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Article

Attributes of Business Incubators: A Conjoint Analysis of Venture Capitalist's Decision Making

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Abstract: Startups contribute significantly to the economic development of a country. Despite their importance and promising future, they are extremely fragile, mainly for their lack of tangible and intangible resources. Since this can be obtained through an incubation process, business incubators (BIs) could have a significant impact on the survival rate of startups. Once defined their core structure and value proposition, there are other players, such as venture capitalists who could guarantee the funds necessary to make the startup's business grow over time. Drawing on the resource-based view theory, this research explores whether some BIs could represent a certification of startup quality for venture capitalists (VCs). Specifically, we investigate whether some specific attributes of BIs increase the probability that a VC funds startups after being incubated; to this purpose, we carry out an experiment on a European sample of VCs. Results demonstrate that some characteristics of the BI can produce a sort of certification effect to the incubated startups, increasing the probability of being funded by VCs.



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Keywords: business incubator; venture capital; conjoint analysis

1. Introduction

Startups play a crucial role in a country's economy, becoming an essential part of the regional economic development. Therefore, supporting these companies is fundamental as they are extremely fragile because the lack of resources prevent them to develop their value proposition and their intended market is sometimes unproved or speculative, making it difficult to predict the success of their offering (Somsuk et al. 2012a). For these reasons, financing could be hard to find for this kind of firms.

Business incubators (BIs), described as infrastructures that provide financial resources, consulting and other services to help startups grow in an efficient and healthy way (Grimaldi and Grandi 2005; Somsuk et al. 2012a), are among the actors that could support these companies. BIs also give know-how to their incubatees, which often lack managerial, technical and marketing capabilities, thus becoming a supervised and nurturing environment where startups can grow and develop an effective value proposition. In recent years, there has been an evolution in the BI service offering: they moved from providing administrative services and spaces to less tangible higher value-added services (Lukeš et al. 2019). In this way, the incubated firms can take advantage of specialized advisory services, support to core business operations and a network of established partnerships; once they are sufficiently structured and their product (or service) is ready for the market, they can exit the BI. Work focused on the resource-based view (RBV) suggests that these programs lower barriers to entry and improve survival rates (e.g., Barney 1991; Schwartz 2009; Woolley and MacGregor 2021). However, as reported by Lukeš et al. (2019), later stage startups continue to struggle to find financial resources even in the subsequent phases. Financial resources represent a continuous constraint to the growth of these companies, especially in high technological content businesses. Despite the fact that it is demonstrated (Lukeš et al. 2019) that companies

that have received external financing from investors such as private equity can have higher probability to grow, it is still difficult for them to find later-stage capital since their uncertainty is still high and success cannot be predicted. In this context, understanding whether investors, along their evaluation process, give credit to the incubation and the attributes of the BI, is particularly relevant for both startups and incubators.

Despite the fact that VCs have been extensively studied in the literature, there are still many aspects that are not fully understood, one among all, their investments selection criteria (Drover et al. 2017a, 2017b; Tykvová 2018). VCs' evaluation process is extremely complex and, due to the strong information asymmetry between the parties, investors rely not only on quantitative elements, but also on qualitative ones. Within this complex situation, certification by other actors, such as previous investors, is one of the factors that VCs evaluate to limit the uncertainty of the investment (Drover et al. 2017b; Tykvová 2018). The uncertainty and risk inherent in the VC evaluation process might be mitigated by the presence of trustable actors that offer a certain reference basis. For this reason, any signal that gives credibility to the value of such firms is valuable to investors (Seppä and Maula 2001). We took BI into consideration because incubation programs are found to be one of the main mechanisms to support innovation (Wonglimpiyarat 2016) and to reduce new venture failure (Ayatse et al. 2017), which attracts subsequent funding (Wang et al. 2020). Besides that, at a certain point we have witnessed an increase in the number and variety of BIs, which caused a subsequent need for evaluating them and their success (Voisey et al. 2006), for example, controlling whether incubated firms survive after graduation from their supporting incubator organizations (Theodorakopoulos et al. 2014). This also stimulated BIs, enhancing the quality of their services, thus being a further certification of incubated firms. However, to the best of our knowledge, the literature on the field has not dedicated enough attention to understanding whether being incubated and the characteristics of the BI might be indicators of the startups' value and consequently might increase the chance for a startup to be funded by VCs. Recently, Woolley and MacGregor (2021) have outlined that VCs might perceive the signal of the private incubator business model favorably, which encourages further research in this domain.

Based on this premise, we draw from the RBV to look at BIs as providers of intangible, besides traditional tangible, resources (van Weele et al. 2020). Using this theoretical background, which is increasingly used to study incubators, the purpose of this study is to investigate whether the incubation process could represent a certification of startup quality for VCs. In particular, we aim to understand whether some specific attributes of BIs (i.e., sponsorship, partnership with universities, focus, reputation and team experience) increase the probability of the incubated startups to be funded by a VC.

To reach our aim, we used the conjoint analysis technique because it allows researchers to unveil the most important attributes for investors to be considered when evaluating an investment in startups. Moreover, this method contributes to solve some of the drawbacks related to the application of other techniques. Indeed, before the introduction of advanced techniques as conjoint analysis (Muzyka et al. 1996), most studies used post hoc analyses (Zacharakis and Meyer 1998) that may cause post hoc rationalization biases to respondents affecting the quality of results (Zacharakis and Meyer 1998; Petty and Gruber 2011). For this reason, past studies have been rediscussed and, in many cases, refuted (Zacharakis and Shepherd 2001; Shepherd et al. 2003; Franke et al. 2006; Petty and Gruber 2011).

The findings of this research contribute to the literature of the early screening stage of VC evaluation, showing that startups incubated in a BI with certain attributes have a higher probability of being funded by a VC. In addition, the results further support previous studies (Drover et al. 2017b; Tykvová 2018) that demonstrate that investors tend to interact with other actors who precede their entry to have a certification of the quality of the investment.

This research also has practical implications, as the results could be useful for entrepreneurs, VCs, public bodies and incubators. Far-sighted entrepreneurs could properly select the incubators that might ensure them a better chance of being subsequently funded

by VCs. At the same time, VCs could establish partnerships with trusted incubators to have a certified quality channel of investment opportunities. Incubators should assess their own operating model and understand if it could be redefined to give a higher quality service and achieve a higher reputation in the market. Finally, incubators, being entrepreneurial assistance programs, might pay attention and enforce the discovered attributes (for example their partnership with university, their reputation, their level of specialization), thus increasing startup survival rate (Peters et al. 2004; Grimaldi and Grandi 2005; Somsuk et al. 2012b). This way, public bodies might also get some suggestions on how to invest in a more targeted way, preferring incubators that ensure the maximum investment continuity.

2. Theoretical Background and Hypotheses

As anticipated, the growth of a startup is not guaranteed in its later stages also because of the lack of funds (Somsuk et al. 2012a; Lukeš et al. 2019). The incubation process contributes to the business idea development and growth of startups by providing resources and competences and offering them the opportunity to grow in a safer and more structured way than they could do if they were independent. Therefore, previous literature has frequently drawn from the resource-based view (RBV) theory to study incubators. RBV starts from the assumption that the tools that a company possesses to implement its strategy and to improve its effectiveness and efficiency are its resources, seen as “stocks of available factors that are owned or controlled by the firm” (Amit and Schoemaker 1993, p. 35). More specifically, according to the RBV, firms are seen as bundles of valuable, rare, inimitable and non-substitutable resources that allow a firm competitive advantage (Barney 1991). There are several taxonomies to distinguish the different types of resources, among which the distinction between tangible and intangible resources is one of the most frequently used (e.g., M’Chirgui 2012; Somsuk et al. 2012a, 2012b; Mian et al. 2016). Tangible resources include raw materials, equipment and production facilities, infrastructure and financing, whereas intangible ones encompass reputation, organizational culture and skills, management know-how and networking. Incubators can provide both tangible and intangible resources (van Weele et al. 2020), but, beyond financing, incubators are increasingly required to develop specific intangible assets to satisfy tenant firms (Calza et al. 2014; Gassmann and Becker 2006). At the beginning, incubators mainly focused on tangible assets, but then the attention turned on the provision of more intangible and high-value services (Grimaldi and Grandi 2005), as the basis for obtaining a competitive advantage over the competition (Petrick et al. 1999).

So far, the literature has used the RBV approach to assess which resources are the most important and should be provided to startups (e.g., Eveleens et al. 2017; van Weele et al. 2020). However, only recently has another perspective been considered, that is whether and how different characteristics and resources of the incubators influence the success of incubatees in terms of VC financing after being incubated (Woolley and MacGregor 2021). Woolley and MacGregor (2021) demonstrate that firms incubated in private incubators, rather than academic incubators, are over 70% more likely to obtain VC funds than nonincubated firms. This pushes further research in this area to ascertain whether the fact that firms have been incubated in BIs with determined features could benefit from a certification effect in the eyes of an investor by reducing the riskiness of the operation and, thus, enhancing the probability of being funded by a VC. More particularly, for the arguments explained above, this study focuses on the intangible assets that previous literature has highlighted as important.

The subsequent section provides a description of these attributes, which leads to the formulation of the hypotheses.

2.1. Sponsorship

The sponsorship of the incubator, intended as the actors who have financed it, represents one of the main factors that can influence its operating model (Grimaldi and Grandi 2005; Clarysse et al. 2005; Gassmann and Becker 2006), as well as its strategic objectives

(Pauwels et al. 2016). On the one hand, private incubators are mainly for-profit structures and they are generally supported by different typologies of actors including private individuals or corporate sector enterprises (Von Zedtwitz and Grimaldi 2006; Gassmann and Becker 2006). Since private incubators finance themselves with their own activities, they aim to make incubatees independent as soon as possible (Grimaldi and Grandi 2005). Consequently, this kind of business model might be considered a high-risk investment in new ventures with a high potential (Pauwels et al. 2016). In addition, to avoid resource losses and to maximize the return on investment, these kinds of BIs are expected to select companies in a stricter way (Klofsten et al. 2020), avoiding projects that do not ensure enough capital gain (Peters et al. 2004). The strict criteria allow BIs to select investments with higher profitability, thus providing a flow of financial resources that could be used to develop higher quality services and networks to their incubatees.

On the other hand, there are non-profit incubators. These structures represent a tool for public bodies to stimulate local economic development (Grimaldi and Grandi 2005; Pauwels et al. 2016) so they are expected to be more inclusive and less selective. These BIs are mainly financed by public funds (Von Zedtwitz and Grimaldi 2006) and, due to their nature, their tenants might have lower returns on investments. Compared to a private BI, public funded ones tend to have less economic resources available, which in turn might impact the services and structures offered.

Thus, since private incubators evaluate and invest following a similar approach to those of a VC, it is assumed that the latter prefers companies incubated by private structures, as the evaluation of the candidate company from other professionals could represent further certification of the investment quality. On such basis, authors formulated the first hypothesis.

Hypothesis 1 (H1). *Startups incubated by a private rather than a public BI have a higher probability that venture capitalists will invest in them.*

2.2. Partnership with Universities/Research Centers

Often incubatees are companies characterized by a high technological and innovative business idea, but they lack enough competences to develop their offering. In this case, the key service for the success of the incubation is the provision of technical know-how (Soetanto and Jack 2016; M'Chirgui et al. 2018), which could also ensure longevity of the incubator itself (Autio and Klofsten 1998). Indeed, if the internal network of the incubator cannot provide some resources or competences, its external network can do it, beyond connecting startups with external stakeholders (van Weele et al. 2020). In this way, network actors become strategic partners, so the incubator takes the role of the coordinator of third-party services (Gassmann and Becker 2006). For this reason, incubators are often located near or partnered with universities or research centers. In a general way, incubators that have established partnerships with universities and research institutes are able to offer specific and high-quality skills and structures (Hackett and Dilts 2004; Schwartz and Hornych 2010; Somsuk et al. 2012a).

Different types of agreements between the incubator and the university might be set, spreading from partnerships in which the university has an office inside the BI to simple informal agreements between the incubator team and the academia. Many incubators even try to position themselves in an area as adjacent as possible to the involved research institution to stimulate interactions that allow the transfer of knowledge between researchers, managers and engineers (Schwartz and Hornych 2010).

In addition, partnering with a research center or a university increases the value offered, thus improving the incubator attractiveness. Based on these premises, collaborating with universities or research centers provides specialized and advanced knowledge that might improve the startup's value and ultimately affect the quality of the incubator for VCs, which leads to the second hypothesis.

Hypothesis 2 (H2). *Startups incubated by a BI affiliated with a university or research institute have a higher probability that venture capitalists will invest in them.*

2.3. Focus

Specialization in a specific sector allows the incubator to develop much deeper knowledge and expertise over time than it would do if it was more generalist and thus involved in many different sectors (Clarysse et al. 2005). Indeed, different industries may require different skills, which sometimes can hardly be used transversally in different companies. Focused incubators can generally offer better services, higher quality technical consultancy and specialized infrastructures which could impact on the level of services offered to incubated companies (van Weele et al. 2020). Furthermore, as reported by Barbero et al. (2012), specialization in a sector allows the incubator to be better recognized among companies and investors operating within that sector.

Von Zedtwitz and Grimaldi (2006) reported that as the specialization allows the BI to design and provide tailored services and specific capabilities, it has an impact on the trustworthiness of the incubator as prospective tenants can expect a higher support. The focalization also influences the network of the tenants because it attracts tenants who share the same competences and characteristics, facilitating knowledge transfer, which gives further value to the incubation process (Hansen et al. 2000; Chan and Lau 2005).

Based on these premises, we hypothesize that an investor would prefer to invest in a company that has been able to benefit from specific services and skills tailored to a specific sector.

Hypothesis 3 (H3). *Startups incubated by a BI specialized in a certain business sector have a higher probability that venture capitalists will invest in them.*

2.4. Reputation

Reputation of the business incubators is another factor authors assume to be relevant in influencing the investment decisions of VCs (e.g., Gassmann and Becker 2006). Starting from the consideration that reputation might depend on different elements, in this article reputation is intended as the knowledge and experiences, as well as a track record of supporting successful startups (van Weele et al. 2020) that have matured and consolidated along time. If the incubator is an established reality in its sector, this could allow it to be partnered with a credit and financial institution and with technological and business consulting firms. Oppositely, a recently founded BI is a new rapidly growing reality that has not developed a strong network yet. Even if it has good growth rates and highly skilled staff, a newly established incubator may not have yet developed the best methodologies and techniques and have all the necessary structures. In addition, established incubators, thanks to their market reputation, are more likely to have developed competences and high-quality services and built a significant network, which client companies can benefit from (Tötterman and Sten 2005).

Over time, while the reputation of the incubator grows, it will attract a wider number of potential tenants, so a stricter selection process is expected (Klofsten et al. 2020).

It is assumed that an investor is more inclined towards startups that have been incubated by an established incubator rather than a newly founded one. On these bases, the fourth hypothesis could be formulated.

Hypothesis 4 (H4). *Startups incubated by a BI with a high reputation have a higher probability that venture capitalists will invest in them.*

2.5. Team Experience

Finally, human resources represent one of the most important factors influencing incubators services and quality (Clarysse et al. 2005; Somsuk et al. 2012b). Employees are the way by which value is delivered to the incubated companies: the human component

can penalize or facilitate the delivery of services, knowledge and skills, thus playing a key role in the success of the entire incubation process. As reported by [Calza et al. \(2014\)](#), the provision of intellectual capital is critical for the competitiveness and the performance of the incubator; in particular, the human component has been widely studied in business incubators and startup literature. [Seidel et al. \(2016\)](#) found that BI CEO expertise is a key resource for the entrepreneur, not only because of his/her competences, but also for his/her ability to attract experienced people. In addition, a qualified manager provides training to its team and tenants. The qualification of his/her staff also impacts on the offering of external services, as an experienced team could provide a wider number of services ([Gassmann and Becker 2006](#)).

Authors expect that VCs are more inclined toward a company incubated by a BI with highly experienced managers and staff, as it could ensure the quality of its services and increase its standing, which is the content of the last hypothesis.

Hypothesis 5 (H5). *Startups incubated by a BI with an experienced team have a higher probability that venture capitalists will invest in them.*

3. Methodology

Conjoint analysis is a statistical technique that allows the understanding of the decision-making processes of a reference sample. It was theorized in 1964 by Luce and Tukey; however, the first practical applications date back to the early 1970s, when Green and Rao understood its potential by applying it to marketing research ([Lohrke et al. 2010](#)). Specifically, it was initially used to identify the most important characteristics of products for customers to maximize their added and perceived value.

Coherently with previous studies (e.g., [Franke et al. 2008](#); [Morawczyński 2020](#)) on VCs that employed conjoint analysis, we used an experiment and conjoint analysis to understand the decision policies of our sample. This technique requires respondents to make a series of evaluations based on a discrete set of attributes (e.g., decision factors) and it has been used to examine decision making, “as it removes a number of potential hindsight biases that might otherwise cloud the individual effects of certain policies” ([Hsu et al. 2014](#)). To determine whether VCs are willing to invest in startups incubated by BIs with certain attributes, each respondent is asked to assess a set of hypothetical investment opportunities (i.e., profiles); each profile is defined by a specific combination of a set of attributes that explain the investment opportunity. Each attribute can take several forms called levels. The evaluation consists of attributing an overall (global) rating to each profile. Every judgment is then compared with the judgments given to the other profiles to extrapolate the importance of individual attributes and to identify which of their levels are preferred by the reference sample ([Shepherd and Zacharakis 1999](#)).

Those evaluations are made through a quantitative model based on two theories ([Green and Srinivasan 1978](#)): the Fishbein and Rosenberg multi-attribute preference model and the Lancaster’s theory of consumer choice behavior. The first theorizes that the total utility depends on the utility of the individual attributes; the second argues that it is possible to decompose the utility of an asset into the utility of its attributes. The interviewee will then evaluate a profile based on its usefulness, which depends on how its characteristics (or attributes) are configured, and the model will then allow us to decompose the total utility into the partial utilities of the individual attributes.

The reliability of conjoint analysis has been widely proved in the literature, indeed decision criteria tested with conjoint analysis are strongly correlated with real decisions ([Drover et al. 2017b](#)). In addition, as previously outlined, this technique is widely employed in VC literature ([Lohrke et al. 2010](#); [Murnieks et al. 2011](#); [Drover et al. 2017b](#); [Warnick et al. 2018](#)), also in very recent contributions (e.g., [Block et al. 2019](#); [Moritz et al. 2022](#)). The VC evaluation process has seen a notable improvement in the techniques used. The first studies (e.g., [Zopounidis 1994](#); [Muzyka et al. 1996](#)) used post hoc methodologies, where investors were asked to explain the choices made in the past to try to understand their decision

process. Following the development of cognitive psychology, it has been demonstrated that investors, despite experts, are not reliable in this type of evaluation as they are rarely able to perform a self-analysis, generating what is called a posteriori rationalization and distortion, thus compromising the reliability of the collected data (Zacharakis and Meyer 1998). In addition, VCs are not fully aware of their own decision process (Zacharakis and Meyer 1998). This proves Petty and Gruber's (2011) point of view that studies based on retrospective evaluation are often prone to errors and biases. Finally, an alternative to conjoint analysis could be the analysis of a sample of startups in which VCs have invested. The percentage of financed startups that were incubated could be an indicator of how much VCs prefer ex-incubatees. However, this could be misleading because the business idea could be successful and considered profitable by the VCs regardless of the incubator, and the entrepreneur could not necessarily have considered to lean on a BI in the early stages. This indicator would be ineffective in understanding the certification effect of BIs, because there are too many variables and factors that could make it ambiguous. Contrarily, conjoint analysis allows the making of a simulation of investment proposal of several identical companies incubated by different BIs, complemented with a marginal analysis on the role of different attributes of the BIs.

3.1. Research Design and Procedures

In this study, an attribute-driven approach was used to create fictional scenarios (Shepherd and Zacharakis 1999) and data were collected through an experiment carried out in 2020. The experiment consisted of requesting a panel of VCs to evaluate a set of hypothetical investment opportunities (profiles) one by one, independently from each other (see Appendix C). The profiles differed from each other based on the combinations of a set of five attributes, which could assume two different levels (detailed description in the Appendix D); this situation would have required the evaluation of thirty-two scenarios. Since it has been shown that respondents' fatigue compromises conjoint experiments in terms of response rate and reliability (Reibstein et al. 1988), we identified sixteen scenarios using a fractional factorial design to reduce inter-class correlations because it minimizes the number of profiles proposed for evaluation (Shepherd et al. 2003), in line with previous studies (e.g., Reibstein et al. 1988). Finally, to evaluate the reliability of respondents, four scenarios, chosen randomly among the sixteen profiles, were replicated to make a test-retest analysis (Warnick et al. 2018).

A sample of European VCs was identified and invited to the conjoint experiment through a web link providing also additional information on the content and purpose of the study and the necessary instructions.

The survey started with the description of a fictional company that is a startup operating in the Internet of Things (IoT) market. In its early years, it joined an incubation program that provided the capabilities to grow, but then it needed an equity injection to continue its expansion (Petty and Gruber 2011). The founder of this company with a high potential was an engineer with extensive technical knowledge and passionate about his work (Shepherd et al. 2000; Murnieks et al. 2011). In the last year, he also developed a business plan with the help of a consulting firm (Kirsch et al. 2009). Since the product they offered was revolutionary in its field, there were no direct competitors (Petty and Gruber 2011). In addition, product flexibility allowed its application in different sectors (Petty and Gruber 2011). The amount of capital asked by the company would entitle the investor of a minority equity stake (Drover et al. 2017b). At the end of the description, it was underlined that the incubation process would not interfere with the investor's ownership target. This is because incubators often require a participation of its tenants in addition to service fees, which could discourage investors (Drover et al. 2017b).

Having defined the general characteristics of the company, the attributes and relative levels were described. Appendix A provides more details on the experiment by showing the full description of the incubated startup and incubator attributes.

3.2. Sample

Considering the investment stage specialization (seed, startup and early stage), 164 funds were selected. The survey was completed by 40 respondents who are venture capitalists. The sample size is comparable to other similar studies, and it is in line with the sample size of [Warnick et al. \(2018\)](#) and the suggestions proposed by [Shepherd and Zacharakis \(1999\)](#).

Three respondents preferred anonymity and 33 (82.5%) were interested in receiving the final report. The sample is quite heterogeneous, as 46% are partners, chairmen and founders, 31% are associates and investment managers and 23% are advisors, analysts and other professionals. Respondents were mostly male (85%) and most of them achieved high academic achievements, as 90% of the sample obtained a master's degree or higher. The mean age of the participants was 41 years and the mean years of experience in the VC industry was 7.2 years. So, the sample could be considered comparable to similar studies such as [Murnieks et al. \(2011\)](#) and [Drover et al. \(2017b\)](#).

Investor descriptive statistics and relative correlations are shown in Table 1.

Table 1. Investor descriptive statistics.

	Variables	Mean	Min	Max	S.D.	1	2	3
1	Gender (male = −0.5; female = 0.5)	−0.35	-	-	0.36			
2	Age (years)	40.78	23	67	12.46	−0.19		
3	Education (B.Sc. = 1; M.Sc. = 2; Ph.D./Master = 3)	2.22	-	-	0.62	−0.15	0.32 *	
4	Investing experience (years)	7.19	0	22	6.38	−0.15	0.59 **	0.15

n = 40; * $p < 0.05$; ** $p < 0.001$.

3.3. Variables

As mentioned above, independent variables refer to the following five attributes: sponsorship, partnership with universities and/or research centers, focus, reputation and team experience. Each variable can assume two levels ([Shepherd et al. 2003](#); [Drover et al. 2017b](#); [Warnick et al. 2018](#)), as described in Appendix B.

BI sponsorship could be public or private, depending on the nature of most of its funders ([Gassmann and Becker 2006](#)). Partnerships with universities and/or research centers ([Somsuk et al. 2012b](#)) is a Boolean variable: if positive, the incubator can take advantage of the know-how of universities or research center in addition to internal skills and competences; if negative, competences and know-how are provided only by employees or external consultants. The third independent variable is the BI focus ([Clarysse et al. 2005](#)): one level indicates that the incubator has a deep knowledge in one or few industries, whereas the other level reflects that the incubator has a multidisciplinary knowledge. Reputation of the incubator is another attribute considered and it outlines if the BI is established or recently founded ([Siegel 2005](#)). Therefore, reputation is captured by the age of the BIs, in line with other studies (e.g., [Siegel 2005](#); [Kaur and Singh 2018](#)). Finally, the latter variable represents the staff skillfulness and has two levels: experienced and motivated, as described above ([Theodorakopoulos et al. 2014](#)). Authors decided to focus on the experience of human resources, considering the relational, organizational and technical components, which has been widely considered in the literature as one of the key success factors of BIs (e.g., [Theodorakopoulos et al. 2014](#)). Two opposite cases have been defined in our study. In the first, the incubator team is made up of expert professionals assessed according to their education and previous experiences. In the second, the staff is selected less strictly but, despite not having significant experience, is made of passionate and dynamic people. It has been decided to define the opposite to the “experienced” level as “motivated”, to avoid any bias generated by the negative meaning in describing the team as inexperienced.

Our dependent variable reflects the probability that a VC invests in the described incubated startup. Following [Murnieks et al. \(2011\)](#), [Drover et al. \(2017b\)](#) and [Warnick et al. \(2018\)](#), the dependent variable was measured through a three-item scale that captures the

probability that the VC invests in the opportunity, the amount of money it would invest and how successful it thinks the opportunity would be regardless of the closing of the deal. Therefore, upon evaluating each investment profile, respondents were asked to evaluate these three items on a 7-point Likert-type scale (Murnieks et al. 2011; Drover et al. 2017b; Warnick et al. 2018) anchored at one end with “Not Likely to Invest” and at the other end with “Very Likely to Invest”, “Very Low Amount” and “Very High Amount”, and “Very Low Success” and “Very High Success”, respectively.

We preferred a three-item scale instead of a single question to increase reliability (Murnieks et al. 2011). This scale showed satisfactory reliability and high item correlations, ranging from 0.762 to 0.827, and thus we computed the mean of the three items.

In accordance with previous research (Franke et al. 2006; Haynie et al. 2009; Drover et al. 2017b; Warnick et al. 2018), the following control variables were included: VC age, gender, education and experience.

4. Results

Linear regression was used to identify the relative importance of the attributes. For the purpose of this research, only the main effects were analyzed and considered significant.

Individual level results were aggregated using the Z-statistic for individual level t-statistics and calculating the means of coefficients (Shepherd et al. 2000). Attributes chosen by the authors were sufficiently descriptive, as the model had a mean R^2 of 69.57% (p -value < 0.001), in line with other studies (Murnieks et al. 2011; Shepherd et al. 2000).

The mean regression coefficient for each attribute was positive, so all of the five hypotheses were supported (see Table 2). In addition, all attributes had a significant effect on the probability to invest in the startup.

Table 2. Results of the probability of investment by VCs.

	B	SE (β)	Z-Value	Hypotheses
Intercept	3.654	0.148	174.276 *	-
Control variables				
Gender	−0.013	0.081	−0.023	-
Age	−0.012	0.003	−0.451	-
Edu	−0.198	0.050	−0.403	-
Exp	−0.025	0.006	−0.488	-
Main effects				
Incubator sponsorship	0.251	0.057	11.711 *	H1 (supported)
Partnership with universities	0.241	0.034	9.450 *	H2 (supported)
Focus	0.201	0.042	7.664 *	H3 (supported)
Reputation	0.315	0.050	12.777 *	H4 (supported)
Team experience	0.282	0.045	11.818 *	H5 (supported)

$n = 40$; * $p < 0.001$.

VCs prefer private incubators as put forward in H1, probably because the logic they follow is similar: both private BIs and VCs must capture economic value from their investments and thus they need to carry out a strict startup selection process ($\beta = 0.251$; $p < 0.001$). H2 was also supported, as investors seem to prefer BIs that established relationships with universities and research centers, which might guarantee a higher quality service ($\beta = 0.241$; $p < 0.001$). This interest could also be found in the last three hypotheses, as VCs prefer a specialized incubator ($\beta = 0.201$; $p < 0.001$) to a generalist one, because it could ensure more targeted knowledge, skills and structures. The most relevant attributes were reputation ($\beta = 0.315$; $p < 0.001$) and team experience ($\beta = 0.282$; $p < 0.001$), so H4 and H5 were

also supported. This means that a good reputation is an important attribute because it is synonymous with the number of years of being in the market and providing valuable services. Instead, team experience is considered fundamental since incubated firms might receive significant support in relation to business, managerial or relational skills that could be key components of a successful incubation process. Since all control variables have high p -values and too low Z -Values (<1645 , [Shepherd et al. 2000](#)), authors can assume that they are not significant.

Attribute effects could be better understood with a marginal means analysis (see [Table 3](#)). This analysis allows one to understand the mean impact of each single attribute on the dependent variable, without taking the others into consideration. For example, reputation is the most significant attribute as it registered a marginal mean value of 3.969 for the “established” and 3.339 for the “recently founded” level, provoking a percentage increase of about 18.9%. The second most significant attribute is team experience, with a percentage increase of 16.7% (3.935 vs. 3.372), followed by sponsorship (14.7%; 3.904 vs. 3.403), partnership with universities (14.1%; 3.895 vs. 3.413) and focus (11.6%; 3.854 vs. 3.453).

Table 3. Attribute marginal means.

	Level	Mean	Std Estimates	95% Confidence Interval	
				Low	High
Incubator sponsorship	Private	3.904	0.206	3.446	4.362
	Public	3.403	0.206	2.945	3.861
Partnership with universities	Yes	3.895	0.206	3.437	4.353
	No	3.413	0.206	2.954	3.871
Focus	Specialized	3.854	0.206	3.396	4.312
	General purpose	3.453	0.206	2.995	3.911
Reputation	Established	3.969	0.206	3.511	4.427
	Recently founded	3.339	0.206	2.881	3.797
Team experience	Experienced	3.935	0.206	3.477	4.393
	Motivated	3.372	0.206	2.914	3.830

Finally, the mean Pearson correlation between the estimated and observed values is 97.5% (p -value < 0.001), so the model fits the VC’s responses.

5. Discussion and Conclusions

The literature analyzes how investors interact to exchange information and rely on each other to obtain a certification of investment quality ([Drover et al. 2017b](#); [Tykvová 2018](#)). More recently, [Woolley and MacGregor \(2021\)](#) have investigated how venture development programs as incubators influence the success of startups. They conclude that VCs might perceive the signal of the private incubator favorably ([Woolley and MacGregor 2021](#)). This article follows this emerging trend aiming to unveil whether BIs could represent a certification of quality for VCs and if certain attributes of the BIs where startups are incubated may impact the decision of VCs to invest in those firms. The findings enrich the literature about the VC decision criteria ([Drover et al. 2017a, 2017b](#); [Tykvová 2018](#)), showing that all the hypothesized attributes of the BI where firms are incubated have a positive effect on the probability that VCs will invest in them. As for H1, we argue the results considering the results of [Murnieks et al. \(2011\)](#), highlighting that VCs seem to be more likely to fund firms incubated in private BIs. This is because VCs perceive private incubators to be more similar to them than public ones in terms of economic logic; indeed, private BIs need to search and select startups that could produce economic value in terms of growth potential, thus being similar to VCs. This aspect unconsciously increases the

perceived quality and the investment attractiveness. In our research, the similarity is not due to experience or attitude (Murnieks et al. 2011), but to the economic logic: private incubators invest their own money (or money coming from other investors and firms) and also earn from the investment exit, as VCs do. For this reason, a private incubator is expected to make a strict selection process (Peters et al. 2004) to prevent capital loss, similar to VCs.

Regarding H2–H5 (i.e., the support offered by the BI), the specific intangible resources offered by the incubator, the support given by its experts and highly skilled staff and the access to a wide range of academic research knowledge might allow the incubated firms to develop better products/services, thus making the investment opportunity more promising, and finally resulting in a better growth of the startup team.

In a nutshell, an ex-tenant incubated by a BI configured as in the hypotheses formulated above, that is receiving a better service, is expected to have grown in a more efficient way than others, which would result in an increased propensity of VC towards investment.

This study has significant academic implications. First, reviewing the academic literature, it emerges that VCs encounter difficulties in evaluating the quality of the investment so they must rely not only on quantitative evaluations, but also on subjective and non-rational ones (Franke et al. 2006; Murnieks et al. 2011). Therefore, an approach that analyzes intangible resources is particularly relevant. From this point of view, our findings offer the literature on VCs an additional perspective that, according to the RBV, recognizes the importance of intangible resources of BIs. Along this line, additional perspectives encompassing the establishment of VC partnerships with one or more incubators, thus generating benefits for both parties, may attract attention: incubators may offer to its tenants the possibility of being funded in later stages, increasing its attractiveness on the market; VCs have a certified quality channel of investment opportunities. Second, this study proves that the incubation program could be a certification of investment quality for VC investors. This is in line with the few articles (Phan et al. 2005; Woolley and MacGregor 2021) that claim that VCs can establish relationships with certain BIs to monitor their incubated startups.

Practical implications of the article are also meaningful. First, one of the main obstacles to startup growth is capital raising. Entrepreneurs can solve this problem by asking for support from different actors such as incubators. However, at the end of the incubation process, the company could have the same problems if it is not sufficiently established or if its value proposition is still not sufficiently developed. In this perspective, the findings of this research might be useful for entrepreneurs seeking BIs since incubators having specific characteristics increase the probability of being funded by VCs in subsequent investment stages. Second, our results might provide some guidelines to public bodies whose primary goal is to generate employment and to stimulate entrepreneurship, also through incubators. Indeed, it was widely proved that incubated firms have a greater chance of surviving than non-incubated ones (Peters et al. 2004). From this perspective, investing in these incubators would allow them to offer better services to develop better capabilities and better structures. Since it has been demonstrated that there are some incubators that partially ensure an investment continuity in later stages, public bodies could invest in a more efficient and effective way. Finally, incubators could use the findings of this research to assess their own operating model and understand if it could be redefined to give better services and improve the quality of the team.

Limitations and Avenues for Future Research

Conjoint analysis is a widely used technique, but since this methodology requires respondents to make considerations about hypothetical situations, answers could not consider the emotional component often present in real life (McKelvie et al. 2011). Furthermore, it is not possible to provide respondents with all the information they would have in a real context. In this research, the company profile was described in a manner as detailed as possible and in line with similar studies (Drover et al. 2017b; Murnieks et al. 2011; Warnick et al. 2018). However, the lack of additional information, such as those related to the economic-financial

context, may have influenced some evaluations. On such basis, other studies can carry out the experiment setting an initial different scenario or adopting a different methodological approach, such as case studies and interviews, with the aim of deepening the topic in the real context. Another limit of this technique is that some respondents could distort their evaluations because they do not give importance to some of the attributes included in the analysis when selecting the investments (Haynie et al. 2009). However, it has been demonstrated (Brehmer and Brehmer 1988) that this problem is a prerogative of young and inexperienced respondents. In this research only four respondents were under the age of twenty-five with a maximum of two years of experience; therefore, this risk could be considered negligible. Future studies might take other attributes of the BI into consideration, such as its social network or level of organizational capital since they could play a significant role. Finally, as there are many variables involved in a decision-making process, obviously taking all of them into consideration is impossible; therefore, any analysis of this type requires a simplification of reality. To this purpose, in our experiment we only considered the BI attributes; however, by recognizing the fundamental role VC variables play in the decision-making process, future studies can embrace both perspectives, BI and VC.

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Appendix A. Company Profile

You are evaluating a startup operating in the IoT market. In its early years, it joined an incubator program giving it the capabilities to grow, but nowadays it needs an equity injection to achieve its objectives for the future. The founder of this high potential company is an engineer with extensive knowledge in his field and is passionate about his work. In the last year, he developed a business plan where the strategic intentions have been defined for the next five years with the help of a consulting firm. Since the product they offer is revolutionary in its field, we can assume that there are no direct competitors and it is extremely flexible thanks to the possibility of being applied in different applications and sectors. The amount of capital asked by the company will entitle you a minority equity stake. As previously said, the company entered an incubator program in the past, but this will not interfere with your ownership target.

Appendix B. Attributes and Levels

In addition to the information above, please consider the following attributes of the business incubator and based on those attributes respond to the questions that follow. Note that each opportunity will be evaluated separately, independently from the others.

Appendix B.1. Business Incubator Sponsorship

Mainly public: The business incubator is mainly founded by public bodies.

Mainly private: The business incubator is mainly founded by private bodies or investors.

Appendix B.2. Partnered with Universities and/or Research Centers

Yes: The incubator can take advantage of the know-how of universities or research centers in addition to internal skills and competences.

No: Competences and know-how are provided only by employees or external consultants.

Appendix B.3. Business Incubator Focus

Specialized: The incubator has an extensive knowledge in one/few industries, allowing it to develop a substantial know-how in its specific field.

General purpose: The incubator has multidisciplinary knowledge to help every sector startup.

Appendix B.4. Reputation of the Incubator

Established: The incubator is an established reality in its sector and this allows it to be partnered with credit and financial institutions and with tech and business consulting firms. This allows the tenant to be supported in all the steps of its incubation program. A strict selection process is required to enter in its programs.

Recently founded: The incubator is a new reality. Despite the fact that it is growing fast, it has not developed a strong network yet. Nevertheless, the staff can give startups all the support they need.

Appendix B.5. Team Experience

Experienced: Staff are strictly selected according to their previous professional experiences and education.

Motivated: Staff are selected more according to their skills and passions than their previous experiences and education achievements. The team is also made up of recent graduates, professional technicians, etc.

Appendix C. Sample Investment Scenarios

The following scheme serves to summarize the incubator characteristics (in grey):

Business Incubator Sponsorship	Mainly Public	Mainly Private
Partnered with universities and/or research centers	No	Yes
Business incubator focus	General purpose	Specialized
Reputation of the incubator	Recently founded	Established
Team experience	Motivated	Experienced

Appendix D. Investment Opportunity Profiles

	Sponsorship	Partnered	Focus	Reputation	Staff Skillfulness
1	Private	Yes	General Purpose	Recently founded	Extensive
2	Public	Yes	Specialized	Established	Limited
3	Private	Yes	General Purpose	Established	Limited
4	Public	No	General Purpose	Recently founded	Extensive
5	Public	No	General Purpose	Established	Limited
6	Private	Yes	Specialized	Established	Extensive
7	Public	Yes	General Purpose	Recently founded	Limited
8	Private	No	Specialized	Recently founded	Extensive

	Sponsorship	Partnered	Focus	Reputation	Staff Skillfulness
9	Public	Yes	Specialized	Recently founded	Extensive
10	Private	Yes	Specialized	Recently founded	Limited
11	Public	No	Specialized	Recently founded	Limited
12	Private	No	Specialized	Established	Limited
13	Public	Yes	General Purpose	Established	Extensive
14	Public	No	Specialized	Established	Extensive
15	Private	No	General Purpose	Recently founded	Limited
16	Private	No	General Purpose	Established	Extensive

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