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Financing Technological Start-ups: A Venture Capital Performance Analysis to Portugal

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ABSTRACT: In order to increase their countries' GDP, Governments often try to promote high-value added exports. Technology-based companies, characterized by scalability and a global reach, can be the key to achieve this goal. In accordance with this objective, an increase in high-quality, promising tech start-ups that provide added value to the economy is being promoted in many countries. One of the important elements that can help increase the growth of new ventures is the funding sources, mainly the formal ones, due to the fact that they don't just supply the needed capital, but also provide essential guidance and resources for the success of a company. In the last few years there has been a significant increase in investments made by Business Angels (BA) and Venture Capital (VC) firms in Portugal. When compared to other European countries, in 2015 Portugal occupied the 3rd and 6th position in investments made by BAs and VCs as a percentage of GDP, respectively. However, circumstantial evidence seems to indicate that, since its appearance in Portugal about 20 years ago, although VCs have invested hundreds of millions in start-ups, there are in fact very few cases where the investment cycle was completed as desired, bringing the investors significant returns. Therefore, the fact VC performance is not particularly positive in Portugal, along with the clear lack of data and research on the topic, constituted the central motivation for the present research – namely to analyse specific characteristics of the funds, as well as the investment criteria. Some of the key variables that characterize VC funds and their performance were applied to a specific case of a sample of Portuguese VC firms, in particular: the origin of the raised capital; the limited partners (LP) and general partners (GP) reward structure; the experience and background of the fund's management team; the target industries; the targeted investment stages; the investment criteria used during the selection process; the quality of the deal flow; the VC and entrepreneurial ecosystem; and so forth. This work used adequate and relevant scientific and technical literature for this purpose and was carried out using as a benchmark state-of-the-art knowledge about VC in more mature markets such as the United States and some European countries. The study was conducted with help of a semi-structured survey sent to the most prominent Portuguese VC funds and through interviews to important venture capitalists in the country. In the end, some implications brought about by our findings, for VCs as well as for entrepreneurs, academics and public decision makers, were put forward and discussed.

1. Introduction

The typical VC business model, as described by Zider (1998), is put in practice through the acquisition of a (minority) stockholding position in a young company with a growing life cycle curve (avoiding the creation stage, in which risk and uncertainty predominate, as well as the mature stage, characterized by increased competition and consequently growth stagnation). After the start-up reaches sufficient size and credibility within a short to mid-term time horizon, a sale of the previous acquired stake is attempted, preferably with capital gains. A VC investor

should therefore always be aiming to help increase the value of the investee, by sharing its risks and working together with the founders to find the best solutions for the business. VCs not only aim to bring liquidity, but also strategic guidance for leveraging the start-up's growth (Hellman and Puri, 2002). Fund managers are usually called the *General Partners* (GPs), while the fund's own investors are known as *Limited Partners* (LPs). LPs are usually institutional investors such as government agencies or pension funds, corporate investors (companies), asset managers, and private individuals, among others. Bob Zider (1998) lists the key tasks of a VC investor in the following way: persuading private and institutional investors to put a percentage of their funds into the VC fund (usually a small percentage as it is perceived as a very high-risk asset); identifying and attracting new deal flow, monitoring existing deals (investee companies), allocating additional capital to the most successful companies in the portfolio, and promoting and negotiating exits. Higher risk should go together with a higher potential profitability. Therefore, VC funds typically invest in a relatively large number of companies in order to diversify their risk, as well as to create strategic synergies between the companies in their portfolios. The capital invested by the LPs is thus used by the VC funds to allocate to the portfolio companies and to pay the GPs themselves a management fee, usually calculated as a percentage of the assets under management (typically 2%), and which is intended to cover the fund's wages and organizational expenses. Nevertheless, the main source of income aimed by the GPs is the so-called carried interest, which amounts to about 20% of the gains made after selling the capital position in a portfolio company (Zider, 1998).

Some advantages and disadvantages for entrepreneurs using VC as a funding source have been compiled from different sources (Tedesco, 2014; IAPMEI and APCRI, 2006), as shown in the table below:

Advantages	Disadvantages
➢ Provides liquidity ➢ Positive signalling effect: attracts new investors, valuing the start-up and increasing stakeholder credibility; facilitates the use of traditional credit ➢ Usually doesn't require financial charges, dividends, and guarantees ➢ Provides access to guidance and resources (knowledge and experience, access to specialists, technicians and other entrepreneurs, strategic partnerships with the VC's network and other investees, access to more capital, among others)	➢ There is a feeling of property loss or dilution after having a VC investor become part of the company's Board of Directors ➢ High decision-making power and contractual control/advantages is given to the VC (e.g. power to change management team; liquidation preference that insures that the VC fund gets paid before others in a liquidity event) ➢ Expensive funding source, as VC buys a percentage of the company's capital (i.e. dilution for founders and other shareholders) ➢ The process for obtaining funding is time-consuming and resource intensive, even when unsuccessful

Figures for 2015 show VC funds raised capital from institutional investors in the order of € 5.3 billion (government agencies are the largest contributors with 31%) in Europe, of which € 3.8 billion was invested in almost 3000 companies (Invest Europe, 2015). From 2012 to 2016, there has been an average annual increase in investments made by VC in Europe of 5%. About 53% of the investments were made at the start-up stage and 45% at the expansion stage (Ibid). Since the financial crisis of 2008, European VC has been gaining traction, the amount invested has been increasing, and VCs have been demonstrating ability to help develop large companies. Between

2000 and 2010 European VCs had invested in only 3 start-ups that became "unicorns" (companies that achieved a valuation of over one billion euros or dollars). In contrast, since 2010, 47 VC-funded companies have been able to reach this latest threshold, which shows that the market has matured (Invest Europe, 2015). The same study by Invest Europe (2015) places Portugal in the sixth position among European countries in terms of investments made by VC as a percentage of GDP (0.039%) in 2015, almost doubling its annual average of 0.02% in 2011, which demonstrates a significant increase in investments made by VCs. This figure of 0.039% represents about € 60 million in investments. The weight of VC investment in the total risk capital investments (the concept of risk capital in Portugal also includes Private Equity (PE)) has been increasing, as in 2012 it represented 12.1%, in 2013 12.5%, in 2014 13.5%, and in 2015 19.3% (CMVM, 2015).

2. Methodology

The present dissertation studies the functioning of Portuguese VC by analyzing specific funds' characteristics, their investment criteria and consequent performance. The research aims at identifying and discussing some good and bad practices in the Portuguese VC industry. Two methods are used: a semi-structured survey (questionnaire) sent to VCs in Portugal, and interviews with important stakeholders in this sector. According to CMVM (2015) there are 45 certified VC/PEs active in the country. For the purpose of this work the majority of the VCs were used for the sample (some withdrawals happened due to the small size of some VC companies, inactivity or lack of information). Additionally, the sample includes a number of VCs not registered in the CMVM, but with relevance in the Portuguese market, and 3 BA funds and 3 Corporate Venture Capitals (CVC) (as they act in a very similar way to VC funds and in order to increase the sample). VC funds not registered in the CMVM were obtained through autonomous research and through talks to key players within the entrepreneurial industry. The VC sample meant to reflect the Portuguese VC industry and accounts for a total of 25 companies (considering the 3 BAs funds and the 3 CVCs), from which 15 responses were obtained, corresponding to 60% of the total number of questionnaires sent, which is considered a representative sample for this type of studies (response rate: 52% VC funds, two out of the three CVCs, and three out of the three BA's funds).

3. Discussion of Results

3.1 Limited Partners

Venture capital companies manage funds coming from public and private sources. The main objective of public entities (government agencies) with the capital they provide to VC funds is to leverage a type of specialized investor who can help companies with great potential to quickly achieve a turnover that will in turn make a positive impact in the economy. Start-ups are not alone in their markets, so having the support of VC knowledge, credibility and networking can be essential, especially in technology-based companies. The main export industries in Portugal are traditional industries that should be promoted but won't likely be the main growth source for exports in developed countries in the near future. Technology-based products, however, will become the basis of a more sustainable economy, mainly because of their global reach and scalability. This connects with the public incentive to technological entrepreneurship in many regions. European governments have been heavily involved when VC funds raise capital, contributing in 2015 with 31% of the capital raised (Figure 1) and being the largest financial

contributors to VC (Invest Europe, 2015). In 2016 this figure dropped to 25% with private investors and family offices (wealth management companies for high net-worth individuals) gaining strength. Nevertheless, it remains the main funding source for VC in Europe.

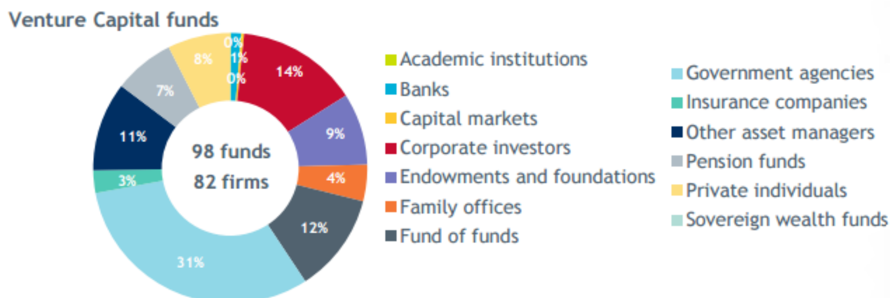

Figure 1 – Percentage distribution of the incremental value raised by the different Limited Partners (EVCA, 2016)

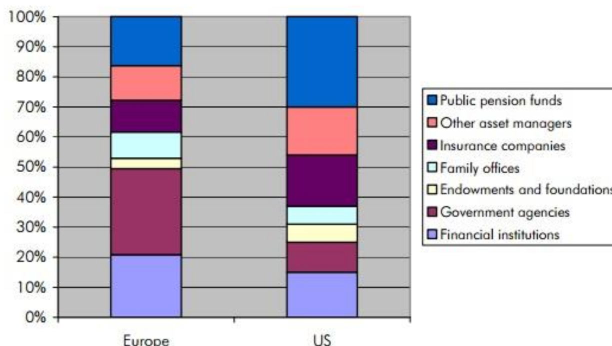

Figure 2 – Origin of VC Funds in Europe vs. United States (EVCA and Boston Consulting Group, 2009)

In the United States the Law allows pension funds to invest up to 15% of their assets into venture capital companies. Therefore, pension funds are the predominant source of capital for VC funds in the US. Furthermore, a relatively more diversified capital distribution characterizes the VC industry in the US, which can be regarded as a sign of market maturity (Figure 2). Portuguese funds, on the other hand, seem to suffer from a significant imbalance in terms of how the various types of the limited partners weigh on the funds. According to our survey, 50 to 70% of raised capital comes from Government agencies. Another aspect that can be concluded from the VC's answers to the survey refers to the nationality of the funds. The capital raised in Portugal is practically 100% national, which can be a sign of low attractiveness for foreign investors.

Several studies have already shown that, from a fund's performance standpoint, the public sector's track record as a direct investor is weak, mainly due to the non-financial objectives sought with its investments (Kelly, 2011). Profit maximization is not necessarily a Government agency's primary goal and this may be a reason for the VC's worse performance in Europe when compared to the United States. Nonetheless, it is a debatable matter, since its positive indirect impact can't be ignored. VC funds managed by the State, often have it as their goal to fill market gaps and foster entrepreneurship, particularly in high-growth industries. This explains why, when analysed from a purely ROI perspective, their results are negative. However, if we consider a more general context of job creation, of fostering innovation entrepreneurship, of building more structured firms, of attracting private investors and of creating a national entrepreneurial ecosystem, then the effect on the economy may be positive, even though it is not as easily measurable.

Public investment can be considered a catalyst for attracting private investment. The State's intervention as a co-investor with private firms may be a way of optimizing its involvement, since the State is rather evaluated by what invests rather than by its return. The success of the VC industry in Ireland, for instance, was explained by the CEO of a Portuguese VC in one of the held interviews, with the fact that Ireland negotiated a mega fund of funds with the European Economic Community (EEC), which agreed to contribute with an equal amount to the amount of capital that would be raised from other sources. For example, if a fund raised € 10 million from other sources, the public fund would co-invest the same amount. This concept of so-called Matching Funds helped remove the influence of the State from the decision on its funds allocation. Government agencies as LPs are estimated to contribute on average with about 3% of the capital raised by VCs in the UK and Ireland, while in other European countries that average is 31% (Invest Europe, 2015). Besides this low presence of government agencies, the UK and Ireland also have in common their better VC performance in comparison with other European countries. According to the study "Should Public Venture Capitalists Invest, Co-Invest, or invest in start-up firms?" (Tavares-Gärtner et al., 2016), investments are more efficient when public funds co-invest with independent funds or when they directly subsidize start-ups, leaving independent funds to manage the investment. Looking at Portugal, there appears to be a very strong presence of the State both as a direct investor – namely through Portugal Ventures (a Portuguese State owned VC company with the most assets under management in the country) – and as an LP for independent funds, when compared to reference markets such as the United States and the United Kingdom. Consequently, there seems to exist room for improvement in the LP mix in Portugal.

3.2 Total investment per company

Studies such as that carried out by Clarysse and Hairman (2007) show that VC-backed companies that receive little capital tend to perform poorer than firms attempting to develop their business model without the involvement of venture capital. That is, an insufficient availability of capital has a negative impact on the performance of a start-up, which in turn will have a negative impact on the VC funds themselves. Regardless of such cases it could be argued that VCs are less diversified if they concentrate their available capital on fewer start-ups. What seems to be happening in Europe, compared to the United States, is that European funds invest less in terms of added value, but support twice as many companies, resulting in a much lower investment per company (Invest Europe and NVCA, 2015). Portugal invests around 0.039% of its GDP through VC funds, which represents an absolute value of around € 60 million. Compared to the United States this is is quite low. Portugal would have to invest more than six times what it is currently investing per year on VC, in order to invest a similar amount to the US, in proportion to GDP. The United States invests around 0.25% of its GDP ($ 59.1 billion in absolute value in 2015), a share that would correspond in Portugal to about € 450 million (NVCA, 2016). The ranking of Portugal in 6th place in terms of investment made as a percentage of GDP in Europe could therefore be considered misleading. Ireland, for example, is one of the countries with the most successful VC industry in Europe, ranking 5th, a position above Portugal, with an investment equivalent to 0.041% of its GDP. However, the per capita GDP of Ireland and Portugal in 2015 was about $ 66,000 and $ 28,000, respectively, and therefore the total amounts invested by the two countries are very different.

Amongst the 15 companies that answered our survey, there is little presence in the expansion stage, which is evidenced by the total investment made by the Portuguese funds on their portfolio companies, which corresponds

on average to a maximum of approximately € 3 million. Investment rounds of series A, B, C, etc. often need to raise much higher amounts, which requires start-ups to look for capital out of the country when reaching more advanced stages. There are a few examples where Portuguese VCs entered more advanced funding rounds as major investors – for instance Unbabel, which in 2016 raised € 4.5 million in a series A round led by Caixa Capital and a British fund (and where other Portuguese funds participated). However, the limited existence of investments made by Portuguese VCs in later stages of the start-up life cycle is notorious. It seems to be an unfilled investment space in the country.

3.3 Diversity of VC fund managers and their incentives

Our interviews with partners and employees of some of the largest VC funds in the country have led to the clear conclusion that, in the words of one manager interviewed, "the money you give to a company is half the story. Completely key is the support given to invested start-ups. The diversity and industry knowledge of the fund's managers is therefore essential". In their opinion, having a hands-on team with diverse and complementary knowledge that can add the appropriate value to the start-up's development makes the difference between a successful and a failed investment. Of particular note are the financiers, the lawyers, and the specialists in certain industries (such as managers / engineers, former consultants, ex-entrepreneurs, etc.). According to Roger Kelly of the European Investment Fund (2011) there seems to be a lack of technical and scientific knowledge amongst European VCs, since most managers (about 50%) have had professional experience in the financial sector. The same author states that in the US is given more importance to individuals with a background in science and some entrepreneurial experience, as they are in a better position to advise the companies. In Europe and the US, more than 50% of the capital of VCs is concentrated in two sectors: Information and Communication Technology and Life Sciences (EVCA and NVCA, 2016), due to the growth potential of these markets. And the same happens in Portugal, even more sharply, since about 75% is concentrated in these two sectors. Having as part of the investor team experts in these industries, can thus be critical.

The results of the questionnaire show that about 42% of the fund managers have backgrounds in finance, 34% are experts in specific industries (eg PhDs or specialized consultants), 4% are ex-entrepreneurs, and 21% are others (corporate units). Thus, when compared to the US venture capital market, there seems to be room for improvement regarding fund's managers diversity, namely space to increase the number of experts from specific industries and former entrepreneurs.

In parallel with background diversity, it is essential that fund managers have good incentives and a strong alignment of interests with the limited partners. There were few replies to our survey on the question of the remuneration structure, but the three VCs that answered replied they had a 20% carried interest (with a hurdle rate of 6%, on average, lower than the typical values of around 8%, which shows that investors in Portugal require a lower minimum rate of return). However, as there are not many successful exits counted to date by VC companies in Portugal, most of the funds seem to be dependent on the management fee, calculated as a percentage of the assets under management. The same three VCs claim to have a management fee of 2-3%. Although it is a typical value for the business model of venture capital funds, its real significance may be debatable, as Portuguese funds are typically very small. A VC firm with about € 7.5 million assets under management, for instance, would have about € 150,000 to pay for all expenses, including salaries for the team. This remuneration

structure, though typical in general terms, may not be adequate for small funds, in that it may not allow them to attract the desired talent.

3.4 Quality of the start-ups and the ecosystem

One of the aspects tried to gain a better understanding of with the survey, was whether the problem could be on the demand side, that is, on an eventual lack of quality in the start-ups seeking investment. Projects and entrepreneurs looking for this type of alternative financing may not be of sufficient quality or maturity for a VC's requirements. This problem on the demand side could be caused by several reasons, for example: an unattractive and undeveloped entrepreneurial ecosystem; a low regard for entrepreneurship as a professional career, leading to people with good ideas not wanting to risk being less valued by employers; a fear of failure, as it may not be well regarded by society (rather than in the American culture, where failure is valued as a learning experience) (Kelly, 2011). A study by Informa DB (2016) points out that about 50% of start-ups will close after three years, in Portugal. Some of the VC managers interviewed believe that we do not need more but rather better entrepreneurs; that there is no need to create so many companies, but rather companies based on good business ideas, with management capacity, since the founder of company is often not the person prepared to run the company. In the USA, a clause often demanded by VCs in investment contracts is the power to replace the founders in some cases, which may be pointed out as one of the causes for the better financial performance of VCs in the US, given that it allows them to better defend situations in which the entrepreneur was poorly evaluated before acquiring a stake in a start-up (Hege et al., 2009). In fact, for most VC funds the entrepreneurs seem to be more important than the business idea itself, which will be discussed in section 3.5.

Looking at the survey responses, more than 50% of VCs who responded (eight in fifteen) feel that there is a lack of quality start-ups which are strong enough to receive investment. They point to reasons such as entrepreneurs lacking management skills, lack of original ideas, too much competition for the products/services, and a weak economy where there is difficulty in making partnerships. They complain that start-ups of quality will eventually go looking for funding outside of Portugal. This type of response raises the interesting question of *why* some of these VCs decided to start or work for funds, if the market was not mature, according to their own view. On the other hand, some of the fund managers interviewed claim that there have been far more good opportunities seeking investment in recent years, which is demonstrated by record numbers of start-ups approaching the funds for investment in 2015 and 2016. Armilar Ventures, for example, is one of these funds but adds that about 50% of the start-ups that came looking for investment in 2016 were not Portuguese.

The so-called entrepreneurial ecosystem is one of the most critical factors for VC, as evidenced by the fact that the performance of US VC funds investing in Europe has not been exceeding those of European funds (Hege et al. 2009). Hence, an ecosystem that facilitates the growth of start-ups has to exist in the United States. There are also several measures that can promote and strengthen it in Europe, amongst them, the existence of events and clusters that allow the proximity between funding sources and entrepreneurs, which facilitates the exchange of knowledge and networking (most Portuguese VCs use references from other investors/entrepreneurs and accelerators/incubators as a source of business); the presence of experienced and talented consultants in the financial, legal and strategic areas; the involvement of companies through Corporate Venture Capital funds, as

happens with EDP; incentives, such as for tax, so that the ecosystem can support companies to grow; amongst others (Kelly, 2011).

3.5 Investment criteria

When an investment made by a VC fund does not go as intended, the fund risks losing the capital entrusted to it by the LPs. It is therefore fundamental to conduct a rigorous and detailed investment process before and after investing in a company (Whitehead, 2003), which typically follows the following order of steps: Deal Sourcing, Deal Screening, Due Diligence, Contract Negotiation and Structure, Post-Investment, and Exit. Consequently, we used the survey to understand the relevance attributed by the Portuguese VCs to several investment criteria during the start-up evaluation process.

During the due diligence process, VCs evaluate the entrepreneurs and the management team, the product, the market and the financial data. The interviewed GPs emphasized that companies "have to have a business model that makes sense, differentiating itself in terms of the value proposition, which should lead to the belief that it is sufficiently better than what exists in the market, in order for it to be more likely to succeed in the future. But the most important is the investment in people. VCs have to have the right characteristics, be smart and determined." These opinions are in line with the results obtained by the survey. Portuguese VCs give as much importance to the experience and personality of entrepreneurs as those coming from reference countries in the VC industry. They prefer to invest in a very good entrepreneur and a good business idea, rather than a good entrepreneur and a very good business idea (Figure 3). Amongst the 10 criteria with the highest score, four appearances are related to the experience and personality of the entrepreneurs, four with the product/service and two with the market. For Portuguese VCs, entrepreneurs have to demonstrate integrity and leadership, specific market experience about their product/service, uniqueness, innovation, scalability and competitive advantage of the product, and a global market with high growth potential (Figure 4). These criteria are in line with international practices, with the exception of financial criteria which in some countries are often deemed less important than the entrepreneurs' personality and experience criteria, but more relevant than the product and market criteria (Mishra, 2003 and Eisele et al., 2001). However, the two criteria with the best score within the financial sub-criteria, "appreciation potential of acquired equity stake" and "diversity of potential exit routes for investors" are in line with international views.

Weight directly attributed to each Sub-Criteria (0 – 100)	VC	VC (late stage)	BAs Funds	CVC	All	Standard Deviation
Sample	10	1	3	2	16	
	μ	μ	μ	μ	μ	σ
I. Entrepreneurs/Top Management						
a) Personality	24.5	20.0	23.3	25.0	24.1	7.0
b) Experience	20.5	20.0	21.7	17.5	20.3	8.8
II. Products (Goods/Services)	21.0	15.0	18.3	22.5	20.3	6.2
III. Relevant Market	16.8	20.0	18.3	12.5	16.8	6.2
IV. Financials	11.1	20.0	11.7	10.0	11.6	4.8
V. Other Relevant Criteria	6.1	5.00	6.7	12.5	6.9	5.0
Total	100.0	100.0	100.0	100.0	100.0	-

Figure 3 – Investment sub-criteria weight distribution (attributed by the surveyed companies)

Top 10 Criteria		Scale	Std. Deviat.
		μ	σ
1	I. a) Perceived integrity	3.81	0.43
2	I. b) Specific industry experience	3.75	0.45
3	II. Scalability	3.69	0.48
4	II. Innovative potential and uniqueness	3.63	0.50
5	II. Practical usefulness for customers	3.63	0.62
6	I. a) Leadership and ability to motivate others	3.56	0.51
7	II. Competitive advantage	3.50	0.52
8	III. High growth potential	3.50	0.63
9	III. Large size (international/global market)	3.50	0.73
10	I. a) Coachable	3.44	0.51

1 – Irrelevant (not a factor in the decision making process); 2 – Somewhat relevant; 3 – Relevant; 4 – Very relevant (must be present under any circumstances in order for an investment to take place)

Figure 4 – Top 10 relevant investment criteria (amongst the surveyed companies)

4. Conclusions

The visibility and notoriety of entrepreneurship has been growing in Portugal, and the role of venture capital is crucial in providing the necessary liquidity and a variety of resources aimed at maximizing the growth of start-ups. These newly formed companies market innovative ideas that contribute significantly to job creation and to the economic growth of a country. They are fundamental pieces of an economy. The present dissertation intended to study the characteristics of Portuguese VC, in order to serve as a starting point for future studies in this field, as well as to help stakeholders of this industry in their future decision making, using the knowledge that can be extracted from it. It turns out that it is difficult to have the right recipe for the success of a VC fund. Through the existing literature, the results to the survey sent to Portuguese VCs, and interviews with important players in this industry, it can be concluded that it is essential to invest in industries where the team brings together relevant knowledge and experience, and to be effectively able to support start-ups. The diversity amongst the fund's managers in terms of background, knowledge and entrepreneurial experiences is also crucial, as is a rich mix of limited partners for the fund and a strong alignment of interests between GPs and LPs, as well as between the GPs and the entrepreneurs/founders. It also seems very important to invest in highly scalable, preferably technology-based companies, and to have a mature and dynamic ecosystem that strengthens the entrepreneurial network, accelerates the growth of start-ups, and brings tax incentives for VC investors, especially during transactions. An adequate prioritization of the most relevant investment criteria is important as well. Two important discussions remain open: the possibility of the State entering as a co-investor, without interfering directly on the management or on decisions of capital allocation for the start-ups, but to put this responsibility on private, independent VCs; and the discussion between the possibility of Portuguese funds to strategically position themselves as a good starting point for start-ups before entering more mature markets, or whether to fill the existing gap in the country in more advanced investment rounds (expansion stage).

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