportunity	0-25%
Product/ Technology	0-15%
Competitive Environment	0-10%
Marketing/ Sales Channels / Partnership	0-10%
Need for Additional Investment	0-5%
Other	0-5%

Table 6: Author elaboration of (Payne, 2011)

The subjective factors above represent the features of a new venture, most interesting for investors because these factors influence the survival and success of a newly founded company and each of them has weight which represents the importance of the factor (also in this case subjective).

For each factor, the target company's performances are compared to the comparable ones: for instance if the company performance in one factor is about average, the number 100% is written and for a stronger performance a number higher than 100% and in the same way a lower percentage in case the performance is weaker compared to the average.

Below is proposed an example of this methodology (table 7):

Comparison factor	Target	Weight	Factor
Strength of the management team	125%	0-30%	0.3750
Size of the Opportunity	150%	0-25%	0.3750
Product/ Technology	100%	0-15%	0.1500
Competitive Environment	75%	0-10%	0.0750
Marketing/ Sales Channels / Partnership	80%	0-10%	0.0800
Need for Additional Investment	100%	0-5%	0.0500
Other	100%	0-5%	0.0500
Sum			1.0750

Table 7: source: (Payne, 2011)

The values of the factors for the target company are computed by multiplying the weight of each factor with the correspondent target performance. The final valuation for the company is obtained by multiplying the sum of those factors with the average pre-money valuation of the comparable companies. The Scorecard Method gives a good understanding of the average of pre-money valuation of Startups companies in a region. With this data, the Scorecard Method gives subjective techniques to adjust the valuation of a target company for seed and Startup rounds of investment

The advantage of this methodology is that it gives a reasonable valuation for the company compared with similar ventures. The comparable are more consistent compared to the ones used in the relative valuation approach, because here they are chosen among other new venture in the same life cycle, business sector and region of the target one. Instead, the relative approach takes into account listed company, which as shown before, are different from Startups for many reasons.

The main drawback of the Scorecard method is that the identification of the factors, the weight given to them and values given to the target company are extremely subjective.

For this reason, it can be considered as a first proxy of the valuation, which has to be corrected by a more sophisticated tool.

In the analysis performed in the next chapter, it will be tested if the valuation of comparable Startups in the Italian market are similar or not, in order to understand if it can be used as first step to assess the valuation of a Startup, like in the model above.

CHAPTER 4

DESCRIPTIVE ANALYSIS ON ITALIAN VALUATIONS AND FINANCING ROUNDS OF STARTUPS

4.1 METHODOLOGICAL APPROACH AND RESEARCH METHOD

In this chapter will be explained the methodological approach used in order to conduct the descriptive analysis about valuations of Startups in Italy and the main sources of data used in the analysis. The research has been made in collaboration with the founder of the equity crowdfunding platform Tip Ventures: Matteo Masserdotti.

This analysis can be considered an “exploratory study”, because it starts with literature review about Startups, their financial sources and the valuations methods used by the investors and entrepreneurs. This is done in order to clarify which are the limits of these methods and why they cannot be used in the Startups context. Then the second part of the analysis is a “descriptive study” which is a part of the explanatory one, because the main goal is to understand how Startups are valued in Italy in the pre-seed and seed phases; then compare these results with international companies.

The data used in the analysis are quantitative data about Italian Startups, which collect money through equity crowdfunding campaigns or other private sources (business angel or venture capital), and international Startups in order to have an idea about the difference in valuations and investments received between Italy and the rest of the world. The Startups chosen for the analysis are all in their initial lifecycle phases of pre seed and seed, because these are the phases where is more difficult to use the main valuation methods due to the lack of information.

The data have been collected using two main sources: Crowdfunding Buzz, crowdfunding platforms and Crunchbase. Crowdfunding Buzz is a web site magazine, an initiative of Fabio Allegreni, with the aim to gather information and news about all the forms of Crowdfunding. The main objective of the magazine is to contribute to the popularization of Crowdfunding and disclose all information and news useful for the companies, which have a project, or people who want to invest

with this new source of financing. Indeed, thanks to this web site, it is possible to gather information about the successful equity crowdfunding campaigns in Italy from the first one (DiamanTech in the 31/03/2014) until now, the last campaign considered is Cubepit of the 3/09/2017.⁴⁴

From Crowdfunding Buzz, are gathered the information about the pre-money valuation per each Startups and the name of the platform where the campaign took place. Then all the platforms mentioned on the site are visited in order to have precise information about the value of the round obtained by the company and the shares given to the new investors. The value of the round is the main information visible on the online page dedicated to the campaign and then it is possible to find out the stake of ownership offered to the new investors in the document “Approval of Capital increase”. This is done in order to double check the valuations of Startups in equity crowdfunding campaigns because it is the key element of the analysis. In each online platform are also available the Business plans of the companies which ask capitals through equity crowdfunding. From these documents, it is possible to gather information about the future business of the Startups and therefore the companies could be divided considering sectors, target markets (B2B or B2C) and if they are software or hardware based companies.⁴⁵ This is done in the second part of the analysis in order to understand if some factors have an impact on the valuation of Startups.

The second main source of data, used for taking information about private founded company in Italy and in the other countries is “Crunchbase”. Crunchbase is the destination for discovering industry trends, investments, and news about hundreds of thousands of public and private companies globally. Crunchbase provides a business information platform that pairs powerful tools and applications to stay competitive and successful, it is more than just data, but it is about community. From Chrunchbase, are taken the information about rounds of investments asked by Italian and International companies, which use equity financing sources like Business Angels and Venture Capitalists; knowing the amount of round of financing, looking at the stake of ownership assigned to the new investors (source Telemaco), it is possible to compute the valuation of the companies.

For the international companies it is necessary to find on Crunchbase both the round of investment and the valuation of the company when it raised the funds, because otherwise it is impossible, to find

⁴⁴ Source: <http://www.crowdfundingbuzz.it/campagne-equity-crowdfunding-finanziate/>

⁴⁵ A Software based company is a company, which provides as main offer to its target client the development, maintenance or publication of software using different business models like licensees. It does not offer a physical product like in case of hardware based companies.

out the stake of ownership obtained by the new investors and therefore the valuation of the Startup itself (no documents available). Then are taken were taken into account only international companies which asked an amount of capital in the range of pre seed and seed and which operate in the same sector of the companies of the equity crowdfunding sample. One of the limit of the research is the number of international companies considered, because with a free account on Crunchbase it was not possible to find out a high number of Startups with all the characteristics needed for the analysis.

The Italian private funded companies selected for the analysis are comparable companies of the ones in the equity crowdfunding samples. Indeed, from the equity crowdfunding sample are selected 10 companies for which it is possible to find out more than one round of investment (an equity story). For them, an average of three comparable companies are identified considering as drivers the sector, the country (Italy) in which they operate (as it was done in the Scorecard Method (Payne, 2011)), plus the business model driver: the comparable companies must have the same or a similar business model of the target company especially in terms of scalability and repeatability. The information about the business model of the companies were collected looking at the business plan of the equity crowdfunding companies on the platforms and on the web sites of the comparable ones (terms and conditions).

Then, for each comparable companies are found out if they asked a round of investment in Crunchbase and, if they did, their valuation is computed looking at the share of capital obtained by the new investors (in the document “Approval of capital increase” on Telemaco).⁴⁶

If it is impossible to find the document about the increase of capital, the change in the ownership structure of the company before and after the round of financing is considered (using Telemaco) in order to identify the stake of ownership of the new investors; then the pre-money valuation is computed as usual.

One limit of this approach is that it is not easy to find out a comparable company which answers to all the requirements and for which it is available the information of external financing on Crunchbase and therefore for which it is possible to compute the valuation. For this reason, in order to increase the sample of Italian private funded companies, Startups, which operate in the same sectors of the target ones and provide similar solutions are added to the sample, even if they are not perfect comparable in terms of Business model.

⁴⁶ Telemaco collects al the “Visure Camerali” of the Italian companies

In table 8, it is provided an example for one of the company selected from the sample: Luche SRL, which operates in the sector of the Energy Harvesting.

The offer of the company consists in selling “tiles” in public places, which are able to convert the steps of people on the ground into energy. The business model is based on selling the tiles per square meter and it has a high value of repeatability and scalability.

<i>Startup</i>	<i>Sector</i>	<i>Activity</i>	<i>Business model</i>	<i>Round</i>	<i>Pre-money valuation</i>
<i>Luche Srl</i>	Energy Harvesting	Clean energy from floor	Price per square meter	184,000 €	1,450,000 €
<i>Underground Power</i>	Energy Harvesting	Clean energy from traffic	Price per square meter	250,000 €	1,700,000 €
<i>Loclain Srl</i>	Energy Harvesting	Clean energy from water/gas	Valves sales	100,000 €	400,000 €
<i>Glass to Power</i>	Energy Harvesting	Clean energy from solar windows	Windows sales	183,750 €	1,500,000 €

Table 8: Luche srl comparable companies

All the comparable companies operate in the same sector and provide a solution similar to the target. Glass to power is a spinoff of Bicocca University, which produces windows with photovoltaic panels and therefore the windows are the ones, which produce energy from the sun. Underground power is a company, which operates in the clean energy industry and develops Lybra, a speed ramp that can transform the traffic into energy.

Loclain Srl produces valves, which can be used as control devices in manufacture in order to control the pressure of gas and water with the aim to recover energy.

As we can see, both Glass to power and Underground power have round and valuation similar to the target company, mainly because all the comparable drivers are respected. However, in the last case of Loclain, the business model is different from the target company in terms of scalability and repeatability: selling valves in the manufacture industry is less scalable than selling tils in public places, speed ramp in the streets of cities and photovoltaic windows for every buildings.

This process was done for all the 10 selected target companies and the comparable companies have been identified with the help of the “register of innovative Startups” where it is possible to filter companies by the sector in which they operate and their business activities.

The data for the three different samples: international companies, Italian private funded and Italian equity crowdfunding are collected in a random way in order to avoid the degeneration of the sample, which is the main condition in order to estimate the features of the original population. In order to preserve the randomness of the sample, the one of international companies is not so large. It is one of the limit of the analysis because in order to find out more companies that are international (and respect the conditions of round and sector) it would have been necessary to filter data according to the value of valuation and therefore obtain a fake selection of data.

The data about valuation and rounds of investment of each companies are reliable because computed by third parties (Crunchbase or from the staff of the equity crowdfunding platforms) and by my own looking at the documents on Telemaco. For this reason, the data respects the internal validity of the sample. The samples for the analysis are “Stratified samples” because are composed by random companies which respect one factor: the amount of round of financing (pre-seed/ seed).

4.2 DATA ELABORATION

In this section, will be described how the data collected for the analysis have been filtered and elaborated and how tables and figures have been created.

The starting point of data elaboration is the equity crowdfunding sample of companies. The data have been collected form Crowdfunding Buzz about a total of 66 companies, which ask capitals through equity crowdfunding with successful campaigns. This sample is selected for the analysis manly because the total population is limited, 66 Startups for which are available all information about rounds and valuations. Therefore, it is the perfect starting point for finding comparable companies and make comparison with them and international Startups.

The campaigns considered are from the first one of Diamantech in the 31/03/2014 to the one of Cubepit in the 03/09/2017 the data in which the analysis started. The data about valuations and rounds of companies, which had success in their equity crowdfunding campaigns, are more reliable. Indeed,

sometimes campaigns fail because companies have a wrong valuation and ask too much capital, when they have not already the metrics and requirements to do it and investors are not willing to invest into the project.

Then the companies are divided into three groups according to the amount of capital asked: the pre-seed companies, which ask an amount, lower than 100,000 €, the seed companies with an investment round between 100.000 € and 550,000 € and the last category the Serie A with a round of investment higher than 550,000 €.

The result is a sample of 47 companies for seed phase and 11 for pre seed phase and then the other companies in the Serie A.

The companies considered were 58 (47+ 11) companies on a total of 66 and therefore the 88% of the starting population of equity crowdfunding successful campaigns in Italy. This because the analysis is performed on the Startups in their first stages of lifecycle and therefore on the ones, which ask capitals in the pre-seed and seed stages. The pre-seed and seed Startups are the focus of the analysis, because these are the phases in which it is more difficult to apply traditional and alternative valuation methods (more than in the Serie A phase). Moreover, because the main objective of Tip Ventures is to understand, with a descriptive analysis, how the Italian market evaluate Startups in these phases.

Per each company, there are further information coming from their business plan and “Visure camerali”: the year of foundation, their business activity, the area in which they operate (service, manufacture, commerce and agriculture), the type of product / service offered (software or hardware based) and if the main clients are other companies or final consumers (B2B and B2C). These further data can be used in order to make tests about the difference in valuations of Startups according to the categories; for instance if it is statistically significant the difference between the average valuation of B2B or B2C companies.

In the same way, as for the equity crowdfunding sample, the Italian Private funded companies have been divided according to the amount of capital asked into pre-seed, seed and Serie A groups. The sample is composed by 42 companies, which are 30 seed and 12 pre-seed. The majority of the companies (32) are comparable of the ones in the equity crowdfunding sample, but other 10 companies operate in the same sectors and ask pre-seed and seed rounds like the comparable, but the business model used could be different.

The international companies sample is composed by a total of 45 companies and 26 of them asked a seed round and other 16 a pre-seed one. The companies are chosen according to the sector and business activity in order to be similar to the companies in the other two samples.

4.2.1 Box Plot Analysis

The Box Plot is a graphic representation of the distribution of data of a variable; it is very useful in order to understand the general features of the distribution like the median, the level of deviation and the asymmetry. It is build considering five numbers of synthesis: the minimum, the first quartile, the median, the third quartile and the maximum value of the distribution.

- The median: if n number of observations is an odd number and the series is sorted in a growing way, the value of the median is computed as $(n+1)/2$ and if the n is an even number it is the average between the two values of the series: $n/2$ and $(n/2)+1$;
- The first quartile: if the number of observation $n+1$ is divisible by 4 and sorted in a growing way, the value of the first quartile is the value in the position $(n+1)/4$ otherwise it is the average between the two adjacent values. The 25% of the distribution of the values fall below this lower quartile;
- The third quartile: if the number of observation $n+1$ is divisible by 4 and sorted in a growing way, the value of the third quartile is the value in the position $(n+1)*3/4$, otherwise it is the average between the two adjacent values. The 75% of the distribution of the values fall below this upper quartile;
- Maximum: it is the maximum value of the distribution;
- Minimum: it is the minimum value of the distribution;

The Box Plot is built as:

The Q1 and Q3 values are the lower and upper extremity of the box and the median divided the box in a half. The two Whiskers are obtained by connecting Q1 with the minimum of the distribution and Q3 with the maximum of the distribution. In the “box” is contained the 50% of the distribution of values by construction. In order to obtain this representation of data SPSS is used as statistic software for the Equity crowdfunding, private funded and international valuation distributions.

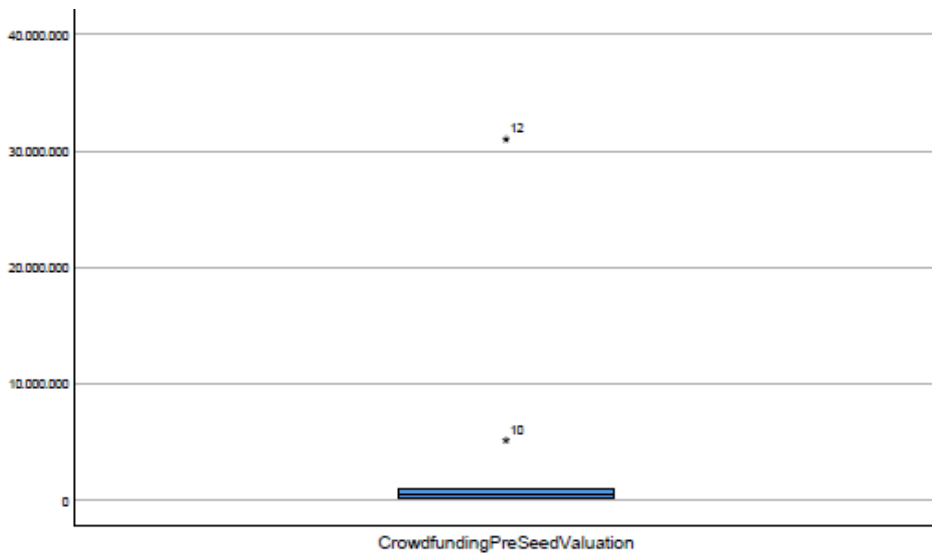


Figure 10: Box plot, crowdfunding Pre-seed valuation

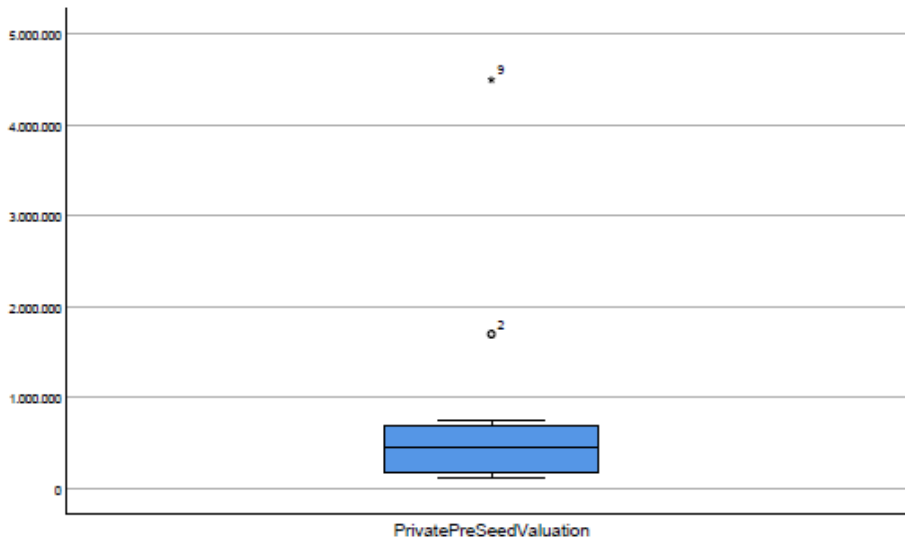


Figure 11: Box plot, private Pre-seed valuation

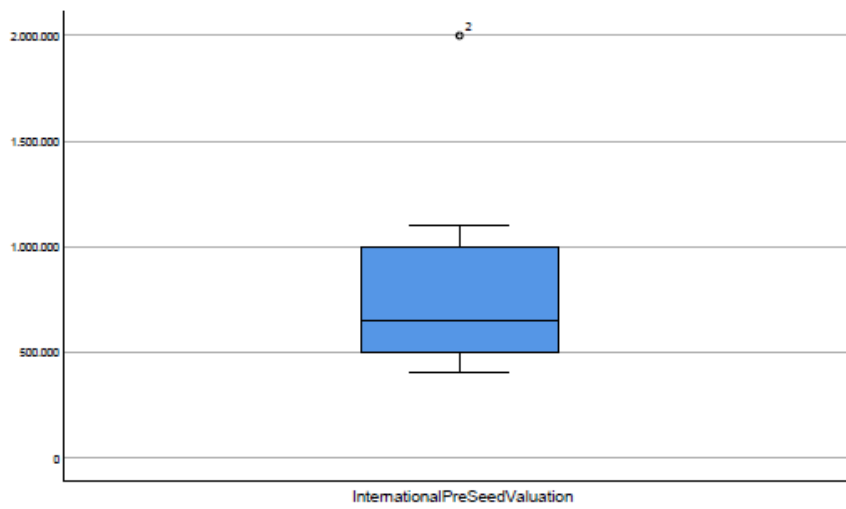


Figure 12: Box plot, International Pre-seed valuation

The figure 10,11 and 12 are examples of box plot analysis for the first three Pre-Seed samples. The first box plot in figure 4.2 is not so clear because there is an outlier value far higher than the upper limit of the box plot. In the Appendix (6.1) there are the box plot of seed samples.

In the SPSS box plot, the minimum and maximum are computed according to these formulas:

$$MIN = \max[MIN, Q1 - 1.5 \times (Q3 - Q1)]$$

$$MAX = \min[MAX, Q3 + 1.5 \times (Q3 - Q1)]$$

Where Q1-Q3 is the interquartile range, which is also an index of the dispersion of data of the distribution.

In general, the modified Box Plot of SPSS, where the value of min and max are computed with the above formulas, can be used in order to identify outliers, which are the values outside the area defined by the MAX and MIN values⁴⁷ (they are identified with an asterisk). The aim of the Box Plot analysis in this descriptive statistical analysis is to identify potential outliers in the pre seed and seed valuations in order to eliminate them and as a result have a more significant comparison between the different samples. The Box Plot analysis is used only on the valuations of the Startups, because there are not outliers in the round of financing distributions by construction (I consider a range of values between a precise max and min for both pre seed and seed categories).

The outliers are values extremes compared to the others of the sample; they are valid data, but can be deleted from the analysis, because they generate distortions in the results especially for the descriptive analysis.

Thanks to the Box Plot Graphs, outliers in the crowdfunding pre seed and seed valuation, private pre seed valuation and international pre seed valuation are identified and eliminated. The result is a change in the number of observations of each samples:

- From 11 to 9 for the Equity Crowdfunding Pre Seed sample
- From 47 to 45 for the Equity crowdfunding Seed sample
- From 12 to 10 for Pre Seed Private Funded sample

⁴⁷Source:

http://studiostat.unibocconi.it/uni/POPUP/Shared/S_12_Box%20plot%20una%20rappresentazione%20sintetica%20della%20distribuzione.pdf

➤ From 16 to 15 for the Pre Seed International sample

For instance, one of the company, which was considered an outlier in both Pre-Seed and Seed equity crowdfunding valuations, is Cynny Spa. This company has a valuation equal to 31,000,000 € for a pre seed financing round of 54,288 € and a valuation of 35,630,963 € for a Serie A round of 1,000,000 €; these values are far higher than the two Whiskers for pre seed and seed valuations.

The Descriptive analysis is then conducted on the samples without taking into account the outliers identified with the Box Plot Analysis.

In the following chapter will be shown the results of the descriptive analysis: the distributions of the samples, the dispersions graphs in order to graphically represent the correlation between rounds and valuations of Startups and summary tables in order to compare the samples between each other.

4.3 DATA RESULTS

4.3.1 Scatter Plot Analysis

The first graphs used in the descriptive statistical analysis is the “scatter plot”. These graphs are useful for interpreting trends in statistical data. Each observation in the scatter plot has two coordinates X and Y, which correspond to two different piece of information about the data, the point is the intersection of the two coordinates. In this case, it is considered as two variables the round of financing and the valuation for each Startups considering all the six samples of data. For the three graphs below the X-axis represents the values of the financing rounds and the Y-axis the correspondent valuation.

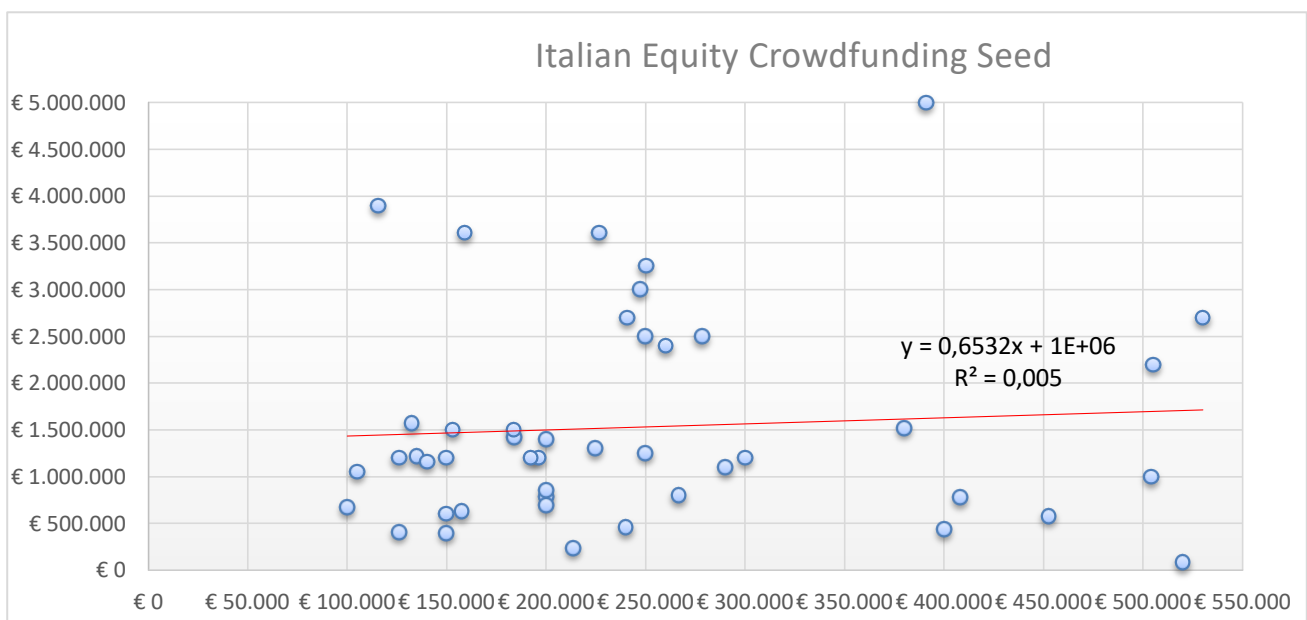


Figure 13: Figure 4.5 Equity crowdfunding seed

In this first graph are represented the data about successful equity crowdfunding campaign with round seed. Looking at the “trend line”⁴⁸ is possible to notice that there is not a correlation between values of rounds and the corresponding valuation for each Startup. This because the majority of the points are not on the line, with a positive and negative variance. Therefore, it is impossible to

⁴⁸ Excel builds the “Trend Line” automatically with the equation of a linear regression. It is useful in order to see how the observation are located compared to the line.

identify any type of trend even not linear like exponential or logarithmic. This means that the dispersion of observations is too high and the value of “covariance” between the two variables is near zero; indeed the covariance increase in absolute value when one variable change its values according to a change in the value of a second variable.

The result is in line with the expectations, because in this graph, are considered valuations about Startups, which ask the same type of round of financing and so the valuation does not grow or decline according to a change in the value of the round asked, which is in the seed range of 100,000 and 500,000 euros.

From the graph, it is possible to notice how the majority of the Startups ask a financing round between 100,000 and 300,000 euros and for a consistent number of Startups the valuation is lower than 2,000,000 €; obviously only a precise cluster analysis can identify groups of observations.

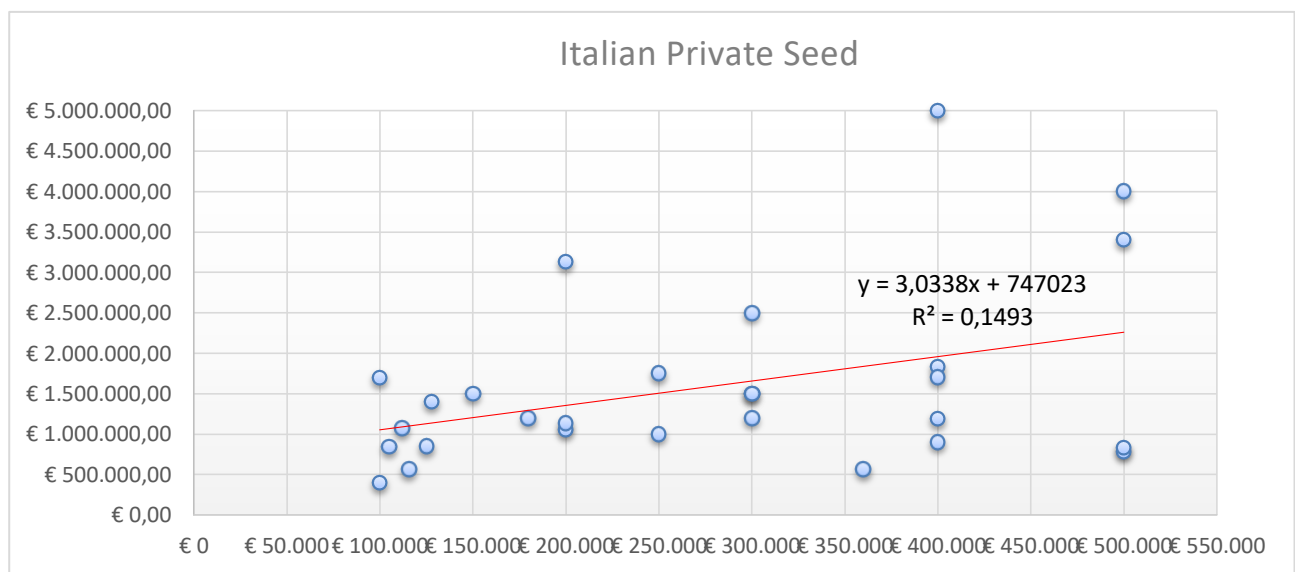


Figure 14: Italian Private Seed

This second graph illustrates the relationship between valuation and round of financing for Private Funded Startups in Italy. Even if here, the R^2 ⁴⁹ is higher than in the first graph, the dispersion of observations is too high and so it is not possible to detect any pattern of relationship between rounds and valuation.

⁴⁹ It is a standardized measure, bounded between zero and one, of how well sample regression models fits the data

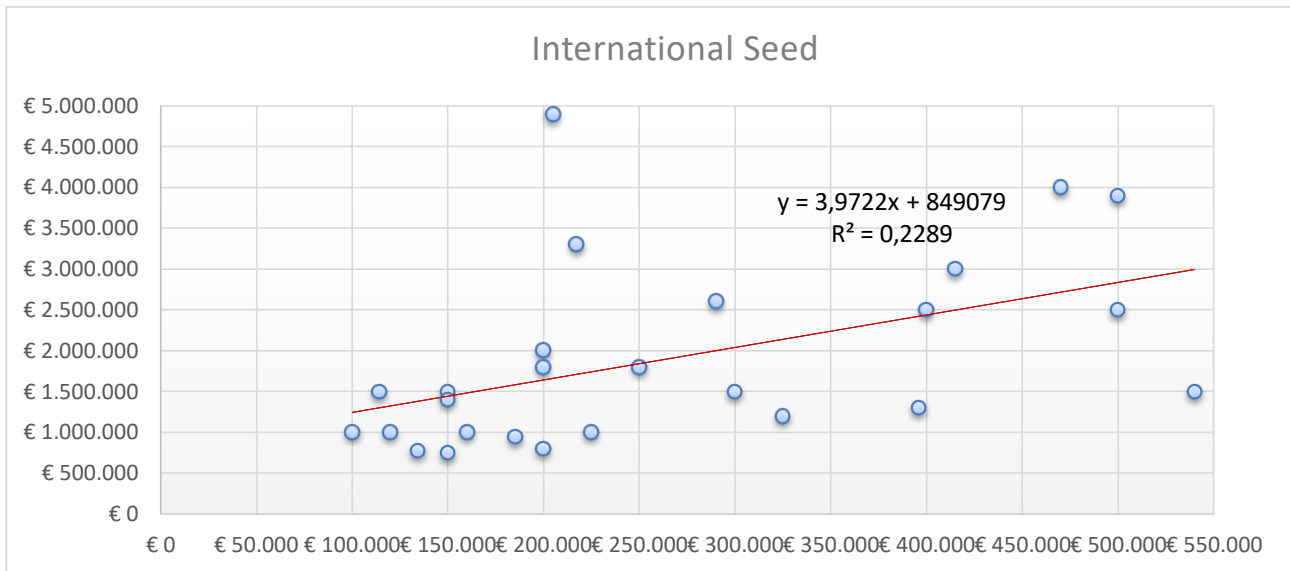


Figure 15: International seed Companies

As in the previous graph, also here it is possible to say that there is a significant group of Startups, which have a valuation lower than 2,000,000, but the value of rounds of financing are distributed more uniformly among the seed range, compared to the previous graph

In the last graph, there is the relationship between seed rounds of financing and valuations for international companies. In this case, the trend line is more positively inclined and it seems that there is a sort of positive relationship between rounds and valuations, but the R^2 is too small in order to consider statistically significant the result. From the graph, it seems that the valuations are higher compared to the other two samples, but this hypothesis will be checked later.

There are not clear groups of variables, which can be identified from the graph therefore more details about the features of this sample will be computed and compared with the others in the next chapters.

The same analysis had been performed on the Scatter plot of pre seed Equity crowdfunding; Private funded Italy and international companies. The main result is that there is not a correlation between the variables of round and valuation like in the seed case; obviously in the pre seed phase a lower amount of round is ask and also the valuations are lower than the seed ones. Look at the appendix (6.2) for graphs.

4.3.2 Data distribution analysis

In this section, it will be described the distributions of the valuations for the Startups, which ask seed financing rounds for all the three samples: equity crowdfunding, private funded Italy and international companies. For each sample, the features of the distribution are summarized into a table and after a histogram is reported. In the histogram graph, the X-axis represents the value of valuations divided into classes of 50,000 € as in the previous scatter plot and Y-axis the frequency for each of the X classes, (the frequency indicates the number of observations for each class). The values of the percentiles and the “higher moments” will be compared among the samples; instead, the median and mean will be compared in the next chapter. For each histogram graph is added the Normal Distribution Curve in order to understand if the sample distribution behaves as this parametric distribution or not; furthermore, in order to obtain a more precise result also normality test are conducted on each sample.

Observations	Mean	Skewness	Kurtosis	Perc 25%	50%	75%
45	1,528,107 €	1.256	1.190	735,176 €	1,200,000 €	2,300,000 €

Table 9: Equity Crowdfunding valuations features

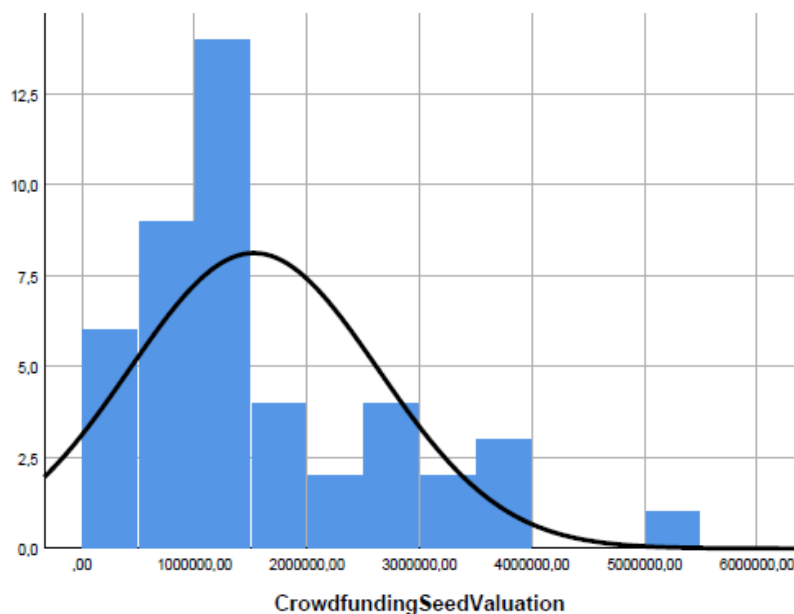


Figure 16: Equity Crowdfunding seed valuation distribution

In this first table and graph are represented the valuations for the Equity Crowdfunding companies, which collect a seed financing round.

The mean value represents the central tendency of the series; in general, it has the aim to measure the “typical value” of the series. (Brooks, 2014). In this case, it is used the simplest way to compute the average: the arithmetic mean, which is simply the sum of all values in the series divided by the number of values. The result is a mean equal to 1,528,107 €, which corresponds to the highest point into the distribution curve in the graph below the table. Than the other factors considered are the percentiles, which gives information about the value below which a given percentage of observations in a group of observations fall. These values are obtained by, first ordering the data into an ascending way and then splitting the sample into four quartiles with the same percentage.

The first quartile in this sample is equal to 735,000€ so this means that the 25% of companies, which collect seed rounds through equity crowdfunding in Italy, obtained maximum this value of valuation. In the same way, the 75% of the sample was able to obtain a maximum valuation equal to 2,300,000 €.

The second quartile corresponds to the Median of the distribution: it is the middle value in a series when the elements are arranged in an ascending order. In the sample the value of the median is 1,200,000 €, which means that the 50% of the observations of the sample were able to obtain this value as a maximum valuation. Then also, the so-called higher moments are reported into the tables for every sample, which are the Skewness and the Kurtosis. The formulas of these two higher moments are:

$$Skewness = \frac{1}{N-1} \times \frac{\sum (y_i - Y)^3}{(\sigma^2)^{3/2}}$$

$$Kurtosis = \frac{1}{N-1} \times \frac{\sum (y_i - Y)^4}{(\sigma^2)^2}$$

Where Y is the average value of the series and σ^2 is the variance of the series.

The Skewness defines the shape of the distribution and the extents to which it is not symmetric about its mean value (Brooks, 2014). When the distribution of data are symmetric the three parameters median, mean and mode⁵⁰ are equals; this is the case of a Normal distribution.

⁵⁰ The mode measures the most frequently occurring value into a series, which is sometimes regarded as a more representative value of the average than the mean.

Instead, in this sample, the data are positively skewed, because the value of the mean is higher than the median (there is a long right tail and most of the data are bunched over to the left). Indeed, the precise value is 1.256, which is higher than zero (the symmetric case).

On the other hand, the Kurtosis measure the fatness of the tails and how the series is peaked at the mean, for a normal distribution this value is equal to three. In general this value is compared with the one of normal distribution, which is defined as Mesokurtic, if the distribution has a Kurtosis value higher than the Mesokurtic is Leptokurtic, otherwise it is a Platykurtic.

In this case, the sample is clearly Platykurtic because the value of the Skewness is lower than 3 (1,190). As a result, this distribution has a peak lower than a normal distribution and thinner tail and more of the distributions in the shoulder compared to a normal distribution.

Observations	Mean	Skewness	Kurtosis	Perc 25%	50%	75%
30	1,589,525 €	1.772	2.972	862,500 €	1,200,000 €	1,740,000 €

Table 10: Italian Private Funded valuations features

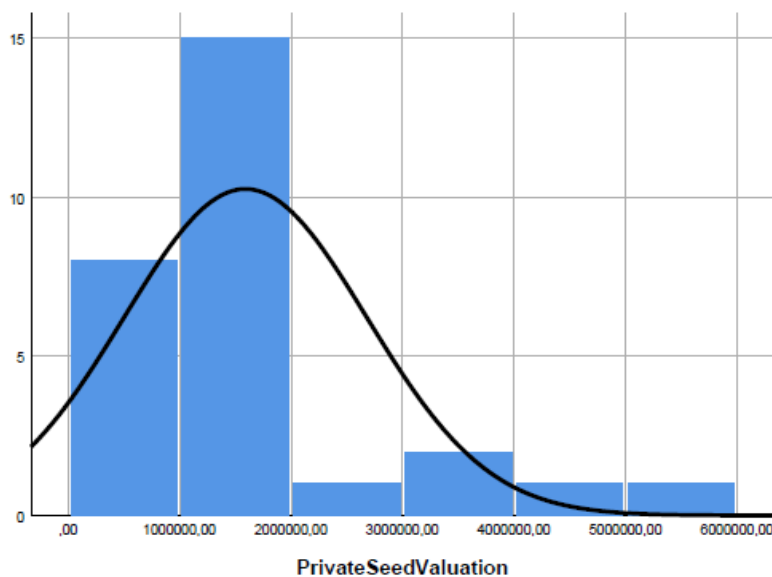


Figure 17: Italian Private Funded seed valuation distribution

This second table and graph consider data about the Italian private funded companies and so the comparable companies of the Equity Crowdfunding. As in the first sample, here are summarized in a table the main features of the distribution and below there is an histogram and the normal curve for the distribution. The value of the mean and median are respectively 1,589,525 € and 1,200,000 €; the mean is very close to the one of Equity Crowdfunding and the value of the median is the same, but these values will be discussed later these results.

If the series is ordered in an ascending way and it is divided into four parts with the same percentage, it is possible to compute the values of the quartiles and compare them with the previous sample. In particular, the 25% of observations obtained, as a maximum value, a valuation equal to 862,500 €, this means that the first 25% of observations were able to get a valuation higher than the previous sample. Instead, the 50% of the observations obtained a maximum valuation of 1,200,000 € and the 75% one of 1,740,000 €. This means that the 50% of the sample got as a maximum exactly the same value of the previous sample, however considering the third quartile and so adding another 25%, the value is lower and therefore the companies in the first samples were able to get a higher valuation.

As a result, the distribution is more concentrated in the left side compared to the sample of Equity Crowdfunding and indeed, the value of the Skewness is higher: 1,772. Like the previous case, here there is a positive Skewness and so not a symmetric distribution like in the Normal case.

The value of the Kurtosis is lower than 3, therefore this is a case of Platykurtic like the first sample. The distribution is characterized by a lower peak and thinner tails compared to the Normal distribution; however, it is more similar to a normal distribution than the Equity Crowdfunding sample because the value is close to 3.

Observations	Mean	Skewness	Kurtosis	Perc 25%	50%	75%
26	1,902,615 €	1.200	0.786	1,000,000 €	1,500,000 €	2,525,000 €

Table 11: International companies valuations features

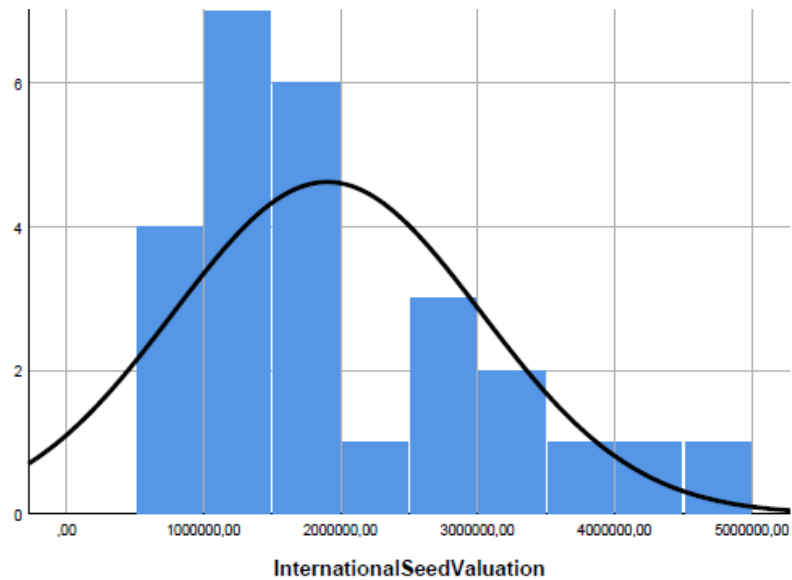


Figure 18: International Companies seed valuation distribution

This third table and graph summarized the information about the distribution of international seed companies. The value of the mean and median are higher compared to the two previous samples (the Italian market ones). Indeed, the mean value is 1,902,615 € and the median 1,500,000 € and in the next chapter will be tested the statistical significance of these results.

Looking at the values of the quartiles the results are all values higher compared to the previous samples. Indeed, the 25% of the sample got a maximum valuation of 1,000,000 € and the 75% a maximum valuation of 2,525,000 €. The effect is visible on the value of the Skewness, which is lower than the Equity Crowdfunding sample (1.220), and therefore the distribution is still positive Skewness but more located around the centre. The Kurtosis is like in the previous samples lower than 3 (0.786) and therefore the distribution is Platykurtic. The result is a lower peak and thinner tails compared to the Normal distribution. Looking to the higher moments which describe shape and symmetry of the distribution, it is possible to say that the distributions of the samples are similar.

After the distribution analysis of the samples, tests have been conducted in order to assess if the distributions are normally distributed or not. From the analysis of the histogram, it is possible to make the hypothesis of not normal distributed samples, but tests are needed in order to have a more statistically significant result.

In order to perform the tests it is used the software “Gretl”, which gives by default results of four tests: Doornik-Hansen test, Shapiro-Wilk W, Lilliefors test and Jarque-Bera test. Each of them have as null hypothesis the normality of the samples. The tables below summarized the results:

Test name	Value of the test's result	P-value
Doornik-Hansen test	18.7647	8.4196*e-005
Shapiro-Wilk W	0.87656	0.000190774
Lilliefors test	0.218212	0
Jarque-Bera test	12.679	0.00176523

Table 12: normality tests for Italian Equity Crowdfunding companies

Test name	Value of the test's result	P-value
Doornik-Hansen test	22.0916	1.59537*e-005
Shapiro-Wilk W	0.803087	0.000190774
Lilliefors test	0.232229	0
Jarque-Bera test	19.0671	7.23832*e-005

Table 13: normality tests for Italian Private Funded companies

Test name	Value of the test's result	P-value
Doornik-Hansen test	11.5169	0.00315593
Shapiro-Wilk W	0.860096	0.00224711
Lilliefors test	0.216974	0
Jarque-Bera test	5.90851	0.0521176

Table 14: normality tests for Italian Private Funded companies

In order to assess if the null hypothesis is accepted or not it is possible to look at the p-value for all the four tests. If the p-value is lower than 0.05 the null hypothesis of normality distribution of the samples is rejected with the 95% of probability to be right. According to the results for all the tests and for all the three samples, it is clear that the null hypothesis of Normal distribution of the samples is rejected.

This is an important result in order to choose which statistic test use on the samples: it is impossible to use tests with as main assumption a normal distribution of the sample.

4.3.3 *Kruskal-Wallis H*

In the next chapter, the data about mean, median and variance will be compared among the different samples of Equity Crowdfunding, Private funded and International companies. The data about pre-seed round financing are less numerous and for this reason it is impossible to apply a robust statistic model in order to understand if the results are related to the features of the samples or can be extended to the origin populations.

On the contrary, for the seed samples, which have more observations, it is possible to carry a statistic test between the different samples in order to understand if their differences are statistically significant and if the results can be extended to the populations and therefore are not only dependent on the features of the samples.

A very well-known test, in order to assess if the difference between the average values (mean) of two samples is statistically significant or not is the t-test. The t-test is one of the many parametric tests, which are used in statistic and are based on the assumption that the samples are distributed according to a known distribution (for this reason are called parametric tests). Indeed, the t-test has the main assumption of normality distribution of the samples and if it is not satisfied by the samples it is impossible to obtain robust results.

In order to overcome this problem a solution could be to use the t test, even if the Normality assumption is not meet by the samples and then consider the results as approximations, but this leads to misleading results. The second solution, which instead was chosen in this analysis, is to use a non-parametric test and therefore a test that does not have any assumption about a certain distribution for the samples.

The test selected for the scopes of the analysis is the Kruskal-Wallis test. It is a non-parametric test available on the software SPSS, in order to compare independent samples.

W.H Kruskal and W.A Wallis developed the Kruskal-Wallis test in the 1952, in the publication of the article “Use of ranks in criterion variance analysis” published by the Journal of American Statistical Association. This is the non-parametric equivalent of the ANOVA test, which analysis the variances of samples and it is one of the most powerful methods in order to verify this null hypothesis (H_0): k independent samples come from same populations or populations with same value of the median. Indeed, the objective of the analysis is to understand if the average (median) value of

valuations and rounds for Equity Crowdfunding, Private funded and international companies are the same not only for the samples, but also for their original populations.

The Kruskal-Wallis H test (sometimes also called the "one-way ANOVA on ranks") is a rank-based nonparametric test that can be used to determine if there are statistically significant differences between two or more groups defined by an independent variable on a continuous or ordinal dependent variable. It is also seen as an extension of the Mann-Whitney U test because it can perform an analysis on K independent groups and not just two.

This test is an “omnibus test statistic”, because it does not give as result which specific groups defined by the independent variable are statistically significantly different from each other; it points out that there is at least two groups, which are different. Therefore, in order to have a better clear understanding of the results it is possible to carry on the test on two groups at a time.

However, in order to use the test there are some assumptions that must be satisfied by the data, in particular, there are four assumptions:

- Assumption 1: the dependent variable should be measured at an ordinal or continuous level. In our case, the values of valuations and the ones of round of financing are both measured in a continuous way and therefore the assumption is satisfied.
- Assumption 2: the independent variable should consist of two or more categorical, independent groups; the groups can be three or more, but also two. In our case the dependent variable is a dummy, which identify if the samples are Crowdfunding, Private Italian funded or international companies and therefore it is a categorical variable.
- Assumption 3: the observations must be independent, which means that there is no relationship between the observations of each groups or between the three groups. This means for instance, than one observation cannot be in more than one group. Therefore, this assumption is satisfied by the data.
- Assumption 4: the shapes of distributions of the samples must be similar; otherwise, the test cannot be conducted on the medians. According to the analysis of the previous chapter the three samples has a similar shape of distributions.⁵¹

⁵¹ Source: <https://statistics.laerd.com/spss-tutorials/kruskal-wallis-h-test-using-spss-statistics.php>

The Kruskal Wallis is a non-parametric test, which performs its analysis on “ranks” of the variables and not on the values. Indeed, to each value of the dependent variable is given a rank and therefore an order number.

The method used by Kruskal Wallis can be summarized in this way:

- First all data must be ranked (from 1 to N) ignoring the group membership. To any tied value is assigned the average of the ranks they would have received not been tied.
- The test statistic (formula) is:

$$H = (N - 1) \times \frac{\sum_{i=1}^g n_i \times (r_i - r)^2}{\sum_{i=1}^g \sum_{j=1}^{n_i} (r_{ij} - r)^2}$$

Where:

- n_i is the number of observations in group i
- r_{ij} is the rank of observation j from group i
- N is the total number of observations across all groups
- r_i is equal to the sum of r_{ij} from J equal to 1 to n_i divided by n_i , and it is the average rank of all observations in group i
- r is equal to $(N+1)/2$ and it is the average of all the r_{ij}
- g is the number of groups

In order to understand if the null hypothesis of same median between samples is accepted or not is sufficient to look at the p-value, which is part of the results given by the test. If the p-value is lower than 0.05 the null hypothesis is rejected with the 95% of probability to be right. If the p-value is lower than 0.1 the null hypothesis can be rejected with the 90% of probability to be right.

4.3.4 Pre seed results

In this first chapter, the data about the pre seed round of financing and valuations of the three samples are reported and compared. The objective is to understand if the rounds and valuations are similar or different among the Equity Crowdfunding, Private Funded and International companies samples. The limit of this first analysis is the number of observation of pre-seed rounds of financing; indeed, from the starting samples only a few companies asked this kind of round and the majority a seed round (for example in the Private funded sample 10 on 40).

For this reason, it is impossible to apply statistic test in order to understand if the results can be extended to the populations and therefore are not only limited to the samples.

	CROWDFUNDING ITALIA	PRIVATE FUNDED ITALIA	INTERNATIONAL COMPANIES
<i>Number of observations</i>	9	10	15
<i>Mean</i>	462,647 €	362,116 €	686,113 €
<i>Median</i>	450,000 €	317,500 €	600,000 €
<i>Standard deviation</i>	354,709 €	228,754 €	300,650 €
<i>Minimum</i>	50,000 €	115,000 €	116,700 €
<i>Maximum</i>	990,000 €	750,000 €	1,200,000 €
<i>Interval</i>	940,000 €	635,000 €	1,083,300 €

Table 15: Pre seed samples Valuations

The table above summarized the information about valuation coming from the pre seed samples of Crowdfunding, Private funded and international companies. The number of observations, as said before, it is small: 9 companies for the first sample, 10 for the second and 15 companies for the international sample. The mean and median values for Crowdfunding and Private funded Italian companies are more similar between each other (but still different) than the results for the international companies. Indeed, for the Crowdfunding sample the value of the mean is 462,647 € and the median is 450,000 €, which are higher than the values of private funded companies which are, respectively, 362,116 € and 317,500 €.

The difference between the values of these first two samples is around an hundred thousand euros and this result could be related to the composition of the samples themselves. The most probable explanation for these difference is due to the features of the samples, and therefore nothing can be said about the populations.

Another possible explanation for these results is related to the features of the Sturtups, which collect this kind of round of financing (information coming from the previous literature analysis).

In general, these are companies in the first stage of their Startup lifecycle, when the Founder has only the business idea or a first version of the product (prototype). The risk is at its maximum level because there are not quantitative metrics in order to evaluate the business and forecast its future growth and profitability. The only efficient tool used to assess the possible future profitability of the business idea is a solid “business plan”, which is the main necessary document in order to ask for external capitals in an Equity Crowdfunding campaign.

Therefore, a possible explanation for higher valuations in Equity Crowdfunding compared to the Private funded sample is that in the first case the companies provide more efficient and detailed business plans to the online platforms and for this reason are able to obtain higher valuation. Indeed, in an Equity Crowdfunding campaign, it is mandatory for the company to disclose the business plan and other information like patents, according to the regulation standards of the Consob; the quality of provided Business plan could be higher than the private funded ones.

The other main source of financing in the pre seed stage are business angels, which are the main investors for the Private funded companies in this stage. As explained in the previous chapter, they are private entrepreneurs, which are willing to invest into risky projects with an informal selection of investments (they do not analyse in detail business plans), for this reason, the agreement about valuation could be lower. Moreover, in general, there is an intense negotiation phase between the Startup and the private investor, which could lead to lower valuations; this does not happen in the Equity Crowdfunding process.

The minimum value for the Equity crowdfunding sample is 50,000 € which is lower than the private funded one (115,000 €), however the maximum value of valuation is higher in the first sample (990,000€) than the one of the second sample (750,000 €). The interval value is the difference between minimum and maximum value and give a first idea about the dispersion level of data. This value is higher for the Equity crowdfunding sample and for this reason; the dispersion in the firs sample is higher than the one of private funded. This result is in equivalent to the value of

the standard deviation, which is higher in the Equity crowdfunding sample (354,709 €) than the one of private funded sample (228,754 €).

Looking at the third sample, the values of mean and median are both higher than the ones of the other two samples, they are respectively 686,113 € and 600,000 €. Here it is impossible to verify with a test if the results are dependent on the composition of the sample or on features of the populations. Therefore, the first hypothesis is that the results are only related to the features of the samples. The second hypothesis is that in the pre seed stage companies outside Italy are able to get higher valuations, mainly due to the features of the market, the location where companies were born which affect a lot their growth and the willingness to invest in neo created ventures of private investors in the other countries.

Both minimum and maximum values of valuation for this third sample are higher than the other two but the dispersion level, coming from the value of standard deviation, is lower than the equity crowdfunding sample (300,650 €).

	<i>CROWDFUNDING</i>	<i>PRIVATE</i>	<i>INTERNATIONAL</i>
	<i>ITALIA</i>	<i>FUNDED ITALIA</i>	<i>COMPANIES</i>
<i>Number of observations</i>	9	10	15
<i>Mean</i>	69,833 €	45,860 €	48,253 €
<i>Median</i>	65,100 €	45,000 €	50,000 €
<i>Standard deviation</i>	17,968 €	21,628 €	19,659 €
<i>Minimum</i>	45,000 €	15,000 €	15,000 €
<i>Maximum</i>	95,426 €	80,000 €	80,000 €
<i>Interval</i>	50,426 €	65,000 €	65,000 €

Table 16: Pre-seed round of financing

In this table are reported the data about the values of round financing collected by the three samples. In this case, the data are not very meaningful, as before and therefore they will not be analysed in detail.

The results are a higher mean and median of the Equity crowdfunding sample compared to the other two samples. This means that the companies, which use the equity crowdfunding source, were able to collect an average of financing round higher than the other two samples. Someone could expect that the international companies, which had a higher level of valuations, were also able to collect more capitals. However, as we have seen in the scatter plot graphs, there is not any relationship between the level of rounds of financing and the relative valuations considering companies which ask the same kind of round (pre-seed or seed). Therefore, a higher level of rounds in the same stage does not lead to a higher valuation.

Looking at the other results, also, the minimum and maximum values in the Equity Crowdfunding sample are higher than the other two samples; however, the interval and the standard deviation, which are measures of dispersion, are lower in the first sample than in the others.

4.3.5 Seed results

In this Second chapter, the data about the seed round of financing and valuations of the three samples are reported and compared. The objective is to understand if the rounds and valuations are similar or different among the Equity Crowdfunding, Private Funded and International companies samples. In this case, the samples result more consistent compared to the previous case of pre-seed companies, because here the number of observations is higher: 45 for the Crowdfunding sample, 30 for the Italian private funded sample and 26 for the international companies sample.

Thanks to the more consistent samples, it is possible to apply the test of Krustal-Wallis, which is a powerful test in order to understand if k independent samples come from same populations or populations with same value of the median. In this case, what is important is to understand if the samples have or not a statistically significant difference in the value of their median, which can be extended to the original populations.

In the table below (table 17) are summarized the data about valuations for the first two samples for Crowdfunding and Private funded Italian companies. Firstly, are analysed the Italian market samples and then the result will be compared with International companies sample.

	<i>CROWDFUNDING</i>	<i>PRIVATE</i>
	<i>ITALIA</i>	<i>FUNDED ITALIA</i>
<i>Number of observations</i>	45	30
<i>Mean</i>	1,528,107 €	1,589,525 €
<i>Median</i>	1,200,000 €	1,200,000 €
<i>Standard deviation</i>	1,104,998 €	1,088,644 €
<i>Minimum</i>	80,000 €	400,000 €
<i>Maximum</i>	5,000,000 €	5,000,000 €
<i>Interval</i>	4,920,000 €	4,600,000 €

Table 17: Italian Equity Crowdfunding and Italian private funded companies seed valuations

As it is possible to see above, the results about mean and median are almost equal for the two samples, indeed for the Crowdfunding sample the values are respectively 1,528,107 € and 1,200,000 € and for the second sample 1,589,525 € and 1,200,000 €. This means that on average (arithmetic mean) both the samples were able to get almost the same valuation and looking at the median, the 50% of the distribution of both samples were able to get a valuation lower than the maximum value of 1,200,000 €. In both cases, the value of the median is lower than the mean and this means that the distribution is asymmetric and that the majority of observations get a valuation lower than the mean.

This clear equality of mean and median are for now valid only for the samples, but thanks to the statistic test of Krustal-Wallis it is possible to assess if the results can be applied to the original populations of the samples. This test is present in the SPSS software so it is possible to make the test and in the table below the results are reported (table 18 and 19)

Ranks for seed valuations:

Dummy	Number of ranks	Mean rank
0	45	36.12
1	30	38.41

Table 18: number and mean of ranks

Test statistics on seed valuations:

Chi-Square	DF	Assymp. Sign
0.20	1	0.654

Table 19: Statistics of the Krustal-Wallis test

As the majority of no parametric test, also the Krustal-Wallis test does not consider the value of observations but a rank: the ranks is a value from 1 to N (N is the total number of observation considering the samples together) ignoring group membership and it is an order number. In the first table are represented the total number of ranks and their mean value, for the two groups which are characterized by a dummy variable (0 for the Crowdfunding sample and 1 for the other).

The second table summarized the results of the test. The three values reported are 0,20 for the Chi-Square, 1 for the number of the degree of freedom and 0,654 for the statistical significance of the test (the p-value).

The Chi-square is the reference distribution used by the test, the number degree of freedom are related to the number of groups (1 for 2 groups), and the p-value is the most interesting one in order to understand the test.

Indeed the null hypothesis H_0 is: k independent samples come from same populations or populations with same value of the median and can be accepted looking at the p-value. If the p-value is lower than 0.05 the null hypothesis is rejected with the 95% of probability to be right and if is higher is accepted with 95% of probability to be right.

In this case, the result is a p-value equal to 0,654 which is far higher than 0,005 and therefore the null hypothesis is accepted and the two population of Equity Crowdfunding seed valuation and Private Italian funded seed valuation have the same median and therefore a similar distribution.

This result is important because, for the Italian private funded sample, were selected companies, which, operate, in the same industry, developed similar solution with similar business model compared to the Equity Crowdfunding sample and all operate in the Italian market.

Therefore, it is possible to conclude that companies, with in common the features listed above, have very similar valuation; therefore, looking to comparable Startups, which have already asked capitals in the market, is a first step from where to start in order to assess the valuation of a Startup,

This is the same result of one of the valuation method, which was presented in the literature: the Scorecard method (Payne, 2011). Indeed, the first step of this method was to select a sample of comparable Startup companies, which operate in the same sector and country and had already asked capitals in the market, and then consider some qualitative elements in order to compute the final valuation.

The resulted values of my analysis are comparable with another one conducted by Massimo Sgrella⁵². Indeed, he tries to compare the Italian and US market of Startups, finding values of valuation of Italian companies divided by the type of round of financing asked. His results were ranges of valuation: between 400,000 and 800,000 € for pre-seed round and between 800,000 and 2,500,000 € for the seed rounds; indeed, the results of my analysis are included in this ranges.

⁵² Source: <https://medium.com/lombardstreet-io/startup-101-startup-valuation-italia-vs-silicon-valley-fd73bfc64660>

Looking at the other values summarized in the table 4.19, the value of the interval gives a first idea about the dispersion level of the data. It is computed as the difference between minimum and maximum values of the distribution. The interval of the Equity Crowdfunding sample results higher due to a lower minimum (80,000 €) which was not considered as an outlier by the box plot analysis. Instead, considering the standard deviation as proxy of dispersion level of the data, the values between the two samples are very similar 1,104,998 € against 1,088,644 €. The standard deviation is the square root of the variance, which is the average square deviation of each data point about its mean value (Brooks, 2014). It is a good measure of spread because it has the same unit measure as the variables whose spread is being measured and outliers less affect it.

The result is that the two samples have almost the same dispersion level, which is in absolute term a high value, because it has the same order of magnitude of the mean and median.

In the table below (20) are summarized the information about round of financing for the Equity Crowdfunding and Italian private funded samples:

	CROWDFUNDING	PRIVATE
	ITALIA	FUNDED ITALIA
<i>Number of observations</i>	45	30
<i>Mean</i>	246,339 €	277,703 €
<i>Median</i>	213,750 €	275,000 €
<i>Standard deviation</i>	119,300 €	138,660 €
<i>Minimum</i>	100,000 €	100,000 €
<i>Maximum</i>	530,000 €	500,000 €
<i>Interval</i>	430,000 €	400,000 €

Table 20: Italian Equity Crowdfunding and Private seed round of financing

In this case, the values of mean of median are for both the samples higher than 200,000, which was a result clear also from the analysis of the scatter plot.

However, the private funded companies were able to get higher round of financing than the Equity Crowdfunding ones, indeed the values of mean and median are respectively 246,339 € against 277,703 € and 213,750 € against 275,000 €.

Thanks to the Krustal-Wallis test performed below (table 21 and 22), it is possible to assess if this difference is statistically relevant or not.

Dummy	Number of ranks	Mean rank
0	45	35.63
1	30	39.20

Table 21: number and mean of ranks

Chi-Square	DF	Assymp. Sign
0.49	1	0.485

Table 22: Statistics of the Krustal-Wallis test

The test is the same of the one performed for the seed valuation and the most important value is the last one, the value of statistical significance of the test (p-value). Like the previous case, also here the p-value is higher than 0.005 and therefore it is possible to accept the null hypothesis of same median in the populations of origin.

The difference between the mean and median is not statistically relevant and therefore both samples were able to collect the same level of capitals in the seed stage and had the same distribution of valuations.

Looking at the dispersion level the Interval is higher for the Equity Crowdfunding because 530,000 € was still considered a seed round of financing and not a Series A. In this case, the interval it is not a good measure of dispersion because minimum and maximum values were fixed before the analysis in order to distinguish between pre-seed and seed stages⁵³. The standard deviation is a better proxy of the spread and it results higher in the second sample (138,660 € against 119,300 €), however both are at the same level of magnitude (one hundred thousand of euros).

⁵³ Pre-seed between 10,000 and 100,000 and Seed stage between 100,000 and 500,000 euros

4.3.5.1 Descriptive analysis for Italian Market

In this subsection of the seed analysis, the Italian market was divided by macro area where the companies operate. In particular, the companies were divided according to the division framework used in the Database of Innovative Startups, which considers these sectors: Services, Manufacture, Agriculture, Commerce and Tourism; any companies in the sample operate in the Tourism sector.

The table 23 summarized the main information coming from a total sample of valuations of 75 companies, which is the resulted number of the sum between Equity Crowdfunding, and Italian Private funded companies. The objective of this analysis is understand if the valuation of Startups change according to the sector, in which the company operates or depends on other factors.

	<i>SERVICES</i>	<i>MANUFACTURE</i>	<i>COMMERCE</i>	<i>AGRICOLTURE</i>
<i>Number of observations</i>	50	15	5	5
<i>Mean</i>	1,726,159 €	1,260,950 €	1,398,333 €	485,333 €
<i>Median</i>	1,257,500 €	1,200,000 €	1,205,000 €	576,000 €
<i>Standard deviation</i>	1,143,171 €	969,527€	757,796 €	368,463 €
<i>Minimum</i>	395,500€	236,250 €	783,333 €	80,000 €
<i>Maximum</i>	5,000,000 €	4,000,000 €	2,400,000 €	800,000 €
<i>Interval</i>	4,604,500 €	3,763,750 €	1,616,667 €	720,000 €

Table 23: Italian companies divided by sectors

Looking at the number of observations it is possible to see that Startups, which operate in the Service sector, are the most numerous, followed by Manufacture companies and then Commerce and Agriculture ones. This is consistent with numbers in the Innovative Startups analysis done by the “Ministero dell’economia” where Startups, which operate in the service sector, are 4836, in the manufacture 1353, in the commerce 290 and in agriculture 39.

Looking at the mean values, the Service companies have on average a higher valuation, compared to the other two sectors, equal to 1,726,159 €, followed by Commerce with 1,398,333 €, Manufacture with 1,260,950 € and then Agriculture with 485,333 €. Instead, according to the median values the first three sectors had obtained almost the same result: a median value around 1,200,000 €. As in the

case of Equity Crowdfunding and Italian Private funded samples, also here it is possible to use the Krustal-Wallis test in order to understand if the medians of the sectors are statistically equal or not. This time it is used a variable with values equal to 0, 1, 2 and 3 in order to group the sample in the different sectors (0 for the service, 1 for the manufacture, 2 for the commerce and 3 for the agriculture).

The table 24 and 25 show the results:

Dummy	Number of ranks	Mean rank
0	50	39.77
1	15	31.10
2	5	36.00
3	5	9.67

Table 24: Number and mean of ranks

Chi-Square	DF	Assymp. Sign
7,16	3	0.06

Table 25: Statistics of the Krustal-Wallis test

Looking at the p-value, in this case the number is very low and if we consider a 90% confidence interval, it is possible to reject the null hypothesis of same median for the original populations of the samples. This is an expected result because looking at the value of mean ranks the number for the agriculture sector is the only one not in line with the others. Therefore, it is possible to conclude, according to the test, that the Startups in the agriculture sectors receive a lower valuation compared to the other sectors. However, this result is not statistically relevant, because the number of Startups in the agricultural sample are only five. Therefore, it is impossible to conclude with certainty if Agricultural Startups get lower valuations or not.

Without considering the agricultural companies, the Krustal Wallis test is performed again, for the other three sectors in order to assess if their equality of medians is significant (table 26 and 27).

Dummy	Number of ranks	Mean rank
0	50	37.01
1	15	28.77
2	5	33.25

Table 26: number and mean of ranks

Chi-Square	DF	Assymp. Sign
1.28	2	0.371

Table 27: Statistics of the Krustal-Wallis test

According to the result of this second test, the mean ranks are similar between the sectors and looking at the p-value, it is possible to accept the null hypothesis because the value is high (0,371).

The result is statistically relevant for the Service and Manufacture sectors for which there are more companies, but the same comment of Agriculture, has to be done also for the Commerce Startups, because are only five companies and therefore the result is not relevant for them.

4.3.5.2 Comparison with International Companies

In this subsection, the main information of the Equity Crowdfunding sample and the Italian private funded one will be compared with a sample of International Startups, which operate in the same sectors of the companies in the Italian market and asks seed round of financing. The sample is composed by 30 Startups, 20 coming from Europe and US and the other 10 from Asia. The main objective is to understand if on average the Italian seed valuations are different from the ones around the world. The limit here is the number of observations compared to the original population; therefore, the results of a statistic test could be not significant. The table number 28, resume the main information for the comparison.

	CROWDFUNDING ITALIA	PRIVATE FUNDED ITALIA	INTERNATIONAL COMPANIES
<i>Number of observations</i>	45	30	30
<i>Mean</i>	1,528,107 €	1,589,525 €	2,148,933 €
<i>Median</i>	1,200,000 €	1,200,000 €	1,500,000 €
<i>Standard deviation</i>	1,104,998 €	1,088,644 €	1,365,784 €
<i>Minimum</i>	80,000 €	400,000 €	750,000 €
<i>Maximum</i>	5,000,000 €	5,000,000 €	5,000,000 €
<i>Interval</i>	4,920,000 €	4,600,000 €	4,250,000 €

Table 28: International and Italian valuations comparison

The mean and median values of the third sample result higher compared to the Italian market, with the mean value higher than the median, which result in similar distributions.

4.4 ANALYSIS ON THE EQUITY CROWDFUNDING SAMPLE

In this chapter, will be performed some tests in order to understand the statistical significance of some factors on the valuations of the Startups in the Italian Equity Crowdfunding seed sample. This sample is the most consistent for performing analysis, because there are 45 companies, which were able to accomplish an equity crowdfunding campaign in Italy (on a total of 66 at 03/09/2017) and it is the most heterogeneous.

The tests will be performed on two features of the Startups , regarding its product and market. For the product, it is tested if the difference between a software or hardware solutions has an impact on the valuation of the companies, therefore if one category is able to get a valuation higher than the other one. In the same way will be evaluated if operating in a B2B or B2C market has an effect on the final pre-money valuation of the company. The different size of the companies could influence

the results of the tests and for this reason, it will be demonstrated that the results are independent from this factor.

4.4.1 *Software vs hardware based Startups*

Software and hardware companies are different for many aspects, but the most important is that Hardware companies provide as solution for the clients a physical product, instead Software companies a digital one, which is not tangible, but despite this, it answers to some needs of the clients. Therefore, with this kind of information the Startups are divided according to the features of their offers, if these are physical one or not.

For instance in the Equity Crowdfunding sample, a Startup like Diamantech which develops online platforms for the Fintech industry is a software company, instead Cantiere Savona which produces innovative Yacht is a Hardware one. The two category of products differ for several reasons:

- Software companies require less volume of capital to reach profitability and growth, mainly because they have not invest in production plants, different skilled labours and inventory of WIP and finished products.⁵⁴
- For software companies it is easier to distribute product outside the local market thanks to internet. Now also the hardware companies use e-commerce to sell their products, but the cost advantages are not the same due to shipping costs and inventory.
- The process to develop a product is different. In a hardware company, a complete 1.0 version of the product is built and then the decision is to develop a new product or improve the existing one. If the product does not work properly, they can experience backlash for the customers⁵⁵. Instead, software Startups can develop their products by iterations with an alpha, beta version and then the final one according to the feedbacks of the clients; software can be constantly developed and improved.
- The team required for a hardware company is bigger than the one of a software. This because for a Software Startup you need developers, businessperson and people who make maintenance of a platform if exists. Instead, for a hardware company you need

⁵⁴ Source: <https://www.pjmconsult.com/index.php/2006/02/software-vs-hardware.html>

⁵⁵ Source: <https://asgard.vc/hardware-vs-software/>

designers for the product, engineers to develop the prototype, more people in the business are because the processes are longer and complex.

- Regarding pricing in general is easier for hardware companies to set a profitable price from the beginning for their product following a cost-based model. Software Startups have to compete with competitors who sell their product free following a freemium model therefore they build a network of consumers and then rely on an upgrade revenues stream or advertising revenues to make profit. The direct costs are lower from the beginning compared to the Hardware companies, but also the initial prices.

Therefore, according to the features described above which distinguish the two category of products, the expectation is a higher valuation for software companies because they are more aligned with the features of a Startup. Indeed, Software companies can better meet the requirements of clients thanks to their iteration development process; they have a business model, which is more scalable and repeatable than hardware companies due to the absence of shipping and logistic costs and so it is easier for them to expand the business outside the local market. Software Startups require less capital in order to growth and develop their solutions and this will be tested looking at the amount of the round of financing asked by the Startups.

In the tables below (29) are summarized information for the Software and Hardware companies' valuations and then a Krustal Wallis test will assess the statistical significance of the results.

	<i>SOFTWARE</i>	<i>HARDWARE</i>
<i>Number of observations</i>	24	21
<i>Mean</i>	1,799,471 €	1,156,767 €
<i>Median</i>	1,257,500 €	1,050,000 €
<i>Standard deviation</i>	1,237,940 €	777,388 €
<i>Minimum</i>	395,500 €	80,000 €
<i>Maximum</i>	5,000,000 €	2,700,000 €
<i>Interval</i>	4,604,500 €	2,620,000 €

Table 29: software and hardware seed valuations

Looking at the values of mean and median the result is a higher numbers for the Software Startups in both the fields: indeed Software companies have a mean valuation of 1,799,471 € against the 1,156,767 € of the hardware ones and a median valuation of 1,257,500 € against 1,050,000 € of the other group. The dispersion level represented by the value of the standard deviation is higher for the Software companies 1,237,940 € and lower for the Hardware ones 777,388 €. In the tables below (30 and 31) are summarized the results from the Krustal Wallis test in order to understand if the results on the samples are statistically significant or not.

Dummy	Number of ranks	Mean rank
0	21	19.11
1	24	25.85

Table 30: number and mean of ranks

Chi-Square	DF	Assymp. Sign
2.90	1	0.08

Table 31: Statistics of the Krustal-Wallis test

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The dummy 0 represent the group of Hardware companies and the dummy 1 the Software one. In the first table, the result is a higher value of mean rank for the Software companies 25,85 against 19,11 of the Hardware group. In the second table, the most interesting value is always the last one, which is the p-value of the test. In this case the value is 0,08 therefore the null hypothesis of equality of medians could be rejected considering a confidence interval of 90%.

Therefore, it is statistically significant that Software companies get on average a higher valuation compared to the hardware ones.

In the table below (32) are summarized the information for the seed round of financing of Hardware and Software and here to the objective is to understand if there is a statistically significant difference between the samples.

	<i>SOFTWARE</i>	<i>HARDWARE</i>
<i>Number of observations</i>	24	21
<i>Mean</i>	216,743 €	286,838 €
<i>Median</i>	196,185 €	240,663 €
<i>Standard deviation</i>	97,501€	136,347 €
<i>Minimum</i>	115,500 €	100,000 €
<i>Maximum</i>	500,000 €	530,000 €
<i>Interval</i>	384,500 €	430,000 €

Table 32: Software and hardware based seed round of financing

In this case the value of mean and median for round of financing asked are higher for the Hardware companies: 286,388 € against 216,743 € for the mean and 240,663 € against 196,185 € for the median. Looking at the standard deviation as indicator of level of dispersion, the Hardware companies has a higher spread compared to the Software Startups: 136,347 € against 97,501€.

As before the Krustal Wallis test is computed to test the level of significance of the results and the tables below, (33 and 34) summarize the information.

Dummies	Number of ranks	Mean rank
0	21	26.95
1	24	20.12

Table 33: number and mean of ranks

Chi-Square	DF	Assymp. Sign
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2.97	1	0.08
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Table 34: Statistics of the Krustal-Wallis test

In the first table the dummy 0 represent the group of Hardware companies which is characterized by a higher value of mean ranks compared to the group 1, which represents the Software Startups (26,95 against 20,12). In the last table the p-value is, like in the previous case, equal to 0,08 and therefore it is possible to reject the null hypothesis of equality of medians with a confidence interval of 90 %.

This result is an expected one, because in the features of Hardware companies is specified that on average they have to collect more capitals in order to develop their solution and grow. Therefore, on average, hardware Startups asked higher round of financing compared to the Software ones. A final comment is that if Hardware Startups on average get lower valuation, but ask higher round of financing compared to the Software’s ones, the result is also a higher % of shares granted to the new investors.

4.4.2 B2B vs B2C Startups

The second analysis, which was performed on the sample, is on the division between B2B and B2C companies. This classification is done considering this market factor and the aim is to understand if this could have an impact on the valuation of Startups or not, especially because B2B and B2C companies are different under many aspects.

B2B companies make business between companies and not between company and individuals like in the B2C case. Indeed, B2B Startups offer services or products to other businesses in order to improve their operations, instead B2C directly answer to consumer need thanks to their products and services. B2B and B2C companies have some similarities for example considering the attention to the marketing function; they start from the needs of their clients in order to develop a solution and have well defined sales processes even if they could be different in length.

However, the differences between them are more numerous:⁵⁶

⁵⁶ Source: <https://leanb2bbook.com/blog/main-differences-between-b2c-b2b-startups/>

- Decision Making Process: It is very different from B2C to B2B companies. Indeed, in the first case, customers consult family, friends and social network but it is no more complex than this. Instead, for B2B companies a purchase of a product require the approval of a higher number of Stakeholders and it has to respect some restrictions, for instance coming from the budget or strategic priorities.
- Sales process: Because B2C companies address directly final consumers the transactions are faster than in the B2B. In B2C, the emphasis is on making transactions as fast as possible in order to increase the number of sales. Instead, in B2B companies it is longer and may take several month, because the process involves more actors and because the contracts for B2B professional are bigger (in terms of value or quantity purchase) than for final consumers.
- Client relationship: the two markets are different in size, indeed the B2B market is generally much smaller that the B2C'one. Therefore, in B2C market losing a few clients on millions of potential ones is not a big deal. Instead, for B2B Startups it is critical for the success of the company the development of strong relationships with a relatively small number of companies. It is very important to build trust and stability with the clients, because in general the kind of contracts signed in B2B market are long term and clients must be convinced that the Startup will be around forth next years in order to make maintenance, consulting or upgrade the deals.
- Prices of products: B2C products have lower prices compared to the B2B ones because they address final consumer, which have fewer resources than a company does. B2B sales can reach millions through long contracts with other businesses; however, the B2C still have the majority considering the entire sales block, because the B2C market is far bigger.
- Return on investment: it is clear that a B2B product is bought in order to increase revenues, reduce costs or increase the customer satisfaction of the client company. Therefore, the expectation to have a high ROI is always considered into the purchase of a B2B solution: ROI is an essential part of making any kind of sales in B2B. On the other hand, B2C consumers buy products in general for it user experience or for fun and therefore, the return on investment has a lower impact on the purchase decision.

According to the literature, mainly online article of CEOs and professional investors, it seems that B2B companies, even if they have a lower market to address and a lower scalability of the business model compared to the B2C companies, result more attractive for several reasons.

- B2B companies sell tangible increases in business efficiency, instead B2C customers have to understand the utility of the product and develop habitual habits to use it. It is easier for an investor or clients understand the benefits of a B2B solution
- In B2B, the monetization process is linear, Startups can compete with cost-based prices, and instead B2C companies have to start most of the time with a Freemium business model in order to create awareness of the product in the customers (also because the marketing competition is high) and these companies require a huge customer base to create profits. Therefore, B2B companies are able to reach faster the profitability.
- If for B2B Startups is easier to reach profitability they are in a better position also when raising new capitals, they have more choice
- The consumers of a B2B company have more financial resources compared to B2C customers. Acquiring customers is easier because B2B companies know who they are because they are other companies and it is possible to approach them directly without huge marketing campaign or marketplace.
- The market validation for a B2B Startup is easier than for a B2C one, because it needs to receive money from a first client, instead the validation for a B2C requires a consistent customer base, because this business is based on repetition, so a continuous purchase from clients. Indeed, Investors are happy to put money into a B2C Startup with an exploding number of free users, especially if they are bound by a network effect.
- The market validation influences also the exit strategy, which is very important for Startups. In a B2B once is shown an initial traction it becomes a target of acquisition for bigger players in the same field. In the B2C market it happens less frequently because acquirers require significant scale, and there are less buyers.

On the other hand, B2C companies can be a better option than B2B because they have a bigger market to address and therefore their scalability is higher. The problem is the lower initial profitability and the need of a more complex market validation. The risk perceived by investors is higher in case of B2C Startups than B2B, because the seconds reach revenues and their target clients faster. For this reason, the expectation is that investors would evaluate B2B companies more than B2C.

In order to understand it is performed an analysis on the Equity Crowdfunding seed sample considering the division between B2B and B2C companies, which was done looking at the business plan of each company. There are companies, which offer services or products in both markets, but with a higher focus on only in one and therefore this is considered the one for the division.

	B2B	B2C
Number of observations	26	19
Mean	1,805,600€	1,150,000 €
Median	1,362,500 €	1,200,000 €
Standard deviation	1,221,140 €	806,278 €
Minimum	80,000 €	236,250 €
Maximum	5,000,000 €	3,005,000 €
Interval	4,920,000 €	2.768,750 €

Table 35: B2B and B2C Equity Crowdfunding Seed Valuations

Looking at the mean and median (table 35), which represent the average value of the distribution, are both higher for the B2B companies: 1,805,600€ against 1,150,000 € for the mean and 1,362,500 € against 1,200,000 € for the median. The assumptions of the Krustal Wallis test are respected (also, the distributions are similar, because the values of Skewness and Kurtosis are almost equal. Therefore, it is possible to perform the test in order to understand if the difference in the average values of valuations are statistically significant or not (tables 36 and 37).

Dummies	Number of ranks	Mean rank
0	26	18.42
1	19	26.35

Table 36: number and mean of ranks

Chi-Square	DF	Assymp. Sign
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4.00	1	0.045
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Table 37: Statistics of the Krustal-Wallis test

In the first table, the dummy 0 refers to the B2C Startups group, instead the dummy 1 to the B2B Startups' one. The mean rank is higher for the B2B group and in the second table the p-value is very low (0,045). Considering a confidence interval of 95% it is possible to reject the null hypothesis of median equality (because 0,045 is lower than 0,05) and therefore the average value of valuations for the two groups is different; B2B companies are able to get higher valuations than B2C ones.

The analysis was performed also on the value of round of financing, however there is no effect of the market factor B2B or B2C on the average (median) of capitals collected by the Startups. In the table below is reported only the data about statistics of the Krustal Wallis test in order to report the value of the p-value and therefore the main result of the test (table 38).

Chi-Square	DF	Assymp. Sign
1.46	1	0.227

Table 38: Statistics of the Krustal-Wallis test

In this case, the p-value is very high (0.227) and therefore it is possible to accept the null hypothesis of equality of median. The division of Startups between B2C and B2B does not influence the average value of round of financing.

4.4.3 *The size of the companies*

One factor, which could influence the results of the tests, is the size of the companies. It is clear that the size of the company or the size of the business in which it is going to operate, have an impact on the valuations: in general, bigger companies get higher valuations. Indeed, these variables are used as control ones in empirical studies about the valuation of Startups like (Tarek Miloud A. A., 2014).

In this analysis, the total assets of a company and its net equity are used to assess its size. In particular, the total assets is the total value of the balance sheet assets of a company and therefore all the economic resources in which the company decide to invest in order to produce benefits. The net equity is computed as share capital plus reserves and retained and current earnings or losses; this value represents the internal sources of financing of the Startup, therefore coming from the shareholders of the company.

The problem in the analysis is that if one of the category considered (software/ hardware or B2C/ B2B) is composed by Startups with a higher dimension compared with the respective other category, this factor influence the test.

Indeed, for instance, if Software companies have statistically a higher size compared to the Hardware ones, their higher valuations, coming from the results of the test, could be related not only to the division (software/hardware), but also to the different sizes of Startups in the two categories. Therefore, in order to obtain reliable tests' results, it is fundamental to demonstrate that the different categories are not composed by, statistically, higher size companies.

In order to perform this control, first are collected all the data about total assets and net equity for the 45 companies of the Equity Crowdfunding seed sample. The main source of data is Telemaco where are taken the Balance sheets of Startups, on the date 31/12 of the year before the round of financing, in order to not consider the new capitals collected.

Then the two new samples Total Assets and Net Equity are divided according to the dummy variables Software / Hardware and B2B / B2C used in the tests before. In this case, the distributions are not normal and therefore a Krustal Wallis test can be performed in order to understand if the categories have or not a statistically significant difference in the average size of their Startups. Not all companies are considered in these new tests, because the balance sheet of some companies was not available on Telemaco⁵⁷.

⁵⁷ New total amount of 42 companies

Starting from the Software/ Hardware companies, the Krustal Wallis test is performed for both Total Assets and Net equity and the results are summarized in the tables below (only the tables 39 and 40 with the statistics of the test).

Chi-Square	DF	Assymp. Sign
0,34	1	0,562

Table 39: Statistic of Krustal Wallis test for Total Assets

Chi-Square	DF	Assymp. Sign
0,40	1	0,529

Table 40: Statistic of Krustal Wallis test for Net Equity

Looking at the p-value for both tests, the result is that the null hypothesis of the Krustal Wallis test is accepted (very high p-value) and the average values of Total Assets and Net Equity for both Software and Hardware Startups are the same (in the seed stage).

Therefore, the size of companies have not impact on the result of the previous test: Software companies are able to get higher valuations than Hardware Startups not due to their higher size.

At the same way, the same test is performed on Total Assets and Net Equity divided by B2B and B2C Startups. The results are summarized in the tables below (41 and 42).

Chi-Square	DF	Assymp. Sign
0,02	1	0,899

Table 41: Statistic of Krustal Wallis test for Total Assets

Chi-Square	DF	Assymp. Sign
0,00	1	0,98

Table 42: Statistic of Krustal Wallis test for Net Equity

Like in the previous case, also here the p-values are very high (near 1) and it is possible to accept the null hypothesis of same average size for B2B and B2C Startups in the seed stage. Therefore, this factor have not impact on the test about the difference on valuation of B2B and B2C companies:

B2B Startups get higher valuation not due to their higher size compared to the B2C ones.

In order to double check the result about the effects of size of the Startups on the tests, it is used a ratio, which consider the size of the companies into the valuation:

$$Valuation\ ratio = \frac{Pre - money\ valuation_i}{Net\ equity_i}$$

The valuations of the Startups will not be equal anymore to the pre-money valuation, but to the ratio between pre-money valuation of the Startups and its size (Net equity). This is done in order to make the valuation of each company coherent with its own dimension. This variable is the new dependent one for the Krustal Wallis test and the categorical variables remain Software/ Hardware and B2B / B2C.

The tables (43 and 44) below report the results for the Software/ Hardware companies:

Dummies	Number of ranks	Mean rank
0	20	18.00
1	22	24.68

Table 43: number and mean of ranks

Chi-Square	DF	Assymp. Sign
3.11	1	0.07

Table 44: Statistics of the Krustal-Wallis test

The first table summarize the values of the ranks, the dummy 1 stands for Software companies and the mean ranks is higher for this category. In the second table, the p-value is equal to 0.07 and therefore it is possible to reject the null hypothesis of same medians considering a confidence interval of 90%. Therefore, also in this case Software Startups, in the seed stage, have on average a

higher valuation compared to the Hardware ones. The same test is performed on the division between B2B and B2C:

Dummies	Number of ranks	Mean rank
0	18	17.78
1	24	24.29

Table 45: number and mean of ranks

Chi-Square	DF	Assymp. Sign
2.90	1	0.08

Table 46: Statistics of the Krustal-Wallis test

The dummy variable 1 indicates the B2B companies and the mean rank for this category is higher than the other one. In the second table, the p-value is 0.08, so the null hypothesis is rejected considering a confidence interval of 90%. Therefore, also in this case the B2B Startups have on average an higher valuation compared to the B2C ones.

4.5 CONCLUSIONS

The purpose of this master thesis was to analyse in the literature review the main valuation models used to evaluate Startups and how they suffer from many limitations, coming from the features of these kind of companies. Indeed, the traditional methods are based on financial information coming from the documents of the Startups, which are not reliable in order to forecast future performances of the company. In order to overcome these problems new models are developed by the main actors in the equity capital markets for Startups: the business angels and venture capitalists; these techniques differ from the traditional ones, because they do not base the valuation only on financial perspectives and balance sheets of the Statups, but also on some qualitative aspects of the companies.

Indeed, one of the new model is the Scorecard method, which starts computing the average of valuations of Startups in the same sector and country of the target one, plus adjustments according to qualitative features. In the second part of the thesis, the first step of this method is applied on the

Italian market and then some statistic tests are conducted in order to understand if two examples of qualitative characteristics have or not an impact on the valuation.

A descriptive analysis is conducted in the Italian Market in order to understand which are the average value of pre-money valuations for the Startups in the early phases of their life cycle the pre-seed and seed stages. In order to perform the analysis an initial sample of Startups, which ask successfully capitals through Equity Crowdfunding is considered. The results are significant for the seed stage due to lack of observations in the other one. The seed average valuation in the Italian Market is 1,500,000 € with a median value of 1,200,000 €. This could be a starting point for an Italian Startup, which ask capitals in this phase, knowing that the average of the market for seed Startups is this value, it cannot pretend to get valuation much higher.

A second sample of Italian Startups, which ask rounds of financing through other sources of equity capital, is considered. It is composed by Startups comparable with the Equity Crowdfunding ones according to sector, business model and country. This is done in order to test the hypothesis that, in the Italian market, Startups with these kind of similarities achieve, on average, the same valuation; the result is in favour of the hypothesis, indeed the two samples have the same median value (1,200,000 €). Therefore, investors must check the market average and comparable Startups, operating in the same sector and which have already received funding, in order to assess the valuation of a Startup in which they are going to invest and therefore calculate how much shares receive for their investment. The total sample of Italian Market is then divided according to the main area in which Startups operate (Service, Manufacture, Agriculture and Commerce); the valuations are not statistically different according to the different areas.

The valuations are then compared with comparable international companies... (da aggiungere)

In the second part of the thesis, the sample of Equity Crowdfunding seed companies is tested in order to understand if some qualitative features of Startups could have an impact on the pre-money valuation. It is tested if Software / Hardware and B2B / B2C companies get higher valuations or not.

From the tests, the conclusions are that Software and B2B Startups are able to get higher pre-money valuation in the seed stage. The results are then tested according to the size of Startups (represented by total asset and net equity) in order to demonstrate that this factor does not distort the conclusions of the tests. These qualitative features of Startups have an impact on the pre-money

valuation and therefore must be considered by the company and investors during the negotiation phase. These are only two examples of qualitative characteristics, which have an impact on valuation, farther analysis can consider and test other elements and therefore other features, which have to be taken into account in assessing the pre-money valuation. Other qualitative features are introduced in the non-traditional methods and can be the subjects of future studies.

The main limit of this thesis is the number of observation considered in the samples, which can make test results less reliable, mainly because the population of successful equity crowdfunding campaigns in Italy is not so numerous. Therefore, further studies can be made considering a higher number of Startup in the Italian market.

The aim of this thesis is not to develop a new model for valuing Startups, but to understand the average in the Italian market, if comparable companies get same valuations and test the impact of some qualitative features. This is only a first step from which other analysis can start in order to verify other characteristics, which can influence the valuation or consider for the analysis all the kind of rounds of financing asked by Startups.

Capitolo 5 BIBLIOGRAFY

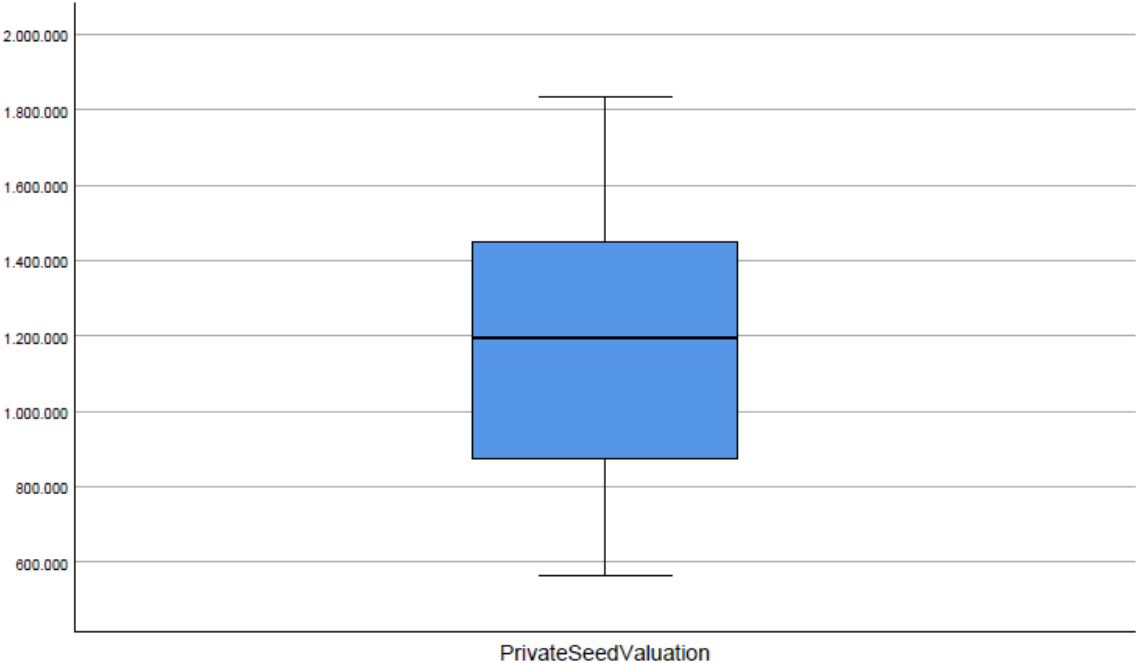
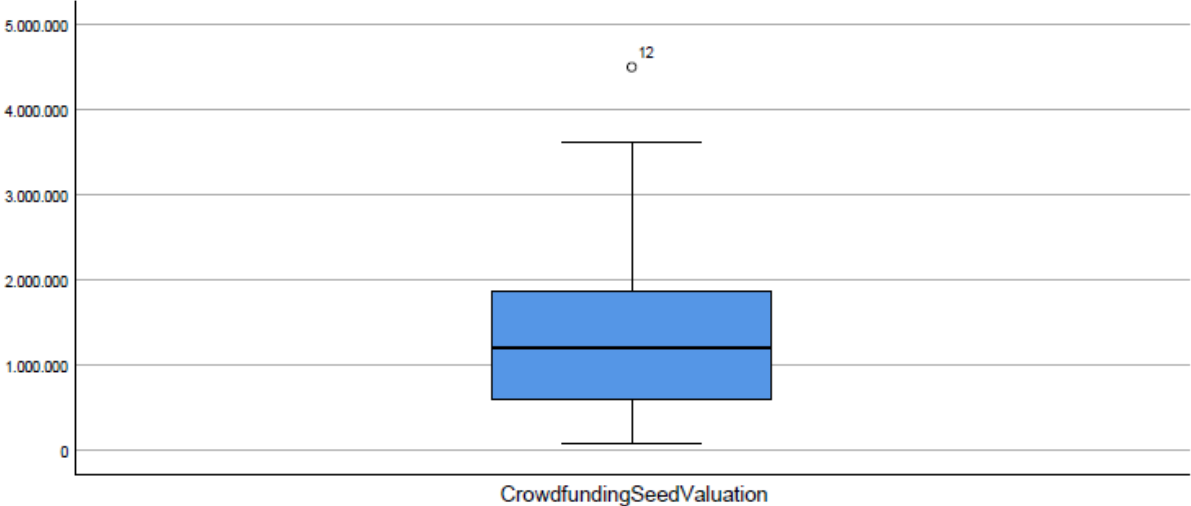
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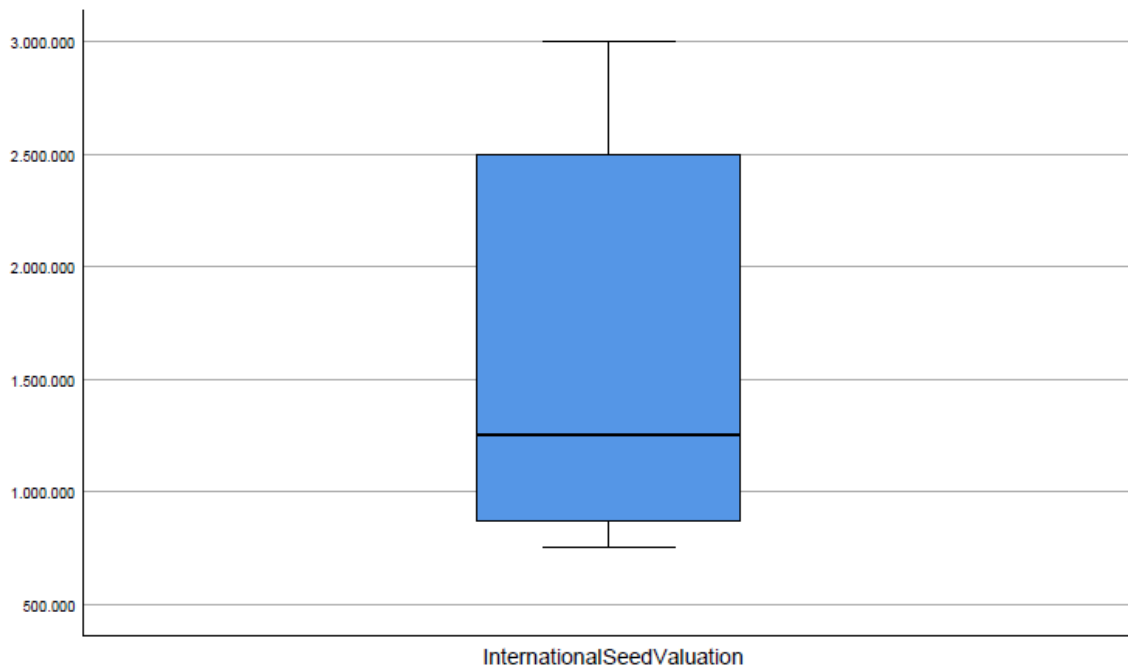
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Capitolo 6 APPENDIX

6.1 BOX PLOT SEED FUNDING ROUNDS





6.2 SCATTER PLOT PRE SEED ROUNDS OF FINANCING

