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Title:
Comparison of the suitability and impact of venture capital companies, business angels and crowdfunding as forms of financing for technology-oriented start-ups in their earliest phases

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Abstract

Title

Comparison of the suitability and impact of venture capital companies, business angels and crowdfunding as forms of financing for technology-oriented start-ups in their earliest phases

Keywords

Start-ups, technology orientation, financing forms, funding, venture capital companies, business angels, crowdfunding

Summary

This thesis compares the suitability and impact of venture capital companies, business angels and the novel approach of crowdfunding as financing forms for very young technology-oriented start-up businesses based on literature reviews, the analyses of scientific studies and industry reports with a focus on the German, other European and North American economies.

The significance of those types of start-ups will be shown, together with their particular characteristics in contrast to other start-ups and mature businesses.

Subsequently, it will be explained how these characteristics make the financing of technology-oriented start-ups more difficult, but that venture capital companies, business angels and crowdfunding are generally promising financing forms for them.

The comparison of those financing forms considering their suitability for, and impact on the start-up, based on several key criteria, will follow in the ensuing chapter.

In conclusion, this thesis argues that there are distinct differences between the three financing forms in these regards, necessitating the examination of the particular start-up case in order to identify an appropriate provider of finances. Suitable start-up scenarios for each financing form, together with the anticipated impact it will likely have on the venture, are presented in the end.

This thesis therefore contributes to the evaluation of current financing possibilities for young start-ups with technology-orientation, and especially with incorporating the novel approach of crowdfunding, it depicts and analyses recent developments and their relevance for those ventures.

Outline

List of figures

List of abbreviations

EU	–	European Union
EUR	–	Euro (€)
GBP	–	Pound sterling (£)
GDP	–	Gross domestic product
IPO	–	Initial public offering
OECD	–	Organisation for Economic Co-operation and Development
US	–	United States of America
USD	–	US-Dollar (US-$)

1 Introduction

1.1 Research problem

Technology-oriented start-ups are young businesses with a focus on knowledge and technology intensive goods or services. Their significance grew throughout the last years and their characteristics differ from other start-up businesses in various ways, one of them being their financing possibilities.

Different possibilities of financing a start-up business exist and their characteristics and availabilities vary considering the kind of start-up and its maturity.

The financing forms of venture capital companies, business angels and crowdfunding all have impact on the start-up business where they are used and their suitability for certain business scenarios differs.

This thesis aims to distinguish key criteria determining the suitability and impact of those financing forms for technology-oriented start-up businesses in their earliest phases and use those criteria in a comparison of those three forms to identify an appropriate form for certain business scenarios.

1.2 Course of investigation

This thesis compares the impact and suitability of different financing forms for start-ups. Descriptions and evaluations concerning the start-ups themselves, their financing and in detail venture capital companies, business angels and crowdfunding will be based on literature reviews and the analysis of scientific studies as well as industry reports. Throughout this thesis, the focus will be on the German, other European and North American economies.

Based upon the research question that has been postulated in chapter 1.1, the second chapter will begin with reflecting the significance of technology-oriented start-ups. Then, the characteristics of start-up businesses in general will be examined, followed by further properties of those with technology orientation in particular. Furthermore, the development phases of those ventures will be considered.

Subsequently, a description of different financing forms that may be used for financing technology-oriented start-up businesses and an appraisal of their general availability in the earliest stages of a start-up will be given in chapter 3.

In the ensuing chapter 4, the financing forms of venture capital companies, business angels and crowdfunding will be compared by key criteria that determine the suitability of these financing forms for, and their impact on the start-up, to eventually identify business scenarios that match these characteristics.

The concluding chapter (chapter 5) sums up the findings and gives a critical acclaim as well as on outlook.

2 Technology-oriented start-ups

2.1 Significance of technology-oriented start-ups

The significance of technology-oriented start-ups is regularly emphasised: They are 'regarded as an answer to ongoing structural changes; they are seen as an important source of new employment and important promoters of technological change and innovation'[1] and take a prominent role in the transfer of those technologies and innovations, for example by concerting new technologies into products and services[2]. These innovations in turn are often a source of competitive advantage.[3]

Since decades, innovative strength and emerging technologies are regarded as promoters for the success of companies and whole economies[4], 'technologically innovative new firms in particular carry major weight in the advancement of societal and economic systems'[5].

As they are regarded in such a way as a driver for social and economic development, this thesis will focus on these types of start-ups.

2.2 Characteristics of a commercial start-up in general

In general, there are different projects that are brought into being by one or more founders and interact within the economic environment with a certain goal. This also includes governmental or charitable start-ups that are not created with the goal of generating profits for the founders and for example research projects within securely established companies.[6] Start-ups in this thesis, however, are solely meant as newly created commercial businesses with the intent of realising profits without a time limitation.

These business start-ups are commonly founded by an 'individual, who, often against significant odds, develops and implements a unique concept for capitalizing on opportunity'[7]. The foundation of the business does by definition not originate from a prior enterprise, but constitutes a new company.[8] The founder thus typically lacks experience in the creation and leading, as in start-ups owners are often at the same time managers[9], of a company and due to the novelty of the business is only able to draw on expert knowledge, his own experiences from former employment activities and possibly data and lessons learned by comparable businesses.[10] Generally, initial funding is necessary for preparations, the legal establishment of the company and the set-up of operations (see chapter 2.4 for further explanations).

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[1] (Almus & Nerlinger, 1999, p.14), see also (West & Bamford, 2005, p.433)
[2] Cf. (Steinle & Schumann, 2003, p.16)
[3] Cf. (Cliff et al. 2006, p.634)
[4] Cf. (Bundesministerium für Bildung und Forschung 1999, p.6)
[5] (BarNir, 2012, p.399)
[6] Cf. (Hemer et al. 2011, p.3)
[7] (Morris et al. 2001, p.35)
[8] Cf. (Breuer & Breuer, 2005, p.130)
[9] Cf. Ibid.
[10] Cf. Ibid., (Engel, 2003, p.309)

The first years of the venture are regarded as essential for their survival on the market place, their competitive position and therefore their development.[11] Wrong decisions made during the earliest phases of the business may result in far-reaching consequences[12] and as the notion 'often against significant odds' in the above quote implies, the degree of success and the mere survival of the start-up are uncertain. A US study by HEADD for example shows that only around 66% of new businesses survive two years or more[13], a German study by MOHR ET AL. even states that only 60% of start-ups are considered to survive the first year.[14]
The success factors of a start-up business are widely discussed and can hardly be narrowed down to a single key factor.[15] Success factors and other characteristics of a start-up furthermore vary within industries and the focus of operation. For further explanations and examinations the range of businesses will therefore be narrowed down to those in focus of this thesis: Technology-oriented young ventures.

2.3 Technology orientation in start-up businesses

Start-up businesses that are technology-oriented display certain characteristics that make them stand out compared to other young ventures.[16] Their products, services, manufacturing processes and/or business model tend to be new and innovative or based on novel technologies and research findings. Thus, these enterprises commonly rely on high levels of know-how within the company as well as research and development activities. The incorporation of new technologies, though, is not limited to knowledge-intensive industries but can serve as a competitive advantage for companies within many different industries and contexts.[17]
With focussing or relying on innovative technologies, the importance of human capital grows: The education, business experience and skills within the field of the applied technology become determining intangible assets.[18] Therefore, especially for technology-oriented start-ups, the founders themselves become main success factors for the company and the largest part of the start-up's value is often represented by them as human capital.[19]
The innovative character of the enterprise can lead to two issues for the start-up: High capital needs and uncertainties. To develop and launch innovative products and services, normally elaborate, capital-intensive activities are needed without generating immediate revenues.[20] A

[11] Cf. (Mohr et al. 2012, p.1)
[12] Cf. (Klandt, 2003, p.104)
[13] Cf. (Headd, 2003, p.59)
[14] Cf. (Mohr et al. 2012, p.46)
[15] Cf. for example (Peña 2002), (Headd 2003), (Mohr et al. 2012)
[16] Cf. (Steinle & Schumann, 2003, p.17f.)
[17] Cf. (BarNir, 2012, p.400)
[18] Cf. (Peña, 2002, p.194f.)
[19] Cf. (Schwetzler, 2005, p.156), (Almus & Nerlinger, 1999, p.150f.), (Peña, 2002, p.194f.), (Nitzsch et al. 2005, p.421)
[20] Cf. (Steinle & Schumann, 2003, p.17), (Almus & Nerlinger, 1999,p. 143)

lot of research and development, as well as the creation of prototypes and test runs are required before a product is market-ready. Additionally, investments in high-technology production facilities might be necessary. On the other hand, research and development activities could have already been executed during own university studies of the founders/employees or a collaboration at a research facility, thus reducing the initial capital needs.[21] Furthermore, expensive own production facilities are dispensable if technology-oriented services or software are offered, also if contract manufacturers or original design manufacturing are used, thereby reducing preliminary fixed costs.[22] Nevertheless, generally the start-up is based on some kind of initial funding and those with a technology orientation face particular problems in acquiring those funds externally, as explained later-on in chapter 3.1.

The mentioned uncertainty of their business is based on the fact that with the main product or service being based on an innovative technology, the functionality and marketability cannot be reliably predicted.[23] Questions concerning the fields of application, legal approval of the technology and potential market standards for the own, as well as comparable technologies, often remain unanswered during the earliest phases of the enterprise. The product or service may be intended for a market that does not exist in that form, yet, and due to the lack of past experiences concerning market potentials and the possible market penetration, sales are projected without a solid basis.[24] These uncertainties are highest in the earliest phases of the start-up and tend to lessen through the maturity of the business, as will be shown in the following sub-chapter.

2.4 Development phases of technology-oriented start-ups

The process of founding a technology-oriented business can be separated into different phases with different characteristics.[25] It will be shown that every phase is marked by particular needs and necessary tasks of the venture, as well as certain risks and problems. One methodology is the separation in an ‘early stage’, an ‘expansion stage’ and a ‘later stage’.[26] The early stage, being the very first step towards a business venture, can be again separated into a ‘pre-seed’, a ‘seed’ and a ‘start-up’ phase[27], as illustrated in the following figure.

[21] Cf. (Klandt, 2003, p.106)
[22] Cf. (Lüthje, 2002, p.230f.)
[23] Cf. (Schwetzler, 2005, p.156)
[24] Cf. Ibid.
[25] Cf. (Klandt, 2003, p.100)
[26] Cf. (Kollmann, 2005, p.71)
[27] Cf. Ibid, p.71f.

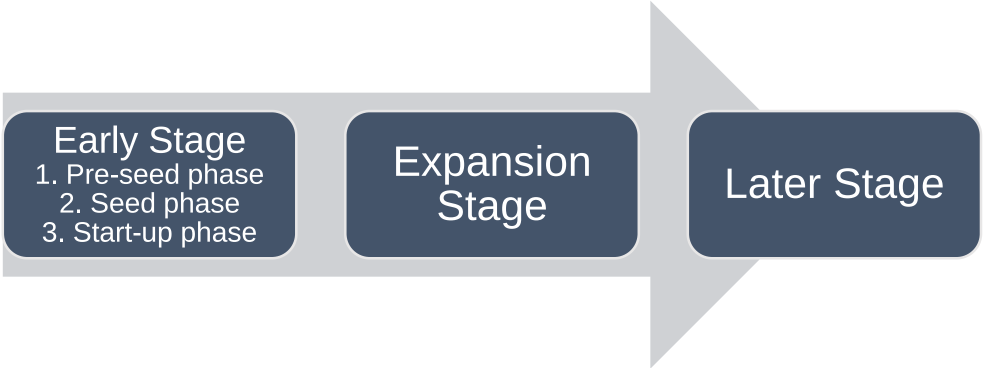

FIGURE 1 Development phases of technology-oriented start-up businesses
Source: own illustration

Since during the pre-seed and the seed phase there is no legally founded company, yet, reliable empirical research for these phases does not exist[28]. So, while from later phases on, the business is registered and representative samples can be captured, this is not the case during the earliest phases, for which also no organised register of the so called 'nascent entrepreneurs' is available. It is, however, reasonable to assume that the risk of failure in this stage of the business start-up is particularly high.[29] Those are the phases in which the generation of first ideas takes place, concerning the products or services to be offered, the targeted market and the business model. Typically, no clear working structure exists, yet, and coordination is done informally.[30] Often, pilot studies are needed to test the feasibility of the planned products, as well as to discover market characteristics and potentials, because those essential traits are generally unknown or at least uncertain during the earliest phases of the venture.[31] This leads to product and market risks. Due to those preparatory activities, there is already need for capital, even though there is no legal business entity, yet.

Another risk factor is the management, as explained in chapter 2.2. Since the experience of the founders/managers of the company is the lowest during the earliest phases, the management risk is the highest at the initial steps of the company.

Typically, the first preparations are followed by the drawing up of a business plan and eventually the legal founding of the company, which can be seen as the beginning of the start-up phase. During this phase, technical and organisational arrangements for the market entry are made. The organisational structure of the company is further established, production capacities are set up and distribution channels are developed.[32] Also research and development activities are continued and potential patent applications are filed.[33] Due to those activities, the uncertainties, and hence the riskiness of the business, are reduced. Overall, though, the future development is still doubtful and the risk still considered to be high.[34]

[28] Cf. (Gelderen et al. 2005, p.365)
[29] Cf. (Achleitner, 2001, p.515)
[30] Cf. (Gaibraith, 1982, p.74f.)
[31] Cf. (Kollmann, 2005, p.72), (Koch & Kuhn, 2005, p.47)
[32] Cf. (Achleitner, 2001, p.516)
[33] Cf. (Kollmann, 2005, p.73), (Gaibraith, 1982, p.75)
[34] Cf. (Achleitner, 2001, p.516)

The introduction of first products or services to the markets represents the end of the start-up phase and the commencement of the expansion phase.[35] Now, substantial growth is the key focus of the venture, in revenues as well as eventually in profits.[36] Production facilities are enlarged, distribution is expanded and also through extended marketing activities the market penetration is to be increased. All those activities lead to further capital needs of the venture, but since the generated cash-flow during that phase is usually not sufficient, external funding is necessary.[37] Especially business models that are focussed on the internet often call for a particularly high number of users/consumers to become profitable, thus for example necessitating higher investments in marketing and increasing the capital needs again.[38] And whereas the market risk is by this time reduced due to first experiences with the acceptance of the product and the characteristics of the targeted market, the growth of the whole business leads to challenges for the management. Generally, the growth makes the recruitment of new personnel necessary, tasks have to be transferred from the management team to specialised employees and the organisational structure becomes more important; a shift from an inventing organisation towards an operational one has to be made.[39]

The later stage is reached when revenues become stabilised, proven unique selling propositions exist, risks are better assessable and the prospective development of the venture becomes more calculable.[40] Therefore, the venture can be considered as established and product, as well as market risks are lowered.[41] Since the venture can hence be considered to have reached a certain form of maturity, this phase and the subsequent development of the business are not further scrutinised in this thesis.

3 Forms of financing technology-oriented start-up businesses in their earliest phases

3.1 Introduction

In general, business founders consider the financing of the venture as the key problem or at least a major difficulty during the founding.[42] And as illustrated in sub-chapter 2.4, technology-oriented start-ups are in need of capital throughout their earliest phases and therefore have to face those difficulties considering the forms of financing the business.

Common to all of those financing forms is the differentiation of the funding as being equity or

[35] Cf. (Kollmann, 2005, p.72)
[36] Cf. (Achleitner, 2001, p.516), (Gaibraith, 1982, p.76)
[37] Cf. (Achleitner, 2001, p.516)
[38] Cf. (Kollmann, 2005, p.76)
[39] Cf. (Gaibraith, 1982, p.75)
[40] Cf. (Kollmann, 2005, p.77)
[41] Cf. (Achleitner, 2001, p.516)
[42] Cf. (Schulte, 2005, p.475), (Wolf, 2006, p.1), (Papadimitriou & Mourdoukoutas, 2002, p.106)

debt capital. While the capital providers of debt take the stance of a creditor in the case of an insolvency of the business, providers of equity serve as debtors in that case and might not only lose the whole investment but even be liable with additional funds.[43] Therefore, also the ways of redemption and receiving of earnings for the provision of capital, the amounts of those earnings, as well as rights and obligations of the supplying party, differ depending on the status of the funding as being debt or equity.[44] These factors furthermore depend on the particular financing form that is chosen, which will be more specifically shown in the upcoming sub-chapters.

The acquisition of capital by technology-oriented start-ups is different from mature businesses and, due to their particular characteristics (see sub-chapters 2.3 and 2.4), also different from other young ventures.[45] The financing opportunities and decisions may influence the scope of action and therefore the strategy of the business.[46] If this is the case, the start-up funding can be described as ‘strategy follows finance’; if, however, the funding does not constrain the initial strategy, the paradigm is ‘finance follows strategy’.[47] In the first case, the business model might have to be altered towards a ‘low-budget’ or even ‘no-budget’ one, where hardly any external financing is needed[48] (sub-chapter 3.2 will further examine this topic). If the business model is rather characterised as ‘big-budget’ and should not be altered, though, an external source of financing is generally needed.[49] An analysis of different available forms of external financing will therefore follow in the sub-chapters 3.3 to 3.7.

Furthermore, common factors exist that make the financing of young start-ups with technology orientation in general more difficult and costly.

First, the access to an efficient capital market such as a stock exchange can be regarded as hardly possible.[50] Their size does not yet justify a costly initial public offering[51] and the legal form of the company may for instance impede the free trade of shares of the company. Hence, the financing generally has to take place with only a few providers[52] (an exception can be found in chapter 3.7).

Second, the external assessment of the business poses a problem. While for mature businesses in established markets, information, experience and expert knowledge about many facets of the business usually exist, this is often not the case for young technology-oriented

[43] Cf. (Schulte, 2005, p.471)
[44] Cf. Ibid, p.472ff
[45] Cf. also (Koch & Kuhn, 2005, p.47)
[46] Cf. (Kollmann, 2005, p.68), (Nathusius, 2001, p.28)
[47] Cf. (Nathusius, 2001, p.28)
[48] Cf. (Kollmann, 2005, p.68f.)
[49] Cf. (Kollmann, 2005, p.69f.)
[50] Cf. (Nitzsch et al. 2005, p.416)
[51] Cf. (Papadimitriou & Mourdoukoutas, 2002, p.105)
[52] Cf. (Nitzsch et al., 2005, p.416)

ventures.[53] Providers of funds, however, generally demand sufficient information about the business ahead of a funding, therefore making an own extensive evaluation of the venture and the business model a prerequisite in these cases, which is typically not part of their usual business.[54]

Third, product and market risks exist, as explained in chapters 2.2 and 2.3. Hence, if a provider of financial funds is found, the risk premium that this provider will demand will likely be relatively high.[55] Another factor increasing this risk premium is the fact that collateral is mostly non-existent in the earliest phases of those ventures.[56]

A matter of insecurity from the point of view of the potential funding partner, and thus an additional reason for an increased risk premium, are the founders, resp. the management, of the young venture.[57] They have a key role for the success of the business (as illustrated in chapter 2.2) and therefore also represent a key concern of financiers. Opportunism on the side of the founders in the form of hidden information and hidden actions are the main aspects in this regard.[58] While in mature companies control mechanisms and institutions reduce these problems, in young start-ups such instruments are not yet established, making the monitoring more complicated and therefore the consideration of the hidden issues more significant.[59] Thus, although these aspects occur generally also in mature companies, constituting the general principle-agent-problem, due to the particular characteristics of young technology-oriented start-ups, they result in higher risk premiums for them.

The financing forms can be distinguished into self-financing, formal and informal financing. Self-financing means the ‘personal capital of the owner and his/her family and retained profits’[60] and is the topic of sub-chapter 3.2. Formal financing is characterised by the institutionalised nature of the funder as well as the standardised and statutory processes and formats of the funding.[61] Banks, governmental support programs and venture capital companies belong to this group and will be further examined in sub-chapters 3.3 to 3.5. If the procedures and structures are not uniform and the funders rather behave as individuals, their financing is referred to as informal.[62] Business angels and crowdfunding are thus considered informal financing forms and will be approached in sub-chapters 3.6 and 3.7.

FIGURE 2 illustrates the preceding explanations considering the classification into self-financ-

[53] Cf. (Nitzsch et al. 2005, pp.419ff.)
[54] Cf. Ibid, p.420
[55] Cf. (Hall, 2002, p.13)
[56] Cf. (Kollmann 2005)
[57] Cf. (Nitzsch et al., 2005, p.421ff.)
[58] Cf. Ibid, p.421, (Amit et al. 1998, p.443)
[59] Cf. (Nitzsch et al., 2005, p.421), (Aghion & Bolton, 1992, p.473f.), (Denis, 2004, p.305f.)
[60] Cf. (Harrison & Mason, 1996, p.6)
[61] Cf. (Hemer et al. 2011, p.28)
[62] Cf. Ibid.

ing/informal and formal forms of financing. It additionally sorts the financing forms by the commonly attached degree of risk of the investment for the funder and the founding phase during which they are used, resp. during which they are accessible. Crowdfunding, however, is not included due to the diverse shapes it can assume. The topics of risk and timing of the financing forms will be further assessed in the succeeding sub-chapters.

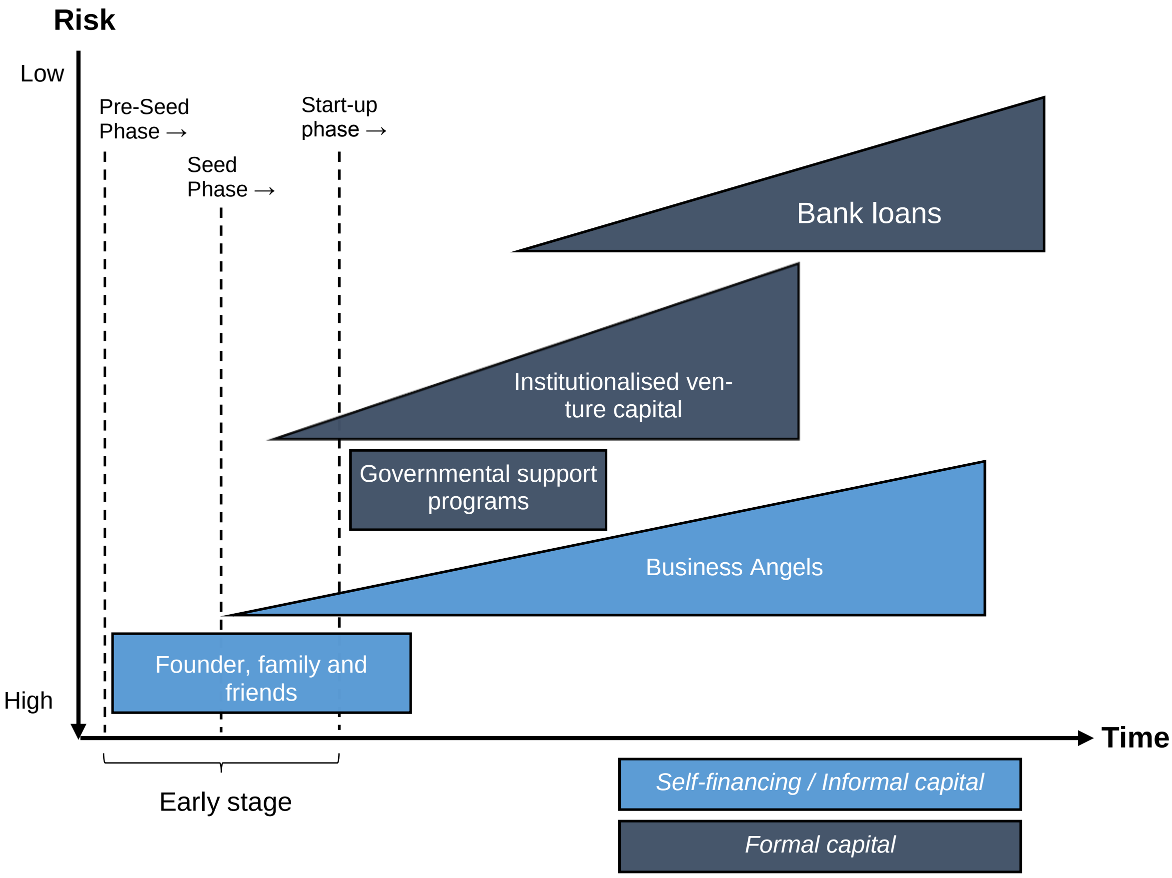

FIGURE 2 Classification of financing forms
Source: own illustration, inspired by (Hemer et al., 2011, p.29)

3.2 Founder, family and friends

The initial funding stems in nearly every start-up from the founders themselves, their family, friends, colleagues from work, neighbours and others from their social surrounding who are characterised as having a personal and possibly emotional connection to the founders.[63] But the share of capital provided by relatives and friends can generally be seen as rather minor. One example is given by a study of Belgian start-ups by VANACKER ET AL. where the contribution of family and friends only accounted for in average 3.7% of the start-up capital.[64]

[63] Cf. (Bygrave & Quill, 2007, p.5) (Bhide, 1999, p.22), (Hemer et al., 2011, p.29)
[64] Cf. (Vanacker et al. 2010, p.15)

The founders themselves are, in contrast, much more involved in the financing of their business.[65] In general, across all business types and 42 nations, the founders of the start-up businesses themselves provide 62% of the capital for the new venture.[66] Nevertheless, there is consequently still need for additional funds. The amount of necessary external funds is often tried to be reduced by other self-financing activities, referred to as financial bootstrapping. Financial bootstrapping means financing the business internally[67] and includes for instance ways of minimising expenses and elevating revenues before the connected costs occur, such as leasing equipment instead of buying it, giving stakes in the company to employees instead of wages, boosting advance payments by customers or selling gift certificates.[68] Thus, it is possible to decrease the need for external funding in certain cases. If, however, also financial bootstrapping is not sufficient for financing the venture, external sources of capital are required.

3.3 Banks

As a matter of principle, one of the functions of banks is the provision of funds for companies that cannot cover their financial needs from within the organisation.[69] The capital is generally given as a loan and is therefore considered as debt for the company; besides the repayment the bank receives variable or fixed interest payments.[70] Due to the already described character of debt investments, for those transactions banks are not directly interested in the profit or growth opportunities of the funded venture, since they would not in turn benefit from that. They are rather concerned about the general repayment capability and hence the risk structure of the business.[71] They want to minimise the default rate and consequently usually only provide funds if the anticipated risk is considered low.[72] Hence, they must be able to assess the risk in an efficient way.[73] But due to the characteristics of technology-oriented start-ups in their earliest phases, like the novelty of its products and business model (see chapter 2.3), the assessment needs time and expertise and even if that effort is taken, usually no reliable prediction of the development of the venture can be derived. The earlier the phase of the venture, the higher the uncertainty and thus the higher the risk (as explained in chapter 2.4). Therefore, banks will generally only provide funds to companies that reached a certain stage of maturity.

The founders of the start-up may build on personal credit lines for example via a credit card or a second mortgage on their own home[74], but those involvements of banks do not imply an

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65 Cf. (Atherton, 2012, p.31)
66 Cf. (Bygrave & Quill, 2007, p.12)
67 Cf. (Atherton 2012, p.31)
68 Cf. (Winborg & Landström 2001, p.254)
69 Cf. (Thiemann, 2001, p.11)
70 Cf. (Wolf, 2006, p.18)
71 Cf. (Stiglitz & Weiss, 1981, p.393), (Wolf, 2006, p.18)
72 Cf. (Stiglitz & Weiss, 1981, p.393ff.), (Wolf, 2006, p.18), (Mittelstädt & Cerri, 2008, p.14f.)
73 Cf. (Åstebro & Bernhardt, 2003, p.305)
74 Cf. (Bhide, 1999, p.21), (Atherton, 2012, p.38),

investment in the venture itself and cannot be assumed to be generally available for business founders.

All in all, banks will generally not provide funds to technology-oriented young ventures during their starting phases; only in later phases where uncertainties are reduced, banks become relevant for the financing of the business.

3.4 Government support programs

The significance of technology-oriented ventures has already been illustrated in chapter 2.1. Also governments all over the world have realised the importance of those start-ups and young ventures in general.[75] Consequently, policy makers try to support the creation and successful development of these businesses. This can be done in an indirect as well as a direct way. An indirect approach is for instance the design of the tax code in a way that helps nascent entrepreneurs and young ventures.[76] On the other hand, payouts to start-ups, for example in the form of a loan, are classified as direct support, also if the payout happens through an intermediary such as a bank.[77] Since the focus of this thesis is the financing of the start-ups, only the direct support will be examined here.

The direct governmental support can assume different shapes. In Germany, the main forms are grants, for instance for research and development activities, and loans with reduced interest rates and liabilities.[78] However, the funding problems of young ventures are often not based on too high interest rates but the access to funds at all – and this government support, just as bank loans, are mainly given to low-risk ventures.[79] Also the US government's role in the financial support for start-up is rather characterised as 'passive'[80] and direct financial support is hardly existent[81]. On the other hand, governments might actively provide venture capital: For example in South Korea, the government itself accounted for nearly one third of venture capital investments during times.[82] Also the Irish government had set up venture capital funds that provide equity investments even for high-technology start-ups and may financially support the venture already during first feasibility studies.[83]

Due to the divergence of the possibilities in different countries and their dependence on current policy makers, however, governmental support programs cannot be considered as universally available financing forms for young technology start-ups.

[75] Cf. (Papadimitriou & Mourdoukoutas, 2002, p.104), (Denis, 2004, p.319), (Bhide, 1999, p.11), (Peña, 2002, p.180), (Wolf, 2006, p.36ff.)
[76] Cf. (Wolf, 2006, p.36)
[77] Cf. Ibid.
[78] Cf. Ibid, p.36ff.
[79] Cf. Ibid, p.37f.
[80] Cf. (Papadimitriou & Mourdoukoutas, 2002, p.104)
[81] Cf. (Åstebro & Bernhardt, 2003, p.306)
[82] Cf. (Mittelstädt & Cerri, 2008, p.33)
[83] Cf. (Papadimitriou & Mourdoukoutas, 2002, p.108f.)

3.5 Venture Capital Companies

3.5.1 Terminology

Venture capital companies are institutionalised, private providers of formal venture capital.[84] The funds are generally provided as equity but also mezzanine (hybrid) forms and financing with debt character are possible.[85] As the term 'venture capital' implies, the funds go to young start-up businesses, rather than to mature companies which is the case for 'private equity' providers.[86] To be eligible for an investment by a venture capital company, these start-ups have to show high growth potential.[87] Often, those investors have a comparative advantage over traditional financial institutions like banks concerning knowledge about industries where informational concerns are important, namely technology-focussed sectors such as biotechnology or computer software.[88] In those sectors they are relatively more efficient than other fund providers in selecting and monitoring investments.[89] Thus, the ventures they invest into are usually located in these sectors, therefore being technology-oriented start-ups. Besides the provision of the financial funds, management support is another aspect of their involvement.[90]

3.5.2 Significance

As these characteristics suggest, the significance of venture capital companies in the financing of, especially innovative and technology-oriented, young start-ups can be high. In the US during the year 2000, venture capital investments reached a size of nearly 100 billion USD and after it plummeted due to the following Dotcom-crisis, it increased again to recently about 23 billion USD in 2011.[91] The US venture capital market is considered one of the biggest and oldest, with the US coming second after Israel as the economy with the highest share of venture capital investments as percentage of the GDP.[92] Formal venture capital can, on the other hand, also be of only small importance in certain countries. The following figure shows its significance in countries such as the US or Israel, but also the differences in comparison to other countries on the basis of an OECD report from 2011.

[84] Cf. (Brettel et al. 2001, p.432)
[85] Cf. (Amit et al. 1998, p.442)
[86] Cf. (Achleitner, 2001, p.514), (Schipporeit, 2001, p.449f.), (OECD, 2004, p.2)
[87] Cf. (Schipporeit, 2001, p.449)
[88] Cf. (Amit et al., 1998, p.441)
[89] Cf. (Amit et al., 1998, p.441)
[90] Cf. (Schipporeit, 2001, p.448), (Denis, 2004, p.305)
[91] Cf. (National Venture Capital Association, 2011, p.5)
[92] Cf. (OECD, 2004, p.6), (OECD, 2011a, p.103)

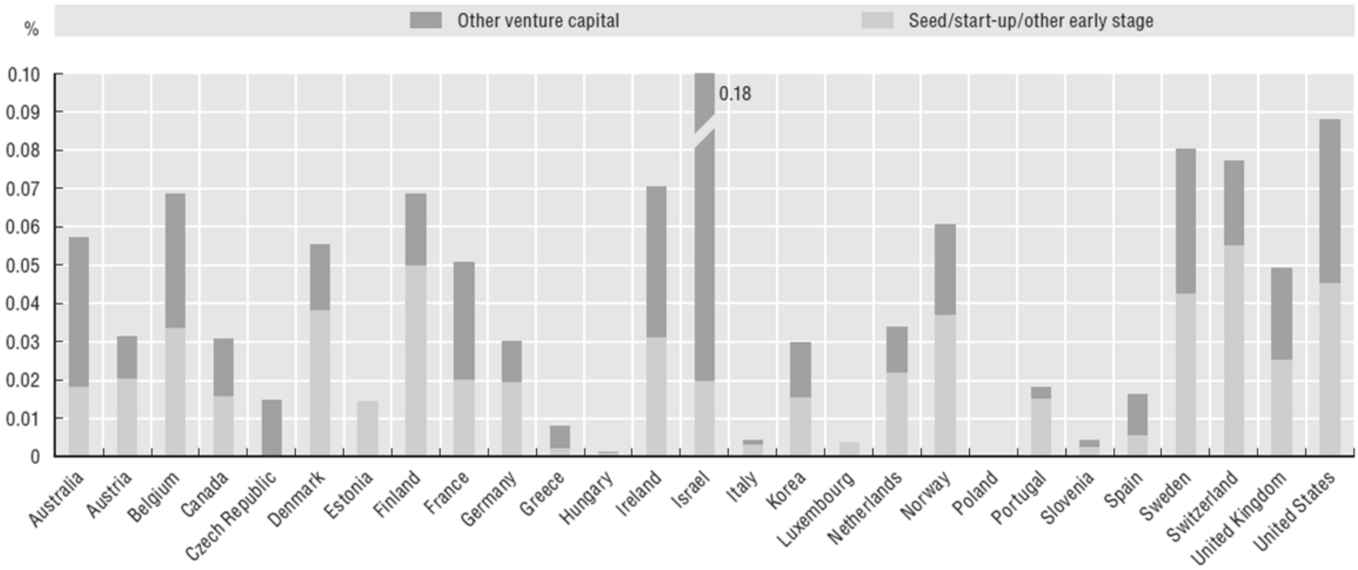

FIGURE 3 Venture Capital as Percentage of GDP for year 2009
Source: (OECD, 2011a, p.103)

In total, the significance of venture capital in Europe is lower than in the US[93] and funds are generally provided in later stages of the start-up[94]. But as FIGURE 3 shows, there are also European countries such as Sweden or Ireland where venture capital plays a more important role, and countries like Finland where it is to a high degree already provided in the early phases of a start-up. Also the EUROPEAN COMMISSION emphasises the importance of venture capital and wants to promote it through its policies.[95]

Certain industries, such as biotechnology, are even said to not have evolved at all, or at a much slower pace if they would not have been backed by institutionalised venture capital.[96]

3.5.3 Summary

Due to the illustrated characteristics of venture capital companies, they appear to be a well suited provider of funding for technology-oriented start-ups in their earliest phases.

But further analyses are needed to assess their impact and suitability in these cases. These analyses, together with comparisons to other financing forms that appear appropriate, will follow in chapter 4.

[93] Cf. (Ernst & Young, 2012, p.2)
[94] Cf. (Hall, 2002, p.15)
[95] Cf. (European Commission, 2013, n.pag.)
[96] Cf. (Wolf, 2006, p.29), (National Venture Capital Association, 2011, p.6)

3.6 Business Angels

3.6.1 Terminology

Business angels are 'private individuals […] who provide equity and other forms of non-collateral finance directly to new and growing businesses with which they have no family connection'[97]. Due to their investment in young start-ups and the fact that their activity is not institutionalised or transacted through an intermediary but individual, business angels are referred to as informal venture capital providers.[98]

But they differentiate from other private investors in their relationship with the start-up: While other informal investors might only passively hold their investment, business angels do not only provide financial funds, but actively support the venture with their knowledge and experience.[99] Accordingly, they typically invest in an industry where they themselves worked or managed an own business.[100] Studies show that business angels are usually affluent, and even though the financial return of their investment is important to them, they pursue their angel activity also due to other reasons, for example the attraction and fun of being part of a venture in an early start-up phase.[101] Networks for business angels evolved in which they, amongst others, collate information about potential investments or exchange experiences in meetings.[102]

3.6.2 Significance

These networks are often also publicly sponsored[103], underlining the importance of business angels for the economy: They are 'recognised as playing a vital role in economic development at both national and local/regional level'[104]. A reliable estimation of the business angel market, however, is hardly possible, since business angels are not obliged to register their investments and often prefer to stay anonymous.[105] Studies suggest that the total size of business angel investments in the US is twice the size of the venture capital companies' investments[106] and that the number of business angels in the US ranges between 300,000 and 350,000[107]. For the UK, the total amount of business angels' investments is even considered to be eight times as high as the investment of venture capital companies.[108] In contrast, the German business angel scene seems to be relatively small, also compared to other European countries.[109] But

[97] (Mason & Harrison, 1996, p.105)
[98] Cf. (Wong, 2002, p.1), (Brettel, 2005, p.234f.)
[99] Cf. (Brettel, 2005, p.234)
[100] Cf. (Freear et al. 2002, p.279), (Cowling et al. 2003, p.3)
[101] Cf. (Freear et al., 2002, p.279), (Mason & Harrison, 2002, p.275)
[102] Cf. (Mason & Harrison, 2002, p.273), (OECD, 2004, p.22)
[103] Cf. (Denis, 2004, p.319), (OECD, 2004, p.22)
[104] (Mason, 2005, p.11)
[105] Cf. (Mason, 2005, p.11), (Macht & Robinson, 2009, p.188)
[106] Cf. (Wong, 2002, p.1)
[107] Cf. (Sohl, 2003, p.15)
[108] Cf. (Mason, 2005, p.11)
[109] Cf. (Wolf, 2006, p.13f.), (Fryges et al. 2007, p.127)

in general, especially for young ventures in the high-tech industry and other technology-oriented start-ups, business angels are considered to be of significance: They constitute 'the primary source of equity financing for start-up and early stage entrepreneurial technology-based ventures'[110] and business angels are more often involved in those kind of start-ups than in traditional ones[111].

3.6.3 Summary

Due to the reasons mentioned above, business angels might serve as a viable financing form for young ventures with technology orientation in their earliest phases. Hence, further explanations and analyses considering business angels will follow in chapter 4. The individual character of their investments and the aforementioned problems in collecting reliable data lead to the fact that the assertions that will follow in that chapter will not be universally applicable, but will still convey a general and viable image of business angels as investors.

3.7 Crowdfunding

3.7.1 Terminology

The term 'crowdfunding' is considerably young, being first used in 2006 in an online technology magazine.[112] On the basis of the number of inquiries in the online search engine Google, the following graph shows that the interest in this term did not substantially grow until the end of the year 2010, however evolving almost exponentially from then on.

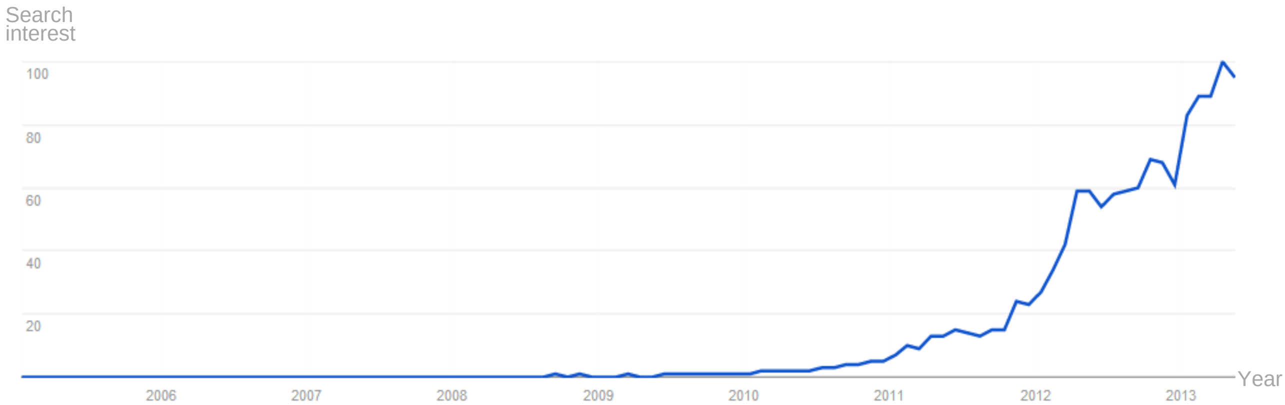

FIGURE 4 Global Google search inquiries for the term 'crowdfunding' from 2006 to 2013
Indexed, 100 = highest search interest. Source: (Google 2013)

The core principle of it is the 'microfinancing of projects or ventures by a large number of funders'[113]. The term 'microfinancing' refers to the characteristic that the funding amounts are typically small; so small that traditional financial institutions do not serve these transactions.[114]

110 (Freear et al., 2002, p.275)
111 Cf. (Fryges et al., 2007, p.43), (Harrison & Mason, 1996, p.11)
112 Cf. (Hemer et al., 2011, p.17)
113 (Hemer, 2011, p.2)
114 Cf.(Hemer et al., 2011, p.20f.)

This approach itself is not novel, the distinctiveness of crowdfunding is the focus on the internet as the place to address the general public, i.e. the 'crowd', and the variety of possibilities of giving financial support and receiving compensation.[115] The following definition of crowdfunding conveys these aspects:

> *"Crowdfunding involves an open call, mostly through the Internet, for the provision of financial resources either in form of donation or in exchange for future product or some form of reward and/or voting rights."*
>
> (Belleflamme et al. 2011, pp.5f.)

Crowdfunding is not limited to businesses with profit orientation, also social, non-profit or scientific projects can be funded using this financing form.[116] In this thesis, however, crowdfunding is only considered as a financing option for business start-ups with the intent of realising a profit. Another important distinction in this regard is the difference between 'ex ante' and 'ex post facto' crowdfunding: While in the ex post facto case the final goods already exist, ex ante crowdfunding is scheduled before any end-product is available.[117] Therefore, since the focus of this thesis is on start-ups in an early development stage, only ex ante crowdfunding is regarded.

3.7.2 Different models

For the purpose of financing technology-oriented start-ups in their earliest phases, five different crowdfunding models are relevant that can be ordered according to their complexity, as illustrated in FIGURE 5.

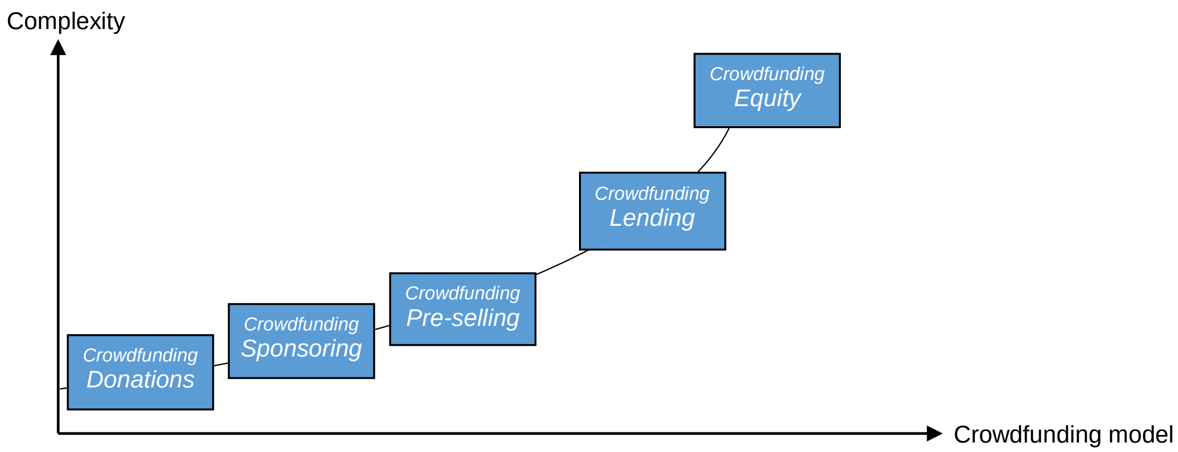

FIGURE 5 Crowdfunding models ordered by complexity
Source: own illustration, see also (Hemer, 2011, p.9), (Collins & Pierrakis, 2012, p.2)

[115] Cf. (Belleflamme et al. 2011, p.5f.)
[116] Cf. (Hemer et al., 2011, p.36f.)
[117] Cf. (Kappel, 2009, p.375)

The characteristics of the models differ and therefore their suitability for, and their impact on the venture.

Common to all models is that there is usually a certain 'goal' that has to be reached, meaning a minimum amount of capital that has to be pledged by backers in a certain timeframe to make the crowdfunding successful; if this goal is not reached the backers get repaid and the venture does not receive any funds.[118]

The model assumed to be the simplest is crowdfunding based on donations, since in this model no direct reward is given for the financial support. It can, thus, be regarded as usually only realistic for social and non-profit projects.[119] However, also commercial start-ups might be developing products which attract altruistic backers that provide financial funds without any direct reward, for instance to support the progress of promising technologies.[120]

Another possibility is to acquire funds by means of crowdfunding sponsoring. Here, financial supporters get a direct, however non-financial, reward.[121] The rewards depend on the project that is to be funded and often also on the amount of financial support.[122] They range for example from being mentioned on the website of the capital seeker, over getting exclusive insight into the production process, to receiving 'goodies' such as T-shirts with advertisement for the project.[123] Due to the provision of rewards, this model is more complex than the donation-based one, especially if tangible rewards are promised. But since the start-up can decide on what rewards to give etc. and does not necessarily incur any more liabilities, it can still be seen as rather basic.

The third possible option involves again more complexity: crowdfunding pre-selling. In this model, a finished product, potentially in a non-final form, is promised for financial support.[124] Commonly, the price that is paid for this product is different from the price that consumers who purchase after the production took place have to pay.[125] Using this model, the start-up and the supporter agree on a legally binding purchase agreement with all legal consequences thereof.[126] Hence, the intricacy of the process is increased.

Crowdfunding lending is another model that comes with an again higher complexity. As in a normal loan agreement, the financial supporter receives interest together with the repayment of his investment, which has the status of debt in the start-up business.[127] These types of agreements can come with complex legal rights and obligations that have to be considered

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[118] Cf. (Buysere et al. 2012, p.14), (Collins & Pierrakis, 2012, p.24)
[119] Cf. (Hemer et al., 2011, pp.51f.)
[120] Cf. (Hemer, 2011, p.13)
[121] Cf.Ibid, pp.14, 52, (Buysere et al., 2012, p.10), (Collins & Pierrakis, 2012, p.3)
[122] Cf. (Hemer et al., 2011, pp.24f.), (Lawton & Marom, 2012, p.56)
[123] Cf. (Hemer, 2011, p.13)
[124] Cf. Ibid, p.14
[125] Cf. (Belleflamme et al., 2011, p.10)
[126] Cf. (Hemer et al., 2011, p.53)
[127] Cf. Ibid, p.54

and complied with, therefore complicating the crowdfunding procedure.[128]

The same holds true for the crowdfunding model overall considered most intricate: Crowdfunding equity. In this model, the start-up business 'offer[s] a certain proportion of its equity for a set amount of capital it is aiming to raise'[129] together with 'some sort of revenue- or profit sharing'[130]. Depending on the specific execution of the model, this can become a highly complex undertaking which demands the assistance of experienced lawyers, tax accountants etc. due to the multitude of applicable laws and legal obligations.[131] These difficulties can, to a certain extent, be reduced if an 'investment club' approach is chosen where the community is closed and investors are therefore legally considered as 'qualified'.[132]

The platform where the transactions take place is determining in this regard, as also in the other models. As the intermediary in the whole crowdfunding process, the online platform can facilitate the search and selection of capital seekers and providers[133] and is therefore considered advantageous in comparison to the alternative of the handling via an own online presence of the capital seeker[134]. The approach and business models of crowdfunding platforms differ according to the crowdfunding models mentioned above, but also within the models. In general, they themselves make profits for instance by keeping a certain share of the collected funds or of the future revenues of the project.[135]

3.7.3 Significance

As stated in sub-chapter 3.7.1, crowdfunding is still in its early stages of development. Therefore its overall significance is difficult to determine. The crowdfunding markets have undergone an accelerating growth since 2007 with an estimated 81% growth in 2012, leading to 2.7 billion USD of raised capital globally in that year with the US and Europe being the main regions.[136] However, these numbers include all kinds of crowdfunding projects, thus also funds not going to commercial ventures. A reliable distinction revealing how much of the totally acquired capital goes to business start-ups is not yet available.

3.7.4 Summary

Even though crowdfunding is still a nascent approach to financing a start-up business, the previously illustrated properties seem promising and a further scrutiny, considering the different possible crowdfunding models, appears valuable.

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[128] Cf. (Bradford, 2012, pp.34ff.), (Hemer et al., 2011, p.54)
[129] (Collins & Pierrakis, 2012, p.10)
[130] (Bradford, 2012, p.33)
[131] Cf. (Hemer et al., 2011, pp.55f), (Bradford, 2012, p.33), (Collins & Pierrakis, 2012, pp.21ff.)
[132] Cf. (Hemer et al., 2011, p.55)
[133] Cf. (Agrawal et al. 2011, p.3)
[134] Cf. (Hemer et al., 2011, p.3)
[135] Cf. (Hemer et al., 2011, pp.56ff.), (Crowdsourcing LLC, 2012, pp.22f.)
[136] Cf. (Kartaszewicz-Grell et al., 2013, n.pag.), (Collins & Pierrakis, 2012, p.8)

3.8 Summary

As shown in the preceding sub-chapter, there are generally numerous different forms of financing for businesses. However, only a few seem to qualify rather universally for technology-oriented start-ups in their earliest phases, namely venture capital companies, business angels and crowdfunding. The following chapter will assess, whether these financing forms would indeed be suitable for these ventures, in which cases they might be more appropriate, and to which extend they affect the ventures.

4 Suitability and impact of venture capital companies, business angels and crowdfunding as financing forms for technology-oriented start-ups in their earliest phases

4.1 Evaluation criteria in general

Technology-oriented start-ups demonstrate unique characteristics, as shown in chapter 2, which also influence the possible selection of financing forms during their earliest phases, as analysed in chapter 3. The three financing forms that seem most suitable for this purpose will be assessed in the upcoming analysis. These capital providers differ in various aspects[137], therefore the assessment and comparison will be done regarding several key criteria that determine the suitability for certain start-up scenarios and represent particular impacts on the start-up business.

4.2 Comparison based on key criteria

4.2.1 General availability, ways of initiation and phase of entry

4.2.1.1 Introduction

In order to use a certain financing form, it has to be generally available to the start-up and accessible through the way of initiation. The availability in geographical terms differs throughout the financing forms, together with the way of initiation, ranging from being mainly available geographically nearby with access only via personal contacts, to being available globally through the internet.

4.2.1.2 Venture capital companies

A spatially clustered settlement of venture capital companies in only a small number of cities that are considered financial and/or high-tech centres is observable.[138] Their investment regularly takes place within a rather close range of their branch, therefore geographically concentrated in key cities throughout different countries, such as Boston in the US, Toronto in Canada or London in the UK.[139] One of the reasons for the geographical concentration is the reliance

[137] See previous and upcoming aspects as well as amongst others (Wolf, 2006, pp.7ff)
[138] Cf. (Mason, 2007, pp.96ff.), (OECD, 2011b, p.10)
[139] Cf. Ibid.

on professional and personal networks for identifying potential investment opportunities, for instance in form of contacts to consultants, other venture capitalists, accountants or law firms.[140] But venture capital companies can additionally be contacted directly by start-ups, often connected with a presentation of their business plan.[141]

The fact that for the initiation, a business plan and/or a contact to partners of the venture capital company is needed already suggests that the investment rather takes place in later phases of the start-up. This view is also widely held in the literature and backed by several studies.[142] A self-conducted analysis of data from 1998 to 2012 of the National Venture Capital Association in the US and the Bundesverband Deutscher Kapitalbeteiligungsgesellschaften in Germany as representatives for the industry supports this position in parts, but for the latest years it conveys a rather different impression, as illustrated in FIGURE 6.

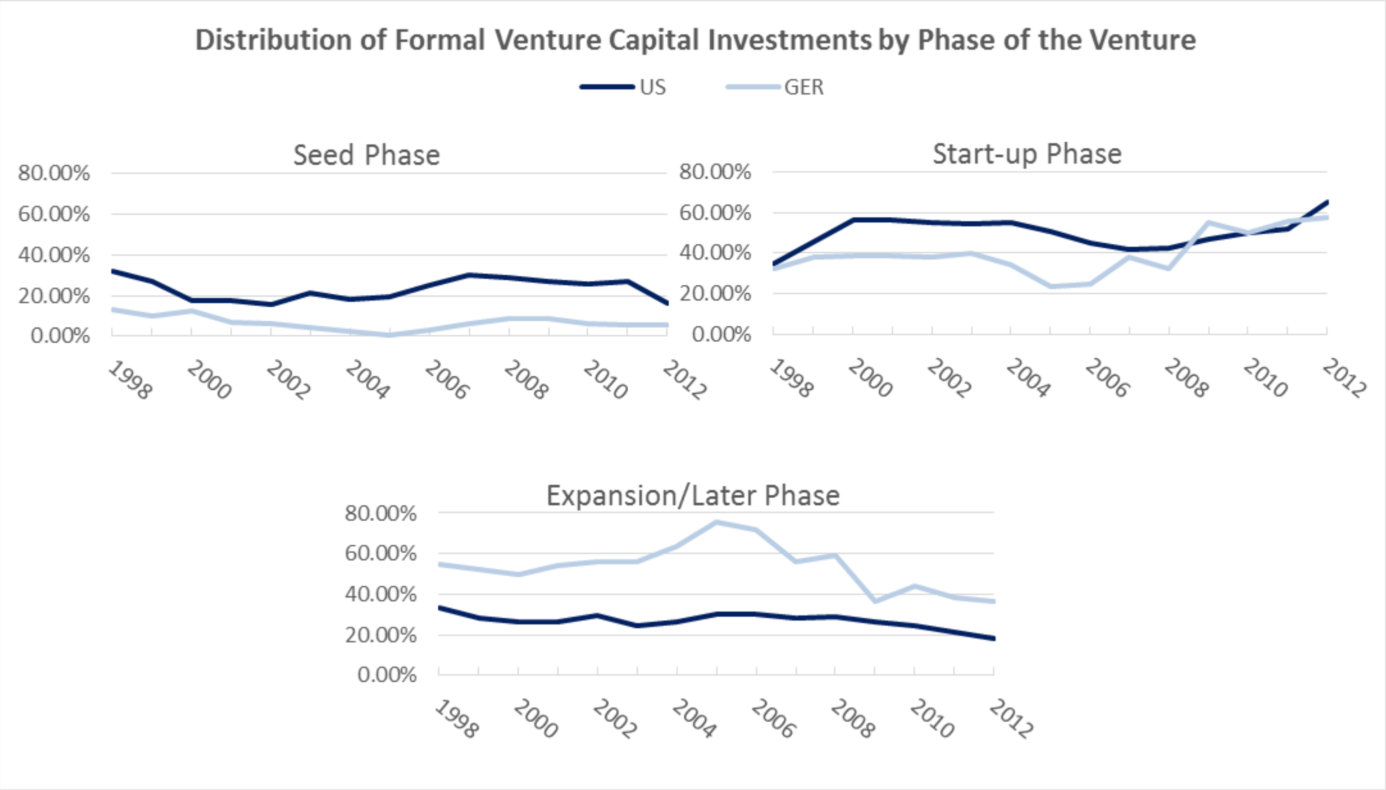

FIGURE 6 Distribution of formal venture capital investments by phase of the venture for the US and Germany for years 1998-2012

Source: own calculations and illustrations, data from: (National Venture Capital Association, 2013) and (Bundesverband Deutscher Kapitalbeteiligungsgesellschaften, 2013)

[140] Cf. (Mason, 2007, p.97f.), (Achleitner, 2001, p.524)

[141] Cf. (Franke et al. 2004, p.653)

[142] Cf. (Mason, 2007, p.34), (Wolf, 2006, p.29), (Brettel et al. 2004, p.433), (OECD, 2004, p.6), (Wong, 2002, pp.11f.), (Freear et al., 2002, p.278), (Amit et al., 1998, p.457)

The data shows that especially the German venture capital companies are focussed on the expansion stage as well as later phases of ventures, and only allocate a small share of their investments to ventures in the seed phase, consistently less than 10 percent and in recent years not even 7 percent. In the US, seed phase investments reached temporarily nearly a 30 percent share but also decreased to under 17 percent in 2012. However, investments during the start-up phase have become increasingly important recently in both countries with unmatched peak shares of more than two thirds of all capital provisions of venture capital companies in the US and nearly 58 percent in Germany. In the start-up phase, the venture is indeed not in its earliest days, but it is still of very young age (see chapter 2.4). Thus, considering the data from the past years, the statement that venture capital companies do not invest during the earliest phases of start-up businesses cannot hold true. They seem to have opened up to already invest in very early phases of a venture.

4.2.1.3 Business angels

Business angels exist in numerous countries throughout all continents.[143] The business angel scene in North America and Western Europe is regarded to be the most advanced, but also in Asian and South American countries a more active scene has evolved in the past few years.[144] Just as for venture capital companies, for business angels one of the main ways of initiation is by referrals through business contacts or personal encounters, often in connection with a presented business plan.[145] But also business angel networks, often with online platforms, are an important hub for initiations where the angels can exchange experiences and information and entrepreneurs have the opportunity to get in contact with them.[146] However, business angels tend to invest in start-ups close to their own location, often only within a 50 mile radius.[147] The ventures they invest into are often still in a very early phase; they are more willing to invest into start-ups in the seed phase than other investors[148], sometimes even before the legal foundation of the company[149]. Nevertheless, also post-seed investments are common for business angels.[150] They can thus be considered as potential providers of financial funds during all early phases of technology-oriented start-ups.

[143] Cf. (OECD, 2011b, p.79) (European Commission, 2012, p.12)
[144] Cf. (OECD, 2011b, p.79)
[145] Cf. (Brettel, 2005, pp.245ff.), (Fryges et al., 2007, p.21), (Mason, 2005, pp.21f.), (Collins & Pierrakis, 2012, p.26)
[146] Cf. (Mason & Harrison, 2002, p.273), (OECD, 2011b, p.37)
[147] Cf. (Mason, 2007, pp.92ff.), (OECD, 2011b, p.39)
[148] Cf. (OECD, 2011b, p.10), (Mason & Harrison, 2002, p.272), (Denis, 2004, p.309), (Wong, 2002, p.11)
[149] Cf. (Fryges et al., 2007, p.12)
[150] Cf. (Fryges et al., 2007, pp.23f.), (OECD, 2011b, p.28)

4.2.1.4 Crowdfunding

Crowdfunding is potentially possible independent of the location of the capital seeker or provider, due to its digital, online-only character. Studies show that up until now, the majority of crowdfunding platforms was created in Europe and North America[151], but that platforms exist in many more countries[152] and that the investment patterns are indeed independent of the location of the involved people.[153] The online setting of crowdfunding 'allows people to overcome offline barriers to market transactions […], the [crowdfunding] platform can help reduce market frictions associated with geographic distance'[154]. This can be considered as an advantage of crowdfunding over venture capital companies and business angels.

Seeking to acquire funds via crowdfunding, the capital seeker usually uses a crowdfunding platform as a way of initiation. He sends his pledge to the platform where it is screened by the intermediary and, if accepted, posted to the site where it is open to the public (see sub-chapter 4.2.2.4 for further explanations). There, the start-up has the opportunity to present its project and call for financial support according to the different crowdfunding models.

Crowdfunding can potentially be used by start-ups in any phase of their development due to the freedom in the choice of models and pledges. There are examples showing the successful crowdfunding of start-ups in later development phases[155], but funding during the seed and start-up phase are more common[156]. Even pre-seed funding is possible and may be successful[157]. Other models, such as equity crowdfunding, however, cannot be used in such early phases due to the fact that the company has to be legally registered to acquire such funding[158].

4.2.2 Assessment of the business

4.2.2.1 Introduction

Before any external capital provider will give money to the start-up business, it will assess the business model of the venture and also the entrepreneurs, as they constitute one of the success factors. The capital provider's evaluation will lead to the investment or the objection of an involvement in the start-up venture.

4.2.2.2 Venture capital companies

Venture capital companies are, compared to 'traditional' capital providers such as banks, considered to be more experienced and efficient in gathering information and dealing with asymmetric information about unproven business models, untested markets or the founding team of a start-up business.[159] After initial screenings executed by it, which about 20 percent of

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[151] Cf. (Hemer et al., 2011, p.86)
[152] Cf. (Crowdsourcing LLC, 2012, p.16)
[153] Cf. (Agrawal et al., 2011, p.19), (Bradford, 2012, pp.12f.)
[154] (Agrawal et al., 2011, p.2)
[155] Cf. (Hemer, 2011, p.29)
[156] Cf. (Hemer et al., 2011, p.95), (Belleflamme et al., 2011, p.7)
[157] Cf. (Buysere et al. 2012, p.19)
[158] Cf. (Bradford, 2012, p.6) (Kortleben & Vollmar, 2012, p.27)
[159] Cf. (Amit et al., 1998, p.441), (Mason, 2007, p.88)

applying start-ups survive, a further due diligence evaluation with personal contacts is done.[160] The final step, to which only about half of the remaining ventures are invited, are contract negotiations, whereupon only a small fraction, about one to four percent of initial applicants, is eventually accepted and provided with funds.[161] Within the evaluation of the start-up, besides revenue potential and other projections, the founding/management team is specified by venture capital companies as an important factor[162], especially their experience and education[163]. Nevertheless, venture capital companies can vary in their evaluation methods and views, and might differ in their appraisal of a start-up's prospect of success.[164]

4.2.2.3 Business angels

Business angels, as previously described, usually invest in start-ups active in an area where they themselves worked and/or managed a company. They can thus evaluate opportunities and risks of the start-up knowledgeably[165], possibly more profound than venture capital companies without such industry insights. Business angels who invest completely on their own tend to assess the venture in a more instinctive way instead of using elaborate calculation or the like.[166] Also they, just as venture capital companies, consider the management/founding team as being of particular importance.[167] If an angel network is contacted, however, the assessment process is often more formal with various rounds of evaluations and thorough due diligence[168], resembling the process for venture capital companies described above. Generally, the large majority of start-ups does not withstand an initial screening by business angels, a study by BRETTEL for example finds that only about one fourth of the start-ups get to the next stage of evaluation.[169] But the whole assessment can be considered less thorough than that by formal capital providers such as venture capital companies.[170]

4.2.2.4 Crowdfunding

For crowdfunding, the ways of assessing the investment opportunity differ among the types of crowdfunding models and platforms. While for donation, sponsoring and pre-selling models, usually rather superficial evaluations are used, the assessment of crowdfunding lending and equity demanding start-ups is regarded as being more extensive. The screening process, the depth of the assessment and what is expected from the start-up, such as due diligence etc., moreover varies among the platforms and some of them, especially those were lending and

[160] Cf. (Franke et al. 2004, p.654)
[161] Cf. Ibid, (Kortleben & Vollmar, 2012, p.12)
[162] Cf. (Schwetzler, 2005, pp.157ff.), (Franke et al., 2004, pp.655ff.), (Achleitner, 2001, p.525)
[163] Cf. (Franke et al., 2004, p.665)
[164] Cf. Ibid.
[165] Cf. (Harrison & Mason, 1996, p.11)
[166] Cf. (OECD, 2011b, p.32)
[167] Cf. (Brettel, 2005, pp.246f.), (Mason & Harrison, 2002, p.281)
[168] Cf. (OECD, 2011b, p.34)
[169] Cf. (Brettel 2005, p.248)
[170] see also (Mason, 2005, p.24)

equity based crowdfunding is offered, apply such strict criteria that not even one percent of the submitted projects are accepted for publication.[171]

Usually, the project is then presented on a website/platform with a text accompanied by pictures and/or videos where the business owners introduce themselves and their project in form of a 'pitch', asking for funding by the crowd.[172] For the first type of models, those pitches, especially for projects in initial phases, can be rather targeted to appeal on an emotional basis to enthusiastic supporters who also want to support the start-up for non-financial reasons.[173] It can be assumed that these kinds of investors are needed for a successful funding and that on the other hand ventures that are not consumer-oriented and cannot mobilise such supporters may have more difficulties in acquiring capital.[174]

Due to the higher complexity in lending and especially equity based crowdfunding transactions on the other hand, pitches for those generally include more profound information: They inform amongst others about the legal details of the start-up and its business model, for instance by providing business plans or professional evaluations of the company.[175]

The presentation to the public leads to two aspects possibly relevant for the young venture. First, if for example the business model of the start-up is very unique or no patents have yet been filed for innovative products, there is a certain risk of revealing too much information, also regarding the difficulties or even impossibility of arranging non-disclosure agreements with such a big group of potential capital providers.[176] Second, through crowdfunding, not a group of experts is addressed, but the public. On the one hand, this can substantially reduce the size of potential backers if profound technical or otherwise specialised knowledge is needed to understand the venture's concept, thus contradicting the purpose of finding a large number of capital providers with respectively small contributions.[177] On the other hand, '[the] knowledge gap that once separated professionals from the general public has shrunk as information has become more readily available through the internet'[178] and the fact that not experts but the crowd is approached may also be of advantage since 'experts often make extraordinarily poor judgements' and 'a diverse group of less-expert decision-makers can often make better choices than an expert working individually'[179]. The case of the venture which invented 'Pebble' is one example for this aspect: It failed to gain funding by venture capital companies but was an eminent crowdfunding success[180] (see also the following sub-chapter).

[171] Cf. (Hemer, 2011, p.21), (Kortleben & Vollmar, 2012, p.13)
[172] Cf. (Buysere et al., 2012, p.14), (Collins & Pierrakis, 2012, p.12)
[173] Cf. (Hemer, 2011, p.13), (Buysere et al., 2012, p.19)
[174] Cf. ibid., (Collins & Pierrakis 2012, p.19)
[175] Cf. (Kortleben & Vollmar, 2012, p.14)
[176] Cf. (Hemer, 2011, pp.28f.), (Collins & Pierrakis, 2012, p.28)
[177] Cf. (Hemer et al., 2011, p.95), (Collins & Pierrakis, 2012, p.19)
[178] (Bradford, 2012, p.114)
[179] (Bradford, 2012, p.114), for additional remarks see also (Lawton & Marom, 2012, pp.159ff.)
[180] Cf. (Lawton & Marom, 2012, p.48)

The rates of successful funding for those start-ups which were able to post their project to the platform vary widely. While on some platforms less than half of the presented projects succeed in acquiring sufficient funds, others successfully mediate funding for more than 90 percent of the published projects.[181] Therefore, altogether, also for crowdfunding a well prepared presentation and well edited information, as well as the right choice of the crowdfunding platform, in each case adjusted to the particular venture, is needed to successfully stand the assessment by potential capital providers. But it likely entails less expenditures for the start-up than the first two financing forms, and also projects that would not be considered by them may successfully acquire funds through crowdfunding.

4.2.3 Amount of capital provided

4.2.3.1 Introduction

The amount of capital needed by the start-up differs among the types of venture, their business models and the phase they are in. The following analyses will show that also the typical amounts of capital provided by venture capital companies, business angels and crowdfunding differ and accordingly their particular suitability for certain start-ups.

4.2.3.2 Venture Capital Companies

Venture capital companies can be considered the suppliers of the highest capital amounts of those three financing forms. They tend to refuse too small participations due to their high operating costs as a professional, institutionalised financier and advisor.[182] The magnitude of their typical investment size has quite a wide range. While MASON indicates that each investment is generally above 5 million GBP in the UK and 10 million USD in the US[183], FREEAR ET AL indicate 2 million USD as the minimum investment size[184]. WOLF underlines that there are broad differences between single companies, but that generally no investments are done under 100.000 EUR by German venture capital companies[185].

FIGURE 7 shows a self-conducted analysis of the investment sizes of venture capital companies in Germany and the US. It confirms the findings by WOLF as far as one can assume that being continuously in average above 600.000 EUR, the investment sizes of German venture capital companies are generally over 100.000 EUR per investment. Concerning the statements by MASON, however, the data cannot prove his point that investments by US venture capital companies are commonly above 10 million USD. With an average of just over 3.5 million USD, there might be investments above 10 million USD, but also numerous deals below this threshold, therefore undermining his assertion. The 2 million USD minimum stated by FREEAR ET AL. on the other hand is consistent with the depicted values. Another interesting information that

[181] Cf. (Hemer, 2011, pp.21f.)
[182] Cf. (Achleitner, 2001, p.524), (Freear et al., 2002, p.277)
[183] Cf. (Mason, 2007, p.86)
[184] Cf. (Freear et al., 2002, p.277)
[185] Cf. (Wolf, 2006, p.30)

can be derived from the data is that there is a downward trend in both the US and German size of investments with a continuous decline since 2005 in both countries. The average size in 2012 was around 37% lower than in 2005 in the US; for Germany the 2012 size was around 57% lower than in 2005.

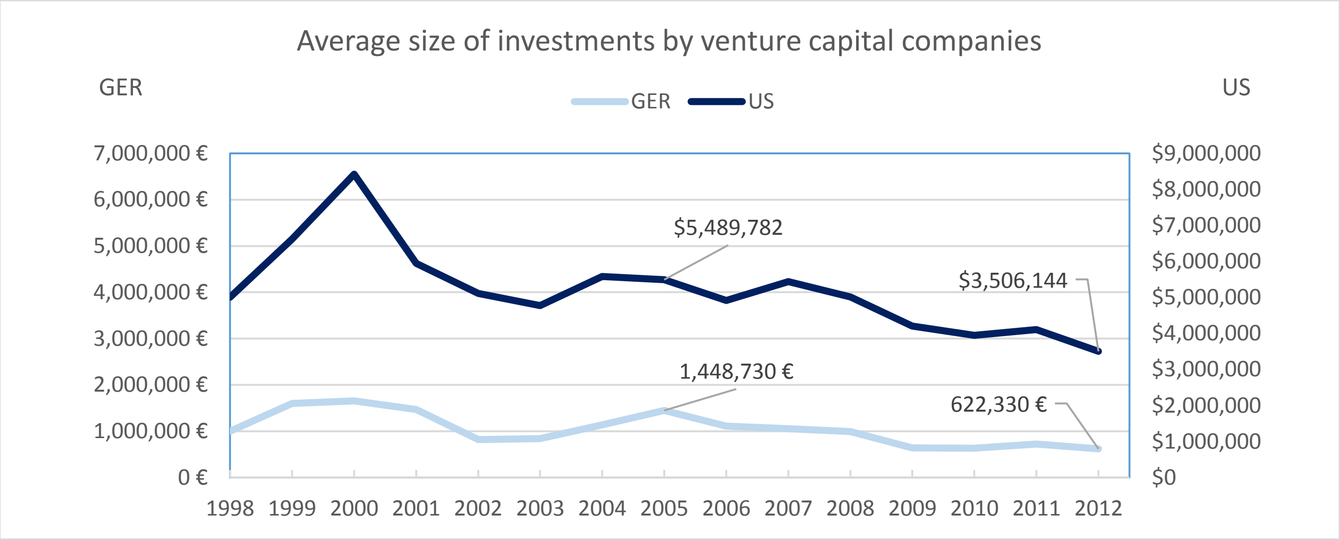

FIGURE 7 Average size of investments by venture capital companies for the US and Germany for years 1998 – 2012
Investments during seed, start-up and expansion/later phase
Source: own calculations and illustration, data from: (National Venture Capital Association 2013) *and* (Bundesverband Deutscher Kapitalbeteiligungsgesellschaften 2013)

4.2.3.3 Business angels

The investments of business angels tend to vary widely in size but they are generally smaller than those of venture capital companies: Business angels' investments in Anglo-Saxon regions are usually smaller than 500.000 USD or 250.000 GBP[186] but above 25.000 USD[187] or 10.000 GBP[188]. Another source claims 2 million USD as the typical maximum size of angels' investments[189]. For European countries a range of 18.000 EUR to 150.000 EUR is stated as the typical investment size per business angel in a study by the EUROPEAN COMMISSION.[190] Also in Germany, business angels' investments rank in such magnitudes with investments being generally between 10.000 EUR and 1 million EUR, averaging 200.000 EUR.[191]

Business angel networks have increased in significance in recent years and with it angel syndication, thus also allowing bigger investment sizes through pooled funds[192] (see also subchapter 4.2.4.3).

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186 Cf. (Mason, 2007, p.86), (OECD, 2011b, p.21)
187 Cf. (OECD, 2011b, p.21)
188 Cf. (Mason, 2005, p.4)
189 Cf. (Freear et al., 2002, p.278)
190 Cf. (European Commission, 2012, p.19)
191 Cf. (Brettel, 2005, p.244)
192 Cf. (OECD, 2011b, p.21), (Freear et al., 2002, p.279)

4.2.3.4 Crowdfunding

Also the investment sizes of crowdfunding projects can be of very different sizes. The equity based projects generally compose the largest funds[193], with 21% of the funds gathered going to projects calling for more than 250.000 USD and another 21% to projects with funding goals between 100.000 and 250.000 USD[194]. Projects based on donations or sponsoring on the other hand generally do not collect such high amounts; 90% of all funds go to projects which have a funding goal below 10.000 USD.[195] However, there are also examples where amounts far above 250.000 USD were collected, also with non-equity based models. A recent case is the technology venture planning on producing ‘Pebble’, a so called ‘smart-watch’ that serves as a wrist watch but also connects to the user’s smartphone, which gathered 1 million USD in only one day and more than 10 million USD in total through the pre-selling model in 2012.[196] In 2013, a handheld 3D printer could prove as well that it is possible to acquire a relatively high amount of capital via crowdfunding: Also using a pre-selling model, in combination with sponsoring, it raised more than 2.3 million USD.[197] These two cases also underline the already mentioned relevance of consumer-orientation and the ability to attract passionate funders who serve as ‘provestors’ (see sub-chapter 4.2.6.4 for further explanations). So far, the projects that have acquired such an amount of funds through crowdfunding can be characterised as meeting those conditions. Ventures not showing these traits may have difficulties in securing capital in this dimension.

4.2.4 Arrangement of financing, expected rate of return and exit strategies

4.2.4.1 Introduction

The financing forms differ in the way the financing is arranged, investors’ expectations concerning the yield of the investment and also their way of exiting their investment. Therefore, their suitability for certain ventures differs and these aspects lead to dissimilar impacts on the start-ups.

4.2.4.2 Venture capital companies

After the initial contact to start-ups as potential investment objects, first selections and an assessment of the businesses as analysed in the previous sub-chapters, venture capital companies conduct negotiations with the venture where mainly the arrangement of financing, control options (see the following sub-chapter) and exiting options are stipulated.[198] A basic principle that is often used by venture capital companies is the so called ‘staging’, i.e. the successive supply of financial resources dependant on certain milestones that the start-up has to reach.[199]

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193 Cf. (Crowdsourcing LLC, 2012, p.14), (Buysere et al., 2012, p.22)
194 Cf. (Crowdsourcing LLC, 2012, p.20)
195 Cf. Ibid, p.21, see also (Buysere et al., 2012, p.22), (Hemer et al., 2011, p.89)
196 Cf. (Lawton & Marom, 2012, p.48)
197 Cf. (Kickstarter 2013)
198 Cf. (Achleitner, 2001, p.525)
199 Cf. Ibid,, (Sahlman, 1990, p.474)

The capital provided in each turn is supposed to be sufficient for allowing the venture to progress onto the next stage of development where the subsequent tranche is paid out.[200] Matching the capital needs of the young ventures in the different development phases described before, the tranches generally increase over time, encouraging the entrepreneurs to abide by the contract terms and performance requirements on the one hand, and reducing the risk for the venture capital company on the other hand.[201] Another typical approach of venture capital companies is to syndicate the investment, i.e. investing together with other venture capital companies, in order to 'improve project selection and learning, spread risk and increase value-creating services for portfolio companies'[202].

The form in which the financing usually takes place in Anglo-Saxon countries is by convertible preferred stock, being shares of the enterprise that can in many ways be adjusted to serve the demands of the venture capital company.[203] The rights of them are often, just as the staging of the financing itself, bound to the performance of the entrepreneurs and the venture, being successively extended if performance goals are not reached.[204] The founders of the company thus typically have to consign large part of their ownership to the venture capital company, enabling these investors to influence, sometimes in fact control the business[205] (sub-chapter 4.2.5.2 will elaborate on this). Through the structure of the financing, founders are usually put in a subordinate position in case of a failure of the venture due to the fact that in many cases the stake of the venture capital company can be characterised as debt rather than as liable equity.[206] In Germany, venture capital companies rather make use of the silent partnership, which is again a mezzanine form of financing, but also regularly provide pure equity; convertible securities on the other hand only play a minor role.[207] The prevalence of silent partnerships is based on the fact that many start-ups in Germany are incorporated as limited liability companies for which it is impossible to issue convertible securities.[208] However, venture capital companies make use of the possibility to design the partnership contract to fit their needs and to include respective covenants in a way that allows them to have comparable advantages to those abovementioned for convertible securities.[209]

The expected rate of return of venture capital companies is mainly shaped by four aspects[210]: As for every financial investment, a return for the provision of money itself and a compensation

[200] Cf. (Achleitner, 2001, p.526), (Sahlman, 1990, p.503), (Li & Mahoney, 2011, p.245)
[201] Ibid.
[202] (Li & Mahoney, 2011, p.246), see also (Brettel et al. 2001, pp.16f.)
[203] Cf. (Kaplan & Stromberg, 2003, p.286), (Gerke & Burrak, 2001, p.480)
[204] Cf. (Kaplan & Stromberg, 2003, pp.286ff.)
[205] Cf. Ibid., (Schwetzler, 2005, p.158)
[206] Cf. (Kaplan & Stromberg 2003, pp.286ff.), (Schwetzler 2005, p.158)
[207] Cf. (Bascha & Walz, 2002, pp.15f.)
[208] Cf. (Rudolph & Haagen, 2004, p.19)
[209] Cf. (Rudolph & Haagen, 2004, pp.20f.)
[210] Cf. (Schwetzler, 2005, pp.168ff.), (Sahlman, 1990, pp.511f.)

for the risk of the investment is to be paid. Venture capital companies will take in account an additional premium for their efforts and services concerning the selection, monitoring and support of the start-up ventures. Also the phenomenon that entrepreneurs assert the future performance of their business in a way that is often regarded as being too optimistic[211] will be taken into account in determining the expected rate of return. In staged financing investments, the expected rate of return will be calculated for every subsequent round of investment and with the risk being progressively reduced in later phases of the start-up, together with the assumed over-optimism of the founders, the expected rates of return decrease.[212] For Germany, studies show that, thus, the expected rate of return is lowered from between 55% and 70% for an initial funding at the early stage of the venture, to around 30% to 35% during the expansion stage and eventually to a range between 20% and 25% for later stage investments.[213] The general conditions and approaches are comparable in other countries and these rates can be seen as roughly representing the expected return rates for venture capital companies at large.[214]

The venture capital company plans from the beginning on to realise this return by ending its participation in the venture after several years: After about five years[215] it sells its stake in the company, typically through a company buyout, a secondary sale or an initial public offering (IPO); if no such return is feasible after a certain amount of time, the company is written off.[216] If a company buyout takes place, also referred to as a company buy back, the start-up itself rebuys the shares of the venture capital company and thus regains full control of the business.[217] In the case of a secondary sale, also called trade sale, the shares are sold to a third party, possibly a customer or supplier of the company or also a competitor – hence leaving the founding team with the option of leaving the company as well or accepting the transfer of substantial voting and possibly other rights to a third party.[218] An IPO can lead to the acquisition of further capital from a multitude of investors, therefore allowing for a further financial leeway while preventing a substantial influence of a single third party on the company; however, the public trading also brings about numerous communication, transparency and performance requirements and with them significant costs for the venture.[219]

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[211] Cf. also (Bhide, 1999, p.144)
[212] Cf. (Schwetzler, 2005, pp.168f.)
[213] Cf. Ibid, p.169
[214] Cf. also (Kerins et al. 2002, p.5), (Gladstone & Gladstone, 2002, p.168)
[215] Cf. (Gerke & Burrak, 2001, p.483), (Sahlman, 1990, p.487)
[216] Cf. (Achleitner, 2001, pp.527f.), (Amit et al., 1998, pp.458ff.), (Brettel et al., 2004, p.432), (OECD, 2011b, p.24), (Wolf, 2006, p.34)
[217] Cf. (Achleitner, 2001, pp.527f.), (Amit et al., 1998, pp.458ff.)
[218] Cf. (Achleitner, 2001, p.528)
[219] Cf. Ibid, pp.527f.

4.2.4.3 Business angels

The investments of business angels generally rely more on trust towards the venture's founders than the participation of venture capital companies; formal protection in the contract terms is considered to be less important to them.[220] One cause for this behaviour is an often observable unwillingness of business angels in comparison to venture capital companies to extensively conduct legal assistance, which would be needed in formulating such protection clauses reliably.[221] Abstaining from legal consultation is also regarded as one of the reasons why business angels usually do not make use of mezzanine forms of financing[222]: In Germany, 97% of business angels rely on pure forms of financing the venture instead of applying mixed funding, as shown in a study by BRETTEL ET AL[223]. That also holds true for other countries and, typically, common equity is chosen as this pure form of investment by business angels[224], but also (unsecured) loans are not unusual[225]. Syndication, as explained for venture capital companies, is also used by business angels, especially in recent years through the usage of business angel networks where co-investing angels can be found.[226]

Considering the rate of return that business angels expect to realise, the same factors are relevant as described above for venture capital companies. However, business angels are regarded to usually not anticipate as high rates as they do.[227] That is firstly based on the fact that the generally earlier phase of investment by business angels yields smaller returns and that the operating expenses of business angels are lower compared to venture capital companies.[228] Furthermore, business angels regularly state that they do not only consider financial gains as a return, but also value the experience of the involvement in a young start-up and the associated fun and pride.[229]

Business angels typically hold their investment for several years, with roughly five years[230] about the same time as venture capital companies, and eventually realise their return by an exit. If the venture is successful, the form of exit is most of the time through a trade sale or a buy-back, less often via an IPO, but also write-offs are very common due to high failure rates.[231] The implications of the particular exit forms are generally similar to those illustrated before for

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220 Cf. (Brettel et al., 2004, pp.437ff.), (Wong, 2002, p.4)
221 Cf. (Brettel et al., 2004, p.434), (Wong, 2002, p.19)
222 Cf. (Brettel et al., 2004, p.434)
223 Cf. Ibid, p.439
224 Cf. (Wong, 2002, p.4), (Brettel et al., 2004, p.434), (Cowling et al., 2003, p.17), (Gerke & Burrak, 2001, p.480)
225 Cf. (Cowling et al., 2003, p.17), (Mason, 2005, p.12)
226 Cf. (OECD, 2011b, pp.21f.), (Mason, 2005, p.33), (Wong, 2002, p.23)
227 Cf. (Gerke & Burrak, 2001, p.478), (Cowling et al., 2003, p.10)
228 Cf. Ibid.
229 Cf. (Freear et al., 2002, p.279), (Mason & Harrison, 2002, pp.275f.), (OECD, 2011b, p.63), (Brettel, 2005, pp.244f.)
230 Cf. (European Commission, 2012, p.40), (Brettel, 2005, p.257), (Mason, 2005, p.32)
231 Cf. (European Commission, 2012, p.40), (Mason, 2005, pp.20, 31f.), (OECD, 2011b, pp.62f.)

venture capital companies. But, also considering the abovementioned motives of business angels, it can be assumed that in exiting their investment, they try to secure a smooth transition besides the financial return.

4.2.4.4 Crowdfunding

The arrangement of financing, expected rates of return and exit strategies of crowdfunding primarily depend on the models used. Again, the least complex one are crowdfunding donations: The supporter dedicates funds to the venture without any monetary returns or further legal claims. Nearly the same holds true for sponsoring if the rewards given in exchange are intangible. There is an obligation to deliver the immaterial reward, for instance to state the name of supporter on the project website, but this has no further implication for the financial state of the venture.

That is different if tangible rewards are promised for the sponsoring, which has therefore similar consequences as pre-selling. Both types of crowdfunding constitute an advanced payment for the delivery of a good, the funds are therefore classified as debt. However, no interest is to be paid on these debt positions and for the conclusion of the relationship, no particular exit strategy is needed besides the delivery of the good. As a kind of expected rate of return, start-ups using one of those three models only have to consider the fee that the crowdfunding platforms retain from the raised funds.

In contrast, in crowdfunding lending, direct financial returns to the investors are part of the agreement. One possibility is the provision of plain loans characterised as debt. The expected rate of return, and therefore the interest to be paid by the start-up, is generally lower than for example for bank loans and is usually either set by the platform, in that case based on an internal rating, or set by an auction within the crowd.[232] Also the possibility of risk-bearing loans exist in this model, where the amount the capital provider gets repaid is dependent on the success of the venture.[233] Again, also the disagio by the platforms has to be considered. They may also set the length of the loan agreement or leave this decision to the start-up.[234]

The equity model, eventually, can also in this regard be considered the most complicated one with the platform where it takes place being of relevance: It determines in what particular form the equity investment is realised as well as which impact the investors can have on the venture[235] and additionally influences many further legal issues as indicated in chapter 3.7.2. Depending on the platform, the equity participation takes place in similar forms as the involvement of venture capital companies or business angels, namely through silent partnerships or com-

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232 Cf. (Buysere et al., 2012, p.11), (Collins & Pierrakis, 2012, p.9), (Bradford, 2012, p.23), (Funding Circle 2013, n.pag)
233 Cf. (Hemer, 2011, p.14)
234 Cf. (Bradford, 2012, p.22), (Funding Circle 2013, n.pag)
235 Cf. (Collins & Pierrakis, 2012, pp.15f.)

mon equity; but also stocks and participation papers are offered by some platforms in exchange for funds.[236] It is therefore also possible that crowdfunders have direct voting powers in the venture, this will be further discussed in the next sub-chapter.

Considering the length of the involvement and the expected rate of return, again the platforms, but also the individual investors, prove to be determining: The standard investment contract of a platform might for instance include covenants allowing for rights of termination only after several years, as it is the case for the German platform ‘Innovestment’ where the investor may end the participation only after three years and the company only after seven years, or limiting the possibility of trading company shares.[237] Consequently, depending on the design of the contracts, also here trade sales or buy-backs are possible. Due to the generally smaller share of the individual crowdfunding investors, though, the aforementioned difficulties for the venture attached to these exit forms are assumed not to be as substantial.

Also the rates of returns these investors expect can be considered lower than those of venture capital companies and certain business angels, especially if the investors provide funds due to a perceived affiliation with the venture, such as an endorsement of the values and activities of the venture.[238]

4.2.5 Influence on the management and control mechanisms

4.2.5.1 Introduction

As already briefly explained in the previous sub-chapter, the arrangement of the funding often involves the permit of monitoring the management activities and voting on important company decisions. On the one hand this means that the founders cede control over their own business to a certain extent. On the other hand, as initially illustrated, founders often lack management skills and the support in making important decisions and professionalising the company might be desired and can lead to a successful business.[239] Since the covenants approaching these topics in the investment contracts vary together with the implemented practices among the different financing forms, a further scrutiny of this subject will follow.

4.2.5.2 Venture capital companies

Venture capital companies’ requirements and demands can be described as the most extensive ones compared to business angels and crowdfunding: They regularly design the investment agreements in a way that obliges the management to obtain the approval by the venture capital company for many decisions, such as the acquisition of loans or the utilisation of the cash flow.[240] As elucidated in the precedent sub-chapter, these possibilities to intervene may

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[236] Cf. (Kortleben & Vollmar, 2012, p.10)
[237] Cf. Ibid., see also (Bradford, 2012, pp.108f.)
[238] Cf. (Collins & Pierrakis, 2012, p.18), (Buysere et al., 2012, p.11)
[239] Cf. also (Engel, 2003, pp.308f.), (OECD, 2004, p.6), (Denis, 2004, p.306)
[240] Cf. (Gerke & Burrak, 2001, p.479)

increase when the performance of the venture is not sufficient. A study by KAPLAN & STROMBERG for the US market for example shows that when venture capital companies are involved, it is usually them and not the founders anymore who take up the majority of board, voting as well as residual cash-flow rights[241]. It also highlights that their decision power gets again increased in case of poor achievements, thus in certain cases meaning full control of the business. That study also shows the prevalence of contract terms that bring about distinct consequences for the founders if they leave the company, and prevent them from working for competitors. Many other sources, also for additional countries, confirm these findings and also show that regularly, venture capital companies have extended monitoring rights.[242]

The founders' demise of an considerable part of ownership and management can, however, be of substantial value to the business[243]: Venture capital companies 'provide valuable support in building the internal organization of the company', amongst others by 'professionaliz[ing] along several dimensions: human resources policies, the recruitment of professional marketing and sales staff, and the adoption of stock option plans'[244]. Furthermore they commonly give advices concerning acquisitions and strategic partnerships.[245]

4.2.5.3 Business angels

Similar support is frequently also given by business angels. Although the involvement of any particular business angel is individual, the management support is generally seen as an significant part of their participation and it is observable that they actively work together with the founders and give operational as well as strategic advice[246]. They 'provide a large knowledge base and expertise relating to business start-ups, as well as issues regarding commerce, industries, markets, marketing, finance and accounting' and some also 'provide legal or organisational support'[247].

Just as venture capital companies, business angels express that they want to monitor their investment and often do that by serving on the board of directors; their contract designs are, however, as already described, more based on trust towards the founders with the restrictions and duties they impose on the founders assumed to be less rigid.[248] Nevertheless, there are also business angels who demand covenants securing that they have a say in the sale of company stakes, obliging founders to stay with the company for a certain amount of time and

[241] Cf. (Kaplan & Stromberg, 2003, pp.288f.)
[242] Cf. (Hall, 2002, p.49), (Denis, 2004, pp.305f.), (Brettel et al., 2001, pp.22f.), (Achleitner, 2001, p.526), (Mason, 2007, p.106)
[243] Cf. also (Achleitner, 2001, pp.517f.)
[244] (Denis, 2004, p.306)
[245] Cf. (Denis, 2004, p.306), (Amit et al., 1998, p.447)
[246] Cf. (Brettel, 2005, p.235), (OECD, 2011b, p.28), (Mason, 2007, p.8), (Macht & Robinson, 2009, pp.190f.)
[247] (Macht & Robinson, 2009, p.190)
[248] Cf. (Gerke & Burrak, 2001, p.429), (Mason, 2007, p.7), (Brettel et al., 2004, p.438), (Kollmann, 2005, p.75)

prohibiting them from working for competitors, but it is not as common as in venture capital companies' contracts.[249]

4.2.5.4 Crowdfunding

In crowdfunding, the influence on the management and the control mechanisms are again dependant on the model that is used. In the donation, sponsoring and pre-selling models, the provision of information and updates about the developments of the venture after the investment is usually only voluntary and the influence and control by supporters mostly only indirect and not based on contractual rights.[250] However, also this indirect influence can be substantial.[251] For example if investors protest against plans of the founders to change the scope of the project and this protest gains 'viral' momentum through proliferation of the crowd, hence receiving publicity and exerting pressure on the venture.

The monitoring activity in crowdfunding lending is often done by the platform through which the transactions take place.[252] But information about the venture and its recent developments can also be obtained by debt or equity investors in communication areas of the platforms where other investors are able to share their insights.[253]

If investments took place through an equity model, the utilised platform and the particular form of investment prove to be decisive for control and monitoring rights. The investors generally have the right to receive information about the business on a regular basis by the venture itself; but depending on the form of the participation there might be no further control rights or influence on the management.[254] For instance in silent partnerships, being one of the main crowdfunding equity participation forms (see sub-chapter 4.2.4.4), the investor normally has no direct influence on the management of the company.[255]

Through other forms of participation and/or a particular contract design, however, this may be possible.[256] There are, for example, crowdfunding equity platforms that enable the venture to state a certain threshold amount above which voting rights are granted to an investor.[257] But, also considering the commonly small individual stakes in the venture, crowdfunding investors will generally not be involved in the operation of the business and the founders keep the majority of control of the management.[258] Other platforms provide investors with voting rights for a co-operative entity that then undertakes the interest management of the group towards the venture, or they completely adopt the governance and further post-investment

[249] Cf: (Brettel, 2005, p.251), (Wong, 2002, p.21)
[250] Cf. (Bradford, 2012, p.64)
[251] Cf. (Hemer et al., 2011, p.78)
[252] Cf. (Bradford, 2012, p.113)
[253] Cf. (Bradford, 2012, pp.134f.)
[254] Cf. (Kortleben & Vollmar, 2012, p.33), (Bradford, 2012, p.96), (Collins & Pierrakis, 2012, pp.27f.)
[255] Cf. (Kortleben & Vollmar, 2012, p.33)
[256] Cf. Ibid.
[257] Cf. (Collins & Pierrakis, 2012, p.27)
[258] Cf. (Bradford, 2012, p.34)

subjects themselves in the name of the investors.[259]

But this approach rather constitutes an exception[260] and presuming the share of crowdfunded capital on these platforms does not represent the majority of the equity of the venture, the founders retain control of the company.

4.2.6 Further impact on the venture and its development

4.2.6.1 Introduction

Besides the provision of funds, the investment by representatives of the different financing forms typically also entails additional benefits for the start-up. These further impacts will be analysed in this sub-chapter.

4.2.6.2 Venture capital companies

The investment by venture capital companies regularly leads to more financial possibilities for the venture besides the capital directly provided by this investor. They are assumed to actively support the acquisition of additional funds from other external sources if needed, and if they provide a substantial amount of liable equity, which is not rare as already shown, the access to outside debt capital is further facilitated and made less expensive.[261] Through the venture capital company, the start-up additionally often gets access to a wide network of partners of this investor, e.g. patent lawyers, accountants or other business contacts that can help in securing a successful development of the venture.[262]

4.2.6.3 Business angels

Such network contacts and the resulting impacts are also often a benefit of the involvement of business angels.[263] And also the investment by a business angel may facilitate the further capital acquisition. First, if liable equity is provided and therefore, just as for venture capital companies, other external sources are more willing to fund the venture.[264] Second, since business angels often already invest in very early phases of the venture, their involvement has a signalling effect[265]: The decision of a business angel to dedicate funds to a venture and his support associated with his involvement are regarded to increase the venture's credibility and the expectation of a successful development. This is supported by the fact that the abovementioned network contacts of most business angels include contacts to other investors who trust their referrals.[266] Thus, with the perceived risk of the investment being lowered, more external

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[259] Cf. (Collins & Pierrakis, 2012, p.27)
[260] Cf. Ibid, p.16, (Kortleben & Vollmar, 2012, pp.33f.), (Hemer et al., 2011, pp.138ff.)
[261] Cf. (Engel, 2003, p.309)
[262] Cf. (Achleitner, 2001, p.518), (Mason, 2007, p.20)
[263] Cf. (Macht & Robinson, 2009, p.191) (Cowling et al., 2003, p.9), (Fryges et al., 2007, p.19)
[264] Cf. (Macht & Robinson, 2009, p.191)
[265] Cf. (Cowling et al., 2003, p.9), (Macht & Robinson, 2009, p.191), (OECD, 2011b, p.28), (Fryges et al., 2007, p.16), (Wong, 2002, p.26)
[266] Cf. (Macht & Robinson, 2009, p.191), (Mason, 2005, pp.21f.), (OECD, 2011b, p.28)

financiers may see the venture as an investment opportunity and risk premiums demanded by investors will likely reduce.

4.2.6.4 Crowdfunding

A signalling effect also regularly occurs if a venture is successfully funded via crowdfunding. In this case, however, the effect is hardly based on trust towards the investors, considering that they are non-professional investors for which industry knowledge or previous investment experiences cannot be assumed. It rather stems from the fact that for many crowdfunding projects, the investors are at the same time customers, thus proving that there is a market for a certain venture and that the ideas of the venture hold water.[267] In crowdfunding projects where the investors do not constitute at the same time a part the customer base, however, a signalling effect cannot be presumed. Therefore, while especially for pre-selling projects but also for most reward or donation based ones, a signalling effect is likely to occur, for crowdfunding projects based on lending or equity, this effect can be considered improbable .

If the investors represent at the same time customers, there is another potential for the start-up besides the signalling effect: The investors can give valuable insights into the design of products, applications, possible problems and their solutions.[268] Therefore, if this option is available and used in the right way, the need for marketability studies or marketing research may be lowered and costs for the venture can be reduced.

An additional way in which the investors can benefit the venture, observable for all crowdfunding models, is by popularising the fundraising itself, but also the product and the whole company[269]: Many crowdfunding investors are so called 'provestors', meaning people who do not only invest in a venture but actively communicate the 'pros' of it. They use online social networks to tell their friends about the upcoming product that they help to fund and can therefore attract new funders, just as investors in crowdfunding equity may attract further investors through bringing the venture's crowdfunding project to the attention of their contacts. Those actions constitute marketing activities and generate prominence at no further cost for the start-up, therefore helping to secure the funding and to extend the customer base, also after the crowdfunding project.

4.3 Evaluation

4.3.1 Overview

The preceding sub-chapters show that the three analysed financing forms differ in various key criteria. TABLE 1 illustrates the elaborated characteristics succinctly.

[267] Cf. (Collins & Pierrakis, 2012, p.19), (Hemer et al., 2011, p.77), (Belleflamme et al., 2011, p.26)
[268] Cf. (Belleflamme et al., 2011, p.25), (Hemer et al., 2011, p.77), (Collins & Pierrakis, 2012, p.27)
[269] Cf. (Kortleben & Vollmar, 2012, p.34), (Belleflamme et al., 2011, pp.25f.), (Hemer et al., 2011, p.77), (Lawton & Marom, 2012, p.56)

TABLE 1 Overview of key characteristics of venture capital companies, business angels and crowdfunding as financing forms for technology-oriented start-ups

Criteria	Venture Capital Companies	Business Angels	Crowdfunding
General availability	Geographically concentrated in major cities	Locally, but in many countries	Globally, independent of location
Ways of initiation	Personal networks but also application by start-up possible	Personal networks but also contact via online business angel networks possible	Online platforms
Phase of entry	Later phases, however in recent years also more often in start-up phase	From very early phases on	Mainly early and very early phases, but also later on
Assessment of the business	Thorough due diligence	Depending on business angel, from informal to diligent	Depending on crowdfunding model: from superficial to more thorough
Amount of capital provided	Highest, from around 100.000 EUR to several million EUR	Medium, from around 10.000 EUR to several hundred thousand EUR	Wide variety, also depending on model: several thousand EUR or several hundred thousand EUR
Arrangement of financing	Staging, syndication, performance goals, deterioration of founder's ownership	Sometimes syndication, generally pure forms of financing with equal treatment of ownership	Depending on model: advance payments, loans or other forms of debt/equity
Expected rate of return	Very high, depending on entry phase from around 20% to 70% per year	Medium, also value non-financial returns	Depending on model: none, repayment only, lower loan interest or lower equity interest
Exit strategies	After around 5 years, trade sale, company buy back or IPO, potentially severe consequences for start-up	After around 5 years, trade sale or company buy back, potentially moderately severe consequences for start-up	Depending on model and platform: from exit of investor already after several months via the delivery of a good up to several years as the fixed minimum, but only minor consequences for start-up
Influence on the management	Most extensive, but also professionalising the venture	Rather active support than enforcement	Generally no direct influence
Control mechanisms	Board seats, extended monitoring rights	Sometimes board seats, but generally monitoring rather trust-based and less rigid	Depending on model: only voluntary insights by start-up or mandatory statements but rarely more
Further impact on the business	Facilitating access to further funds and business partners	Access to business network, signalling for further investors	Signalling for further investors in certain cases. Investors may form base for marketing studies, deliver insights, help popularising the venture

Source: own illustration, based on preceding analyses

4.3.2 Venture capital companies

The preceding analyses show that venture capital companies are generally only available in major cities with financial and/or high-technology clusters. Since, furthermore, the first contact to them is normally initiated through personal contacts, this financing form is hardly available to start-ups that are not located in, or with contacts within such a cluster.

If the venture is in a very early phase, chances of being considered by a venture capital company as a viable investment are lower. If the start-up is principally considered as an investment option, it has to withstand thorough screenings, generally more extensive ones than in the other analysed financing forms and with a focus on the background and attributes of the founders of the venture.

The amount of money they provide if all screenings are successfully passed, however, is the highest of the three financing forms with usually several hundred thousand, up to several million euro per investment, making it suitable for start-ups with large capital needs. The payout of the capital is staged, meaning tranches are only released after certain performance goals are met.

Through the arrangement of the financing, venture capital companies additionally secure a superior access to the venture's residual funds compared to the founders in case of a failure of the venture. The returns venture capital companies wish to achieve with their investment are the highest of the three financing forms, being realised at the end of their involvement through an exit which may have distinct consequences for the venture.

To ensure the successful exit from their involvement, they monitor the venture closely and the influence they exert on the management can be regarded as being the most extensive of the three financing forms. They may virtually control the venture completely if for instance certain milestones are not reached. The founders therefore have to be willing to give up a considerable part of the management and accept the clear scope set by the venture capital company. At the same time, the venture capital companies' experience in professionalising young ventures can be very valuable for the start-up. Moreover, it can profit from further funding opportunities and access to an extended business network.

4.3.3 Business angels

Business angels act mainly individually and locally, therefore a general availability cannot be presumed. However, the preceding scrutiny shows that they can be found in many countries, hence generally accessible for many start-ups. The contact to them is mostly established through business contacts and personal encounters but also through online platforms. Compared to venture capital companies, they do not focus on start-ups in later phases and also invest in ventures in very early phases.

Also for them, the founding team is of high importance during the assessment of the venture and if an angel network is contacted, the screening of the business resembles those of venture

capital companies. But acting individually, they generally proceed rather informally. Taking furthermore into consideration that they often possess previous industry experience, they might see potential in a venture that other investors dismiss.
After the successful assessment, business angels generally provide between several ten thousand and several hundred thousand euro.
The investment typically does not come with such extensive legal constructs common for venture capital companies, but via pure forms of equity or debt. With these investments, also business angels want to realise a financial return, but they value the experience itself as well and are generally content with yields that venture capital companies may hardly consider sufficient. Their holding time and exit strategies, however, are similar to those of venture capital companies, but with IPOs as an exit being the exception and a smooth transition not only being important to the founders but also to many business angels, the consequences for the venture are likely not as far-reaching.
A central part of the involvement of business angels is also the support of the management. Different from venture capital companies, their involvement can be characterised as based on advices rather than assertion. They also want to monitor their investment, but with the whole relationship being more based on trust, they often do that without binding contract covenants. Nevertheless, also they provide business contacts and their investment is often a signal to other investors, hence facilitating further capital acquisitions.

4.3.4 Crowdfunding

One advantage of crowdfunding compared to the other analysed financing forms is its independence of the location of the start-up or the investor and therefore its global availability. Therefore, also ventures located outside of any financial or technological clusters or major cities may potentially be funded via crowdfunding.
The application on the crowdfunding platforms is generally open to every start-up and through the platform it gets in contact with the potential investors. The variety of crowdfunding models allows ventures in all development phases a funding opportunity.
The particular model that is utilised also influences the way in which the venture is assessed. On the one hand, investors interested in debt and equity transactions and the platforms mediating those transactions often demand similar insights into the business as venture capital companies or business angels, leading to the attached expenditures for the start-up. On the other hand, investors interested in pre-ordering, sponsoring or donating frequently also invest for emotional reasons and do not plan to conduct such a thorough screening, thus reducing the venture’s outlay. Furthermore, crowdfunding investors in general may see an opportunity in a venture which conventional experts see as unpromising. Thus, start-ups with unprecedented, offbeat products or business models that would be, or have been, turned down by traditional investors may be more successful in acquiring funds via crowdfunding. However, if

the product or business model of the venture is not oriented towards consumers and able to mobilise passionate supporters, it will have more difficulties in acquiring capital.
With a successful appeal, very different amounts of money can be collected, again also dependent on the employed model. Commonly, several thousand euro of capital can be acquired, but also ventures with capital needs within the hundred thousand euro range or above m be funded. In the donation and sponsoring models, the start-up gets those funds for free or in exchange for a non-financial reward but has to appeal to enthusiastic supporters. Also in the pre-selling model only the promised product has to be delivered. Therefore, the costs and consequences for the venture are minimal, no direct influence is exerted on the management by the investors and the provision of updates about the venture's recent development are mostly voluntarily – an advantage compared to the other financing forms.
That is different for the debt and equity models where direct financial rewards are expected. These expected returns, though, are often smaller than those of venture capital companies or business angels. The exit forms are similar to the ones used by them but do not tend to entail serious consequences for the venture. The duty to provide ongoing information about developments are often mandatory for crowdfunded debt and equity transactions, again resembling venture capital companies' and business angels' investments. Also a direct influence by investors has to be accepted in certain cases, however not as far-reaching as in the other two financing forms.
The absent or rather minor influence by investors in all crowdfunding models does indeed retain the independence of the founding team and keeps the additional effort down. It does, however, also mean that no professional advice can be expected and the venture cannot reliably draw on the business experience of any investors. The start-up may, nevertheless, use the contact to the crowd of investors for marketability and other forms of studies, if investors are at the same time future customers of the business. Also promotion activities by the investors may be valuable to the venture. Eventually, just as with the investment of a business angels, a successful funding via crowdfunding gives a signal to other investors if it proves that a viable customer base exists, hence facilitating the access to further capital.

5 Conclusion

5.1 Summary

Technology-oriented start-up businesses have been shown to be of high significance for the economy, since they are important promoters of innovation and new employment. As in other commercial start-ups, their founders often lack experiences relevant for managing a new venture and many firms do not survive their first years. It was revealed that with their focus on innovative products and services, the uncertainties entailed in the creation of the business are higher than in other start-ups. Their knowledge-intensity furthermore increases the relevance of the founders, with human capital often being the main source of value in such ventures. These ventures pass through three main stages: The initial stage is the so called early stage, in turn separated into pre-seed, seed and start-up phase. It is followed by the expansion and the later stage. The capital needs of the venture have been proven to rise throughout these stages but already in the initial phases, where the business is not yet legally founded, it has been shown that capital is necessary.

Financing the business, however, is considered one of the main problems of young ventures. As revealed, the characteristics of start-ups with technology orientation increase these difficulties additionally, especially during the very early phases. For the founders, the options of financing their start-up with own funds, altering the business model towards no or very small capital needs or financing the venture internally by bootstrapping strategies exist. But in many cases that is not possible and an external source of funds has to be found. Banks are seldom a possibility since they refrain from dedicating funds to ventures regarded as implying high risks, as yielded by the analysis. Also government support programs are often not available to them. However, the initial depiction of venture capital companies, business angels and crowdfunding demonstrated that they are generally promising financing forms for technology-oriented start-ups in their earliest phases.

A comparison of these three financing forms concerning their suitability for and their impact on the start-up has revealed the following characteristics.
Venture capital companies are most suitable for start-ups that are located in major cities, rely on a business model that is to a certain extend proven and have a large capital demand. In exchange for the highest amount of funds of the three financing forms, venture capital companies claim the most extensive rights regarding the monitoring of the venture and the influence on it, also their exit can mean distinct consequences for it. At the same time, they have the most experience in professionalising ventures as well as the widest contact networks and can hence provide a lot of value to the ventures they invest in.
Business angels seem to best fit young ventures that are searching for a knowledgeable partner in realising a specialised business model. They understand the industry and can see possibilities where other investors back off, base their involvement on trust towards the founders and support the venture with their experience and contacts; chances are that their exits are rather smooth. Their capital provision is located in the medium range and may help securing additional funds through a signalling effect.
Crowdfunding is most promising for ventures that value its global availability and come with novel, unusual business models and products that attract enthusiastic investors.

In crowdfunding based on donations, sponsoring or pre-selling, the venture can acquire various capital amounts in exchange for comparably modest rewards, no further exit problems and only passive influence on the business. Often investors are at the same time customers, thus allowing the start-up to consult the crowd for advice concerning the product development, and to count on its investors for bringing publicity to its products.
Equity or lending based crowdfunding often allows higher capital provisions but also increases the duties and the influence from investors the venture has to accept. However, the costs it has to bear are below-average and it keeps the main control of the venture.

The analysis has shown that venture capital companies, business angels and crowdfunding can serve as financing forms for technology-oriented start-ups in their earliest phases but that their suitability and impact on the start-ups differ. The most promising financing form is therefore dependent on the particular case of the start-up and which impacts the nascent entrepreneurs in search of an external source of financing are content to accept.

5.2 Critical acclaim

An important subject in this thesis was the financing form crowdfunding. Crowdfunding is, however, still in an early stage of development, as explained in the course of this investigation. The descriptions and evaluations here are only a snapshot in time and with crowdfunding coming of age, certain characteristics may change, possibly making these statements outdated. It was also pointed out that the individual character of business angels' investments make it difficult to provide reliable statements concerning those investors. The assertions about them should therefore be approached cautiously, in certain settings a business angel's activity may deviate substantially from the model presented here.
Furthermore, this thesis focussed on European and North American economies. In general, statements made in the course of this investigation probably also apply to further countries. This cannot, however, be anticipated.

5.3 Outlook

As explained, start-up business, and especially technology-oriented ones, are considered to be of high importance to the economy. There are no reasons to believe that this will change in the near future. With a further interconnection of global markets and enterprises and more and more technology finding its way into the working, as well as leisure habits of many people, it can be assumed that these start-ups may even increase in relevance.
They will, however, still be in need of capital to realise their full potential. Considering the financing of those start-ups in their earliest phases, several approaches and developments seem worth to enlarge upon.

One is the cooperation of business angels and venture capital companies.[270] Besides the addressed signalling effect, there are more possible touching and cooperation points of those two types of investors through which they, but also the start-ups can profit. Further research aimed at identifying these opportunities and assessing their value for start-up business may reveal interesting insights.

Also the trend towards business angel networks was broached in this thesis. Novel opportunities for business angels and start-ups emerge through these online platforms and they may facilitate the initiation as well as the ongoing involvement and the further funding of young ventures by this type of investors. Again, additional research approaching this trend may give valuable findings.

The most interesting topic from today's point of view, however, is crowdfunding.

First approaches of a cooperation between crowdfunding and business angels or venture capital companies are observable.[271] Thus, follow-up financing after the crowdfunding project may be facilitated and the venture may receive valuable professional support it would normally not get if only funded through crowdfunding. Appraising this cooperation through analysing the underlying approaches and its results may reveal the value of those further opportunities of crowdfunding.

In general, the full potential of crowdfunding is not yet assessable, it may even revolutionise the way young businesses are funded entirely and deserves close observation throughout the coming years.

[270] Cf. (Fryges et al., 2007, p.16f.), (Macht & Robinson, 2009, p.191), (OECD, 2011b, p.40)
[271] Cf. (Lawton & Marom, 2012, pp.174f., 178), (Collins & Pierrakis, 2012, p.26)

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Eidesstattliche Erklärung

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