Influence of the maturity of the venture capital market on the decision making of venture capital companies: A case study of the Algerian Startup Fund

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Abstract:

Research on the determinants of decision-making in Venture Capital Companies (VCCs) is almost unexplored in Algeria and Africa. Through this article, our objective is to remedy this gap by examining the determinants of decision making within the Algerian Startup Fund (ASF). This issue is analyzed taking into account the moderating role that the maturity of the venture capital (VC) market is supposed to play.

The use of a mixed methodology exploiting a quantitative approach (statistical analysis of data collected from 45 labeled start-ups) and a qualitative approach (interview with the ASF's general director) shows the predominant role attributed to financial and forecasting information in the ASF's decision-making process.

Keywords: Venture capital, decision making, market maturity, signals, financial informations.

Jel Classification Codes: D81, G24.

1. INTRODUCTION

When people think of start-ups, they usually think of the relaxed atmosphere that prevails, the flattening of hierarchical barriers between the different members, in short, a culture and an identity of their own (Marty, 2002). However, apart from this stereotypical view of what the start-up myth

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represents, it is generally known that this type of company contributes to job creation and to the wealth of the economy at large. In this respect, (Montani et al., 2020) estimate that the contribution of start-ups to the global economy is in the order of 2.8 trillion dollars.

Aware of the contribution that start-ups could make to the economy, the Algerian government has undertaken an approach to enhance the value of start-ups by 2020, the main effects of which can be summarized as the creation of a ministry of start-ups, a regulatory and fiscal framework and a VCC, namely the ASF.

The creation of the ASF may surprise an uninformed public at first sight, but its existence is justified by the lack of interest of the historical players[1] in Capital Investment (CI) in Algeria with regard to the VC profession.

This lack of interest in the VC profession in Algeria has attracted the attention of several researchers who have attempted to explain this low level of interest (Boudali, 2020; Himrane & Salhi, 2019; Mohamed & Asma, 2016). Beyond this topic, the Algerian academic literature has addressed the key concepts of the VC activity and the actors who are likely to be involved in it. No attention has therefore been paid to the determinants of financing decisions within the historical actors of the CI, nor yet within the ASF.

Through this article, the objective is to address the determinants of the financing decision of the ASF. Since its inception in January 2021, this fund has financed no less than 70 start-ups[2] , which makes it a major player in the financial ecosystem of start-ups in Algeria.

To achieve this objective, we formulate the following **problematic**:

- On what criteria is the ASF's decision-making based?

To address this issue we formulate the following hypothesis:

Hypothesis: ASF management should give greater weight to financial information because of the influence that the maturity of the VC market is expected to have on their decision making process.

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[1] Namely: FINALEP, africainvest, sofinance, asicom and el djazair istithmar.

[2] **Source:** https://www.elmoudjahid.dz/fr/economie/financement-des-start-up-600-millions-da-pour-l-innovation-181263 (accessed on 5 June 2022).

As mentioned earlier, the VC business in Algeria is still in its debuts, which suggests that the maturity of the market should influence the decision-making determinants used (Manigart et al., 2000; Sapienza et al., 1996).

In order to answer this hypothesis, we used a mixed methodological approach based on a quantitative study carried out on a non-random sample of 45 labeled start-ups that had applied for funding from the ASF and on a semi-structured interview with the general director of the ASF.

The rest of this paper is organized as follows. In the first section, we discuss the determinants of VCCs' decision-making along the dimension of market maturity. In the second section, we explain our data collection process. We conclude with a presentation and a discussion of the results obtained.

2. The moderating effect of the maturity of the VC market on VCC decision-making

In a pioneering study, (Sapienza et al., 1996) suggested that variability in the determinants of VCCs' decision-making is likely to be observed according to the dimension of the maturity of the VC market. Thus, VCCs based in countries with a mature VC industry will focus their analysis on information about the entrepreneur and the management team and on market and product information. In contrast, in VCCs in less mature VC markets, the focus will be on financial information when reviewing funding proposals. This focus on financial information has been explained by (Sapienza et al., 1996) by the influence of the financial and banking background of VC fund managers.

(Manigart et al., 2000) empirically examined the proposal of these researchers. Their results show that in European countries where the VC industry is relatively young, accounting information (qualified audit report, long-term management projection, due diligence by external experts) is significantly more used. This result therefore indicates the existence of a moderating effect of market maturity on VCC decision-making.

In the following points we will examine the subtleties in the determinants of decision making of VCCs in mature and less mature markets.

2.1. Signaling as a decision support for VCCs in mature markets

In these markets, the scientific literature has demonstrated the link between signaling and VC funding (Conti et al., 2013; Islam et al., 2018;

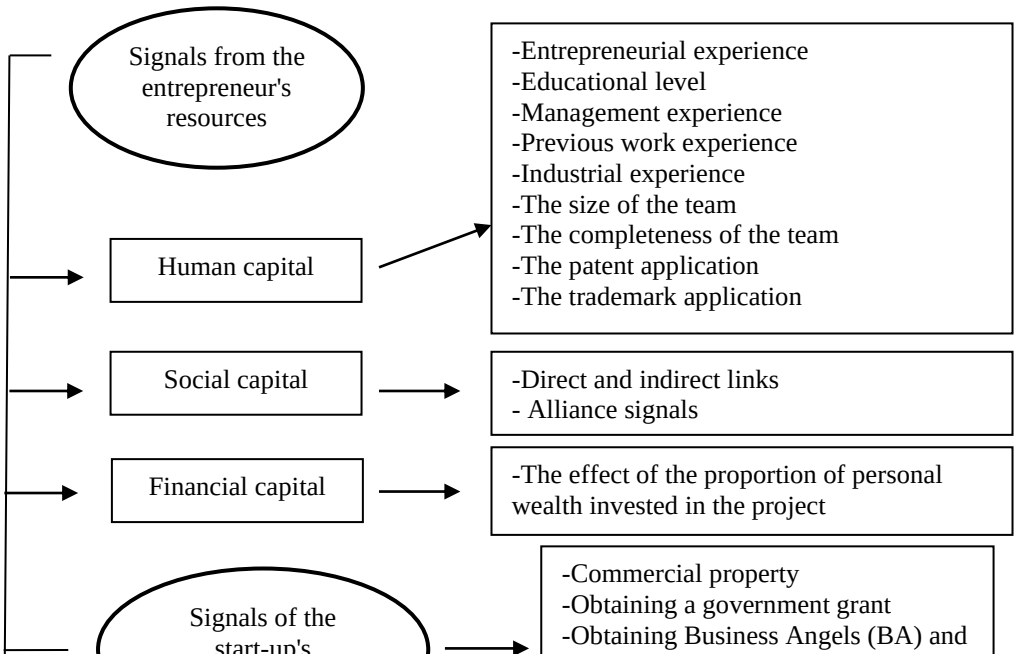
Plummer et al., 2016; Zhou et al., 2016). Signaling is derived from the work of (Spence, 1973) on the adverse selection problem (Akerlof, 1970) which highlights a situation in which the VCC, due to information asymmetry, is unable to distinguish between two start-ups of distinct quality. This problem characterizes the set of relationships that are subject to delegation, and therefore affects the start-up - VCC relationship that involves a delegation of part of the funds from a VCC to a start-up. To solve this problem, (Spence, 1973) suggested in his signal theory that the better informed party (the start-up) can signal its quality to the less informed party (VCC).

However, this signaling is conditioned by the meeting of two requirements, namely cost and observability (Spence, 1973). For (Kirmani & Rao, 2000), the concept of cost refers to the fact that the amount of the signal must be high enough to dissuade the low quality firm from sending a signal, but low enough to make it attractive to the high quality firm. The concept of observability, on the other hand, refers to the ability of outsiders to notice the signal. So not every action is useful as a signal (Connelly et al., 2011).

In the field of VC, the literature on signaling is highly developed and fragmented in the sense that no study has sought to value the completeness of the signals used within an academic document.

Our review of the literature has identified 28 potential signals that start-ups are likely to identify when seeking to mobilize VC. The figure below illustrates a classification of these signals into three categories.

Fig.1. Summary of the main signals in the field of VC



Source: made by us.

Through this figure, we see the emergence in the literature of a new category of signals that do not always meet the signaling requirements formulated by (Spence, 1973). Among these atypical signals, we can identify the entrepreneur's coaching ability (Ciuchta et al., 2018), the signal of the integration of images and colors in the business plans (Chan & Park, 2015) and the use of an eponymous name (Belenzon et al., 2017). The appearance of these signals should be linked to the acceleration of the decision-making process of VCCs and their need to invest more and more upstream in the life cycle of the start-up.

2.2. Financial information as a decision-making tool for VCCs in less mature VC markets

Few studies have examined the effect of VC market maturity on VCC decision-making, to our knowledge, there are only those of (Manigart et al., 2000) and (Silva, 2004). The former confirmed the existence of a moderation of VCC decision-making by market maturity in the European VC industry of the early 2000s. Such moderation is explained by the greater weight attributed to financial information at the expense of non-financial information (signals). (Silva, 2004), in his study of a Portuguese VCC, did not find any differences between the decision-making process of this VCC and those established in more mature markets. Such discrepancies therefore encourage further investigation into the influence of this variable on VCC decision-making.

To examine whether the ASF gives greater weight to financial determinants in its decision-making process, it is necessary to distinguish the financial information that influences the decision-making of VCCs. In view of the limited literature on the market maturity dimension, we have relied on the financial information that has been found to be significant in mature VC markets. This literature review demonstrated the positive effect on VC mobilization of the following 6 financial and forecasting information:

- Treasury information;
- Research & Development (R&D) expenditure;
- The Profit and Loss Statement (P&L);
- The income generated;
- The expected Internal Rate of Return (IRR);
- Expected profitability.

These 6 financial and forecast information and the 27 previously distinguished signals[3] will be empirically tested in this article.

3. EXPERIMENTAL

In order to determine whether the ASF gives more weight to financial information in its decision-making process, we used a mixed methodology, consisting of a quantitative study of 45 start-ups that had applied for funding from the ASF and a semi-structured interview with the general director of the ASF fund, Mr Hachani Okba. The use of this dual methodological approach is explained by the difficulties encountered during the data collection process, where our multiple requests to the ASF and the Ministry of Start-ups did not receive any favorable response. The inability to access the population of start-ups that had applied for funding from the VCC therefore greatly influenced the initial approach to data analysis (multivariate analysis via logistic regression).

3.1. Data

The mixed methodology used implies the use of two distinct types of data. Thus, quantitative data were accessed through the administration of a questionnaire to a non-random sample of labeled start-ups.

[3] Except for the gender effect.

Start-ups that met the discrimination criterion (application for ASF funding) were invited to respond to the questionnaire by telephone or email. This approach made it possible to target the founder or co-founders of the start-ups directly.

The questions included in the questionnaire were formulated to obtain dichotomous data on financial and non-financial determinants. This type of coding allowed us to test the effect of the existence of the determinant identified in our literature review on start-ups. At this level, the passion signal was excluded due to the difficulty in finding an appropriate coding approach.

To examine the effect of these quantitative data we used a bivariate analysis. The effect of each determinant on the dependent variable (funding via ASF) was tested via the chi-square test of independence. This measure of association was used in conjunction with measures indicating the strength of the association such as Phi, Cramer's V and Eta squared.

The data for the qualitative study was collected through a semi-structured interview with the new general director of ASF, Mr Okba Hachani.

The interview lasted one hour and thirty minutes. Due to the respondent's refusal to record the interview, we only took notes which we completed later. Due to the complexity of the research topic, we had to complete the interview with a supplementary questionnaire asking the respondent to indicate the importance of each determinant on a 5-point Likert scale.

4. Results

The results of the two types of studies were first analyzed separately and then combined in the interpretation and discussion of the results.

4.1. Results of the quantitative study

Of the 350 start-ups contacted, 54 responses were obtained. 45 of these 54 responses are considered valid in the sense that they met the discrimination criterion (applying for ASF funding). The remaining 9 responses were excluded either because the start-ups were waiting for a response regarding funding or because they did not apply for funding.

The table below presents some descriptive statistics on the distribution of the analyzed determinants within the population of 45 start-ups.

Table 1. Frequency of observation of the analyzed determinants

Elements	**No (0)**	**Yes (1)**	**Mode**	**Missing values**
Entrepreneurial experience	23 (51%)	22 (49%)	0	0
Educational level	04 (9%)	41 (91%)	1	0
Management experience	11 (30%)	26 (70%)	1	08
Industrial experience	15 (68%)	07 (32%)	0	23
Professional experience	15 (33%)	30 (67%)	1	0
The size of the founding team	19 (42%)	26 (58%)	1	0
The completeness of the team	30 (67%)	15 (33%)	0	0
The patent application	36 (80%)	09 (20%)	0	0
The trademark application	22 (49%)	23 (51%)	1	0
Direct links	41 (91%)	04 (9%)	0	0
Indirect links	31 (69%)	14 (31%)	0	0
Alliance	41 (91%)	04 (9%)	0	0
The proportion of personal wealth invested	09 (26%)	26 (74%)	1	10
Installation in a commercial property	08 (18%)	37 (82%)	1	0
Obtaining funding via BA	43 (96%)	02 (4%)	0	0
Obtaining funding via crowdfunding	45 (100%)	0	0	0
Obtaining a government grant	43 (96%)	02 (4%)	0	0
The existence of a functional product or service	08 (18%)	37 (82%)	1	0
The entrepreneur's coaching ability	30 (67%)	15 (33%)	0	0

Parental entrepreneurship	33 (73%)	12 (27%)	0	0
The business plan	0	45 (100%)	1	0
Integrating images into the business plan	12 (27%)	33 (73%)	1	0
The integration of the color red in the business plan	33 (79%)	09 (21%)	0	03
The integration of the color blue into the business plan	23 (55%)	19 (45%)	0	03
The eponymous naming strategy	45 (100%)	0	0	0
Insertion in a growth market	19 (42%)	26 (58%)	1	0
R&D expenditure	19 (43%)	26 (57%)	1	01
Cash flow generation	26 (58%)	19 (42%)	0	0
Income generation	25 (56%)	20 (44%)	0	0
P&L statement	06 (13%)	39 (87%)	1	0
The IRR	02 (4%)	43 (96%)	1	0
Expected profitability	0	45 (100%)	1	0
Financing via the ASF	16 (36%)	29 (64%)	1	0

Source: data collected.

These descriptive statistics, in addition to providing general indications on the sample, allow us to identify 10 determinants that should not influence the decision-making of the ASF because of their constant or quasi-constant character. These are: obtaining funding via BA, crowdfunding and via government grant. In addition to these variables, the eponymous naming strategy, direct links, alliance building, IRR, education level, business plan and expected profitability are also excluded. For the last two variables, the measurement instrument used does not allow us to identify the influence of these determinants on the ASF's decision making, it only informs us about the mandatory nature of this information.

The table also shows that 6 variables have missing data. In this study we will not give any statistical treatment to these missing values to avoid biasing the results by overestimating certain parameters.

The remaining 22 determinants were cross-sorted with the dependent variable, financing via the ASF. The p.value associated with the chi-square test of independence was only statistically significant for the 4 determinants presented in the table below.

Table 2. Determinants influencing ASFs decision making

Independent variables / Financing by the ASF	R&D expenditure		The patent application		The P&L statement		Entering a growth market	
	No	Yes	No	Yes	No	Yes	No	Yes
No	11	5	16	0	5	11	14	2
Yes	8	20	20	9	1	28	5	24
Total	19	25	36	9	6	39	19	26
Chi-square test for independence	p.value = .010		p.value = .013		p.value = .009		p.value = .000	
Fisher's exact test			,017		0,17			
V of cramer/Phi	,390		,371		,391		,681	
Square Eta	,390		,371		,391		,681	

Source: SPSS analysis.

When examining the strength of the association between these determinants and ASF funding, the degrees of association range from moderate for the variables of patent application, P&L statement, R&D expenditure to strong for entering a growth market.

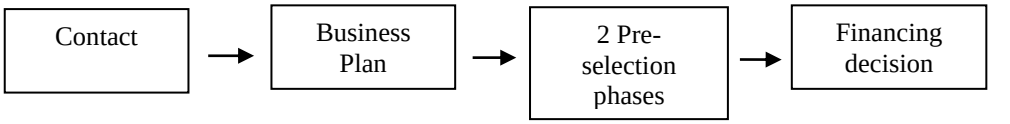
At this stage of the research, there is evidence of complementarity between financial and non-financial information in the decision-making of the ASF.

The results of the interview will allow us to further explore the question of the determinants influencing the decision-making of the ASF, to examine the effect of some untested determinants and finally to corroborate the effects found above.

4.2 Results of the qualitative study

The interview revealed four main phases of the ASF's investment process. These are summarized in the figure below.

Fig.2. Decision-making process of the ASF



Source: interview.

The contact phase can take place either via a physical presentation at the ASF's headquarters, or via e-mail, or via the organization's website. This phase is followed by the preparation of a business plan and the drafting of a dated and signed application for financing. The two pre-selection phases are based on the decision-making matrix presented in the table below.

Table 3. Decision-Making Matrix of the ASF

Criteria	Regulatory		Technical		Functional		NPV[4]		IRR ASF		PI[5]		RT[6]		Σ
Weighting	4		2		3		5		1		3		3		
Project 1		4		6		12		15		5		12		3	57
Project 2															
Project n															

Source: ASF internal document.

[4] NPV stands for Net Present Value.
[5] PI for profitability index.
[6] RT for Recovery Time.

The first three criteria indicated in the matrix constitute the first pre-selection phase, the objective of which is to inform the ASF of the legal feasibility of the projects, the degree of saturation of the target market, and the founder's good mastery of the technical aspects of the project. For founders with previous business creation experience, due diligence is conducted to ensure that they have not been responsible for the failure of previous businesses.

From the table, it can be deduced that the second screening phase is mainly focused on the financial character of the project. The overall profitability of the project is assessed through indicators such as NPV, RT or PI. Mr. Hachani stated that during this phase, scenarios for the outcome of the projects are constructed on the basis of the forecast figures provided by the project promoters. A sensitivity analysis is also carried out which leads to the recalculation of the IRR. This approach ensures the reliability of the forecasts made. The respondent was also puzzled by the reliability and subjective nature of this project evaluation process. The respondent felt that he strongly prefer start-ups with a financial track record as their financial assessment can be made with greater robustness.

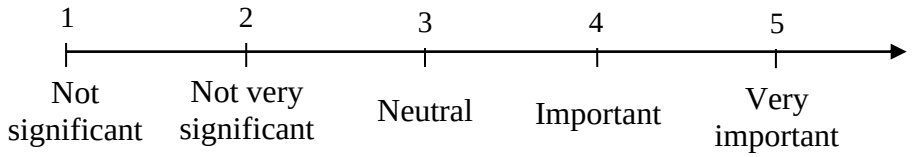
The highest rated projects on this decision-making matrix are then presented to the fund's investment committee. The final funding decision is based on the results of the evaluation matrix, profitability analysis and financial analysis where actual data exist, as well as on portfolio strategy requirements.

In order to confirm the respondent's earlier comments, a question was asked to the respondent to find out if there is a complementarity between non-financial and financial information in the ASF's decision making. The respondent answered in the negative, indicating that financial information carries more weight in the ASF's decision making, so that it can compromise a financing decision, unlike non-financial information which is used for evaluation purposes only and is in no way detrimental. The answer to the second question on non-financial information that compromises the financing decision supports the respondent's initial answer in the sense that the non-

financial rejection criteria are mainly banking related such as the high age of the project owner or the debt load.

In order to get an indication of the importance given to each driver, we completed the interview with a questionnaire asking the respondent to indicate the weight associated with each driver on a 5-level Likert scale organized as follows:

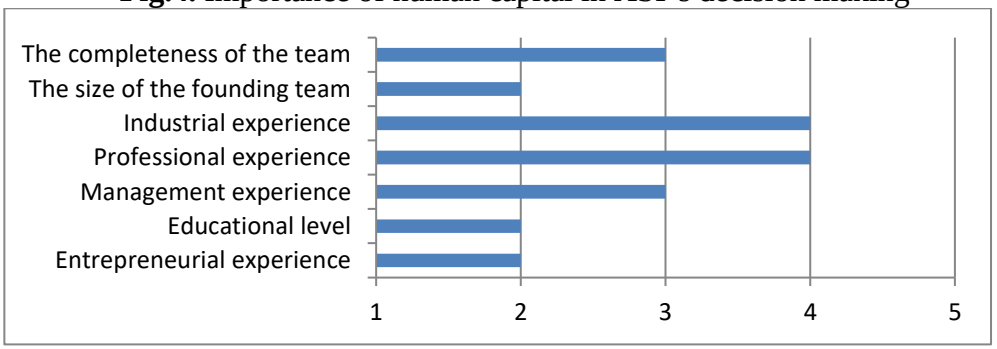
Fig.3. Organization of the 5-level Likert scale



Source: made by us.

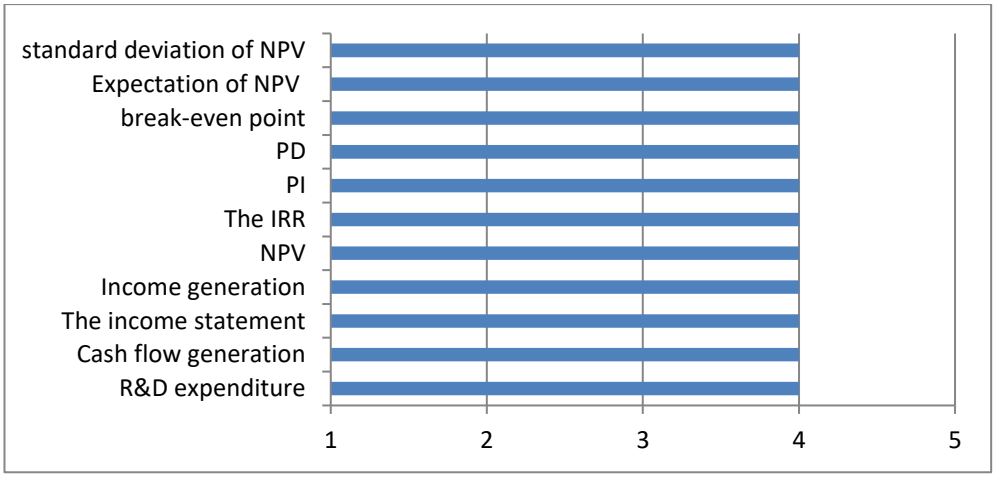
The figures below provide an illustration of the importance attached to the determinants studied.

Fig.4. Importance of human capital in ASF's decision making



Source: Supplementary questionnaire.

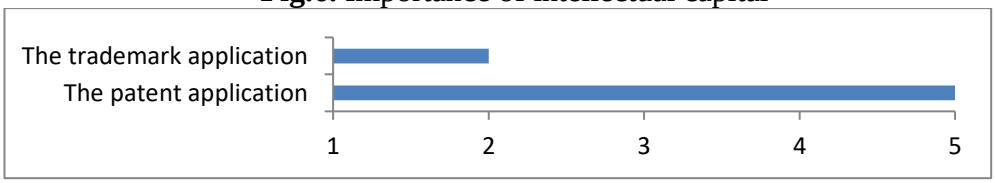
Fig.5. Importance of financial and forecasting information



Source: Supplementary questionnaire.

The answers provided in Figure 5 clearly show the greater weight given by the respondent during the interview to financial and forecasting information.

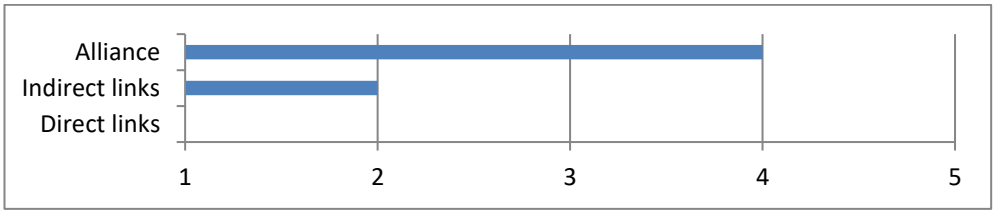
Fig.6. Importance of intellectual capital



Source: Supplementary questionnaire.

In terms of intellectual capital, the patent application is better valued than the trademark application. This result is in line with the result of the quantitative study which indicates the significance of this determinant.

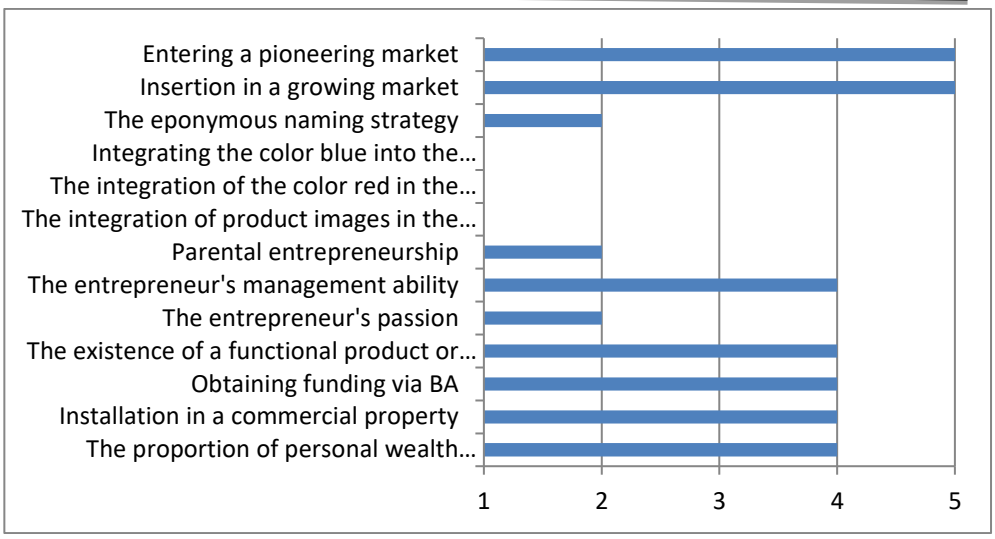
Fig.7. Importance of social capital



Source: Supplementary questionnaire.

In terms of social capital, the conclusion of the alliance is important to the decision-making of the ASF but not detrimental (result of the interview). Direct and indirect links are not valued.

Fig.8. Importance of other determinants



Source: Supplementary questionnaire.

In this category, two drivers have a very important weight in the ASF's decision making. Five drivers are considered important. The other six fall into the category of not very and not significant.

An important point to note about the findings of this questionnaire is that they should be considered in line with the interview results, which suggest a greater weighting of financial information at the expense of signals.

5. Interpretation and discussion of the results obtained

To identify the determinants of ASF decision making, this study used a mixed methodology. The quantitative study found a significant effect for only four determinants, which may be surprising given the large number of determinants examined. These results can be explained by the findings of the interview, which suggest a non-discriminatory role for signals. The literature has also provided some answers to these findings. Indeed, (Zhang et al., 2019) suggest a limited effectiveness for signaling to public VCCs, thus, for these VCCs the choice of investments is not a direct reaction to signals. For their part, (Connelly et al., 2011) link this result to the limited number of signals that start-ups could rely on in emerging industrial contexts.

In order not to question the interest[7] of the mixed methodology used, it is necessary to provide explanations for the few divergent results found. Thus, the non-discriminatory character of the non-financial information underlined by the interview explains the divergence of the results with regard to the effect of professional and industrial experience, the effect of the alliance and the proportion of personal wealth invested. With regard to the effect of the trademark application, the difference is linked to the compulsory nature of this process in Algeria (Risac, 2020). The insignificance of IRR, expected profitability, cash flow generation and revenue should be related to the bivariate analysis framework pursued in the quantitative study. In other words, the financial information should be examined in a combined rather than individual approach. Finally, with regard to the product or service effect, coaching ability and business plan, the discrepancy is linked to a miscoding of these variables. Thus, the assumed link between managerial capacity and the degree of belief in the start-up should not prevail. With regard to the product or service, it seems that the ASF is more concerned with the innovative character and the degree of mastery of the latter than with their functional character. Furthermore, it would have been more appropriate to examine the quality of the business plan than its use as a decision-making tool.

Before closing this discussion, it is necessary to respond to the hypothesis that was formulated. Thus, the hypothesis suggesting that ASF managers should give more weight to financial information in their decision making process because of the influence that the maturity of the VC market should have on decision making **is confirmed**. Indeed, all financial and forecasting determinants were associated in the supplementary questionnaire with an importance level of 4 on the Likert scale. In addition, the ASF's general director revealed during the interview the appreciative and non-prejudicial nature of the signals. Finally, the financial determinants receive a

[7] This is reflected in the depth of analysis that the qualitative study allowed by challenging the claims of complementarity between financial and non-financial information suggested by the quantitative study.

higher rating (35 points out of 57 compared to 22 for signals) in the decision-making matrix presented in Table 3.

6. Conclusion

The issue of the determinants of VCC decision making is strongly rooted in the literature and was first developed in the early 1980s. On the other hand, the effect of the maturity of the VC market on decision making has been little explored in the literature where, to our knowledge, there are only the studies of (Silva, 2004) and (Manigart et al., 2000) that have addressed this issue. However, these studies have produced divergent results, hence the need for further investigation.

In this study, we are interested in the influence of this dimension in the Algerian VC market. In particular, we looked at the case of the ASF, which was created in 2020. The results we obtained demonstrate the greater weight attributed to financial and forecasting information (R&D expenses, cash flow and income generation, indicators of project profitability: NPV, IRR, break-even point) in the financing decision of the ASF. These results show that there is a moderating effect of market maturity on ASF's decision making.

The findings of this paper have implications at several levels. From a theoretical perspective, this study has moved away from the developed economic contexts where research on VCC decision making proliferates (Scheela et al., 2015). By examining signals such as images, colors, coaching ability, this study has contributed to a new stream of research on so-called 'weak' signals. From a practical point of view, the results help to explain why some start-ups receive funding while others do not. They also provide information to the entrepreneurial community on both the sequence of activities and events that make up the decision-making process and the determinants that may influence ASF's decision making. Such clarification will enable entrepreneurs to identify a priori their likelihood of obtaining funding.

Future research could assess the differences between mature and emerging VC markets from the demand side (difference in entrepreneurial profiles) and not only from the offer side (difference in VCCs). We encourage researchers to study the interaction between several signals to avoid providing

a simplified picture of VCC decision making (Patzelt, 2010). This single-case study cannot reveal whether there is homogeneity in VCC decision-making. Future studies can take advantage of the maturity of the Algerian VC sector to verify whether VCCs follow a multi-criteria perspective (Monika & Sharma, 2015) or whether they are united around common decision-making criteria (Shepherd, 1999). The research component on the influence of financial information on VCC decision-making is relatively underdeveloped compared to the signaling component. Future studies should pay more attention to the relevance of such information both within and outside developed VC markets.

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