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Abstract

This study identifies the importance assigned to the various criteria used by the Portuguese Venture Capitalists (VCs) to evaluate and select early stage venture capital projects. The data was collected through a questionnaire answered by 20 Portuguese VCs. We use descriptive statistics techniques and non-parametric tests to identify the most valued criteria and test differences in the importance assigned to the criteria of several types of VCs and investments.

The study reveals that the personality and experience of the entrepreneur and of the management team are the most valued groups of criteria. VCs with a majority of private share capital value more the personality of the entrepreneur and management team than the companies with a majority of public share capital. Additionally, the VCs that did not yet internationalize consider the personality of the entrepreneur and management team and the financial aspects, to be more important than the VCs that have already expanded abroad.

Keywords: *Venture capital; Evaluation criteria; Early-stage investments; Internationalization.*

JEL classification: *G24; G32.*

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Introduction

Venture capital (VC) is one attractive financing alternative for entrepreneurs with innovative projects. The biggest risk associated with these projects implies that their proponents often have difficulty in raising funds through the traditional forms of financing. The Venture Capitalists (VCs) play an important role as intermediaries in financial markets, providing capital to companies that would otherwise have difficulty in attracting funding (Gompers and Lerner, 2001).

In Portugal the first VCs appear only in 1986. In recent years this market has grown significantly, asserting itself as an alternative form of financing. In 2007, according to the Portuguese Association of Venture Capital and Development (APCRI and Ernst & Young, 2007), Portuguese VCs have invested 169 million Euros.

In spite of its recent growth, the Portuguese venture capital market is still small in relative terms (0.215% of GDP). Like other European Union countries, Portugal is committed to foster the development of venture capital funding as a way to promote innovation. A deeper understanding of how Portuguese VCs evaluate and select investment projects may help the development of this type of financing. This knowledge may be particularly relevant for entrepreneurs who submit proposals to the VCs.

The main aim of this study is to identify the relative importance attached to the criteria used by Portuguese VCs in the process of evaluation and selection of early-stage venture capital projects. In addition we investigate whether the importance given to each criterion and to each group of criteria are different for public capital and private capital VCs, for VCs who are already internationalized and the VCs that did not start that process. We also investigate whether there are differences depending on the type of the project (*early-stage* versus *later-stage* projects).

This article contributes to the literature in two important ways. First, it provides evidence on the VCs behaviour in a small venture capital market. Since most of the existing literature on this area refer to large VC markets, the present study is important to investigate whether the conclusions reached by the previous studies can be extended to a small VC market, like the Portuguese one. Second, this study is a contribution to the literature on the internationalization of VCs and it is the first study that explores the impact of the VCs being internationalized on the value given to the various selection criteria of *early-stage* venture capital projects.

This article is organized as follows: section two presents a literature review and explains why we cannot simply extrapolate previous results to the Portuguese VC market, section three outlines the objectives and research hypotheses, section four presents the sample and methodology used, section five presents and discusses the results and, finally section six summarizes the main findings of the study.

Literature Review

In order to understand how VCs apply their resources one needs to know the criteria used by VCs in selecting and evaluating investment projects (Fried and Hisrich, 1994). This theme has been the subject of research over the past few decades. Most of the studies were developed in large VC markets, especially the USA (e.g. Wells, 1974; Poindexter, 1976; Tyebjee and Bruno, 1984; MacMillan *et al*., 1985; Hall and Hofer, 1993; Fried and Hisrich,1994; and Zacharakis and Meyer, 1998). In smaller markets were investigated, among others, France (Benoit, 1975; and Zouponidis, 1994), Australia (Shepherd *et al.,* 2000), India (Mishra, 2004), Poland (Bliss, 1999), Greece (Bakatsaki-Manoudaki *et al*., 2006), Germany and Austria (Franke *et al*., 2008) and Spain (Pintado, 2002). In Portugal, this issue was investigated by Silva (2004).

Table 1 – Summary of previous studies

	Wells (1974)	**Tyebjee e Bruno (1984)**	**MacMillan *et al.* (1985)**	**Hall e Hofer (1993)**	**Fried e Hisrich (1994)**	**Muzyka *et al.* (1996)**	**Zacharakis e Meyer (1998)**	**Bliss (1999)**	**Shepherd *et al.* (2000)**	**Pintado (2002)**	**Silva (2004)**	**Mishra (2005)**
Sample Size	8	41	14+102	4	18	73	51	6	66	51	1	40
Context of the study												
Developed equity market	X	X	X	X	X		X		X			
Cross-national comparison						X						
Transition economy								X				
Small equity market										X	X	X
Country												
EUA	X	X	X	X	X		X					
Europe						X [(1)]						
Poland								X				
Australia									X			
Spain										X		
Portugal											X	
India												X
Data gathering method												
Interviews	X				X	X			X			X
Questionnaires		X	X		X	X			X	X		X

	Wells (1974)	Tyebjee e Bruno (1984)	MacMillan *et al.* (1985)	Hall e Hofer (1993)	Fried e Hisrich (1994)	Muzyka *et al.* (1996)	Zacharakis e Meyer (1998)	Bliss (1999)	Shepherd *et al.* (2000)	Pintado (2002)	Silva (2004)	Mishra (2005)
Verbal protocols				X								
Experiment							X					
Participant Observation											X	
Data analysis method												
Descriptive statistics	X	X	X		X			X	X	X	X	X
Content analysis	X			X	X			X			X	
Factor analysis		X	X									
Discriminant analysis		X										
Cluster analysis			X			X				X		
Regression analysis							X					
Conjoint analysis						X			X			

Source: Authors.

(1) United Kingdom, Ireland, Germany, Austria, Switzerland, Italy, France, Belgium, Netherlands, Spain, Portugal, Nordic countries.

The existing scientific research differs with respect to the country under analysis, the associated development of the venture capital market, the sample size, the data collection procedure and the method of data analysis. Table 1 shows the characteristics of the studies on the selection and evaluation criteria of investment projects.

In the existing research, the evaluation criteria used by VCs have been fundamentally divided into four groups of criteria: the entrepreneur and management team, product, market and financial aspects. Most studies suggest that the criteria that companies attach greater importance when selecting and evaluating projects belong to the "entrepreneur and management team” group. For instance, Tyebjee and Bruno (1984) and MacMillan *et al*. (1985) conclude that five of the ten most important criteria in the evaluation process are related to the experience and personality of the entrepreneur (Silva, 2004). Also Mishra (2004), in his work in India, concludes that from the 10 criteria most valued by the VCs, nine are related to the personality and experience of the entrepreneur and his management team.

Table 2 presents a summary of the three most important criteria for VCs in the studies conducted by Tyebjee and Bruno (1984), MacMillan *et al*. (1985), Muzyka *et al*. (1996), Pintado (2002) and Silva (2004). Although there are slight differences across the various studies regarding the specific criteria included in the top three most valued criteria, this table shows a very clear predominance of the criteria in the group of the entrepreneur and management team.

Besides the identification of the most valued criteria, some studies investigated whether there are differences in the criteria used by VCs depending on the characteristic of the VCs or the type of the venture capital investment. Pintado *et al*. (2007) suggest that VCs with a majority of public capital give more importance to the high-tech products than VCs with a majority private capital. Moreover, the latter value more the existence of barriers to entry for new firms than VCs with a majority of public capital.

For other researchers (e.g. Carter and Van Aucken, 1994) the investment decision is affected by the type of project to invest because *early-stage* and *later-stage* projects have different levels of risk and different expected rates of return. Elango *et al.* (1995), in their study of the USA, argue that the importance attached by VCs to criteria related to the product and to the market is different depending on the type of investment project. In *early-stage* projects VCs give more importance to the ownership of the patent, whether the product is unique and the rate of market growth. In *later-stage* projects VCs value more products that have a demonstrated market acceptance.

Table 2 – Criteria most valued by VCs in the selection and evaluation of investment projects

	Tyebjee e Bruno (1984)	**MacMillan *et al.* (1985)**	**Muzyka *et al.* (1996)**	**Pintado (2002)**	**Silva (2004)**
Entrepreneur and management team					
Quality of management team	X				
Ability to perform a continuous and intense effort		X			
Familiar with the company's objectives		X			
Knowledge of the sector			X	X	X
Leadership potential			X		
Professional experience			X	X	X
Honesty and integrity				X	
Market					
Dimension e growth	X				X
Product					
Competitive advantages	X				
Financial Aspects					
Expected return		X			

Source: Authors.

The literature review shows that most existing studies on this subject refer to large markets, particularly the USA. Considering the heterogeneity between the VC markets, the previous studies findings can hardly be generalized to other countries without being subject to investigation. This suggests that it is worthwhile to explore how Portuguese VCs value the different evaluation criteria and verify whether the findings of the previous studies apply in the Portuguese VC market. Note that the work done in Portugal by Silva (2004) is a case study and consequently it does not allow us to draw conclusions to the universe of Portuguese VCs.

One aspect that has not been explored in the literature is the effect of the internationalization of VCs on the relative valuation of the criteria they use when they select and evaluate projects.

The importance of internationalization for VCs is evidenced in the work of Bottazzi *et al.* (2004). These authors claim that 27% of European VCs surveyed in their study already have offices abroad, 25% have partners from other countries and 24% of their investments are in foreign companies. The only work that examines the difference between VCs regarding internationalization was developed by Wright *et al.* (2002). Specifically, they examine differences between foreign VCs (mainly North American) and domestic VCs in India, and domestic VCs in the USA. They conclude that there are differences in the criteria used in the risk assessment of projects between the two groups of VCs firms. However, the previous study does not answer the question: "do VCs from small venture capital markets which already began their internationalization process value in a different manner the evaluation and selection criteria of *early-stage* projects, than VCs that did not yet start that process?", which is precisely one of our research questions.

Objectives and research hypothesis

The main aim of this work is to identify the most valued criteria used by the Portuguese VCs in the evaluation of *early - stage* projects. There are at least two reasons for this choice. First, this type of projects is becoming increasingly important in Portugal. Second, there are fewer alternatives to VC financing for *early-stage* investments than for *later-stage* investments. Hence knowing the evaluation criteria is particularly important for the proponents of this type of projects.[1]

In addition, we are interested in investigating whether the most valued criteria for Portuguese VCs when selecting and evaluating *early - stage* projects are the same than when evaluating projects of a *later-stage* kind. Finally, we want to explore whether there are differences between VCs with a majority of public capital and VCs that have most private capital and differences between VCs that are already internationalized and VCs that are not yet internationalized.

Our analysis is always done at two levels:

- Within-group analysis: to identify within each group of criteria, the criterion that is most valued by Portuguese VCs in the evaluation of venture capital projects and to identify whether there are differences in the importance given to each criterion depending on the VCs type of capital, VCs internationalization and type of venture capital project.

[1] The fact that many projects submitted to VCs are rejected (see, e.g., Maier and Walker, 1987, and Pintado, 2002) may be a symptom that the proponents are not completely aware the VCs evaluation criteria.

- Between-group analysis: to identify the most valued groups of criteria by VCs when they select and evaluate venture capital projects and to identify whether there are differences in the importance given to each group of criteria depending on the VCs type of capital, VCs internationalization and type of venture capital project.

Our study has four specific objectives which will be studied using the two previous approaches.

The first objective is to identify the importance given by Portuguese VCs to the criteria used in selecting and evaluating *early - stage* projects. The Portuguese VC market has closely followed developments in Europe. The studies conducted in Europe on this issue, notably in Spain (Pintado, 2002), concluded that the most valued criteria by Spanish VCs are identical to those in the USA. It is therefore probable that the most valued criteria for the Portuguese VCs are also identical to the most valued criteria for VCs in USA. Regarding the first objective and considering the between group analysis, our research hypothesis is the following one:

Hip. 1: In the selection and evaluation of *early - stage* projects, Portuguese VCs give more importance to the groups of criteria related to the entrepreneur and management team, than to the groups of criteria related to the market, product, financial aspects and other aspects of the investment.

If the data support this hypothesis then we can conclude that the results reached in previous studies apply to the Portuguese VC market.

Our second objective is to test whether there are differences in the value assigned to the various criteria depending on the type of capital of the VCs (mostly public or mostly private). Our research hypothesis is the following one:

Hip. 2: When evaluating *early-stage* projects, VCs with a majority of public capital do not value all the criteria and group of criteria in the same way than VCs with mostly private capital.

The third objective is to investigate whether the internationalization of VCs influences the importance attached to the different evaluation criteria, or groups of criteria, of *early-stage* projects. The motivation for including this objective arises from the increasing internationalization of the Portuguese VCs. In 2007 the VCs investments on non-resident entities represents 12.79% of total investments (CMVM, 2007). Furthermore, as explained in the literature review, there is only one study on this subject (Wright *et al*., 2002). The research hypothesis associated with this objective is the following one:

Hip. 3: When evaluating *early-stage* projects, VCs that started their internationalization process do not value all the criteria and group of criteria in the same way than VCs that did not start that process.

Finally, our fourth objective is to identify if the importance given by the Portuguese VCs, to each criterion or group of criteria is the same when evaluating *early-stage* investments and *later-stage* investments. Considering Carter and Van Aucken (1994) and Elango *et al.* (1995) we expect the investment decision to be affected by the type of project, thus our research hypothesis is as follows:

Hip. 4: In the analysis of *early-stage* or *later-stage* projects, the VCs do not value all the criteria and group of criteria in the same way.

Methodology

Sample and questionnaire

The population under study consists of all 24 SCR that, in the beginning of 2009, were registered in the Comissão do Mercado de Valores Mobiliários (CMVM).

Given the size of the universe, we aim to study the entire population, thus ensuring that all features of the universe are included in our work.

The survey technique chosen to carry out the research work was the questionnaire. In its preparation we avoided the introduction of sensitive questions (including the request for financial information) and there was also a special concern regarding its size.

The questionnaire was structured into three homogeneous blocks of questions. The first block involved general questions related to the characteristics of the VCs: whether the capital is mostly public or private and what kind of projects the VCs finances. On this last point we used the classification used by Félix (2008) (seed and start-up, development and expansion, replacement, buyout and other).

The second block of questions seeks to ascertain whether the VCs have already begun the process of internationalization. Considering that this work is centered on the issue of investment and not on fundraising, we defined internationalization of VCs as *"investing in companies based in other countries than the country of origin of VCs"*.[2]

The third block of questions is related to the importance given by the VCs to each criterion used by VCs in the selection and evaluation of *early-stage* projects. Based on the works by MacMillan *et al*. (1985), Muzyka *et al*. (1996) and Pintado (2002), we identified 45 criteria used by the VCs in the selection and evaluation of *early-stage* projects (see the Appendix). These criteria were distributed into six groups:[3]

- Group of criteria related to the <u>personality</u> of the entrepreneur and his management team;
- Group of criteria related to the <u>experience</u> of the entrepreneur and his management team;
- Group of criteria related to the <u>market</u>;
- Group of criteria related to the <u>product</u>;
- Group of criteria related to <u>financial aspects</u>, and,
- Group of criteria related to <u>other aspects of the investment</u>.

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[2] The definition of internationalization of VCs used by Wright *et al.* (2005, p.147) involves on the one hand "*the process of raising funds in foreign markets"* and on the other hand, *"the investing in companies based in other countries than country of origin of VCs"*.

[3] It should be noted that our classification is slightly different from others. First, we divided the criteria related with the entrepreneur and his management team into two groups: one group including the criteria more related with personality aspects, another group including the criteria more related to the experience. Second, we added a group of other criteria including aspects such as the quality of the business plan.

To measure the importance of each criterion, as in Pintado (2002), we used a rating scale 1-5. We used a rating scale of odd number *because "if the questionnaire is anonymous and contains no sensitive questions it is usually best to use an odd number of alternatives"* (Hill and Hill, 2008, p.127). Moreover, according to Hill and Hill (2008, p.127), we chose to describe only the extremes of the scale (1 = not important, 5 = very important), since there are no problems in using this procedure when respondents usually have high academic qualifications, as in our case.

Data collection

The questionnaire was sent to 22 of the 24 VCs. We excluded two VCs from the sample because, even though they were registered in the CMVM, they were not active VCs.

Of these 22 VCs, two did not show interest in participating in this study, thus our respondents' sample includes 20 VCs, representing a response rate of 90.91%. This is a very high response rate comparing, for instance, with MacMillan *et al.* (1985) and Pintado (2002) who achieved response rates of 68% and 80.95%, respectively.

The collection of information took place during the months of January and February 2009. The VCs directors were contacted by phone and invited to participate in the study. After explaining the objectives and guaranteeing the confidentiality of data, we requested a meeting. The time spent in meetings was particularly important in the process of gathering information since it increased the response rate and, through the clarification of questions during the interview, allowed us to obtain information of better quality.

Data analysis

We used the statistical software SPSS (version 17.0) to perform descriptive analysis and test our hypothesis.

To identify within each group of criteria, which is the most valued criterion for the Portuguese VCs in the selection and evaluation of *early - stage* projects (within-group analysis) we used descriptive statistics, including mean and standard deviation. To assess whether the average importance assigned to each criterion is significantly different from the group average importance, we used the nonparametric Wilcoxon test for two paired samples. This test allows us to identify, within each group of criteria, the criteria that have an importance significantly above (or below) the group average.

To assess whether the average value assigned to each criterion is significantly different depending on the capital of the VCs, the type of investment and its internationalization process, we used the nonparametric Mann-Whitney test for two independent samples.

A similar approach was followed in the between-group analysis. To compare the importance given to the various groups we used the nonparametric Wilcoxon test for two paired samples. To investigate whether there are differences in the mean value attached to each group of criteria according to the VCs type of capital, the type of the investment and the internationalization, we used the Mann - Whitney test. Note that in all statistical tests used the null hypothesis is that there is no difference between the means. Thus rejection of the null hypothesis can be interpreted as supporting our research hypothesis. In all the statistical tests we identify whether the differences are significant with significance levels of 1%, 5% and 10%.

Results and Implications

Sample characterization

Regarding the age of the VCs, 30% of the respondents have less than 5 years of activity while 35% have existed for more than 10 years. The remaining 35% of VCs are active for more than 5 five but less than 10 years. This allows us to conclude that the VC Portuguese market is still a quite young market.

Of the 20 VCs that participated in the study 25% (5 VCs) have a majority of public capital and the remaining 75% (15 VCs) have mostly private capital. Our data also shows that 14 (70%) VCs have included in their portfolio early-stage projects, while the remaining 6 (30%) VCS only invest in later – stage projects.
It should be noted that the questionnaire was primarily directed to VCs that invest in *early-stage* projects and specifically asked the importance of the criteria for this type of projects. However, we decided to ask VCs that only invest in *later-stage* projects to answer the questionnaire based on the criteria they use in selecting and evaluating such projects. This allowed us to compare the importance assigned to the criteria according to the type of investment. Note that the six VCs that invest only in *later-stage* projects are only considered to test our fourth objective. For the remaining objectives our sample is constituted by the 14 VCs that invest in early-stage projects.

The results also indicate that 50% (10) of VCs surveyed have already begun the process of internationalization. This internationalization process took place primarily through investments from Portugal in European Union countries and countries outside of Europe.

Results

Within group analysis

As mentioned above we identified 45 criteria used by the VCs in the selection and evaluation of early-stage projects which were grouped into six groups of criteria. The within group analysis seeks to identify within each of these groups the most valued criterion by the Portuguese VCs.

Regarding the criteria used in assessing the **personality of the entrepreneur and his management team** (Table 3), there are two criteria with an average importance significantly above the overall mean for this group of criteria: honesty and integrity (the most valued criterion) and long term vision. This is a natural result, since the relationship between VCs and entrepreneurs is based on mutual trust and having a long term vision is particularly important in early stage projects. On the contrary, the attention to detail, the desire to earn money and being favourable to suggestions and critics are criteria that have a mean importance significantly below the group average importance.

Table 3 – Importance attached to the criteria relating to the personality of the entrepreneur and his management team

Variable	***Early-stage***						***Early-stage***	***Later-stage***
	Total		Capital		Internationalization			
	N = 14		N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
	Mean	St. Des.	Priv.	Pub.	Yes	No	Mean	Mean
Honesty and integrity	5.00***	.000	5.00	5.00	5.00	5.00	5.00	5.00
Long term vision	4.86***	.363	4.89	4.80	4.75	5.00	4.86**	4.00**
Capacity of reaction and risk assessment	4.57	.514	4.67	4.40	4.50	4.67	4.57	4.67
Ability to perform a continuous and intense effort	4.36	.497	4.33	4.40	4.13**	4.67**	4.36	4.67
Ability to raise empathy with the VCs	4.14	.864	4.22	4.00	4.00	4.33	4.14	4.17
Favourable to suggestions and critics	4.14**	.535	4.22	4.00	4.00	4.33	4.14	4.17
Desire to earn money	4.00*	.784	4.44***	3.2***	3.75	4.33	4.00	4.17
Attention to detail	3.71***	.825	3.89	3.40	3.25**	4.33**	3.71	4.33
Test	Wilcoxon		Mann-Whithey					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the group average importance.
Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

Regarding the differences between the various types of VCs, we verify that VCs with mostly private capital assign greater importance to the criterion desire to earn money, than the VCs with a majority public capital. It should also be noted that the VCs that did not start their internationalization process, assign greater importance to the ability to perform a continuous and intense effort and to the attention to detail than the VCs which have already internationalized.
With respect to differences according to the type of investment, we verify that the VCs when investing in *early-stage* projects value more the criterion long term vision than when investing in *later-stage* projects.

Comparing with other works, one verifies that Pintado (2002) obtained the same result regarding the most valued criterion by Spanish VCs. On the other hand, in the USA, the ability of the entrepreneur to perform an intense effort is the criterion most highly valued criterion in this group (MacMillan *et al.*, 1985) whereas in Europe the work of Muzyka *et al.* (1996) indicates the potential for leadership as the most important criterion. It should be noted that the last two results consider any kind of investment (are not restricted to *early - stage* projects).

With respect to the criteria related to the **experience of the entrepreneur and his management team** (Table 4) the criteria most valued are the entrepreneur being focused and familiar with the market objectives of the company and his knowledge of the sector. Besides the two previous criteria, the ability to organize the management team also has a mean importance significantly above the group mean importance whereas the educational record and the entrepreneur available capital have a mean importance significantly below the group average.

Table 4 – Importance attached to the criteria relating to the experience of the entrepreneur and his management team

Variable	***Early-stage***						***Early-stage***	***Later-stage***
	Total		Capital		Internationalization			
	N = 14		N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
	Mean	St. Des.	Priv.	Pub.	Yes	No	Mean	Mean
Focused and familiar with the market objectives of the company	4.71***	.469	4.67	4.80	4.63	4.83	4.71	4.67
Knowledge of the sector	4.71**	.611	4.67	4.80	4.75	4.67	4.71	4.17
Ability to organize the management team	4.64***	.633	4.67	4.60	4.63	4.67	4.64	4.33
Technical skills	4.36	.633	4.33	4.40	4.25	4.50	4.36	4.17
Management skills	4.36	.842	4.22	4.60	4.38	4.33	4.36	4.33
Professional experience	4.07	.917	4.11	4.00	3.75	4.50	4.07	4.17
References of others	4.00	.679	4.11	3.80	3.88	4.17	4.00	3.50
Educational record	3.50***	.519	3.56	3.40	3.25* *	3.83* *	3.50	3.00
Entrepreneur available capital	3.21***	.975	3.22	3.20	3.13	3.33	3.21* *	4.17* *
Tests	Wilcoxon		Mann-Whitney					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the group average importance.
Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

VCs that did not yet start their internationalization process value more the educational record than VCs that have already begun this process. When VCs invest in later - stage projects they value more entrepreneurs' available capital than when they invest in early - stage projects. This result is quite natural since early - stage projects entrepreneurs are often young people without enough capital to invest in the project.

Similar conclusions were drawn by other studies. In the USA the entrepreneur and his management team being familiar with the company's objectives is the most valued criterion (MacMillan *et al.*, 1985) and in Europe the knowledge of the sector by the entrepreneur and his team is the most important criterion (Muzyka *et al.,* 1996). In Spain, VCs give more importance to the professional experience and knowledge of the sector by the entrepreneur and his management team.

The criteria related to the **market** have lower levels of importance (Table 5). The most valuable criteria are the growth rate of the target market and the ease of access to distribution channels and suppliers (both have a mean importance significantly above the group average). The most important market criterion in the studies of MacMillan *et al*. (1985), Muzyka *et al*. (1996) and Pintado (2002) is also the growth rate of the target market. On the contrary, the familiarity of the VCs with product market and the market size are criteria that have a mean importance significantly below the group average importance.

Table 5 – Importance attached to the criteria relating to the market

Variable	***Early-stage***						***Early-stage***	***Later-stage***
	Total		Capital		Internationalization			
	N = 14		N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
	Mean	St. Des.	Priv.	Pub.	Yes	No	Mean	Mean
Growth rate of the target market	4.07**	.829	4.11	4.00	4.25	3.83	4.07	3.17
Easy access to distribution channels and suppliers	4.07**	.730	3.89	4.40	4.38*	3.67*	4.07* *	3.00* *
Barriers to entry of new products	3.79	1.051	4.11	3.20	3.50	4.17	3.79	3.50
Company's ability to create a new market to the product or service	3.57	.938	3.33	4.00	3.38	3.83	3.57* * *	2.3* * *
Minimal competition in the first 3 years	3.36	1.216	3.56	3.00	3.25	3.50	3.36	2.67
VCs familiar with product market	2.93*	1.207	2.89	3.00	2.63	3.33	2.93	3.17
Market size	2.86**	1.099	3.11	2.40	2.75	3.00	2.86	3.00
Tests	Wilcoxon		Mann-Whitney					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the group average importance.
Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

Note also that when VCs invest in *early - stage* projects, they give greater importance to ease of access to distribution channels and suppliers and the company's ability to create a new market to the product or service than when investing in *later - stage* projects. These results are consistent with the nature of *later - stage* investments. In many cases these investments are used in the replacement of the management team or in strengthening the financial structure where the goal is not necessarily creating a new market.

In the set of criteria related to the **product or service** (Table 6), the most valued criteria are the potential foreign market and product with demonstrated market acceptance. However, only the first criterion has a mean importance significantly above the group mean importance (due to the higher variability in the importance given to the second criterion). On the contrary, the criterion with least mean importance is the product being a high-tech product.

Table 6 – Importance attached to the criteria relating to the product

Variable	*Early-stage*						*Early-stage*	*Later-stage*
	Total		Capital		Internationalization			
	N = 14		N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
	Mean	St. Des.	Priv.	Pub.	Yes	No	Mean	Mean
Potential foreign market	4.00**	.555	4.11	3.80	3.88	4.17	4.00	3.67
Product with demonstrated market acceptance	4.00	.784	3.89	4.20	3.75	4.33	4.00	4.17
Company owning the patent	3.93	1.141	4.22	3.40	3.88	4.00	3.93	3.83
Availability of raw materials	3.71	1.069	4.00	3.20	3.88	3.50	3.71	3.83
Innovation in production process	3.64	1.393	3.67	3.60	3.50	3.83	3.64	3.50
Product developed to point of a prototype	3.50	1.160	3.56	3.40	3.13	4.00	3.50	3.83
Uniqueness of product	3.43	.756	3.56	3.20	3.25	3.67	3.43	3.17
High-Tech product	2.71**	1.383	2.56	3.00	2.38	3.17	2.71	3.17
Tests	Wilcoxon		Mann-Whitney					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the group average importance.
Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

Analyzing the findings of other studies on this group we found that in the USA (MacMillan *et al.*, 1985) give more importance to the company owning the patent whereas in Europe (Muzyka et al., 1996) VCs give more importance to the level of understanding that the market has about the product. For Spain Pintado (2002) concludes that the most important criteria are the life cycle of the product and if it has a demonstrated market acceptance.

The highest importance attributed by Portuguese VCs to the possibility of a potential foreign market is contrary to previous results. The small size of the Portuguese market when compared with countries such as Spain or the USA (particularly regarding the number of inhabitants and GDP per capita) may justify the higher importance given by Portuguese VCs to projects that are not intended exclusively for the domestic market.

In the group of criteria related to the **financial aspects** of the investment (Table 7), the most valued criteria are the expected rate of return and the ease of exit. This suggests that VCs are particularly concerned with the profitability and liquidity of their investment. On the contrary, the criterion with least mean importance is the VCs synergy with current investees.

Table 7 – Importance attached to the criteria relating to the financial aspects

Variable	***Early-stage***						***Early-stage***	***Later-stage***
	Total		Capital		Internationalization			
	N = 14		N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
	Mean	St. Des.	Priv.	Pub.	Yes	No	Mean	Mean
Expected rate of return	4.79***	.426	4.89	4.60	4.63	5.00	4.79	4.67
Ease of exit	4.64***	.745	4.56	4.80	4.75	4.50	4.64	5.00
Structure costs	3.79	.802	3.89	3.60	4.00	3.50	3.79	4.00
Time to break-even	3.64	1.008	3.67	3.60	3.50	3.83	3.64	3.33
Investment size	3.64	.745	3.89	3.20	3.50	3.83	3.64	4.00
Time to pay back	3.50	1.092	3.44	3.60	3.38	3.67	3.50	3.00
Capacity to obtain complementary financing	3.50	1.019	3.56	3.40	3.50	3.50	3.50	3.50
Synergy with current investees of the VCs	2.71***	1.069	2.78	2.60	2.50	3.00	2.71	2.83
Tests	Wilcoxon		Mann-Whitney					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the group average importance.
Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

When compared with other works we found that in the USA (MacMillan *et al*., 1985), as in the present work, VCs give more importance to the expected return and the ease of exit, while in Europe (Muzyka et al., 1996) VCs assign greater importance to the ease of exit.

In our questionnaire we also included **other criteria** that may be important for VCs when selecting and evaluating projects. In this set of criteria (Table 8), the <u>quality of the business plan</u> is the most valued criterion when analysing *early - stage* projects. <u>Production capacity</u> and <u>geographical location</u> of the investment are the less valued criterion. For this last criterion there is a significant difference depending on the internationalization process. VCs that are not internationalized value this criterion more than VCs that have already begun this process, suggesting that internationalized firms are more willing to finance projects regardless of their location.

Table 8 – Importance attached to the criteria relating to the others investment aspects

Variable	***Early-stage***						***Early-stage***	***Later-stage***
	Total		Capital		Internationalization			
	N = 14		N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
	Mean	St. Des.	Priv.	Pub.	Yes	No	Mean	Mean
Business plan quality	4.50***	.519	4.44	4.60	4.50	4.50	4.50	3.67
VCs intuition	3.93	1.207	4.00	3.80	4.00	3.83	3.93	3.67
Sensibility to economic cycles	3.43	1.089	3.44	3.40	3.38	3.50	3.43	3.50
Production capacity	3.14**	1.231	3.22	3.00	3.00	3.33	3.14	2.50
Geographic location	2.71**	1.326	2.89	2.40	2.00* *	3.67* *	2.71	2.83
Tests	Wilcoxon		Mann-Whitney					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the group average importance.
Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

Overall, considering the 45 criteria, one can conclude that 7 of the 10 most valued criteria belong to the groups **personality** and **experience of the entrepreneur and management team** (see the rank of each criterion in the Appendix). This conclusion coincides with the results in the existing literature. Tyebjee and Bruno (1984) and MacMillan *et al*. (1985) conclude that five of the ten most important criteria in the evaluation process are related to the experience and personality of the entrepreneur (Silva, 2004). Also Mishra (2004) in a study in India, concludes that among the 10 criteria most valued by VCs, nine relate to the personality and experience of the entrepreneur and his management team.

Analysis between groups

The aim of this analysis is to identify the groups of criteria that VCs value the most when selecting and evaluating *early-stage* projects.

Overall, the Portuguese VCs when selecting and evaluating *early-stage* projects consider the groups of criteria related to entrepreneur and management team more important than the groups of criteria related to the market, product, financial aspects and other aspects of the investment (Table 9). In other words we can reject the null hypothesis that mean importance given to personality and experience criteria is the same than the overall mean importance. Thus, the statistical evidence supports our first research hypothesis.

Table 9 – Mean importance attached by VCs to each group of criteria

Group of criteria	***Early-stage***					***Early-stage***	***Later-stage***
	Total	Capital		Internationalization			
	N = 14	N = 9	N = 5	N = 8	N = 6	N = 14	N = 6
		Priv.	Pub.	Yes	No		
	Group Mean	Group Mean	Group mean	Group mean	Group mean	Group mean	Group mean
Personality	4.35***	4.46**	4.15**	4.17**	4.58**	4.35	4.40
Experience	4.17***	4.17	4.18	4.07	4.31	4.17	4.06
Market	3.78	3.57	3.43	3.45	3.62	3.52	2.98
Product	3.62	3.69	3.48	3.45	3.83	3.62	3.65
Financial	3.54**	3.83	3.68	3.72**	3.85**	3.78	3.79
Others	3.52***	3.60	3.44	3.38	3.77	3.54	3.23
Tests	Wilcoxon	Mann-Whitney					

Notes: 1 = not important; 5 = very important. The dashed line indicates the position of the overall mean importance.

Level of significance: *: $p \leq 0.1$; **: $p \leq 0.05$; ***: $p \leq 0.01$.

These conclusions fully agree with the conclusions reached in the USA (MacMillan *et al.*, 1985), Europe (Muzyka *et al*., 1996) and Spain (Pintado, 2002).

In short, we can conclude that both in this study and in the existing literature, the aspects related to human factors are most decisive in the decision to fund VC projects.

Regarding the comparison between VCs with a majority of private capital and VCs with a majority of public capital our results show that, when VCs with a majority of private capital select and evaluate *early - stage* projects they give more importance to the set of criteria related to the personality of the entrepreneur and management team than the VCs with majority of public capital. The differences for the remaining groups of criteria are not statistically significant. This conclusion differs from results in the study conducted by Pintado (2002), who finds significant differences in the group of criteria related to financial aspects (VCs with a majority of private capital give more importance to the financial aspects than the VCs with majority public capital).

Table 9 shows that there are two groups of criteria where there are significant differences between internationalized and non-internationalized firms. The Portuguese VCs that did not start their internationalization process, when selecting and evaluating *early-stage* projects consider the group of criteria related to the personality of the entrepreneur and management team and the group of criteria related to financial aspects more important than the VCs that are already internationalized.

Wright *et al.* (2002) examine the differences between foreign (mainly North American) and domestic VCs in India, and domestic VCs in the USA. They concluded that in the risk assessment of projects, the domestic USA VCs give greater emphasis to the financial contribution of entrepreneurs to the project than the American VCs operating in India; and give less emphasis to the aspects of the product market than the American VCs operate in India. However it is difficult to compare these results with ours since the objectives of both studies are different.

The results in Table 9 do not support the fourth research hypothesis since we are unable to reject the null hypothesis that the mean importance of each group of criteria is the same when evaluating *early-stage* or *later-stage* projects. The study by Pintado (2002) reached substantially different conclusions: Spanish VCs that invest mainly in *early-stage* projects give more importance, in a statistically significant sense, to the groups of criteria related to the product and the financial aspects than the VCs that invest mainly in *later-stage* projects. The difference in the conclusions may be justified by the definition of the two samples being compared. While the present study asked the VCs to recover the criteria when selecting and evaluating a particular project type *early-stage* or *later-stage*, in the work of Pintado (2002), the sample was made according to each VCs investing mainly in *early-stage* or mainly in *later-stage* projects. Thus Pintado (2002) is not really testing differences according to the type of project but rather to type of VC (more oriented towards *early-stage* or more oriented towards *later-stage* projects).

Conclusions

This work studied, in the Portuguese market, the importance assigned to the criteria used by VCs in the selection and evaluation of *early-stage* projects, using a single data base collected by the authors. The criteria used by VCs have been investigated over the past years. Nevertheless, most studies have been developed in large VC markets, especially the USA. Our main objective was to explore whether the previous results can be extended to a small venture capital market such as the Portuguese one.

Considering 45 evaluation and selection criteria of early-stage projects divided into six groups, we started by identifying the most valued criterion within each group of criteria and to assess whether there are differences in the importance assigned to each criterion depending on the type of capital of the VCs and on the VCs internationalization. In addition we investigated whether there are differences in the evaluation of early-stage and later-stage projects.

The within-groups analysis reveals that the most valued criteria are: honesty and integrity in the group of the personality of the entrepreneur and management team; being focused and familiar with the market objectives of the company and knowledge of the sector in the group of criteria related to the experience of the entrepreneur and management team; the growth rate of the target market and the ease of access to distribution channels and suppliers in the set of criteria related to the market; a potential foreign market in the group of criteria related to the product or service features; the expected rate of return and the ease of exit in the financial aspects; and the quality of the business plan in the group of other aspects of the investment. Most of these conclusions are similar with the ones of previous studies. However we should notice the higher importance assigned to the product having a potential foreign market, a result which is expectable in a small open economy.

An overall look at the 45 criteria reveals that seven of the 10 most important criteria belong to the groups of the personality and experience of the entrepreneur and management team. Moreover, the statistical evidence supports the view that the Portuguese VCs when selecting and evaluating *early- stage* projects consider the groups of criteria related to the entrepreneur and management team more important than the groups of criteria related to the market, the product, the financial aspects and other aspects of the investment.

Our results also reveal some interesting differences depending on the capital of the VCs, on whether the VCs is internationalized or not and on the type of the investment. Regarding the type of capital of the VCs, the results show that Portuguese VCs with a majority of private capital, when they evaluate *early - stage* projects consider the group of criteria related to the personality of the entrepreneur and management team more important than the VCs with a majority of public capital. Moreover, the analysis reveals that the desire to earn money is more valued by VCs with a majority of private capital than by VCs with a majority of public capital. Thus our results support our second research hypothesis that there are differences in the importance assigned to criteria and groups of criteria depending on the type of the capital of the VCs.

Concerning the impact of the VCs internationalization, our results show that the Portuguese VCs that are not internationalized consider the group of criteria related to the personality of the entrepreneur and management team and the group of criteria on financial aspects more important than the VCs that are already internationalized. Furthermore, the ability to perform a continuous and intense effort, the attention to detail and the educational record are more valued by VCs that are not internationalized than by firms that are already internationalized.

The evidence regarding the impact of the type of project on the importance assigned to various criteria and groups of criteria is mixed. On the one hand, there is no support to the hypothesis that the importance given to the various groups of criteria differs according to whether the type of project is *early-stage* or *later-stage*. On the other hand there are several differences when we look at each individual criterion. When evaluating early-stage projects more importance is given to the entrepreneur and management team having a long term vision, the company ability to create a new market to the product or service and to having easy access to distribution channels and suppliers than when evaluating later-stage projects. On the contrary, the entrepreneurs' available capital is more valued in later-stage projects.

To summarize, overall our results are consistent with the existing literature confirming the higher importance assigned to the set of criteria related with the personality and the experience of the entrepreneurs and the management team as well as the existence of valuation differences according to the type of VCs and the type of the investment. The two aspects that should be highlighted are the higher importance attributed to the criterion honesty and integrity and the product having a potential foreign market. The first criterion was also highly valued in Spain (Pintado, 2002) which suggests that this aspect is more valued in Iberian countries than in other European countries or the USA. The higher importance assigned to the product having a potential foreign market is a novelty in the literature but it is quite natural for a small open economy like Portugal.

We believe that this work opens perspectives for the realization of future research. Business angels are, by their very nature, investors who bet on *early - stage* projects. A study including also the business angels would allows the comparison between the criteria most valued by that type of investors with those most valued by VCs. In this work we examined the criteria that VCs use to decide on an initial investment in a project. However, many projects financed by VC require new rounds of financing, so it would be interesting to see whether the most valued criteria for VCs when they decide whether to reinvest in a project coincide with the ones used for the first investment.
This study analyzes the impact of a VC being internationalized on the importance given to the various criteria. However, for those VCs that are already internationalized, there are still interesting unanswered questions. For instance, for historical reasons Portuguese VCs are likely to invest in countries whose official language is the Portuguese. However, the cultural reality and the institutional environment in these countries differ from the one that exists in Portugal. Thus it would be relevant to study whether the most valued criteria by VCs when they invest in Portugal are the same than when they invest in projects based in other countries.

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Appendix – Rank of Criteria used in the selection and evaluation of early-stage projects

Variable	N = 14	
	Mean	Rank
Personality of the entrepreneur and his management team		
Capacity of reaction and risk assessment	4.57	8
Ability to perform a continuous and intense effort	4.36	10
Desire to earn money	4.00	18
Honesty and integrity	5.00	1
Attention to detail	3.71	26
Favourable to suggestions and critics	4.14	13
Long term vision	4.86	2
Ability to raise empathy with the VCs	4.14	13
Experience of the entrepreneur and his management team		
Educational record	3.50	32
Ability to organize the management team	4.64	6
Professional experience	4.07	15
Knowledge of the sector	4.71	4
Focused and familiar with the market objectives of the company	4.71	4
Entrepreneur available capital	3.21	39
References of others	4.00	18
Technical skills	4.36	10
Management skills	4.36	10
Market		
Market size	2.86	42
Growth rate of the target market	4.07	15
VCs familiar with product market	2.93	41
Company's ability to create a new market to the product or service	3.57	31
Minimal competition in the first 3 years	3.36	38
Barriers to entry of new products	3.79	24
Easy access to distribution channels and suppliers	4.07	15
Product or service		
Company owning the patent	3.93	22
Product with demonstrated market acceptance	4.00	18
Product developed to point of a prototype	3.50	32
High-Tech product	2.71	43
Potential foreign market	4.00	18
Uniqueness of product	3.43	36
Availability of raw materials	3.71	26
Innovation in production process	3.64	28
Financial aspects		
Expected rate of return	4.79	3
Structure costs	3.79	24
Time to break-even	3.64	28
Time to pay back	3.50	32
Investment size	3.64	28
Synergy with current investees of the VCs	2.71	43
Capacity to obtain complementary financing	3.50	32
Ease of exit	4.64	6
Other Investment aspects		
Geographic location	2.71	43
Business plan quality	4.50	9
VCs intuition	3.93	22
Sensibility to economic cycles	3.43	36
Production capacity	3.14	40