

DETERMINANTS OF DEBT AND EQUITY FINANCING FOR NEW HTSFs

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Abstract

How should high-tech start-ups finance their business? Should they borrow from a bank or is it better to relinquish some equity to a venture capitalist to avoid saddling the new company with debt? In this paper we focus on which factors influence the process of fund raising in a new tech venture (and how). Through Cambridge-based empirical evidences, we try to understand which variable control for optimal financing, from the firm's point of view and what differentiate this perspective from investor's one.

Based on five companies (two VC backed, two because they had obtained equity from business angels and one as bank-backed), some improvements were also made to the model for the purposes of analysis (as concern the entrepreneur's disposition to open the business and technological related issues) and some new aspect have also been taken into account (such as the implementation of a soft start and the market description).

On the basis of the data collection and analysis process, as well as interviewees' comments, the indications are that the model of analysis proposed may be comprehensive and ready to be tested on a statistically significant sample.

Keywords: HTSFs, Technology entrepreneurship, banks, business angel, venture capital, pecking order theory

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1. Introduction

Over the last few years, academics, policy makers and practitioners have become increasingly interested in the relationship between technology, entrepreneurship and finance. High technology small firms (HTSFs) have demonstrated dramatic success, especially in the very early stages, and contribute significantly to the economic environment, particularly the knowledge economy.

Western countries can beat the new challenges generated by low production cost countries only by fostering their comparative advantage through innovation. Audretsch (2004) identifies the ‘commercialization of knowledge’ – through venture capital (henceforth VC) and the creation of new firms – as one way to achieve this.

Before they can show significant growth and/or success, one of the most significant constraints new firms have to face is the lack of resources. It seems that HTSFs face a particular financial gap – the combination of high tech risk, information asymmetries and low collateral may worsen capital market imperfections (Carpenter and Petersen, 2002a), causing a large difference between supply and demand (generating a funding gap), with firms investing substantially less than they would if external (particularly debt) were a perfect substitute for internal finance.

Contrasting patterns are shown by Cosh *et al.* (2005), whose survey indicates that HTSFs seeking finance manage to secure money from at least one of the available sources (bank loans, VC, angels, etc.), and De Meza and Webb (1987), who suggest that the inability of banks to monitor firms’ status may even cause “too much investment”. Library House (2006) concludes that the real gap in the UK is more one of managerial and commercial readiness than of funding.

Financial institutions are extremely challenged by intangible (or knowledge-based) asset evaluation. Start-ups lack any history or reputation, are known to be extremely risky and show many managerial limitations. This generates a problem of opacity in the process of fund raising, which often prevents them from developing their strategy effectively, if at all.

How should high-tech start-ups finance their business? Should they borrow from a bank or is it better to relinquish some equity to a venture capitalist to avoid saddling the new company with debt? Some high-tech entrepreneurs choose debt instead of equity in order to preserve their chance of high returns in the future, accepting the greater risks involved. However, some experts believe that the riskier the project, the more likely entrepreneurs are to seek VC support.

Our work attempts to answer this question and help technology-based entrepreneurs match their business plans with the most appropriate financial strategy. It touches on several areas in the fields of finance – where the definition of ‘optimal financing’ (Davila *et al.*, 2003) is critical – and entrepreneurial sciences. Our approach takes the entrepreneur’s point of view, which few authors do, arguing that entrepreneurial criteria may differ from investors’ (Davila *et al.*, 2003).

As to the juxtaposition between debt and equity, there are plenty of (potential) entrepreneurs whose expected growth is not likely to require VC investment, but whose projects are worthy of financing; or whose problems of managerial control exclude equity as external source of funding. On the other hand, many entrepreneurs may be VC worthy and but are unaware of the fact. Many of the pilot interviews we ran at the beginning of our research showed that awareness among the entrepreneurial community of appropriate investors with the best match to different business opportunities, was very useful.

This work represents the second step of a broad research effort, whose first findings were presented in Giorgino and Minola (2006). Much improvement was needed to that first study, as concerns the theoretical approach and the model of analysis. In particular, the overlapping and conflict between the entrepreneur’s and investor’s perspective called for more rigorous investigation. In this paper we set the fuzzy implementation aside, as we’re more concerned about the theoretical and methodological issues outlined above. Yet fuzzy logic proves to be very useful and effective (Güllich, 1996, Bath and Weyer, 1996) as a tool used by financial institutions to score credit- or funding- worthiness of companies. Our purpose is to recover the functionality of fuzzy logic for a later stage of research, where some quantitative analysis may make the fuzzy framework reliable and the prediction tool effective to suggest the ‘best’ financial strategy for an HTSF.

In this paper we focus on which factors influence the process of fund raising in a new tech venture (and how). We look for determinant variables through the holistic assessment of a firm and information gathered from a business plan. Furthermore we try to understand: which variable control for optimal financing, from the firm’s point of view? What differentiate this perspective from investor’s one?

2. Literature review

Several literature streams analyse how investors could reduce informational problems in financing HTSFs, which are intrinsically disadvantaged in a classical risk-return paradigm. As entrepreneurs have information the investor lacks, asymmetries tend to be very high, so that ex ante evaluation and subsequent monitoring are difficult (Colombo and Grilli, 2003). Debt contracts, in particular, raise moral hazard issues: after the investment has been made, entrepreneurs' incentives can change and the bank can be damaged by the firm undertaking riskier projects (Myers, 1984). On the other hand, investors may run into adverse selection (Akerlof, 1970). All these factors lead to a phenomenon that Stiglitz and Weiss (1981 and 1996) identified as credit and equity rationing.

The most significant theory we rely on is the pecking order theory, which states that firms prioritize the source of financing from internal (cash flow or entrepreneur's own capital) to external, according to relative availability and (opportunity) cost. Support for this theory was recently provided by Cosh *et al.* (2005), who find that the greater capital expenditure is over profit, the greater the likelihood a firm will apply for external finance.

From the empirical evidence that most HTFS fail to obtain equity financing, Ueda (2004) builds a model that compares the likelihood of applying to banks rather than venture capitalists according to asymmetric information and intellectual property (IP) protection. Her assumption is that VCs can evaluate the risk and value of the project accurately, but can also expropriate the project from the entrepreneur. Her findings, in agreement with Audretsch and Lehmann (2003) and Gompers and Lerner (2001), suggest that little collateral, high growth, high risk, and high profitability, as well as stronger IP protection (she presents no evidence about high tech), lead to VC investment. In contrast, Berger and Udell (1998) observe that debt contracts provide 50% of external financing for the small firms sample (though not specifically HTSF) they analyse. Huyghebaert and Van de Gucht (2004) also argue that Belgian HTSFs in high-growth industries seek more borrowing. Åstebro (2002), analysing US HTSFs, even says that of the few companies that asked for debt, the vast majority obtained it.

Cosh *et al.* (2005) focus simultaneously on credit and the equity market and their competition; they affirm that, while banks are likely to finance profitable business, VCs are more likely to finance innovative, risky and growth-oriented start ups. Specifically, they note that rejection rates by banks tend to be higher for firms formed as pure start ups. Huyghebaert and Van de Gucht (2004)

determine that banks still finance HTSFs; to avoid adverse selection, they may reduce the level of investment.

Schäfer *et al.* (2003) use project and financial dimensions to proxy the overall risk. They analyse the likelihood that HTSFs will obtain external financing, looking at size, assets, project and novelty. According to their findings, risk does not have a predictive power of the likelihood of a company's receiving debt or equity.

Equity is often referred to as more expensive than debt (Carpenter and Pedersen, 2002a) but generally the comparison should be done in spite of the profile of the company and its need. Berger and Udell (1998) suggest that different leverage may be optimal for firms in different stages of the so-called financial growth cycle paradigm; according to their model, differences in the relative relevance of information provided may be a justification for how HTSFs are funded.

Our analysis adopts a generalist approach, comparing debt and equity financing. The literature contains research on different forms of both. Huyghebaert and Van de Gucht (2004) suggest that leasing and trade credit may be used to replace bank contracts in case of adverse selection. Trade credit is also found to be relevant by Berger and Udell (1998), as suppliers may suffer less from information problems than lenders, even though it is generally expensive. The same research provides a good analysis of VC and business angel financing, as do Mason and Stark (2002). Colombo and Grilli (2003) underline the value of personal wealth as a funding source but also as a signal for investors (especially banks) about the quality of the firm.

So how should high-tech start-ups finance their business? The literature shows the need for research to answer this question. Our research, like Huyghebaert and Van de Gucht (2004) and Cosh *et al.* (2005), examines several sources simultaneously. These authors represent a milestone in our theoretical formulation, although we take into account technological and innovation issues, as well.

A common critical issue is how a firm's and investors' priorities may differ. Even though we want to adopt the firm's point of view, our documentation puts much emphasis on the vast literature stream investigating investor's evaluation criteria, which should be understood by the firm as relevant and a frequent constraint to its financial strategy.

De Coster and Butler (2005) develop a process-based approach supporting HSBC in assessing HTSFs. Their appraisal tools provides detailed evaluation of product- and market-related risk, completely disregarding financial issues (which were then put through a strictly financial due diligence by a bank manager).

Davila *et al.* (2003) show that investors do not select investing opportunity on the basis of expected growth – in general they don't use a consistent assessment approach at all. Conversely, Muzyka *et al.* (1996) argue that the inability to gather reliable information from personal knowledge forces an investor to develop consistent decisional criteria like high industry-related competence, low competitive rivalry, high educational capability, long lead time, and pioneering. Similarly, Shepherd *et al.* (2000) use conjoint analysis to determine an assessment tool replicating VC criteria.

Finally the work by Sohn *et al.* (2007b) is very interesting. They develop a structural equation model linking technology evaluation factors and the financial performances of Korean SMEs being targeted by a technology credit fund. They distinguish between measurement variables and latent variables, the former being simple financial indexes and the latter being knowledge and experience of manager, operation ability of manager, level of technology, marketability, and profitability. Again, ability of manager, followed by the quality of the technology, rank as the most relevant factors.

3. Theoretical approach

Our research focuses on the new tech venture process of seeking money: we want to understand which factors influence it and how. Sub-questions are:

- What is the correlation between the main characterising variables of a high tech venture and the kind of financier it attracts?
- Which dimensions control for the optimal choice (entrepreneur's point of view)? Which can be considered as performance index (survival, growth, profits, etc.)?
- Which financier's evaluation criteria are objective and predictable (Moon and Sohn, 2007)?

Our original contributions to the literature investigated so far, are:

- We adopt the entrepreneur's point of view, taking a holistic approach in evaluating the relationship between the firm's profile and the optimal investor (whereas normally single or specific dimensions are investigated in the literature).

- At the same time, we don't want to disregard investors' evaluation criteria, as they often act as significant constraints in the fund raising process. This simultaneous focus on different point of view, trying to identify critical and challenging issues, is novel in the literature, where the focus is normally on investors.

Another original aspect of our empirical research is that it is Cambridge-based. We ran many preparatory interviews, did some case studies and surveyed local reports, which led us to discover that:

- Cambridge is acknowledged as the European hot spot for technological entrepreneurship and innovation, with about 25% of UK and 8% of European VC investment. Library House, an intelligence broker, is a very useful source of information about the local as well as European VC industry.
- In Cambridge, banks are also involved in entrepreneurship fostering, being part of a broader distributed network of players that has proved to be very effective. .

HSBC's experience of investing in HTSFs has been significant, both because of its effectiveness and of the theoretical background to HSBC's investment appraisal tool, i.e. the interesting model developed by De Coster and Butler (2005). Their methodology is based on a scoring system, the criteria of which are consistent with the literature analysed earlier, and leads to an evaluation, although mainly in qualitative terms. Their assessment tool has been applied to over 400 business plans.

One of the main pieces of evidence suggested by HSBC's experience is that, despite many theoretical considerations, banks *do* lend to young, innovative, even technology-based companies. There are several explanations for this. One is the so-called 'funding escalator' approach, according to which bank lending is subordinated to the sales readiness of the company. But a relationship with the bank may start even before that: the bank helps the company to raise additional funds (typically grants or from informal investors, like business angels) and makes a profit by providing it with other services (such as transactional banking, savings facilities, trade services or insurance services), until the firm is ready to lower its risk through sales and revenues. All this is extremely consistent with the dynamics described by Berger and Udell (1998) about 'relationship lending': information is obtained by the bank through continuous monitoring of the firm and the entrepreneur in a service-based relationship.

Another significant justification is the ‘soft start model’ (Bullock, 1983), also mentioned by Connell (2006, p.1): “A company whose funding comes mainly from R&D contracts is sometimes known as a ‘soft’ company. Its business may be based around the founders’ scientific or engineering expertise or around a piece of proprietary technology with applications in different markets. ‘Hard’ companies, focused on the development of standard products, have less flexible strategies. They conform more to the Silicon Valley approach to venture capitalism”

Soft start firms require relatively low investment to get started and growth can often be achieved through internal finance. As activity mostly consists of technical project management and selling ideas, risk is supposed to be rather low. These features, combined with modest rates of growth, make soft start firms of a low interest to VC investment.

We look at the funding of HTSFs using a progressive model: fund raising events are cyclic and dynamic, rather than static; companies, given the unique pattern of past events and features that make up its identity, should in each instant address a specific financier. We now want to go some significant way along this route, in the field of entrepreneurial finance, to highlight the main dimensions of a firm’s ‘profile’ that will identify such a pattern.

The vast majority of research in this area focuses on entrepreneurs’ and management’s profile and skills, in terms of human capital (Audretsch and Lehmann, 2003), education and professional experience (Colombo and Grilli, 2003) or educational capability (Shepherd *et al.*, 2000). In Muzyka *et al.* (1996) the human capital of the entrepreneurial team is found to be much more relevant than financial requirements. We don’t limit our focus to skills, but also look at dynamic aspects, such as entrepreneurial orientation, willingness to disclose information about the business, control, and personal concerns in term of career and reputation, as highlighted by Landier (2002). In Landier’s model, entrepreneurs’ exit options shape their bargaining with the investor, who – in a model of several infusions of capital – can deny further investment. We also intend to monitor the cohesion of the entrepreneurial team and the reason why the firm was established, which, according to Cosh *et al.* (2005), affects the likelihood that the money sought will be obtained.

The general quality of the entrepreneurial project is held as significant, even though ambiguous: expected profitability (IRR and payback time for the investor) attracts external investors (Muzyka *et al.*, 1996) and strengthens the chance of obtaining funding, but fails to predict the likelihood that the firm will seek external finance (Cosh *et al.*, 2005). As concerns expected growth, while

Huyghebaert and Van de Gucht (2004) show the proportion of bank debt to be higher for Belgian HTSFs with larger expected growth, the work from Davila *et al.* (2003) sheds a new and different light. Their findings indicate that VC seems not to consider expected growth as a consistent selection criterion but, at the same time, firms that receive equity show faster growth. We will also monitor whether or not a firm implemented a soft start model (Bullock, 1983) and its sales readiness at the time money was sought.

Issues about timing often mitigate or strengthen the worth of start up projects and the efficiency of financial contracting: according to Shepherd *et al.* (2000) timing affects the profitability of the business and De Coster and Butler (2005) hold timeliness as a relevant market criterion (i.e. if the market is ready for the product and vice versa).

Our approach also takes into account the technology and innovation features of the company: whereas Schäfer *et al.* (2003) and Audretsch (2000) indicate that a firm's innovativeness makes it more likely to obtain equity, De Coster and Butler (2005) maintain that recently launched and innovative products (if combined with positive early reports from customers) or established products with satisfied customers and good order book are significant requirements for bank lending.

One of the major constraints for a start up business is the absence of assets to be pledged as collateral. Investors, especially banks, often need collateral to reduce moral hazard in the relationship with the firm (Huyghebaert and Van de Gucht, 2004). In Berger and Udell (1998), the role of collateral explains the tremendous and surprising amount of external debt obtained by young firms; they also distinguish between inside (firm's) collateral, which is ambiguous in predicting the risk of the firm, and outside (from wealthy entrepreneur) collateral, the availability of which acts as a strong indicator of the lower risk of the firm. We will also monitor the role played by intangible assets (eventually pledged as innovative collateral) and government support initiatives to fill the funding gap, like the Small Firm Loan Guarantee Scheme (SFLGS) and grants.

The last dimension is the market. Many investors are disappointed by first-time entrepreneurs taking access to the market for granted; integration and understanding of the market are often crucial for success. Shepherd *et al.* (2000) say that the relative risk of the market (considering maturity and level of competition) strongly lowers the profitability assessment made by VC, while

according to Cosh *et al.* (2005) the level of competition (proxied by the proportion of larger competitors) lowers the likelihood of a firm's obtaining the amount of external capital sought.

Besides these, we also investigate other aspects of start up funding; firstly, we're concerned with how investors' qualities and skills are perceived by the firm. As Garmaise (2000) underlines, the traditional pecking order is reversed when investors' skills and value-added are relevant. We are interested in whether the acknowledged values or reputation of the investor may fill a gap in the firm's bid to be financed, or even change the financial terms of the contract (Hsu, 2004). Secondly, we take into account potential issues that may arise in the relationship between the firm and the investor and affect the ex-post perception of the worth or optimality of a given financial strategy. Thus, by talking to both parties and monitoring problems concerning timing, exit strategy, control, financial terms, etc., we try to capture some consistent indication for the definition of an optimal financial strategy.

4. Case studies

In recent years, case study-based research has been very successful in the management sciences, because phenomena can be studied within a real-life context, particularly useful when the borders between phenomenon and context are not very evident (Yin, 1994). Our empirical research was done through case studies in which we tried to take into account all the aspects of a funding process with lower effort, acknowledging that the larger the number of dimensions considered, the more rigorous the research.

Our approach has been descriptive and retrospective (in order to catch the instant of choice of a funding strategy, as a result of a past identifiable event).

We developed multiple case studies, based on five companies (coherently with Eisenhardt, 1989), which were chosen according to the theoretical replication principle (i.e. different results explained by governed differences), in order to strengthen the cause/effect relationship between the funding source (which was the only selection criterion) and its determinants; two companies were selected as VC backed, two because they had obtained equity from business angels and one as bank-backed. The unit of analysis is the firm as a whole at the precise moment of a fund raising process.

Multiple sources of information were used: in each case we gathered information on the company, the product, the market, the investor and the entrepreneur before the interviews took place.

Wherever possible we interviewed both the founder and the investor, with the aim of providing insight on different evaluation issues. The interviews were developed through a very rigorous protocol, compiled by the interviewer, asking for mainly quantitative information, which made the interview process easy and fluent and the discussion objective and reliable.

Case 1 is a start-up that designs, develops, manufactures and sells a hardware and software platform that delivers a real-time location system, with customers from different sectors: logistics, retail, manufacturing, workplace, entertainment, military, healthcare and hazardous environments. The company has offices in the USA, Germany and Asia. In 2006 the company raised £2 million from a syndicate business angel deal.

The team's background was industry relevant and helped to attract informal investors, according to the CEO, who is a serial entrepreneur and business angel himself (one of his previous business was listed on Nasdaq and later acquired by a large corporation). He claimed the founder team's fear of failure was extremely low, even though the venture is still rather risky and not yet profitable. These factors, and his perception of VC strategies as too short-term for ambitious businesses, influenced his choice of informal investor. As a matter of fact, as the market could only be defined in general terms, with limited feedback from customers, investors in this company seem to have borne considerable risk.

This company represents a very good example of a soft start, having strong and constant revenues from consultancy and services, which also bring in new customers. This strategy seems to be particularly successful in stimulating demand from the market, since the order backlog is currently worth several million pounds.

In conclusion, the entrepreneur was very happy with his financial sources: there were no issues to raise with investors and he felt that there was no funding gap for HTSFs. The company is looking to float shares on the stock exchange in the not-too-distant future.

Case 2 is a fabless semiconductor company developing single chip solutions for high bandwidth wireless connectivity based on ultra wideband (UWB) technologies. UWB enables data rich content to move securely over short or medium distances. The firm offers a range of complete UWB chipsets and reference designs, licensable IP, firmware and software. We focused on the company's fund raising in 2004, when the company raised £7 m through a syndicate VC deal. The technology

was attractive, but surprisingly over the years the company raised some £25 million, even though it was (and still is) pre-customer and pre-revenue.

The CFO, who is one of the founders, said he appreciated the VCs' commercial experience and high risk tolerance, but that a lot of issues and concerns arose from the company's relationship with them; he also felt there was no funding gap and said that the company would be likely to look to exit through an IPO in late 2009 or early 2010.

The investor is a Cambridge-based VC. He said he appreciated the team's commercial skills and background (the founders came from another successful high tech start up). Key criteria for the investment were a strong disclosure from the team, the firm's ambition and technological breakthrough, a good report from an early customer, extremely high expected growth and a favourable payback time. Sales readiness, patents as a unique form of protection, size of the deal and the founder's own co-invested capital were not found to be drivers at all. Finally, the investor seemed to have no perception of the critical issues pointed out by the entrepreneur and had a more modest and realistic view of the team's previous entrepreneurial success.

Case 3 is a university spin off (USO) developing innovative projection systems through a patented and performing technology, which obtained £120k from a business angel in 2005. One of the founders, a PhD student at that time, said he felt no personal risk, but this perception would have been enhanced by the company's being bank backed.

Interestingly, this company implemented a soft model, too, but its considerable expected growth and the amount of capital it required to grow quickly were not compatible with debt capital financing. The founder said that the market was not promising enough (in terms of focus and clearness) to seek VC finding, and was also too uncertain for a bank, but was the most consistent driver for seeking angel investment. The informal investor appreciated intangible assets (and protection), collaborated in the firm's development and was happy with the size of investment (a recent application for £0.5m had been refused by VC).

Surprisingly, the investor, a Cambridge-based business angel and serial entrepreneur, didn't consider anyone except the young founders in the evaluation, although an experienced manager was already on board at the time of the fund raising and contributed to the development of the company. The young team's evident managerial and commercial skills, and the fact that the technology was at

an early stage – ambitious and not yet proven – were not barriers to investment. On the contrary, they made the company attractive, as it required the investor's direct and active involvement and corresponded to his investment strategy. He seemed to be mostly concerned about stigma of failure, and the entrepreneurs' personal ambition, control and wealth anxiety: he stated that a key criteria for every investment should be the extent to which people work for the company rather than for themselves. Finally, when a considerable problem arose around IP rights, it seemed the investor had a clearer perception of its relevance and risk than the founder team.

Case 4 is a mobile search company, due to launch its service by the end of the 2007, which recently (end of 2006) raised £5 million from VC. The founder is a serial entrepreneur who had had several previous deals with the same VC firm currently backing him.

The business model is far from a soft start. Both the entrepreneur and the investor agree that the targeted market is immature, but that it is going to grow dramatically, as the next evolution of the global communications scenario. However, they are still unsure about how and when this will happen. The entrepreneur sought VC investment because he considers VC investors more risk tolerant, more ambitious and more suitable for large amounts of investment. The VC firm selected was chosen on the basis of the specific commercial competences it could provide.

Both entrepreneur and investor agreed about the positive role of the entrepreneur's stigma of failure, which helped the business to be run more effectively, without impacting on the need for or usefulness of investment.

Furthermore, the investor said that he trusted the entrepreneur, because of their long relationship, and had a strong preference for opportunity- over need-driven entrepreneurship. He confirmed the company's ambitious market vision and added that his VC firm was not looking for good sales and revenues deals, but for a unique core service and good value proposition in a market worth £ billions.

Case 5 is a family business, driving the expansion of inkjet hard coating into targeted industry sectors, through a patented process. The company was founded in 1999 but the new business (based on licensing and development of the technology) and the fund raising are quite recent activities: the company received £100,000 as a bank loan in late 2006. The entrepreneur explained that the company had not been making enough money since 2001 (when the main patent was filed) because

of the lack of sufficient funding to help it grow: he had problems with banks because of collateral. The firm was in the final of Library House – Running the Gauntlet 2006 (a competition that offers £1 million investment to East Anglia-based entrepreneurs) but was rejected because the Cambridge VC considered the business too capital intensive (the entrepreneur, who didn't agree, considered the competition a waste of time). The firm received £200,000 from an investor, who held minority stakes, but this was not enough, so the entrepreneur and his father had to put much of their own capital into the company in its first years. Regarding the access to debt capital, a key role was played by the Department of Trade and Industry's (DTI's) SFLG scheme, very useful to the entrepreneur, who was highly satisfied and would advise all entrepreneurs to use it. Sadly for him, the UK government changed the rules in 2006, preventing the company – because of its age – from using SFLG scheme further. They were forced to pledge some personal assets as collateral: even though this was uncomfortable, the entrepreneur said he accepted this as part of the entrepreneurial challenge.

According to the entrepreneur, his motivation to open the business was high, but at the same time he was very concerned about keeping control of the business. Market focusing and timeliness of technology and market readiness were quite good, which unambiguously correlated to his search for debt. Patents were also good, and core to the business, but he complained that banks didn't even look at them (in contrast, in Germany, a subsidiary of theirs obtained a bank loan simply on the basis of the exclusive licensing agreement). He felt the bank had no evaluation or general skills and did not provide any high-value service to the company, but his relationship with the bank manager was quite good.

5. Case Discussion (data analysis)

We used the technique of 'pattern-matching', trying to report some simple evidence from a cross-case analysis and to find explanations for some independent (profile of the firm) and dependent (financial choice and preferences) variables. We acknowledge that, given the very small (but thoroughly investigated) sample, the validity of our findings has an analytic but not statistically generalisable meaning.

All the companies studied shared a high-tech profile; technological risk, level of ambition and patents rated high both in all self-assessments and in investors judgement.

As far as the management profile and skills are concerned, the impression in all the cases is that they help the search for external funds in general, as they give confidence in the business and market, but do not drive a specific source (although business angels, if personally involved in the business development, may tolerate less specific skills in the team).

Some unique features result from Case 5 (bank debt): the entrepreneur's self-assessment about market focus and time accordance with product was much more clear and convincing than the other cases, while ambition was slightly lower, all this possibly reflecting the investor's interests; unsurprisingly, this is the only case where collateral was involved, the investor had no skills and added-value services were not provided.

Both angel- and debt-backed companies in our sample show good implementation of the soft start. This initial observation seems to be consistent with Connell (2006), who states that VC may be relatively less interesting to soft companies.

As to the different perception between the two parties (entrepreneurs and investors), all the cases show relatively major concerns, over the sample considered, common to all entrepreneurs about: the urgency to obtain funding, critical issues arising in the relationship with the investor, and how the size of the investment required should direct an entrepreneur towards the most proper investor.

Our limited sample also suggests that there may be a further segmentation of investors, due to the combination of technological risk and market features (in terms of clear focus and estimated value): high tech risk is common in VC-backed firms while a lower technological gap is geared to angel- and bank-backed companies. The former have potentially bigger but less focused markets, while the latter targets better established markets that show less dramatic growth. Furthermore, all these aspects seem to be objective (the investors and entrepreneurs agree in their judgement in each case) and testable; as a development of the research, it would be interesting to validate this segmentation over a larger sample.

6. Conclusion

If only a small minority of proposals are suitable for classic venture capital investment, further training is required to enable bankers to understand technology and the changing needs of the businesses involved with it; besides that, the European high tech ecosystem would benefit from further development of the business angel sector.

In this scenario, we have seen that the way in which HTSFs (can) access financial resources is a crucial point; through five case studies that examine how HTSFs in Cambridge raised funds from different investors, we moved a step towards an assessment of debt versus equity orientation, and propose a dynamic approach that allows us to characterize the proper financial strategy.

On the basis of the data collection and analysis process, as well as interviewees' comments, the indications are that the model of analysis proposed in Giorgino and Minola (2006) may be comprehensive. Some improvements were also made to the model for the purposes of analysis, such as differentiation between disposition to open the business and to give away (part of) its control, the conversion of the generic 'technological content' dimension to a more precise and explicit 'technological risk', and the use of number of years since the establishment as a proxy for market maturity.

Some new aspect have also been taken into account: the implementation of a soft start, the level of ambition, the market description (focus and timeliness) and the use of the number of competitor as a proxy for the market competition.

Some light is shed on the possibility of clustering the decisional criteria; some (for example, the quality of the entrepreneurial team's human capital) may be a condition to access external funding, while others may help to drive the choice: timing, critical issues, potential friction with the investor and size of the investment may be relevant to the entrepreneur, and financial profile and market issues more relevant to the investor.

We had confirmation that the fund raising process, as a whole, involves relevant aspects at the entrepreneur or firm level, or both. A preliminary insight may be that focusing on entrepreneur's profile and priority is helpful to determine the suitability of a given investor, while firm-related issue work as predictor of the likelihood to actually get the financing sought.

A limitation of the present work may be the relatively small sample considered and perhaps its Cambridge-related bias (although we do not offer conclusions that are environmentally dependent). We will address this by including further case studies, especially on bank-backed companies, with a broader geographical focus.

The provisional insight presented in Section 5, asks for a statistically significant sample, of which a quantitative analysis may validate some of the determinant features of an HTSF gearing, at least by considering the segmentation of investors (from the entrepreneur's point of view) discussed above. Insights about the optimality of HTSF financial strategy could be derived, in that context, from an

analysis of the relationship between financial source and the failure and duration of the relationship with the investor, as patterns emerging from these case studies suggest.

7. References

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