

Significance of Criteria for Early-Stage Venture Assessment

Systematic Literature Review

Christoph P. Wessendorf, David Wilking and Orestis Terzidis
EnTechnon, Karlsruhe Institute of Technology (KIT)
Karlsruhe, Germany
christoph.wessendorf@partner.kit.edu

Abstract— The valuation of early-stage ventures represents a difficult and often subjective process that is characterized by risk and uncertainty. This can be further stressed for technology-driven ventures, having substantial technological risks. We therefore approached existing research on the significance of criteria driving the early-stage technology venture evaluation process in a structured way through means of a Systematic Literature Review (SLR). It could be shown that research deals with an enormous number of criteria that can in principle be included in the evaluation process. However, only a few of them can be assigned a decisive character. It became clear that a positive evaluation outcome is primarily driven by the passion of the venture’s founders, their industry and leadership experience, market growth and the uniqueness of the product. In essence, venture evaluation depends largely on management criteria, and thus an investor’s focus lies primarily on the skills and experience of the founders themselves, with personality characteristics slightly outweighing. The market and product-related criteria seem to be relatively far behind, and so we assume that no positive investment decision would be made if the management shows deficiencies in the qualification, no matter how promising the market or the product itself is. In the end, we found that the market potential in most cases outweighs the product itself, which is astonishing in that the offer of the venture itself moves to the last place in the evaluation.

Keywords— *technology venture, New Technology-based Firm, venture capital, business angels, business valuation process, evaluation criteria*

I. INTRODUCTION

The number of newly founded and venture capital-backed companies around the world is increasing from year to year, partially driven by the continuing low interest rate environment and a consequent search for the rare investment opportunities promising decent return perspectives, partially driven by entrepreneurs motivated by the current founder age. In Germany alone, the largest European national economy, the investment volume in start-ups reached a record high in 2017 at around 11.3 billion euros according to the (BVK).

These young, not yet established companies, which were founded with low initial capital to realize an innovative

business idea, usually depend on external investors to expand their business idea and strengthen their capital base in a very early stage (Achleitner, 2018). Financing via debt capital by traditional credit institutions is often ruled out due to a lack of corporate history, the absence of collateral and an unprofitable business in early days (Kaserer, 2007; Damodaran, 2009; Zinecker and Bolf, 2015).

In order to close this investment gap, venture capital (VC), which enables equity financing in the form of temporary investments, is the main instrument of choice. Hence, besides the business opportunity, the investors also take part in the business risk of the company, so the high return potential of investments in innovative ventures is countered by particular uncertainty regarding their later success (Franke et al., 2004). The last few years have shown that 35% of all VC investments fail in the first five years, 20% of them without any capital returns (Csaszar et al., 2006). For this reason, the focus of every investment decision should be on a sound evaluation of the companies in order to best assess the risk and avoid bad investments.

In particular, the pronounced information asymmetry between investors and entrepreneurs plays a central role, which is associated with agency risks with regard to the quality of the entrepreneurial project and the founding team as well as possible opportunistic behavior after conclusion of the investment contract (Franke et al., 2004). According to Stuart et al. (1999), the challenge in evaluating young companies is that investors must rely on attributes that are observable at the time of the assessment and presumably correlate positively with the quality of the company. Due to the often missing company history and the special characteristics of early-stage ventures, it is not possible to form a rational evaluation based on the expected returns from the investment. Many techniques used to estimate the required cash flows, growth rates or discount factors simply do not work or provide unrealistic results (Damodaran, 2009), which is why meaningful non-financial evaluation criteria come into focus.

It is precisely these criteria that appear difficult to measure quantitatively and create increased complexity. So far, no generally valid and satisfactory approach has been identified here.

This paper starts from this knowledge gap and aims to find out which non-financial criteria are considered to show the greatest importance to investors and how significant they are in terms of evaluating early-stage technology ventures (i.e. New Technology-Based Firms, NTBF as defined by Storey and Tether (1996) and Runge (2014)). This study will therefore use a Systematic Literature Review (SLR) to qualitatively describe the significance of the key evaluation criteria that have been analyzed in previous literature, while at the same time placing them in order of importance. The insights gained are then supplemented and discussed with the help of quantitative aspects regarding their actual influence on the evaluation. Besides the evaluation of the relative importance of the relevant criteria (i.e. importance of one criterion relative to another) and their influence (i.e. impact of one criterion on the evaluation process) on venture assessment, it should also be expressed whether on the one hand the investor type, the technological orientation or on the other hand also the current financing phase of the company brings with it differences regarding the significance of individual criteria. The answers to the defined questions are highly relevant for academics and practitioners alike. Regarding academics, the subjectivity and the respective complexity of a fair early-stage evaluation poses a considerable challenge. A better understanding of the decisive assessment criteria used in practice will help research in this field to make further progress. With a well-founded and structured presentation of the decisive evaluation criteria as well as the evaluation of their respective significance and influences, the understanding of the evaluation process of young companies is broadened, thus providing clear scientific value-added. The practice-oriented relevance extends to investors of early-stage companies and their founders. For business angels (BAs) (i.e. wealthy individuals investing in early-stage ventures active in their respective industry or field of expertise) and venture capitalists (VCs) (i.e. institutional investors aiming for strong returns based on venture investments) (Osnabrugge and Robinson, 2000), it seems important to gain new insights into the key criteria that can help any investor question their own evaluation process and thus better position themselves in the competitive VC market. Thus, the quality and return of a portfolio also depend on the extent to which the investors succeed in correctly assessing the success and risk of the projects (Eisele et al., 2002). An insight into their own evaluation process is a basic prerequisite here. The founders themselves can benefit in that they can significantly increase the probability of successful financing through a better understanding of the decisive evaluation criteria. According to Franke et al. (2004), this helps founders to better assess their own project in order to identify possible shortcomings. Entrepreneurs with a fundamental understanding

of the essential evaluation criteria can thus gain decisive advantages over other ventures to obtain necessary growth capital for their company and increase their prospects of success.

On the basis of various analyses, criteria such as the entrepreneurial spirit of the founders, their industry and leadership experience, market growth and the unique selling proposition of the product, in no case lose their decisive importance and are therefore essential in the evaluation of a young venture, regardless of its current phase or technical orientation. Nevertheless, certain changes in influence could be detected comparing technology ventures and young ventures in general. With regard to the type of investor, it was not possible to identify significant differences with the help of the available literature. It is argued that this is due to the fact that BAs become increasingly professionalized and VCs strongly enter more early-stage investments, therefore making a clear differentiation in investment behavior disappear (Wessendorf et al., 2019).

We show that a positive assessment by investors depends primarily on the passion of the founders, their industry and leadership experience, market growth and the uniqueness of the product. In addition, we recognized that the evaluation depends largely on the founder's characteristics, and thus the focus of investors is clearly on the skills and experience of the founders themselves. Further, the market potential in most cases outweighs the product offered, which is astonishing in that the offer of the venture itself moves to the last place in the evaluation

We structure the remainder of the paper in three main sections. First, previous research with relevance to the subject will be identified and discussed. This enables clear differentiation of the present work. In the next step, we will set the Systematic Literature Review methodology out to identify and analyze relevant scientific publications along the SLR-planning, -conducting and -reporting phase. We will discuss the attained findings and conclude the paper followed by limitations and potential avenues for future research.

II. PREVIOUS RESEARCH

A. Literature Reviews on Significance of Criteria for Early-Stage Venture Assessment

In order to gain a better understanding of the current state of knowledge, a structured search string is used to search the literature databases *Nexis*, *Web of Science* and *Business Source Premier* as well as *Google-Scholar* for already published research work in this field. The aim is to justify the general necessity of this study. This is the case if no published SLR or comparable scientific work can be found.

The search string used for the search comprises several individual search terms, the first of which is derived from the actual core topic of this work, namely evaluation criteria. These are supplemented with the terms Start-Up as evaluation object

and Business Angels or Venture Capitalists as the evaluating investors. Finally, the term SLR is added to the search term to find already published literature reviews. The fact that the SLR's focus is on the influence of the individual criteria on the evaluation process and thus also their importance and significance to the assessment is not explicitly considered in the search term. This will be accounted for while reviewing the abstracts of identified studies. Keywords were chosen in English and German in order to allow for a full representation of the largest European Economy. In order to cover the largest possible search spectrum, the search is not limited to the above-mentioned search terms but is supplemented with corresponding synonyms from the online database *OpenThesaurus* (www.openthesaurus.de) and the respective English translations. We show the exact structure of the search term in Figure 1.

[Fig. 1 about here.]

The "OR selection" is used to select a term from each category, which is then merged by means of "AND linkage". This process is repeated iteratively in order to cover all possible combinations in the relevant literature databases. The wildcard operator "*" allows one not to restrict oneself to a specific expression of a term.

As a result of the search process, it emerges that no literature review with the objective of a structured analysis of publications focusing on criteria's importance and influence on venture evaluation has been published so far.

B. Differentiation to Previous Research

Regarding systematic literature reviews of assessment-relevant criteria in young companies in general, there are likewise only a few relevant studies to be found. On the one hand, the work of Köhn (2018) should be mentioned here, which describes the assessment criteria of start-ups researched in literature but does not address their significance and thus their importance and influence within the assessment process. This also applies to Wessendorf et al. (2019), who, however, hypothesize a causality between the importance of a criteria and the frequency of its treatment in scientific publications. However, this cannot be conclusively validated. Further, there is literature available focusing on individual evaluation criteria, such as Klotz et al. (2014), that however refrain from providing an overview of different assessment criteria and their relationship. Additionally, although these studies quantitatively examined the criteria for the evaluation of young enterprises, the work aims to identify differences between successful and unsuccessful enterprises. Thus, these studies cannot be considered as relevant for the defined research objective.

Thus, the present work can clearly distinguish itself from existing publications, by limiting itself on the structured analysis of publications with a focus on the importance of criteria among each other and their respective influence on the investment and venture assessment process. In addition to covering criteria's relative importance to as well as impact on the evaluation process of a venture, the present work's strict

focus on NTBF in the early-stage of company development adds to a clear differentiation to previous research.

III. METHODOLOGY AND ANALYSIS

The research question is to be answered through means of a Systematic Literature Review (SLR), in which already published scientific publications (i.e. primary literature) with relevance to the defined subject area are collected, evaluated and interpreted in a structured manner. The aim is thus to summarize existing research work on individual research questions and to point out connections between the existing studies. We divide an SLR into three phases: Planning, Conducting and Reporting (cf. Fig. 2).

[Fig. 2 about here.]

A. Planning Phase

In order to gain a better understanding of the current state of knowledge, a structured search string is used to search the literature databases *Nexis*, *Web of Science* and *Business Source Premier* as well as *Google-Scholar* for already published research work in this field. The aim is to justify the general necessity of this study. This is the case if no published SLR or comparable scientific work can be found.

The planning phase begins by justifying the need for performing an SLR and thus lays the methodological foundation. In order to demonstrate this necessity, we use a suitable search scheme to check the current state of knowledge. If no comparable work exists, or if we can clearly distinguish the work from already published work, and if the primary literature found also shows an increased complexity and thus a need for clarity, the performance of an SLR is justified. The next and most important step is to define the relevant research questions. In order to identify relevant primary literature, we define the exact search strategy in a research protocol through clear inclusion and exclusion criteria. In addition, we must define how the quality of the resulting studies will be assessed and how the data will ultimately be extracted and processed.

1) *Necessity of the SLR*: The necessity of an SLR is justified on the one hand because the defined subject area and the relevant publications are complex and therefore difficult to holistically understand. In addition, it is important that no comparable work in the defined subject area exists that reduces this complexity through a systematic literature review. The wealth of studies that have been dealing with evaluation criteria for venture capital financing for over 30 years and have made great efforts in numerous cases to quantify the influence of these criteria, on the one hand, contribute to the complexity of the subject area. On the other hand, this complexity is driven by the high number of variables subject to every objective evaluation. Thus, the necessity for an SLR seems justified.

2) *Research Questions*: In a first step, this study aims to present the significant evaluation criteria in a structured and clear manner and to filter out which of them make up the

decisive part of the evaluation process. Thus, the first Research Question (RQ) is defined as follows:

RQ1: Which non-financial criteria are given increased significance in the evaluation and to what extent are they included in the investment process?

The next step is to check whether the identified evaluation criteria gain or lose importance over the course of the company's development. The second Research Question is therefore as follows:

RQ2: What is a potential change in relative importance of the evaluation criteria examined along with the different phases typically experienced by a young company?

Furthermore, this study wants to recognize whether venture capital investors change the evaluation focus and thus the evaluation criteria to be used as soon as a young technology company is to be evaluated. The next Research Question is therefore:

RQ3: Are there any differences in terms of significance of the evaluation criteria focused on young technology companies in particular and young companies in general?

Finally, the extent to which the type of investor influences the significance of the criteria will be examined. The last Research Question is therefore defined as follows:

RQ4: What are the fluctuations in terms of significance of relevant evaluation criteria between business angels and venture capitalists?

These four research questions map the objectives of the SLR carried out and thus define the framework of the following analysis activities.

3) *Review Protocol: Search Process* - Before we can define the search term, based on which the desired primary literature can be found, it should first be clarified which studies are suitable for this work. In addition, the research methods used will be presented and the respective advantages and disadvantages briefly discussed.

3.1 Definition of the relevant primary literature - Relevant for the present analysis are studies dealing with evaluation criteria of business angels or venture capitalists within an early-stage venture capital financing. The decisive point, however, is that the criteria are not merely named, but that they are clearly evaluated in terms of their respective importance. To guarantee this quantitative aspect of the objective, it is possible to consider the relative importance of criteria among each other or to investigate their actual influence on the evaluation process with the help of analytical studies.

3.2 Search Term - In order to find the desired primary literature, a clearly defined search term must now be compiled. To ensure the greatest comparability, the structure of this search term follows the search term defined at the beginning, which has already been used in the search for previous publications. We repeat the search with an "OR selection" in four categories, which are then combined to a search string through "AND linkage". The first term refers to the actual core of this work, namely the evaluation criteria. This is followed by the evaluation object in category 2 as well as business angels or venture capitalists as evaluating investors in category 3. Finally, the search focus is still on financing. This ensures that the purpose of the evaluation is the participation in a young company, or a later investment process. As with the previous search query, keywords were chosen in English and German in order to allow for a full representation of the largest European Economy.

In the next step, these keywords were extended with the online database *OpenThesaurus* (www.openthesaurus.de) by corresponding synonyms and the respective English translations. The wildcard operator "*" ultimately ensures that the user does not have to commit himself to a specific form of a word, but, for example, that studies with the keywords "financing" and "finance" are indicated by "Finanz*" (*cf.* Fig. 3).

[Fig. 3 about here.]

3.3 Study Inclusion Criteria - In order to keep the quality of the SLR as high as possible, clear inclusion criteria are defined for the literature selection, so that the literature strain available at the end only includes the primary literature that fits exactly to the defined scope of analysis. The literature search is therefore only directed at full-text-accessible academic literature (e.g. in journals), which can be written in English or German, and is not limited either in terms of time or geography. Further, a study will only be included in the review if it provides results from empirical or experimental primary research, in contrast to reviews of these works, that will not be included.

3.4 Study Exclusion Criteria - In order to ensure that the quality of the SLR is as high as possible, clear exclusion criteria are defined for the selection of literature, so that the literature strain available at the end only comprises the primary literature that exactly fits the defined scope of analysis.

A study is only considered relevant if it is not limited to a qualitative description of the criteria treated but expresses their significance quantitatively either based on relative importance to each other and their direct influence through analytical studies. Similarly, only studies that refer to business angels or venture capitalists as evaluating investors are

relevant regarding the investor type. All other studies that do not meet this criterion are excluded from the analysis.

As the present analysis is designed on the one hand for the evaluation process of early-stage companies, but it is also intended to identify differences from the later phases of the company, no restrictions are made for the time being regarding the financing phase. The same applies to the technological orientation of the company, which will also not be restricted. However, a classification within the resulting protocol defined below makes it possible to later make the desired comparisons with regard to development phase and the technological orientation of the company.

3.5 *Quality Assessment Criteria* - Well-defined inclusion and exclusion criteria, good SLR planning and a thorough choice of keywords in a structured search string are decisive for reliable results from an SLR. The publications' context and assumptions, as well as its theoretical foundation and findings, were therefore checked for validity regarding this SLR's objective. The reference management software Mendeley was used to manage the selected publications.

B. *Conducting Phase*

The actual literature search begins in the conducting phase, where the aim is to find as much primary literature as possible using the previously defined search strategy. In order to further strengthen the quality of the SLR, we use only primary literature to answer the research questions in order to maintain objectivity in the analysis. The selection of literature itself comprises a multi-stage process. Since an SLR should be transparent and replicable, the extracted data are ultimately clearly recorded in a result protocol.

Building on this, the data synthesis begins, in which the individual research results from the available studies are compiled for discussion. Here, the significance of the individual assessment criteria researched in the literature is to be clearly summarized in order to identify their relevance in the assessment.

1) *Search and Selection of Primary Studies*: The search and subsequent selection of the appropriate primary literature were carried out in January 2019. The literature databases *Nexis*, *Web of Science* and *Business Source Premier* as well as *Google Scholar* were successively screened for relevant literature using a search string structured in advance. Thereby, 145 scientific publications were identified as potentially relevant in the first step (cf. Fig. 4).

[Fig. 4 about here.]

In a second step, these 145 publications were further checked for their relevance by analyzing the content summaries (Abstract and Conclusion), whereby the original strain of literature was reduced to 15 remaining scientific publications. If a study met the defined inclusion and

exclusion requirements, it was included in the literature strain and thus included in the results of the SLR.

Finally, Snow Ball Tracking was used to assess which further studies are cited by (recitation) or cite a previously relevant study.

This identified a further 36 potentially relevant studies, of which only ten proved to be actually relevant after reviewing the summaries. We found one reason for the high rejection rate of studies in the approaches of the studies themselves. The most important factor is that many of them only focus on a pure naming and qualitative description of the criteria, and are thus excluded because of the inclusion criterion requiring a quantitative description. In addition, many publications also concentrate on other reference points, which can be well illustrated using the example of the study by Macmillan et al. (1987). Although these quantitatively examined the criteria for the evaluation of young enterprises, the work aims to identify differences between successful and unsuccessful enterprises. Thus, the focus is not on the evaluation of the companies themselves, which is why studies of this kind do not fit in with the subject of this analysis.

The literature search resulted in 25 scientific publications, 13 of which deal with the relative importance of evaluation criteria and 12 of which investigate the direct influence on evaluation using analytical approaches.

2) *Data Extraction and Analysis*: Below is a list of relevant scientific publications resulting from the literature search in accordance with the defined results protocol. Table 1 lists all studies that deal with the relative importance of evaluation criteria among themselves, whereas studies from table 2 examine the actual influence of criteria on the evaluation and investment process.

[Table 1 about here.]

[Table 2 about here.]

As a first step, the relevant publications listed here will be subjected to a systematic review to gain a better understanding of the respective context of the work and its objectives. After this systematic review, which deals with the temporal, geographical and investor-specific level of publications, the next step is to carry out the essential literature analysis to answer the defined research questions.

2.1 *Temporal Level* - We found that, except for 1992, 1999, 2004 and 2013, there is never more than one scientific publication per year. Particularly striking is the year 1999 with three publications, which could possibly be explained by the internet and technology boom from 1996 to 2000. According to Franke et al. (2004), numerous new VC companies entered the market in anticipation of high and rapidly realizable returns, which also increased interest in a better understanding of the evaluation process.

In this context, the two striking events, the bursting of the Dot-com bubble in 2000 as well as the global financial crisis in 2008, in which countless young VC-financed companies went bankrupt and thus influenced interest in a better understanding of early-stage evaluation, should also be mentioned in this context. It became apparent that just after the Dot-com bubble burst, three research papers were published in the following years 2000, 2001 and 2002. With regard to the financial crisis in 2008, there is no evidence of increased interest in the following years, as the year 2013 will be the first to catch the eye again with two publications. The persistently low level of interest rates could explain this, with interest in VC financing increasing as a result of increasing investment pressure from professional investors (Wessendorf and Hammes, 2018).

2.2 Geographic Level - The analysis of the geographical focus of the relevant studies shows that most of the surveys concentrate on North America (11) and Europe (13), whereas only four studies dealt with investments in the Asia-Pacific region. The predominance of European studies is slightly surprising since the VC market as we know it today originated in North America and was shaped by it for a long time (Franke et al., 2004). Only sometime later did the VC markets develop in other regions, and thus the enormous significance of the US VC market is still apparent today in many respects. However, this could also be the explanatory approach, since the increased growth of the European VC market in the last two decades has increased the interest on the part of research, which is reflected in the high number of European studies.

2.3 Investor Type Level - With regard to the type of investor, it is noticeable from tables 1 and 2 that with 17 relevant publications, most of the available studies concentrate on venture capitalists, whereas only three studies deal with the evaluation approaches of business angels. In addition, there are five publications dealing with both types of investors, three of them separately and two with a mixed sample.

The priority of the VCs is less surprising when one looks at the respective investment volume. For example, BAs only have a share of 25% (K.P.M.G., 2018), which clarifies that VCs make up the majority of investments in young companies and are thus also attributed a greater interest on the part of research.

2.4 General Analysis of Criteria - When analyzing the criteria arising from the relevant studies, it is noticeable that the criteria used often vary greatly between the individual studies. This complicates a clear comparison and thus the evaluation of the criteria. Since many research studies often base their list of criteria on previous expert interviews (Bogle and Reuber, 1992; Bachher and Guild, 1996; Bachher et al., 1999; Franke et al., 2004), this at first appears as if there were a certain disagreement among investors as to which criteria constitute a successful venture. Nevertheless, there are some

dominant criteria that are discussed in many studies. This should make it possible to identify certain factors as knockout or success criteria (Franke et al., 2004).

In a first step, this work intends to use the identified studies, which examine the relative importance of individual criteria, to work out the supposedly decisive evaluation criteria, the influence of which will then be supplemented and discussed in a second step, with findings from analytical studies. This approach is justified by the fact that the criteria investigated vary too much between the individual studies and therefore cannot be meaningfully aggregated. Nevertheless, this approach allows the findings to be supported and discussed.

2.5 Decisive Evaluation Criteria - In order to extract the decisive evaluation criteria from the 19 surveys assessed as relevant, a selection had to be made in a first step. Of the 57 identified criteria, those that were (1) listed at least once in a survey among the six most important criteria and were (2) also treated in at least two surveys in general were taken into account. Since this analysis concentrates on both business angels and venture capitalists, the criterion should also (3) have been evaluated at least once by both. The reason for limiting the results by these 3 aspects is the considerable reduction in complexity at this point. Thus, many subordinate criteria and those that were only dealt with in one survey or by one type of investor were omitted, leaving the 14 most important criteria across all studies.

In a second step these were then sorted according to their supposed importance one after the other with the help of a score. This was done by adding up how often a criterion emerged as the most important in a survey (#1), second most important (#2), third most important (#3), fourth most important (#4), fifth most important (#5) or sixth most important (#6) criterion. This total frequency was then divided by the total number of interviews that dealt with each criterion (#B). The score thus indicates to what extent the respective evaluation criterion, within the studies in which it was treated, is among the six most important criteria, which ultimately results in the ranking to be taken from table 3. In the event that two criteria had the same score, the criterion that was more frequently found to be the most important, or second most important, or third most important, etc., was classified as more important.

[Table 3 about here.]

This evaluation shows the special role that entrepreneurs themselves play in the evaluation. As Figure 5 shows, most of the 14 dominant criteria (57%) relate to the founders themselves. Thus, it is above all factors relating to the personality of the founders (36%) and their experience (21%) that play a decisive role in the evaluation. Evaluation criteria regarding the market and the product play a subordinate role both in terms of their ranking and their absolute frequency

among the top 14. Thus, only three criteria (21%) deal with the characteristics of the market, followed by two criteria (14%) focusing on the product or service offered. Finally, one more criterion (7%) can be found, which deals with the intellectual property (IP) of the company.

[Fig. 5 about here.]

We can describe the individual evaluation criteria from table 3 in more detail according to their categories. In addition, the insights gained are supplemented and discussed with the help of quantitative aspects from the analytical studies.

2.5.1 Founder Characteristics: The decisive role of venture characteristics can already be seen in the quote from VC practice “We would rather fund a 2nd rate idea from a 1st class team than a 2nd class team with a 1st rate idea“ (Franke et al., 2004). Thus, it is obvious that in almost all studies available, the entrepreneurs themselves are assigned an outstanding importance (Knight, 1994; Macmillan et al., 1985; Elango et al., 1995; Eisele et al., 2002; Bachher and Guild, 1996; Bachher et al., 1999; Muzyka et al., 1996; Sudek, 2006; Osnabrugge, 2000; Zutshi et al., 1999; Bogle and Reuber, 1992; Brettel, 2001) and ultimately among the 14 decisive criteria identified, 57% of them relate to the founders themselves (cf. Figure 5).

According to McKelvie et al. (2014), human capital has a particular influence on the performance of the venture and ultimately contributes to success and failure. According to Shepherd and Zacharakis (1999), it is precisely the strategic decisions of the entrepreneurs that create essential competitive advantages. They would decide on the profile of the venture and which direction it would take, and thus ultimately create the basis for its survival and long-term profitability. Brettel (2001) stresses that entrepreneurs play a particularly important role in risk analysis and risk reduction and quotes in this context Tyebjee and Bruno (1984), who in their study demonstrated by means of correlation analysis that the correlation between the independent variable “managerial capabilities” and the dependent variable “risk” had the greatest negative correlation, and furthermore identify shortcomings in management as the reason for more than a third of all refusals to invest.

The primacy of the founding characteristics is reaffirmed by Figure 6, which shows how the three most important criteria from the studies are distributed among the individual categories. For example, in almost 90% of the surveys investors see the most important evaluation criteria in the area of entrepreneurial characteristics, and it becomes clear that the categories market, product/service, and IP situation seem to be far behind. This aspect is made even clearer because in more than half of all surveys all three first-mentioned criteria stand out as venture characteristics.

[Fig. 6 about here.]

In the following, we present the individual decisive venture characteristics regarding the personality and experience of the founders.

2.5.1.1 Entrepreneurial Spirit: In his study, Brettel (2001) emphasizes on the decisive role of so-called “soft criteria”, which investors would use to characterize founders based on cognitive, personality-related and motivational characteristics, and at the same time emphasizes the latter. This aspect is confirmed in the present literature and thus, with enthusiasm, the supposedly most important evaluation criterion falls into the motivational area of the founders. The criterion is treated fifteen times in the literature found and without exception ends up among the first six criteria, which is not the case with any other criterion. According to McKelvie et al. (2014), the passion of the founders is so decisive because they are most trusted to be able to survive even under very difficult conditions. In addition, it is a positive signal that they invest a lot of time and energy in achieving their goals, which at the same time reduces the risk of opportunistic behavior and possible goal conflicts.

Sudek (2006) also describes this criterion as perseverance and emphasizes that the ability to make sustained intensive efforts is one of the most important prerequisites for mastering the many challenges faced by the founders because it is precisely the will to succeed that can ultimately make the difference.

As mentioned in detail, the risk factor plays a decisive role in the evaluation, and so in the area of personality-related criteria, the ability to recognize and deal with risks (risk management) is also of elementary importance. This factor is dealt with in 12 surveys and is always among the first six criteria with about 83%. In about 60% of the cases, this criterion is among the three most important factors and thus represents the supposedly fourth most important evaluation criterion across all studies. According to Dubini (1989), this characteristic and attention to detail had the highest correlation with the company’s success. The latter is only partially confirmed in the present literature. Investors rank this criterion among the more important ones (rank 7,7,8,10,10, 11,11) in the studies by Macmillan et al. (1985); Knight (1994) and Brettel (2001), but in the survey by Eisele et al. (2002), for example, it receives less attention (rank 17,18,21). However, the reason could be that, with 30 non-financial criteria, the number within the study by Eisele et al. (2002) is rather high, whereby the result could be distorted by the addition of many other criteria. Nevertheless, the factor “attention to details” has more of a subordinate role across studies and is therefore ultimately not to be found among the 14 most important criteria.

Within the framework of the evaluation, the assessment of management skills also plays a formative role. Although this criterion is only dealt with in six surveys, it ranks among the first six in almost 70% of the cases and thus also finds its

place among the decisive criteria. Although the criterion was dealt with comparatively less often in the present literature and thus appears to be of less interest, within the studies that deal with it, it becomes apparent what value a well-functioning management team has for the investor and thus this factor emerges, for example, from the study by Bachher et al. (1999) as the most important for BAs and in the study by Sudek (2006) as the second most important criterion for VCs.

Franke et al. (2004) recognized in this context that investors seem to attach importance to heterogeneity within the team. Thus, for example, it becomes apparent that the greatest benefit is generated when there are founders with both a technical and a commercial training background in the team, whereas a team of founders with only one training background generates significantly less positive benefit. This would show that the investors believe in complementary skills of a founding team, whereby the entrepreneurs should complement each other with their skills and thus ultimately compensate for deficiencies in individual qualifications. In their study, Eisele et al. (2002) also concluded that a balanced management is of great importance. Investors would see this as a clear advantage in being able to manage tasks more efficiently and quickly by dividing them up. According to Riquelme and Rickards (1992), a strong management team is the basis for all success, as a single founder will have more difficulties to realize comparable achievements.

The communication strength of the founders is also becoming increasingly important, with persuasiveness being the most important factor (Brettel, 2001). On the one hand, investors judge this by the extent to which the business idea can be convincingly represented. This criterion is dealt with in 14 surveys and, with only a few exceptions (Bogle and Reuber, 1992; Zutshi et al., 1999), is always among the ten most important criteria. On the other hand, communication strength is assessed on the basis of sales skills, which in the study by Muzyka et al. (1996) can even be found among the five most important criteria.

Finally, the subjective assessment of the relationship between founders and investors also plays a role. For example, trustworthiness is one of the two most important criteria in four surveys (Bachher and Guild, 1996; Osnabrugge and Robinson, 2000; Sudek, 2006). However, a certain sympathy towards entrepreneurs also plays a subordinate role, but one worth mentioning. For example, this criterion is one of the five most important criteria twice (Osnabrugge and Robinson, 2000; Zinecker and Bolf, 2015) and can therefore also be found in 13th place among the dominant criteria. According to Zinecker and Bolf (2015), it is precisely the sympathy between founders and investors that builds trust and thus creates the basis for successful cooperation and, last but not least, reduces information asymmetries.

2.5.1.2 Founder Experience: According to McKelvie et al. (2014), the elementary role of experience in the evaluation can be explained by the fact that with increasing experience of the

founder the probability increases that the investors perceive the objectives of the entrepreneurs as realistic and consider the information provided by them to be credible.

The most important criterion is industry experience, which for Eisele et al. (2002) represents absolute familiarity with the relevant target market. The criterion is also the only criterion that is treated without exception in all 19 surveys and is, with twelve mentions, one of the two most important criteria (63%), making this factor the second most important evaluation criterion in the literature. According to Eisele et al. (2002), a high level of knowledge about the conditions in the target market helps to avoid certain mistakes at the beginning of the entrepreneurial activity, which thus significantly reduces the risk and the associated loss potential of an investment, thereby ultimately increasing enterprise value. The priority of the criterion is also confirmed in the two analytical studies by Franke et al. (2004, 2008), which use two different conjoint approaches to analyze the influence of seven venture characteristics, whereby industry experience, with a share of over 32% in each case, has a decisive influence on the evaluation. However, since the two studies only refer to venture characteristics and therefore other criteria used by investors in the other categories are not dealt with, the results should not be overestimated due to possible distortions. Nevertheless, these reflect the primary importance of industry experience very well and also make it clear that leadership experience is attributed an important but subordinate role. Within the two studies by Franke et al. (2004, 2008), for example, this has a significantly lower share in the evaluation with around 12% each, which can also be seen within the decisive criteria. Here, the leadership experience only comes in ninth place and is thus clearly behind the industry experience. It is decisive for the entrepreneurs to inspire the employees with their ideas and to be able to carry them along, which naturally increases the quality and performance in the company (Elango et al., 1995). Ultimately, the studies of Franke et al. (2004, 2008), show that both industry experience and leadership experience are clear KO criteria if not a single team member can meet them. The benefit curve of the two characteristics also shows that the value to investors rises steadily with the number of founders bringing industry experience, whereas in terms of leadership experience it makes no difference whether all or only some of the founders have it. From the perspective of Franke et al. (2008), however, this would be relatively plausible to explain, since not all founders within the venture could assume a leadership role either.

Finally, the track record of entrepreneurs can be found among the 14 dominant criteria, which is reflected in 14 surveys and ranks 11th across all studies. However, the question remains as to how the authors define the criterion precisely. On the one hand, it could be seen as the general professional past of entrepreneurs or whether they already have start-up experience. The latter should, therefore, have a very positive effect on the evaluation, as the founders can

already fall back on certain experiences, which significantly reduces the risk of the company. In our opinion, however, the criterion is not significant enough for this interpretation, since the importance should ergo be close to industry experience. Thus, in most studies it will probably only be seen as the professional career of the entrepreneurs and whether this has a connection to the company, which can be an advantage, but is not of essential importance. As one VC says in a study by Mason and Stark (2004): “It’s not their track record. I’m not interested in the CVs. It is the personalities of the people concerned because ultimately you are backing people,” which confirms this assumption.

2.5.2 Market Characteristics: In our analysis, the market characteristics occupy a clearly subordinate position behind the founder characteristics, and thus, for example, in only two surveys (Zinecker and Bolf, 2015) does the most important evaluation criterion fall into this area.

The only important thing for investors is that the relevant market is characterized by a high growth rate (Eisele et al., 2002). The relevance of the criterion can already be seen from the fact that, with only one exception (Bachher and Guild, 1996), it is applied in all 19 surveys and is thus subject to broad interest on the part of investors and researchers. Within the surveys, market growth is among the six most important criteria in 83% of cases and thus ultimately represents the supposedly third most important evaluation criterion. According to Brettel (2001), this could be explained above all by VCs intending to maximize returns, which can only be achieved with strong corporate growth, which in turn requires a rapidly growing market. Zinecker and Bolf (2015) also see market growth as an opportunity for venture companies to achieve profitability, as this enables them to generate growth without having to take shares from established market participants.

Landström (1998) emphasizes that market growth is a decisive factor in correctly assessing the company’s potential. At the same time, he found that market potential is more searched for by investors when evaluating early-stage ventures and that less emphasis is placed on existing strengths and weaknesses. In his study, for example, market share achieved so far is only on the 28th place out of 34 criteria, while Muzyka et al. (1996) place the criterion on 17th place, supporting its lower importance. It is more decisive to see that there is an existing market demand for the product on offer, which is shown, for example, in the study by Zinecker and Bolf (2015) as the second most important criterion or in Bachher et al. (1999) as the third most important criterion. Although the factor of an existing market demand can be found among the dominant criteria, it must be taken into account that this was only dealt with in four surveys and thus seems to be less interesting for research and, thereby confirming the initial statement of Eisele et al. (2002) that within the market characteristics the decisive focus lies on growth of the relevant target market.

Ultimately, many studies are still concerned with assessing the competitive structure. Although, according to Porter (1980), a strong competitive intensity often reduces the profitability of companies in an industry, for example, because prices have to be set lower with strong competition, this criterion is rated less important by investors and is found in the literature on average only between rank 11 and 17. It is more decisive for the investors to see that the venture has certain competitive advantages, which, for example, is classified as the most important criterion in the study by Zinecker and Bolf (2015) and thus ultimately also represents the eighth most important evaluation criterion across all studies. According to Zinecker and Bolf (2015), clear competitive advantages over competitors, together with the benefits of the product for the customer, are the two decisive factors for the venture ultimately being able to establish itself on the market in the long term.

2.5.3 Product Characteristics: With regard to product-related criteria, the subordinate role behind the founder characteristics becomes even more apparent. In all existing studies it occurs only once that a criterion from this area falls under the three most important criteria. Ultimately, with the uniqueness of the product (USP) and the existence of a functional prototype, there are only two criteria that have made it among the 14 most important criteria.

Investors use the USP to assess the extent to which the product on offer can assert itself and establish itself on the market. The criterion is dealt with eight times in the present literature and is among the first six criteria in 75% of the cases. According to Eisele et al. (2002), the USP, together with a clearly discernible customer benefit, are the two most important influencing factors for a strong competitive position, which in turn forms the basis for the long-term success of the company and is thus given corresponding importance by investors.

Here it can be seen that in all studies dealing with both the USP and market growth, with one exception (Bachher et al., 1999), the latter was consistently perceived as more important by investors. This suggests that the economic potential of the company assessed based on market growth outweighs the product potential in the evaluation.

The same findings can also be found in various analytical studies. For example, the conjoint analysis by Mason and Stark (2004) shows that the “market” category accounts for about three times as much of the evaluation as the “product” category, with an average of about 20% and just under 6% respectively.

However, it must be mentioned that the samples of three and four persons are very small and therefore it can be doubted that the difference is so drastic. However, a certain tendency can still be identified, which is supported by a conjoint analysis by Knockaert et al. (2010) also shows that the two criteria of market size and growth, together at 13.23%, account for a much larger share than the USP with 8.53%. We

can also find this aspect in Landström's conjoint analysis (1998), in which they rank market growth 9th with an influence of 3.7%, whereas the USP is only ranked 13th with 3.3%. Although the difference does not appear to be particularly large, Landström (1998) emphasizes that this is due to the strong heterogeneity on the part of the investors, whereby the influences on the 34 criteria examined would on average be extremely distributed. Nevertheless, the tendency can be seen that the market potential outweighs the product, which confirms the presumed assumption.

Within the product characteristics, it is also striking that the degree of innovation or the classification as a high-tech product is rated with surprisingly little importance by investors and that this criteria comes in last place in almost all available studies. This is surprising because, for example, in Germany, the largest European economy, more than half of the investment volume flows into technology companies (, BVK). However, it must be taken into account that the standard deviations for this characteristic are sometimes above average (Macmillan et al., 1985; Knight, 1994), which according to Eisele et al. (2002) shows that the interviewees have very different ideas regarding the importance of this characteristic.

The opinions of the investors regarding the existence of a functional prototype also diverge. On the one hand, the comparatively high standard deviations within the surveys are again noticeable, and the criterion also fluctuates strongly among the ranks assigned with regard to importance. In the study by Eisele et al. (2002), for example, it only ranks 24th, and 15th in Bachher et al. (1999), whereas in Knight (1994) it is one of the four most important criteria and is ultimately found among the 14 decisive criteria.

2.5.4 Intellectual Property: Regarding intellectual property, Hoenig and Henkel (2015) take up the signal theory researched by Spence (1973), in which the founders, as better informed parties, have the possibility of reducing existing information asymmetries vis-à-vis investors by sending clear quality signals. The focus here is on patents, which on the one hand can reduce the information gaps between the parties (Hsu and Ziedonis, 2013) and enable investors to better assess the quality of the product offered and thus also the potential of the company (Hoenig and Henkel, 2015). Jell et al. (2010) confirm the previous assumption in their work, whereby the number of patents has a positive influence on the level of financing and at the same time increases the probability of attracting an investor with a high reputation as a provider of financing. Nevertheless, the factor does not appear to be as important in the present literature as it might initially appear. Although the criterion is ultimately one of the dominant criteria, it is clear that it is one of the more subordinate criteria among the 14 decisive ones, although the importance of the individual studies differs. If, for example, Bogle and Reuber (1992); Elango et al. (1995) and Macmillan et al. (1985) consider it one of the more important criteria (rank 3,5,9),

protecting the product is almost insignificant in many studies (Osnabrugge and Robinson, 2000; Eisele et al., 2002; Sudek, 2006), and so patents ultimately emerge as an important, but not an essential factor for investors (Hoenig and Henkel, 2015).

The reason for this fluctuation could, however, be found in the fact that only three of the studies dealt with so far place a clear focus on NTBFs, and the publications just mentioned by Bogle and Reuber (1992) already show that the influence of patents in ventures with a technical orientation is significantly greater. According to Hsu and Ziedonis (2013) as well as Greenberg (2013), the strategic advantages would also depend strongly on the respective industry, which is why the following analysis will show how the influence of patents and other previously mentioned assessment criteria changes for NTBFs.

2.6 Criterion Analysis with Regard to NTBFs - According to Bachher and Guild (1996), NTBFs would be characterized by the fact that their offering is marketed in this form for the first time, and this leads to the assumption that it should also be precisely the offer itself which is attributed a decisive role in the assessment of technology ventures. For Hoenig and Henkel (2015), the greatest challenge is to correctly assess the quality of the technology developed. The assumption of an increased product focus in the evaluation of NTBFs can be seen in all existing studies with a technological orientation of the ventures (Bachher and Guild, 1996; Bachher et al., 1999; Bogle and Reuber, 1992; Hoenig and Henkel, 2015; Hoenen et al., 2014; Greenberg, 2013; Hsu and Ziedonis, 2013).

The study by Bogle and Reuber (1992), for example, shows that the criterion of absolute familiarity with the technology on offer is the most important criterion on the one hand, and is rated by around 65% of investors as an essential and indispensable factor in the evaluation. Bachher and Guild (1996) and Bachher et al. (1999) find a comparatively above-average importance of the product characteristics based on USP.

In our analysis, we find that the uniqueness of the product is among the five most important criteria in three out of four surveys and, with one exception (Elango et al., 1995), and thus consistently considered more important for NTBFs. Furthermore, USP is rated more important than market growth in two out of four studies. This is reversed in all studies focusing on non-technology driven ventures. To us, this indicates that the product potential of NTBFs outweighs the market potential.

The empirical study by Hoenen et al. (2014) shows the strong influence that patents can have on the evaluation of NTBFs. These analyzed the financing of 580 US biotechnology companies through regression analysis, whereby it was shown that the investment volume and thus the company value for each additional patent increased *ceteris paribus* by 7.7%. Similar findings emerge from the studies by Greenberg (2013) and Hsu and Ziedonis (2013), which also

showed by regression analysis that the company value increases by 46% and 28% *ceteris paribus* if the number of patents doubles.

According to Hsu and Ziedonis (2013), patents would enormously increase control over the product offered and strengthen the company's competitive position while keeping potential competitors at a distance. At the same time, the founders can achieve more profits from their own R&D and its human capital through cost advantages, price surcharges or the granting of licenses (Teece, 1986). Nevertheless, the results of the individual studies mentioned above should be treated with great caution, as the strategic advantages of patents strongly depend on the respective industry (Hsu and Ziedonis, 2013), which therefore does not make it possible to make valid general statements about the influence of patents.

Nevertheless, Hoenig and Henkel (2015), who analyze the influence of the three criteria patents, alliances and team experience in a conjoint analysis, also confirm the strong influence of patents on the evaluation of NTBFs (35%). Only alliances account for an even larger share (38%), with Hoenig and Henkel (2015) also coming to the conclusion that alliances are used by investors as clear quality signals for the technology on offer. They point out that companies with serious alliance networks can benefit enormously from the cooperation and that it is therefore more likely that the ventures will outperform others. For example, an agreement with a distributor could help to better position the innovative product in the market. But also partnerships with large companies would increase the value of the venture, as these companies have to select their alliances to protect their own reputation and send positive signals to investors. According to Hoenig and Henkel (2015), it can be assumed that a venture is of high quality if it cooperates with a strong alliance partner, which also reduces the existing information asymmetries between the founders and investors.

Ultimately, however, it must be noted that an investment in NTBFs is not as different from other ventures as it would appear at first glance. Thus, Bachher and Guild (1996) state that the evaluation of NTBFs is about correctly assessing the potential of the offered technology and thus assigning greater importance to the product characteristics and the IP situation. However, in the end all ventures would introduce a new product in a certain way, and so it is again the founder characteristics which emerge as the most important criteria in NTBFs. Bogle and Reuber (1992) conclude in their study that financing experienced and highly qualified founders enable the best business opportunity for NTBFs, which further strengthens the primary role of the founder characteristics in the evaluation.

2.7 Criterion Analysis across Venture Development Stages
- The studies by Elango et al. (1995); Eisele et al. (2002) and Brettel (2001) are used to identify changes in the significance of individual criteria over the various financing phases, as they

deal with this topic in concrete terms. Figure 7 shows the three most important criteria of each survey by green markings.

[Fig. 7 about here.]

As is immediately obvious, the investors' focus remains unchanged over time, and thus in each phase, we can find the decisive criteria, as in the general analysis of the criteria, in the area of the personality and experience of the founders. According to Elango et al. (1995), for example, the top priority in all phases is highly qualified management, since, besides the product idea itself, commercial implementation is decisive for subsequent market success, which depends largely on the efforts of management (Eisele et al., 2002).

The most important evaluation criteria are again industry experience, the enthusiasm of the founders and the ability to assess and deal with risks. In theory, the latter should be the most important criterion, especially in the early phases of the venture, since the risk seems to be highest at the beginning of the entrepreneurial activity and risk management should therefore be of correspondingly high importance (Brettel, 2001). Although the criterion is one of the decisive factors in all phases, in the present studies it is perceived as more important by investors in the later phases of the venture, which does not confirm the assumption. In the study by Elango et al. (1995), for example, the importance of the criterion rises from sixth place in the seed-stage to third place in the early-stage to the first place in the late-stage, where it is the most important factor in the evaluation.

There are no significant differences in industry experience, which shows that the criterion is considered an essential factor by investors in all phases. According to Eisele et al. (2002), this is not only a prerequisite, especially in the early phase, for target market-oriented research and development as well as for carrying out a well-founded market research on the expected market situation, but is also ultimately advantageous for the correct market launch of the product if the founders are already familiar with the corresponding target market. In the study by Elango et al. (1995), for example, industry experience is the most important criterion in the seed-stage and the second most important criterion in the early-stage.

In the expansion-stage, Eisele et al. (2002) emphasized the founders' familiarity with the domestic and foreign sales market, which is a prerequisite for generating rapid and sustainable growth. In their study, industry experience in the expansion-stage is the most important criterion, which is again confirmed in the late-stage. This can be explained by the increasing competition through the market entry of competitors as well as the increasing market saturation, which creates a need for action for the founders in order to maintain growth through new and more innovative products (Eisele et al., 2002).

It also shows that leadership experience is, without exception, becoming more and more important over time. In the study by Elango et al. (1995), for example, the significance

of the criterion rises from seventh place in the seed-stage to fifth place in the early-stage, until it represents the second most important factor in the assessment in the late-stage. According to Brettel (2001), this can be explained above all by the growth of the company and the associated increase in the number of employees, whereby leadership qualities are attributed an increasingly decisive role. In this context, the factor of a balanced management team in the expansion-stage is also gaining in importance, which for Eisele et al. (2002) goes hand in hand with the increasing diversity and complexity of the tasks, where it is of great advantage if the management complements each other with its skills and experience.

Certain differences can also be identified in terms of market and product characteristics. While the focus in the early-stage is more on market entry and thus criteria such as barriers to market entry (Muzyka et al., 1996; Sudek, 2006) or a low intensity of competition in the first three years (Macmillan et al., 1985; Knight, 1994; Osnabrugge, 2000; Sudek, 2006), investors pay more and more attention over the course of time up to the late-stage to the extent to which the product is already established in the market and thus shows a certain market acceptance.

While Eisele et al. (2002), ranked market acceptance 27th in the early-stage, it is ranked 9th in the expansion-stage and thus one of the essential factors. This reflects the enormous importance of a recognizable market acceptance in the evaluation, as this ultimately forms the basis for long-term profitability of the venture (Eisele et al., 2002). The importance of existing distribution channels also rises from initially the least important factor in the study by Eisele et al. (2002) to 22nd place, as this is a strong indicator that the product is already well integrated into the market.

Elango et al. (1995) also found in their study that early-stage investors look more at the USP of the product (rank 4) and at high market growth (rank 3), which are the two decisive factors for being able to introduce a product competitively and successfully into a market. Eisele et al. (2002) also conclude that it is decisive for investors in the early phase to see that there is a clearly discernible customer benefit (rank 5) and certain advantages (rank 9) over competitors. It thus becomes apparent that in the earlier financing phases, investors were more focused on the potential of the product and the market and felt that differentiation from competing products was very important.

Finally, the aspect of patents should be taken up. Due to the decreasing information asymmetries over time, Hoenen et al. (2014) concluded in their study that patents would lose their signal effect within further financing rounds, whereby the positive influence of the criterion only becomes apparent with the first financing. Greenberg (2013) also concludes in his study that the positive influence is only so pronounced in the early-stage of the company and that the significance would diminish the more mature the venture is in the evaluation.

Nevertheless, to conclude this section, it has to be pointed out that the presented results are based on a very limited number of studies, thereby affecting the ability to generalize the findings as well as their informative value. This represents a clear limitation and needs to be addressed in further research.

2.8 Criterion Analysis with Regard to Investor Type - When analyzing the significance of criteria in connection with the type of investor, it can be seen that the most important criteria of both BAs and VCs fall within the area of venture characteristics, and thus, regardless of the type of investor, the focus is again on a qualified and experienced founding team (Bachher and Guild, 1996; Bachher et al., 1999; McKelvie et al., 2014; Osnabrugge, 2000; Sudek, 2006).

Nevertheless, various studies have concluded that certain differences can be discerned both within the venture characteristics and in the subsequent criteria (Bachher and Guild, 1996; Osnabrugge, 2000; McKelvie et al., 2014). Osnabrugge and Robinson (2000) explain the different weightings of individual evaluation criteria because the investors would use different control mechanisms to minimize their respective risks. McKelvie et al. (2014) extend this approach and emphasize that in the case of BAs, the information asymmetry between them and the founders is more pronounced due to the often earlier time of investment than in the case of VCs, and that the latter therefore pay more attention to human risks, whereas VCs try to avoid possible conflicts of objectives and opportunistic behavior on the part of the entrepreneurs. Finally, their conjoint analysis shows that BAs place more emphasis on the passion of the founders, whereas VCs place more emphasis on the economic potential of the company. The former cannot be confirmed in the other available studies, since VCs also rate the enthusiasm of the founders very highly (Knight, 1994; Macmillan et al., 1985; Bachher et al., 1999; Zutshi et al., 1999; Bogle and Reuber, 1992) and this is, therefore, one of the most important factors in the evaluation, regardless of the type of investor.

That BAs nevertheless pay more attention to the entrepreneurs, especially to their relationship with them, could be assumed from the trustworthiness, which emerges in the studies by Osnabrugge and Robinson (2000) and Bachher and Guild (1996) as the second most important criterion and in the study by Sudek (2006) even as the most important criterion. According to McKelvie et al. (2014), for the BAs it is a matter of finding the "right" entrepreneur from their point of view, whereas Sudek (2006) emphasizes that a lack of familiarity with the founders would destroy any good business idea or attractive growth potential. Although no comparison can be made on the basis of the available literature, in our view it nevertheless represents the basis for successful cooperation among them as well.

The hypothesis confirmed by McKelvie et al. (2014) that VCs would give greater weight to the company's economic potential is explained by their increased intention to generate

returns, whereby they focus in particular on market growth as the first indicator of the venture's potential. Bachher and Guild (1996) as well as Bachher et al. (1999) also suspect an increased market-oriented view on the part of the VCs, and thus the market growth in the two studies comes in second and third place, with one investor saying in an interview : "The first thing we look for is the market. If it's not there, we don't invest." (Bachher and Guild, 1996). Nevertheless, the BAs from the study by Bachher et al. (1999) also regard it as the third most important criterion and in the studies by Sudek (2006) and Osnabrugge and Robinson (2000) the factor with rank six and seven is still one of the important criteria of the BAs, whereby the assumption can only be partially confirmed.

It is striking, however, that USP is attributed comparatively above-average importance by the BAs in the studies of Bachher and Guild (1996) and Bachher et al. (1999) with rank four and five, respectively. According to (Bachher and Guild, 1996), this is due to the often earlier investment time of the BAs, in which the analysis of the target market usually still proves to be difficult and thus the focus must be on the offer of the venture itself, since a good product is a basic prerequisite for a successful market entry. A business angel in the interview, for example, said: "all we want to know is that there is an excellent product idea. We feel most comfortable if we create the market.". The study by Osnabrugge and Robinson (2000) also shows that with the sales potential of the product in 3rd place and the quality of the product in 7th place, the BAs consider the product characteristics to be very important. The question remains as to whether VCs do this significantly less, since, for example, the USP has a decisive share in the evaluation of VCs in the study by Bachher et al. (1999) with rank four as well as in the two surveys by Zinecker and Bolf (2015) with rank six each. Landström's conjoint analysis (1998) also refutes the assumption of Bachher and Guild (1996), as it shows that for BAs the influence of market growth is higher than that of USP.

Ultimately, it is difficult to discern significant differences between VCs and BAs with the available literature, since aspects taken up in studies often can only be partially confirmed or even refuted in other publications, which at the same time raises the question of whether BAs and VCs can be correctly differentiated at all or whether there is simply a general heterogeneity within investors, regardless of which category they belong to. Thus, it is argued that the investment behavior of BAs and VCs becomes increasingly difficult to differentiate as BAs become more professionalized in their investment approach and VCs strongly enter more early-stage investments (Wessendorf et al., 2019).

3) *Threats to Validity*: Validity is crucial for meaningful findings and thus needs to be properly reflected within the selection of publications analyzed and the methodology chosen. To assess potential threats to validity, we account for four categories of validity relevant to SLRs: descriptive,

theoretical and interpretative validity as well as generalizability (Tahir et al., 2016).

Descriptive validity refers to the factual accuracy of the account and whether the researchers could produce descriptively same data for the same event or situation. When performing SLR, one major potential threat is not using appropriate keywords during search as well as the issue of omission. The selection of primary studies holds a threat such as 'True Negative' (the selection of primary studies which are not relevant or of low quality) and 'False Negative' (the omission or rejection of primary studies which should be included). To avoid these threats, we devised a well-defined review protocol including a search string, inclusion and exclusion criteria, as well as quality assessment criteria. When forming the search string, we first reviewed the relevant concepts and terminology and then identified the keywords to be used. Next, we checked synonyms and alternatives for each keyword. In order not to miss any relevant study during the search, we used well-known online research databases and search engines. Furthermore, we also applied snowball tracking each primary study identified during the search.

Theoretical validity is concerned with what researchers have in mind and what is investigated and whether this was correctly captured. To capture the relevant and correct information, we designed a data extraction form in which we defined specific requirements for answering the RQs. All authors reviewed the data extraction form and the definitions to avoid misinterpretations.

Interpretive validity is concerned with whether the conclusions follow from the data and are not biased by the researchers. Qualitative studies, such as SLR, are more apt to these types of threats due to researchers interpreting the data. We tried to reduce subjective interpretations of the researchers by collecting the data in a structured way and deriving conclusions following a rigorous analysis process.

Generalizability deals with the degree to which conclusions we draw are reasonable. As SLR's involve mostly qualitative data analysis, we used well-defined information requirements in the data extraction forms to mitigate this threat. Below is a list of relevant scientific publications resulting from the literature search in accordance with the defined results protocol. Table 1 lists all studies that deal with the relative importance of evaluation criteria among themselves, whereas studies from table 2 examine the actual influence of criteria on the evaluation and investment process.

C. Reporting Phase

In the last phase, the reporting phase, the analysis of the identified studies begins. Based on the findings of the previous Conducting Phase, the defined research questions are answered. A final evaluation and conclusion in the sense of a discussion of findings completes the SLR.

1) *RQ1 — Which non-financial criteria are given increased significance in the evaluation and to what extent are they included in the investment process?*

To evaluate the significance and influence of the decisive evaluation criteria in the early-stage of a new company, we use the general analysis of the criteria in the conducting phase. As was already apparent in this analysis, not all decisive criteria could be described quantitatively, as only some of them were dealt with in analytical studies. Nevertheless, the following attempts were made to express the quantitative aspects of as many criteria as possible.

As was initially apparent from the derivation of the decisive evaluation criteria there are only a few of the many identified factors which can be assigned a decisive role in the evaluation. It was thus possible to recognize that the positive outcome of the evaluation process depends to a large extent on the skills and experience of the founders themselves and that the qualification of management is therefore ultimately an important indicator of the later success of an investment (Eisele et al., 2002). The decisive evaluation criteria were the enthusiasm of the founders and their industry and leadership experience. Bachher and Guild (1996) explain the enormous importance of a highly qualified and experienced management team by the fact that it is the entrepreneurs themselves who ultimately transform the business idea into reality and have to establish the product on the market. Often it is not the venture itself that is invested in, but the skills of the founders, because if they are unsuccessful, their business is unlikely to be successful.

Based on analytical studies, it then became clear that in most of the studies industry experience alone influenced the assessment by about one third (Shepherd, 1999; Franke et al., 2004, 2008). For Macmillan et al. (1985), this was the deciding factor for investors, as it would give them the greatest confidence that the founders could identify any problems in a familiar area at an early stage and resolve them accordingly, which enormously increases the probability of success for the company. On the other hand, it could be shown that leadership aspects only account for about 10% of the criteria examined and thus occupy a slightly subordinate position among the decisive criteria (Shepherd, 1999; Franke et al., 2004, 2008).

With regard to market and product characteristics, it can be said that the decisive focus of investors is on assessing the company's potential. In the early-stage, this is the central aspect of the evaluation, whereas existing strengths and weaknesses are less important. Thus, it is ultimately up to the investors to assess the product potential based on the USP and the economic potential of the company on the basis of market growth. However, these criteria have a clearly subordinate position behind the founder characteristics, whereby their influence is in some cases 30-40% less than these (Landström, 1998; Knockaert et al., 2010).

At the same time, it could be shown that the economic potential clearly out-weighs the product potential in the evaluation, since market growth appeared to be more important than USP in all surveys with only one exception. This aspect can also be seen quantitatively, where market

growth is estimated to be about 5-10% more important than the USP (Landström, 1998; Knockaert et al., 2010). Thus, it would not be necessary for the product to be superior to other products due to its uniqueness, whereas strong market growth would be indispensable for a successful company (Rea, 1989). Macmillan et al. (1987) add that market factors would generally be more important than product factors in order to assess the success of the venture, which is ultimately also reflected in the importance of the individual evaluation criteria.

2) *RQ2 — What is a potential change in relative importance of the evaluation criteria examined along with the different phases typically experienced by a young company?*

Even if the quest for answers to RQ2 resulted in interesting insights, it has to be pointed out that the presented results are based on a very limited number of studies, thereby affecting the ability to generalize the findings as well as their informative value. This represents a clear limitation and needs to be addressed in further research. Nevertheless, the insights derived will be derived in more detail.

To address this research question, we first assessed the significance of individual criteria over the course of a venture and at the same time highlighted possible changes. In general, it can be said that criteria that are mentioned as the most important in the individual categories in the early-stage segment are rarely dropped in later development phases (Eisele et al., 2002). This leads to the conclusion that there is probably an agreement among investors that certain evaluation criteria are regarded as essential prerequisites for a positive investment decision, regardless of the venture's current development phase. Thus, it can be stated that investors regard the two most important criteria, passion and industry experience of the founders, as indispensable factors in all phases.

Although the focus in all phases of the venture is on an experienced and qualified founding team, this work nevertheless reveals certain changes. However, these changes logically go hand in hand with the growth of the company and thus do not produce any surprising results, which, according to Eisele et al. (2002), means they can also be expected theoretically and can, therefore, be explained plausibly.

It is leadership aspects and the balance of the management team in particular that appear to be increasingly important over time. The increasing size of the company and the growing complexity of the tasks can ultimately explain this. Within market and product characteristics, the focus of investors over time is increasingly on existing strengths and weaknesses (Landström, 1998). Whereas in the early-stage, due to the lack of company history, there is often only the possibility of assessing the potential of the company on the basis of the USP and market growth. It is ultimately important for investors to see from a certain point in time to what extent the product offered has already established itself on the market and can therefore demonstrate a certain market acceptance.

The significant changes occur mainly between the early and expansion stage, whereas the transition from expansion to late-stage is much less noticeable in the importance of the criteria.

According to Eisele et al. (2002), an investment in a company that is in the early-stage segment would be so recognizable that it is viewed differently from an investment in later development phases, which is explained at the same time by the different conditions to which such a young company is exposed.

Further, it became apparent that criteria such as patents and alliances, which in the early-stage of NTBFs were still regarded as positive quality signals for investors, lost their essential importance over time due to decreasing information asymmetries.

3) *RQ3 — Are there any differences in terms of significance of the evaluation criteria focused on young technology companies in particular and young companies in general?*

The significance of evaluation criteria shows that irrespective of the technical orientation of a young company, there are decisive criteria regarding the venture characteristics as well as product and market characteristics, the non-fulfillment of which would not result in financing by the investors. Thus, the evaluation of NTBFs in particular does not differ from investments in young companies in general. Nevertheless, with the help of the available literature, it was possible to recognize that the focus of investors is more on the product than was the case in the general criteria, and that they must foremost correctly assess the quality of the technology offered in the evaluation (Hoenig and Henkel, 2015). It was noticeable, for example, that the USP was felt to be of above-average importance in studies with a technical orientation of the companies and that criteria such as familiarity with the technology offered also played an essential role.

However, the central difference can be seen in the influences of patents and alliances. It became apparent that patents and alliances have a decisive influence on the evaluation and that a positive evaluation outcome correlates positively with the number of patents and alliances. The company value increased by an average of 30-40% when the number of patents doubled. In addition to their protective effect vis-à-vis competitors, patents are also proof for investors that the young company is well managed and has already reached a certain stage of development (Hsu and Ziedonis, 2013). Alliances are largely credited with beneficial effects, as the ventures could thereby gain valuable access to knowledge or other assets. This would enable them to achieve technological developments that they might not have achieved on their own (Hoenig and Henkel, 2015).

Ultimately, both alliances and patents additionally reduce the information asymmetries between founders and investors through the clear quality signals of the developed technology, although there is also agreement in the literature that the influence strongly depends on the respective sector (Greenberg, 2013; Hsu and Ziedonis, 2013; Hoenen et al., 2014).

4) *RQ4 — What are the fluctuations in terms of significance of relevant evaluation criteria between business angels and venture capitalists?*

Based on the available literature, it is only partially possible, if at all, to detect significant differences between business angels and venture capitalists, since anomalies within one study cannot be confirmed or even refuted in other studies. Only the aspect of market growth can be partially confirmed, which is more in the focus of VCs due to their increased intention to generate returns and which therefore places more value on the economic potential of the company. However, the question remains whether BAs do this significantly less. Although they do indeed have a different investment strategy, and there is agreement in the literature that they invest at a much earlier stage than VCs, market growth is generally an essential factor for a company's success. Thus, it can be doubted that BAs attach significantly less importance to this. This has ultimately been confirmed in the other studies available, in which market growth has always been among the most important criteria for BAs as well.

A further differentiation according to investor type is currently not possible, however, since there are too few studies up to the present time which concentrate on identifying differences between the two investor types. However, various cluster analyses within the existing studies (Franke et al., 2004, 2008) show that several and above all distinguishable investor types emerge from the samples surveyed. For example, an analysis of variance in the study by Franke et al. (2004) showed that the VCs surveyed produced five homogeneous but heterogeneous groups. Within these, it became apparent that all five types had different focal points in their evaluation and that the influence of individual criteria even differed by almost 50% in the most extreme case. According to Franke et al. (2004), it could be seen that there are enormous differences in the subjective significance weights among the investors and that one cannot therefore speak of "the" evaluation process, but must differentiate between different types, which differ from each other. It can be assumed that this could also apply to the differentiation of business angels and venture capitalists, whereby it may not be possible to draw a strict line along the investor type, but there are simply different types of early-stage investors with the same evaluation patterns, which may be represented both within BAs and VCs. Thus, the boundary may be drawn based on their characteristics, but not between BAs and VCs.

IV. CONCLUSION

This study was aimed to get a better understanding of the decisive criteria used by Business Angels and Venture Capitalists to evaluate early-stage ventures. By following a structured search process, we tried to sum up the existing research results to find out which non-financial criteria have the most impact on the evaluation process.

As a result, we summarized the significance of the criteria of business angels and venture capitalists used in practice regarding the evaluation of early-stage ventures. We could show that research deals with an enormous number of factors which can in principle be included in the evaluation, but only a very few of them can ultimately be attributed to be of decisive character. At this stage it should be pointed out, that even if financial criteria are almost non-existent in very early

investments, they will play an increasingly important role at later stages. Yet, the research focus on non-financial criteria is not considered compromising the results with regard to the evaluation process, as the impact of non-financial criteria relative to financial criteria, e.g. on valuation, was proven to be highly comparable Sievers et al. (2013).

It became clear that a positive assessment by investors depends primarily on the passion of the founders, their industry and leadership experience, market growth and the uniqueness of the product. In addition, we recognized that the evaluation depends largely on the founders' characteristics, and thus the focus of investors is clearly on the skills and experience of the founders themselves, with the personality traits slightly outweighing. The market- and product-related criteria seem to be relatively far behind, and so it can be assumed that no positive investment decision by the investors would be made if the management has deficiencies in the qualification, no matter how promising the market or the product itself is. In the end it could be stated that the market potential in most cases outweighs the product itself, which is astonishing in that the offer of the venture itself moves to the last place in the evaluation. The analyzed studies agreed that market characteristics are important, even though there are slight differences with regard to the most important single criteria. Product-related criteria show a high standard deviation and thereby indicate different opinions regarding the importance assigned by investors. The same holds true for intellectual property.

On the basis of various comparisons in the analysis of the criteria, the above-mentioned criteria in no case lose their decisive importance and are therefore essential in the evaluation, regardless of the current phase or technical orientation of the venture. Nevertheless, in both cases, certain changes could be detected in the following criteria.

On the one hand, product characteristics tend to have a stronger influence on NTBFs than on general ventures; on the other hand, patents and alliances have an extremely positive effect on the assessment, whereas these are desirable for ventures without a technical orientation, but all in all are not essential. The more mature the company becomes, the more investors focus on existing strengths and weaknesses and not pure potential. Thus, from the expansion stage onward, it is important to see that the venture can demonstrate market acceptance with its product, while at the same time factors such as leadership and risk management capabilities gain enormously in importance as the company grows. With regard to the investor, it was not possible to identify significant differences with the help of the available literature.

A. Theoretical Contribution and Practical Implications

This study enables an overview on current research results with regard to evaluation of early-stage ventures. Through a systematic review of existing research, it was possible to gather the results of a wide spectrum of existing empirical analyses to form one holistic picture, which thereby reduced the complexity of the topic enormously.

Since Shepherd (1999) showed that investors clearly lack an understanding for their own evaluation process and pattern,

an overview of the most important criteria helps them to question their own evaluation process. For startups and entrepreneurs this study is also a way to get an insight on the criteria used by investors and their respective impact on evaluation, which increases their chance of getting funded by an investor and thus attain the financial means to drive their growth. It appears, that this study has clear advantages for several groups and can thereby create a value added.

B. Limitations

We base the fundamental limitation of this work on the enormous subjectivity of investors' assessments and the resulting heterogeneity within them, which makes it difficult to make universal statements. In addition, the studies require an insight into the investor's own evaluation process, which is often limited. According to Landström (1998), the interviewees would tend to overestimate the significance of the individual factors, often leading to an inflationary assessment of importance, in which all the criteria discussed are classified as particularly important.

In studies on the relative importance of assessment criteria, the formation of ranks within each study also represents a potential limitation. The differences between two criteria are very small in the vast majority of cases, so it is not given that one criterion, which has a higher rating, is actually significantly more important than another. In addition, the importance given is always averaged out across the entire sample, whereby the standard deviations from the studies already show that there are strong differences of opinion within some investors surveyed. For the founders, however, this can be seen as positive, because a bad rating on the part of an investor does not mean that all investors will share this same opinion. Rather, it is a matter of finding the right investor (Franke et al., 2004).

In analytical studies, the actual influence of criteria can be determined more precisely. Here, however, the problem occurred that the criteria examined vary strongly and it was therefore not possible to aggregate these criteria meaningfully. Thus, the analytical studies were individually included in the evaluation, whereby their significance is strongly dependent on the respective sample.

However, despite the aforementioned limitations of the topic itself and the respective individual research methods, it was possible to derive consistent facts or tendencies, which ensured the fundamental quality of this work.

C. Future Research Directions

Future research in this area should address different requirements and assessments by business angels and venture capitalists, as the question was raised as to whether they exist at all. Thus, future research could investigate how the significance of the evaluation criteria between the two investor types relate to each other. In addition to the entrepreneurs and the investors themselves, new findings in this matter could also benefit political decision-makers and other managers in the corporate finance sector, for example.

In addition, more analytical studies should generally be conducted in the future to investigate the actual influence of

evaluation criteria. For example, it was not always possible to examine quantitative aspects of all decisive criteria in this study, as there is still a great lack of such research. To this end, the preceding topic with the differences between BAs and VCs could also be examined more closely. In analytical studies, for example, it would become clear exactly to what extent the influences of the individual criteria differ between the two investor types. In addition, it is precisely the analytical studies that provide investors with an insight into their own evaluation process. Shepherd (1999) explored exactly this approach by letting investors estimate the influences of their criteria used in the evaluation followed by a validation with help of conjoint analysis. It turned out that the estimates deviated greatly from the actual influences. In reality, for example, almost 35% of industry experience was included in the evaluation, whereas investors initially estimated the influence to be only about 15%. According to Shepherd (1999), this shows that investors only have limited insight into their own evaluation process and a limited understanding of it. Thus, it emerges from the above aspects that there is still a great need for analytical studies to broaden the understanding of the actual evaluation patterns of investors.

REFERENCES

- Achleitner AK (2018) Start-Up Unternehmen - Ausführliche Definition. URL <https://wirtschaftslexikon.gabler.de/definition/start-unternehmen-42136/version-265490>
- Bachher JS, Guild PD (1996) Financing Early Stage Technology Based Companies: Investment Criteria used by Investors. *Frontiers of Entrepreneurship Research* URL https://www.researchgate.net/profile/Paul_Guild/publication/256420976_Financing_early_stage_technology_based_companies_investment_criteria_used_by_investors_Frontiers_of_Entrepreneurship_Research/links/00b7d52305d3776f78000000.pdf
- Bachher JS, de Leon ED, Guild PD (1999) Decision criteria used by investors to screen technology-based ventures 1:269–273, DOI 10.1109/PICMET.1999.787815
- Bogle GT, Reuber AR (1992) Issues Involved in the Financing of Canadian Biotechnology Firms By Venture Capitalists. *Journal of Small Business & Entrepreneurship* 9(2):2–13, DOI 10.1080/08276331.1992.10600393
- Brettel M (2001) Entscheidungskriterien von Venture Capitalists - Eine Empirische Analyse. WHU – Forschungspapier Nr. 82, URL https://scholar.google.de/scholar?cluster=13970058021782277607&hl=de&as_sdt=0,5
- (BVK) BDK (2018) Der deutsche Beteiligungskapitalmarkt 2017. URL https://www.bvkap.de/sites/default/files/page/20180226_bvk-statistik_2017_presentation_final2.pdf
- Csaszar F, Nussbaum M, Sepulveda M (2006) Strategic and cognitive criteria for the selection of startups. *Technovation* 26(2):151–161, DOI 10.1016/j.technovation.2005.01.010
- Damodaran A (2009) Valuing Young, Start-up and Growth Companies: Estimation Issues and Valuation Challenges. Stern School of Business, New York University, NY: 1-67. DOI: 10.2139/ssrn.1418687
- Dubini P (1989) Backed Entrepreneurs Have the Best Chances of Succeeding? *Journal of Business Venturing* 4(2):123–132
- Eisele F, Habermann M, Oesterle R (2002) Die Beteiligungskriterien für eine Venture Capital Finanzierung: Eine empirische Analyse der phasenbezogenen Bedeutung. *Tübinger Diskussionsbeiträge* 238: 1-35, URL <http://hdl.handle.net/10419/47571>
- Elango B, Fried VH, Hisrich RD, Poloncjek A (1995) How venture capital firms differ. *Journal of Business Venturing* 10(2):157–179, DOI 10.1016/0883-9026(94)00019-Q
- Franke N, Gruber M, Henkel J, Hiosl K (2004) Die Bewertung von Gründerteams durch Venture-Capital-Geber - Eine empirische Analyse. *Die Betriebswirtschaft* 64(4):651–670
- Franke N, Gruber M, Harhoff D, Henkel J (2008) Venture Capitalists' Evaluations of Start-Up Teams: Trade-Offs, Knock-Out Criteria, and the Impact of VC Experience. *Entrepreneurship Theory and Practice* 32(3):459–483, DOI 10.1111/j.1540-6520.2008.00236.x
- Greenberg G (2013) Small firms, big patents? Estimating patent value using data on Israeli start-ups' financing rounds. *European Management Review* 10(4):183–196, DOI 10.1111/emre.12015
- Hoenen S, Kolympiris C, Schoenmakers W, Kalaitzandonakes N (2014) The diminishing signaling value of patents between early rounds of venture capital financing. *Research Policy* 43(6):956–989, DOI 10.1016/j.respol.2014.01.006
- Hoening D, Henkel J (2015) Quality signals? the role of patents, alliances, and team experience in venture capital financing. *Research Policy* 44(5):1049–1064
- Hsu D, Ziedonis R (2013) Resources as dual sources of advantage: implications for valuing entrepreneurial-firm patents. *Strategic Management Journal* 34:761–781, DOI 10.1002/smj.2037
- Jell F, Block JH, Henkel J (2010) Innovativeness of a Start-Up as a Criterion in Venture Capital Decision Making. *Kredit und Kapital* 44(4):509–541, URL <https://ssrn.com/abstract=1394149>
- Kaserer C (2007) Private Equity in Deutschland. Rahmenbedingungen, ökonomische Bedeutung und Handlungsempfehlungen. Books on Demand GmbH
- Klotz AC, Hmieleski KM, Bradley BH, Busenitz LW (2014) New Venture Teams: A Review of the Literature and Roadmap for Future Research. *Journal of Management* 40(1):226–255, DOI 10.1177/0149206313493325
- Knight RM (1994) Criteria Used by Venture Capitalists: A Cross-Cultural Analysis. *International Small Business Journal* 13(1):26–37, DOI 10.1177/0266242694131002
- Knockaert M, Clarysse B, Wright M (2010) The extent and nature of heterogeneity of venture capital selection behaviour in new technology-based firms. *R&D Management* 40(4):357–372, DOI 10.1111/j.1467-9310.2010.00607.x
- Köhn A (2018) The determinants of startup valuation in the venture capital context: a systematic review and avenues for future research. *Management Review Quarterly* 68(1):3–86, DOI 10.1007/s11301-017-0131-5
- KPMG (2018) Venture Pulse Q4 2018
- Landström H (1998) Informal investors as entrepreneurs. *Technovation* 18(5):363–365, DOI 10.1016/S0166-4972(98)00001-7
- Macmillan IC, Siegel R, Narasimha PNS (1985) Criteria used by venture capitalists to evaluate new venture proposals. *Journal of Business Venturing* 1(1):119–128, DOI 10.1016/0883-9026(85)90011-4
- Macmillan IC, Zemann L, Narasimha PNS (1987) Criteria distinguishing successful from unsuccessful ventures in the venture screening process. *Journal of Business Venturing* 2(2):123–137, DOI 10.1016/0883-9026(87)90003-6
- Mason C, Stark M (2004) What do Investors Look for in a Business Plan?: A Comparison of the Investment Criteria of Bankers, Venture Capitalists and Business Angels. *International Small Business Journal* 22(3):227–248, DOI 10.1177/026624260402377
- McKelvie A, Hsu DK, Haynie JM, Simmons SA (2014) What matters, matters differently: a conjoint analysis of the decision policies of angel and venture capital investors. *Venture Capital* 16(1):1–25, DOI 10.1080/13691066.2013.825527
- Muzyka D, Bidey S, Leieux B (1996) Trade-Offs in the Investment Decisions of European Venture Capitalists. *Journal of Business Venturing* 11(4):273–288, DOI 10.1016/0883-9026(95)00126-3
- Osnabrugge MV (2000) A comparison of business angel and venture capitalist investment procedures: An agency theory-based analysis. *Venture Capital* 2(2):91–109, DOI 10.1080/136910600295729
- Osnabrugge MV, Robinson RJ (2000) Angel Investing: Matching Start-up Funds with Start-up Companies - The Guide for Entrepreneurs, Individual Investors, and Venture Capitalists. Jossey-Bass, San Francisco, URL <http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0787952028.html>

- Porter ME (1980) Competitive Strategy: Techniques for Analyzing Industries and Competitors. *Competitive Strategy* 1(6):396
- Rea RH (1989) Factors affecting success and failure of seed capital/start-up negotiations. *Journal of Business Venturing* 4(2):149–158
- Riquelme H, Rickards T (1992) Hybrid Conjoint Analysis: An Estimation Probe in New Venture Decisions. *Journal of Business Venturing* 7(6):505–518, DOI 10.1016/0883-9026(92)90022-J
- Runge W (2014) *Technology Entrepreneurship. A Treatise on Entrepreneurs and Entrepreneurship for and in Technology Ventures*. KIT Scientific Publishing, Karlsruhe
- Shepherd DA (1999) Venture capitalists' introspection: a comparison of "in use" and "espoused" decision policies. *Journal of Small Business Management* 37(2):76–87
- Shepherd DA, Zacharakis AL (1999) Conjoint Analysis: A New Methodological Approach for Researching the Decision Policies of Venture Capitalists. *Venture Capital* 1(3):197–217, DOI 10.1080/136910699295866
- Sievers S, Mokwa CF, Keienburg G (2013) The Relevance of Financial versus Non-Financial Information for the Valuation of Venture Capital-Backed Firms. *European Accounting Review* 22(3):467–511
- Spence M (1973) Job Market Signaling. *The Quarterly Journal of Economics* 87(3):355–374
- Storey DJ, Tether BS (1996) A Review of the empirical knowledge and an assessment of statistical data on the economic importance of new technology based firms (NTBFs) in Europe. European Commission, Directorate General XIII, the Innovation Programme.
- Stuart TE, Huang H, Hybels RC (1999) Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly* 44(2):315–349, DOI 10.2307/2666998
- Sudek R (2006) Angel Investment Criteria. *Journal of Small Business Strategy* 17(2):89–103, DOI 10.1111/j.1748-5827.2011.01219.x
- Tahir T, Rasool G, Gencel C (2016) A systematic literature review on software measurement programs. *Information and Software Technology* 73:101–121
- Teece DJ (1986) Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy* 15(6):285–305, DOI 10.1016/0048-7333(86)90027-2
- Tyebee TT, Bruno AV (1984) A Model of Venture Capitalist Investment Activity. *Management Science* 30(9):1051–1066, DOI 10.1287/mnsc.30.9.1051
- Wessendorf CP, Hammes C (2018) Methods and Criteria affecting Early-Stage Venture Valuation DOI 10.5445/IR/1000079690
- Wessendorf CP, Kegelmann J, Terzidis O (2019) Determinants of Early-Stage Technology Venture Valuation by Business Angels and Venture Capitalists. *International Journal of Entrepreneurial Venturing* 11(5):489–520, DOI 10.1504/IJEV.2019.102259
- Zinecker M, Bolf D (2015) Venture Capitalists' Investment Selection Criteria in CEE Countries and Russia. *Verslas: Teorija ir praktika* 16(1):94–103, DOI 10.3846/btp.2014.441
- Zutshi RK, Tan WL, Allampalli DG, Gibbons PG (1999) Singapore Venture Capitalists (VCs) Investment Evaluation Criteria: A Re-Examination. *Small Business Economics* 13(1):9–26, DOI 10.1023/A:1008011216414

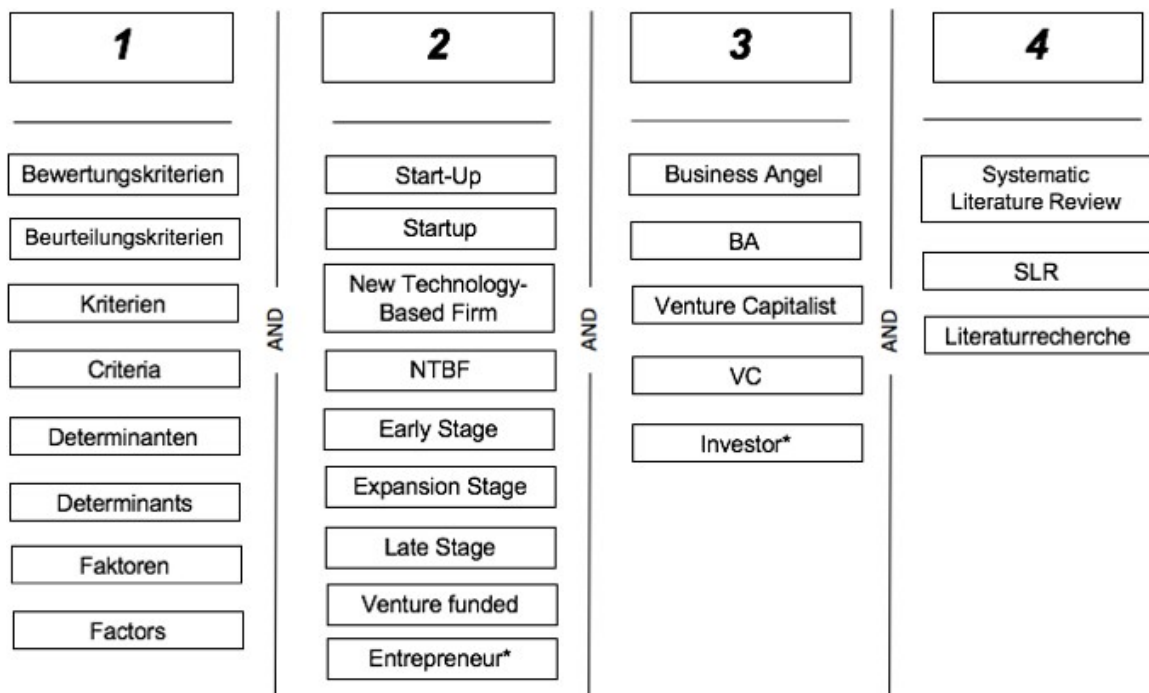


Fig. 1 Structure of the Search Term to Identify Previous Research

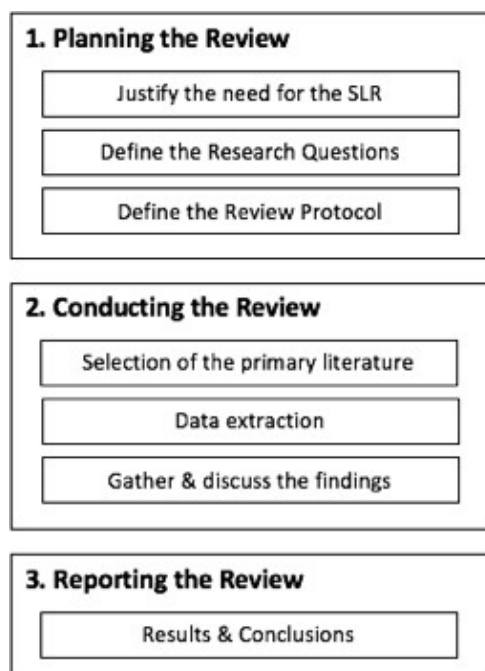


Fig. 2 SLR Process Sequence

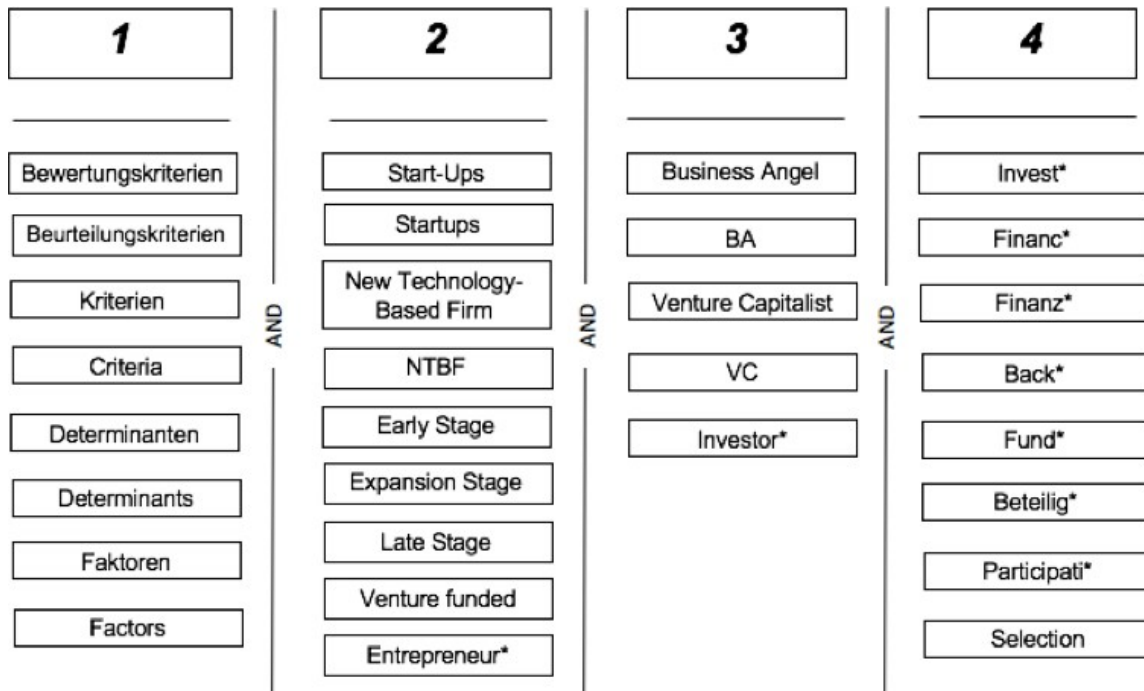


Fig. 3 Structure of the Search Term

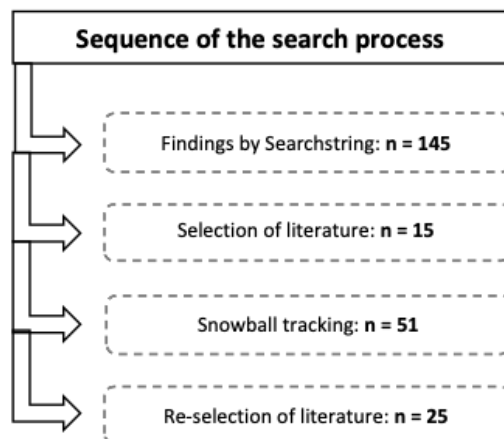


Fig. 4 Sequence of the Search Process

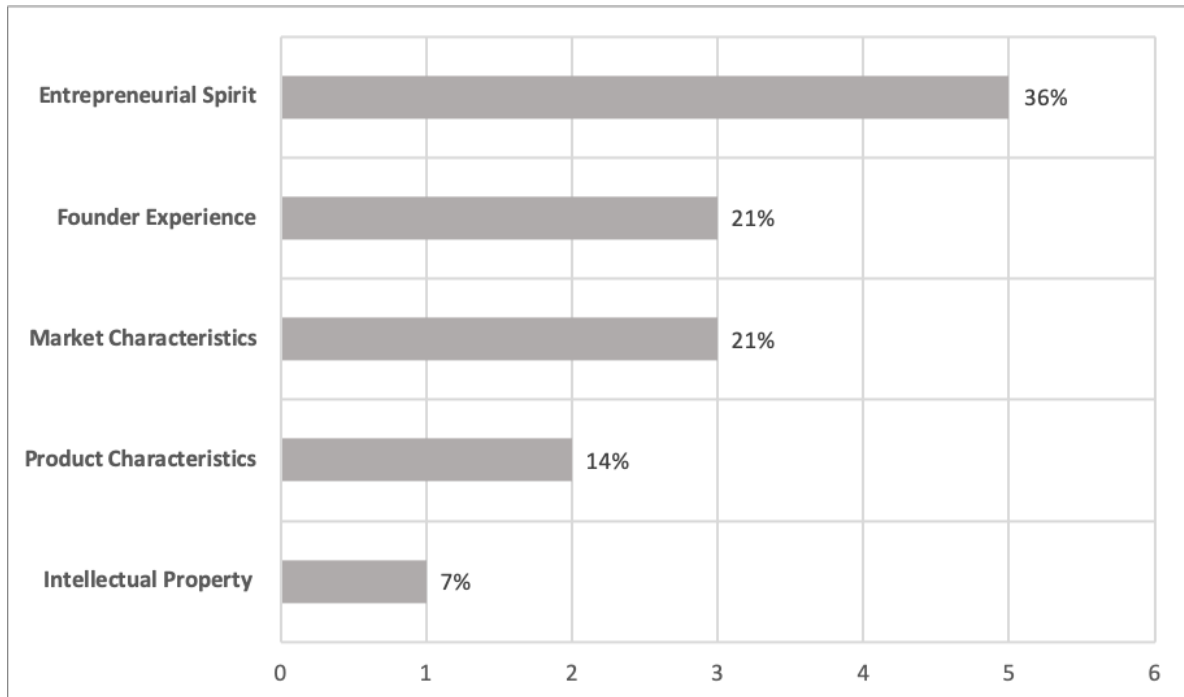


Fig. 5 Frequencies of Dominant Criteria by Category

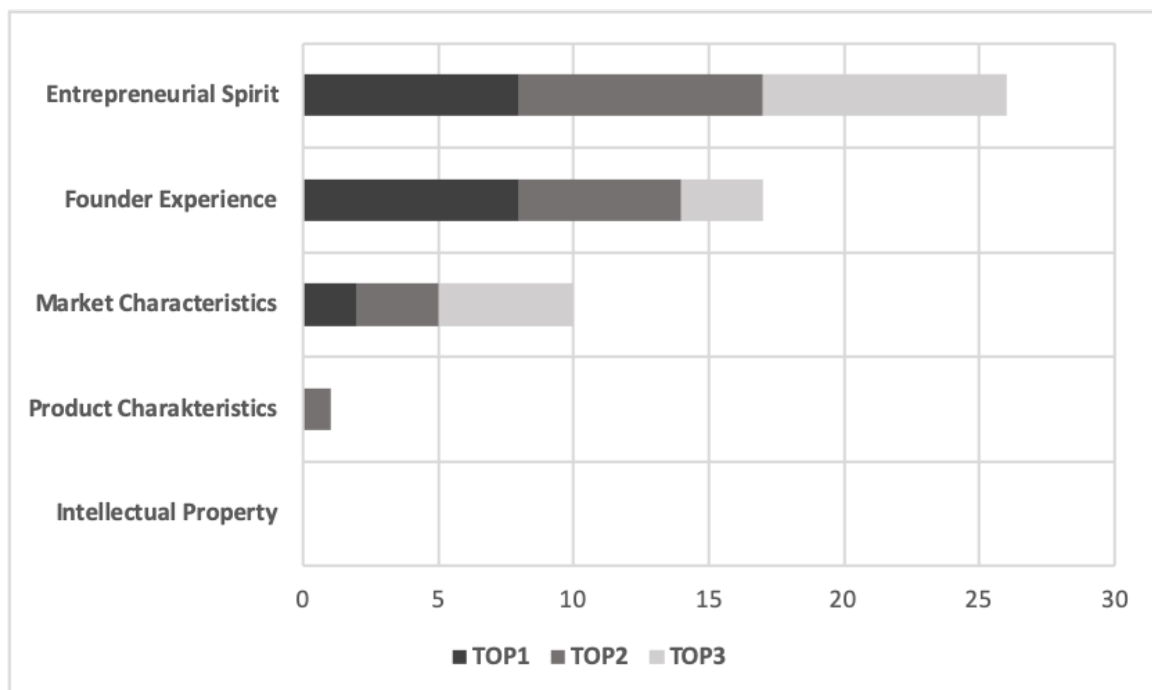


Fig. 6 Frequency Distribution of the Three Most Important Evaluation Criteria from each Study

<i>Company Stage</i>	(Elango et al., 1995)			(Eisele et al., 2002)			(Brettel, 2001)		
	<i>Seed</i>	<i>Early</i>	<i>Late</i>	<i>Early</i>	<i>Expan.</i>	<i>Late</i>	<i>Seed</i>	<i>Early</i>	<i>Expan.</i>
Entrepreneurial Spirit									
<i>Enthusiasm</i>	2	1	3	3	6	9	1	3	4
<i>Risk Management</i>	6	3	1	4	2	3	3	2	1
<i>Management Capabilities</i>				15	10	8			
<i>Communication Strength</i>				23	13	14			
Founder Experience									
<i>Industry Experience</i>	1	2	3	6	1	1	2	1	2
<i>Leadership Experience</i>	7	5	2	20	11	7	17	13	7
Product									
<i>USP</i>	4	9	11						
<i>Prototype</i>				24	--	--	19	6	3
<i>Customer Benefits</i>				5	7	6			
<i>Market Acceptance</i>				27	9	13	20	15	5
Market									
<i>Market Growth</i>	3	4	7	11	17	20	5	5	8
<i>Existing Distribution Channels</i>				31	24	22			
IP Situation									
<i>Intellectual Property</i>	5	7	10	21	22	18	15	11	11

Fig. 7 Ranking of Criteria Across Different Financing Phases

Table 1 Result Protocol on the Relative Importance of Evaluation Criteria

Author	Sample Size	Methodology	Scale	Geography	Investor Type	Company Phase	Technology
Macmillan et al. (1985)	100	Survey	1-4	USA	VC	Early-Stage	Miscellaneous
Bogle and Reuber (1992)	23	Survey	1-4	Canada	VC	Early-Stage	NTBF
Knight (1994)	81	Survey	1-4	Canada	VC	Early-Stage	Miscellaneous
	53			Asia			
Elango et al. (1995)	149	Survey	1-4	Europe	VC	Early- & Late-Stage	Miscellaneous
				USA			
Muzyka et al. (1996)	73	Conjoint-Analysis	n.a.	Europe	VC	Early-Stage	Miscellaneous
Bacher and Guild (1996)	20	Survey	1-7	Canada	BA	Early-Stage	NTBF
	20				VC		
Bacher et al. (1999)	20	Survey	1-7	Canada	BA VC	Early-Stage	NTBF
Zutshi et al. (1999)	31	Survey	1-4	Singapor	VC	Early-Stage	Mixed
Os-nabrugge (2000)	n.a.	Survey	n.a.	Europe	BA	Early-Stage	Mixed
Brettel (2001)	58	Survey	1-4	Germany	VC	Seed/ Start-Up/ Expansion-Stage	Miscellaneous
Eisele et al. (2002)	30	Survey	0-3	Germany	VC	Early/ Expansion/ Late-Stage	Miscellaneous
Sudek (2006)	72	Survey	1-5	USA	BA	Early-Stage	Miscellaneous
Zi-necker and Bolf (2015)	35	Survey	1-5	CEE	BA and VC	Early-Stage	Miscellaneous
	14			Russia			

Table 2 Result Protocol on Influence of Evaluation Criteria

Author	Sample Size	Methodology	Basis	Geography	Investor Type	Company Stage	Technology
Riquelme and Rickards (1992)	7	Conjoint-Analysis	Full-Profile-Approach	Great Britain	VC	Miscellaneous	Miscellaneous
Landström (1998)	44	Conjoint-Analysis	Trade-Off-Approach	Sweden	BA	Early-Stage	NTBF
Shepherd (1999)	66	Conjoint-Analysis	Full-Profile-Approach	Australia	VC	Miscellaneous	Miscellaneous
Mason and Stark (2004)	3 and 4	Regression	Speech Protocol	Australia	BA and VC	Miscellaneous	Miscellaneous
Franke et al. (2004)	51	Conjoint-Analysis	Full-Profile-Approach	Germany/Austria	VC	Early-Stage	NTBF
Franke et al. (2008)	51	Conjoint-Analysis	Plackett-Luce-Modell	Germany/Austria	VC	Early-Stage	NTBF
Knockaert et al. (2010)	68	Conjoint-Analysis	Full-Profile-Approach	Europe	VC	Early-Stage	NTBF
Greenberg (2013)	317	Regression	Historical Data	Israel	VC	Mixed	Mixed
Hsu and Ziedonis (2013)	370	Regression	Historical Data	USA	VC	Early-Stage	NTBF
Hoenen et al. (2014)	580	Regression	Historical Data	USA	VC	Early-Stage	NTBF
McKelvie et al. (2014)	85	Conjoint-Analysis	Full-Profile-Approach	USA	BA and VC	Miscellaneous	Miscellaneous
Hoenig and Henkel (2015)	187	Conjoint-Analysis	Full-Profile-Approach	Germany/USA	VC	Early-Stage	NTBF

Table 3 Ranking of Decisive Criteria for Early-Stage Venture Evaluation

Rank	Criterion	Category	#B	#1	#2	#3	#4	#5	#6	Σ	Score
1	Enthusiasm	En- trepreneurial Spirit	15	5	4	3	1	1	1	15	1.00
2	Industry Experience	Founder Experience	19	6	6	1	1	-	3	17	0.89
3	Market Growth	Market Characteris- tics	19	-	1	4	3	4	4	16	0.84
4	Risk Management	En- trepreneurial Spirit	12	1	1	5	1	-	2	10	0.83
5	Market Demand	Market Characteris- tics	4	-	1	1	-	1	-	3	0.75
6	USP	Product Characteris- tics	8	-	1	-	2	1	2	6	0.75
7	Management Capabilities	En- trepreneurial Spirit	6	1	1	-	-	-	2	4	0.67
8	Competitive Advantage	Market Characteris- tics	6	2	-	-	-	1	-	3	0.50
9	Leadership Experience	Founder Experience	14	1	-	1	2	3	-	7	0.50
10	Prototype	Product Characteris- tics	10	-	-	-	1	-	2	3	0.30
11	Track Record	Founder Experience	14	-	-	1	-	2	1	4	0.29
12	Communica- tion Strength	En- trepreneurial Spirit	11	-	1	-	2	-	-	3	0.27
13	Sympathy	En- trepreneurial Spirit	12	-	-	-	-	2	-	2	0.17
14	Intellectual Property	Intellectual Property	14	-	-	1	-	1	-	2	0.14