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7. What factors determine the use of venture capital? Evidence from the Irish software sector

Teresa Hogan and Elaine Hutson

1. INTRODUCTION

New technology-based firms (NTBFs) are major conduits for translating scientific knowledge into commercial products and processes, and play a vital role in the development and diffusion of innovation. (NTBFs are defined as independent ventures less than 25 years old that supply a product or service based on the exploitation of an invention or technological innovation.)

In order for such firms to thrive, it is critical that they receive appropriate finance at start-up, through to commercialization and growth. Academics and practitioners agree that venture capital is the most appropriate source of finance for NTBFs. NTBFs tend to satisfy the requirements of classic venture capital, which is a medium-term source of funding used to finance investment activities such as research and development, targeted at new or young firms with the potential to grow and expand. Software NTBFs fit the profile of preferred venture capitalist investments in that they have significant potential for rapid value creation, being in new, expanding markets, with products that are protectable by patent and copyright, and with founders who are generally keen to see their businesses grow.

In this chapter, we report the findings of a novel research programme into the venture capital financing of high-technology small businesses in Ireland. Based on a survey of 110 privately held indigenous software companies, of which 54 are venture capital backed and 56 are not, we investigate what factors affect the use of venture capital in NTBFs. Four of our eight explanatory variables relate to the traits of the lead founder: education to degree level and to post-graduate level, prior start-up experience, and management experience in the software sector. A fifth human capital variable is the size of the founding team. We also examine the impact of

product lead times, start-up costs, and founders' willingness to relinquish control.

2. THE SURVEY

We sent questionnaires to the population of Irish indigenous software product companies, which comprised 257 firms in May 2002. The number of valid returns was 117, giving an impressive response rate of just under 46 per cent. In 82 per cent of firms the lead founder and chief executive officer completed the questionnaire. (The remaining 18 per cent were also founders and held other key positions in the company.) The number of venture and non-venture capital-backed firms in the study is similar: 56 of the 110 (51 per cent) firms for which data are available had not received venture capital backing, and 54 (49 per cent) were funded by venture capitalists. (Seven firms were excluded on the basis that they provided insufficient information on whether or not they had received venture capital funding.) This proportion of the sample that is venture capital backed is rather high even among NTBFs, confirming that 'software products' is a sector that attracts considerable venture capital interest. Table 7.1 provides summary information on the sources of finance for the 96 firms that provided detailed funding information. The figures for the full sample show a 50/50 divide between internal and external sources. A mere 4 per cent of financing is sourced from banks, and the remaining outside finance is equity (39 per cent) and grants (7 per cent). Venture capital comprises an average of 28 per cent of financing for the sample firms, with the largest representation among firms 2-4 years old.

Table 7.1 Sources of finance for current investment requirements

Stage	Internal sources (%)			External sources			
	Savings	Other internal	Total internal	Bank loans	Venture capital	Other external	Total external
Start-up (< 2 yrs)	43.0	29.5	72.5	0.0	13.0	14.5	27.5
Commercialization (2-4 yrs)	10.0	22.0	32.0	3.0	38.0	27.0	68.0
Growth (5-10 yrs)	9.5	46.0	55.5	6.5	28.0	10.0	44.5
Mature (> 10 yrs)	10.0	66.0	76.0	5.0	11.0	8.0	24.0
Full sample	14.0	36.0	50.0	4.0	28.0	18.0	50.0

3. WHAT DETERMINES THE FOUNDER'S DECISION TO USE VENTURE CAPITAL?

3.1 Work Experience

The prior industry experience of the lead entrepreneur is critical in the venture capital selection process, and the received wisdom is that venture capitalists like to back strong teams. Studies show that venture capitalists tend to favour firms founded by people with relevant experience in the industry (Muzyka et al., 1996). The entrepreneurship literature also stresses the benefits of an experienced management team for the survival and growth of new firms, and such firms should be attractive to potential financiers. Prior experience should also give entrepreneurs a greater knowledge and familiarity in dealing with potential providers of finance. We separate experience into two different variables: experience in a previous start-up, and management experience in the software sector.

We find, rather surprisingly, that venture capital backing is more likely when the founder has not previously been involved in a start-up. Twenty-seven out of 56 (48 per cent) non-venture capital-backed firm founders were previously involved in a start-up, whereas only 21 out of 54 (39 per cent) venture capital-backed founders had start-up experience. This difference, however, is not statistically significant.

One possible explanation for this finding is that founders previously involved in start-ups have considerable wealth to bring to the new business, earned perhaps from accumulated retained earnings or from the proceeds of a trade sale. If the 'serial' founder brings more wealth to the new venture, this may reduce the need for external funding. To examine this possibility, we tested whether 'serial' founders had greater initial start-up capital than firms with founders who had no start-up experience. The median start-up cost for both was in the band €63,500 to €127,000, and statistical tests confirm that this difference is not significant.

Figure 7.1 depicts our findings on the relation between prior management experience in the software sector and venture capital backing. The figure shows clearly that in each 'years of experience' category there is very little difference between the proportions that are and are not venture capital backed. This runs contrary to the received wisdom in the venture capital industry. It is also inconsistent with the evidence on venture capital selection criteria, in which the lead entrepreneur's industry experience is considered critical. Similar to the findings about prior start-up experience, this suggests that the factors considered important prerequisites for venture capital support are not the same as those affecting the founder's demand for venture capital.

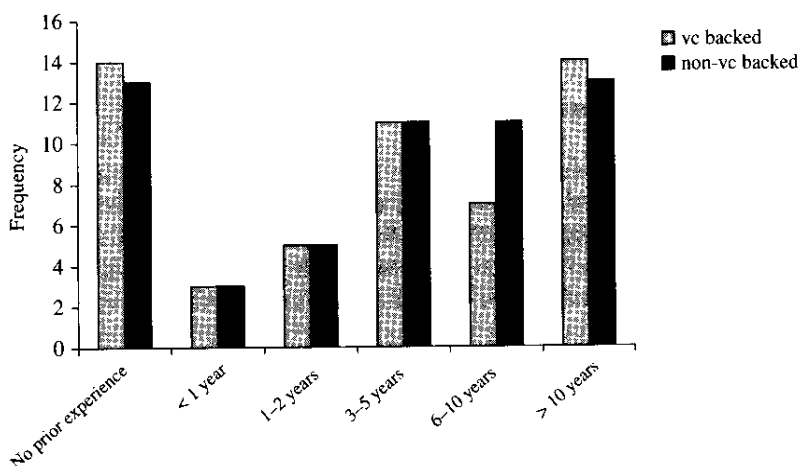


Figure 7.1 Management experience in the software industry

3.2 Size of the Founding Team

The venture capital literature is unanimous in its support for venture teams. There is a strong intuitive argument for the benefits of multi-founder businesses, in that 'many hands make light work'. Because starting a business is a complex process, a founding team should increase the new venture's chances of survival and subsequent growth, in which case teams may have a greater propensity to seek outside finance in order to support the anticipated growth.

Similar to the experience variables, there appears to be no difference in team size between firms that are venture capital backed and those that are not. Figure 7.2 depicts this relation. Eleven out of 26 (42 per cent) of the single founder firms are venture capital backed, compared to 43 out of 84 (51 per cent) firms founded by teams of two or more founders. The difference between these proportions is not statistically significant. Can teams having greater combined financial resources, and therefore not needing external finance, explain the insignificance of the team size variable? Dividing the sample into small (less than €63,500 initial capital) and large firms (greater than €63,500 initial capital), we can conclude that team size is positively related to initial capital. The median team size for firms starting with less than €63,500 is two, and for those with more than €63,500, the median team size is three. This difference is highly significant, confirming that the larger the team, the greater the capital founders bring with them.

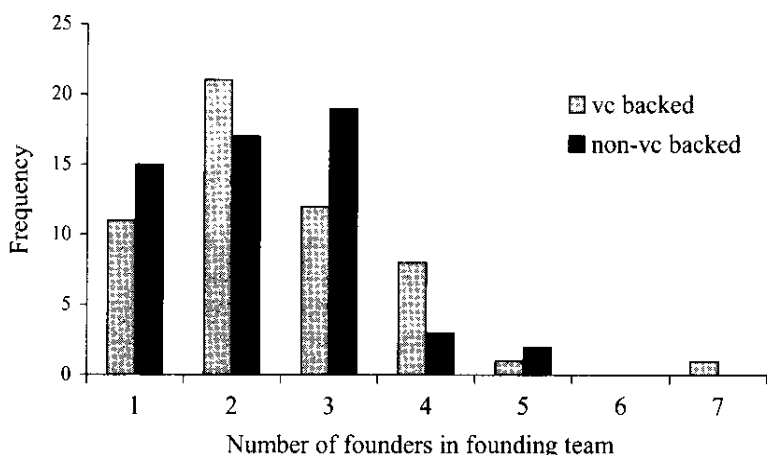


Figure 7.2 Size of the founding team

3.3 Educational Background

A considerable body of academic research has consistently found that the educational background of founders is not important in the venture capital selection process. In contrast, education is often used as a potential explanatory variable in research on the performance of small firms, and it is well established that education to degree level has a positive effect on survival, profitability and growth. This significantly positive relation, however, does not hold for education beyond degree level. How might educational background affect founders' demand for funds? In so far as founders with degrees are keen to see their businesses grow, it is likely that such firms will require external funding to support this growth. Growth firms tend to be more highly geared than non-growth firms, and external equity is more likely to feature as a source of finance in fast-growth firms.

Consistent with prior research on firm performance, we find no relation between education beyond degree level and venture capital backing. On first-degree qualifications, however, our findings are strongly supportive of a positive relation between educational attainment and venture capital backing. Only three out of 54 sample firms (6 per cent) with venture capital backing had founders who were not educated to degree level, compared with 15 out of 56 founders (27 per cent) in firms without venture capital backing. This difference is highly statistically significant.

While education may be considered unimportant by venture capitalists, it is certainly an important demand-side determinant of venture capital backing. Why might this be the case? Apart from the argument that degree

holders are keener to see their businesses grow, superior education may equip entrepreneurs to negotiate effectively with potential financiers (Oakey, 1984). We suggest two reasons why the founder's educational qualifications may improve his or her chance of successfully applying for venture capital. First, entrepreneurship research has shown that the founder's degree qualifications are associated with lower levels of NTBF failure. Highly educated founders may therefore be seen by venture capitalists as lower risk propositions, in which case they may well find it easier to obtain finance. Second, a degree may be considered to be a critical qualification for founders in high-technology businesses. Because advanced technical skills in electronic/software engineering or programming would probably be a prerequisite for founders in the software industry, a degree may have a 'certification effect'; that is, it provides an important measure of suitability for starting a high-technology business.

3.4 Product Lead Time and Start-up Costs

NTBFs differ from the general population of start-ups in that they are characterized by an intensive period of research and development early in their life cycle. There is evidence that the longer the product lead time, the more likely it is that the NTBF will require external funding. NTBFs in the biotechnology sector, for example, are more likely to require venture capital funding than firms in other high-technology industries because they face longer product lead times and take longer to reach break-even point than their counterparts in the electronic and software sectors (Oakey, 1995).

Figure 7.3 depicts the sample firms by lead time. There appears to be little difference in lead times for venture versus non-venture capital-backed firms, and statistical testing confirms that the difference is not significant. Venture capital-backed firms do, however, have higher start-up costs. The median non-venture capital-backed firm had start-up costs in the lowest range of less than €63,500, while the median venture capital-backed firm is in the range €127,000 to €317,000. Figure 7.4 shows that the difference in start-up costs between venture and non-venture capital-backed firms is most dramatic in the smallest cost category (less than €63,500), and the largest (greater than €1,270,000). Of the 49 firms in the lowest start-up cost category, 63 per cent are not venture capital backed; and of the 10 firms with start-up costs greater than €1,270,000, only two are not venture capital backed.

So while start-up costs are positively related to venture capital finance, this is not due to longer product lead times requiring greater external finance. In fact, we find no relation at all between product lead time and external financing. This can be seen from Figure 7.5, which plots mean and median product lead times against the start-up cost categories. The figure clearly

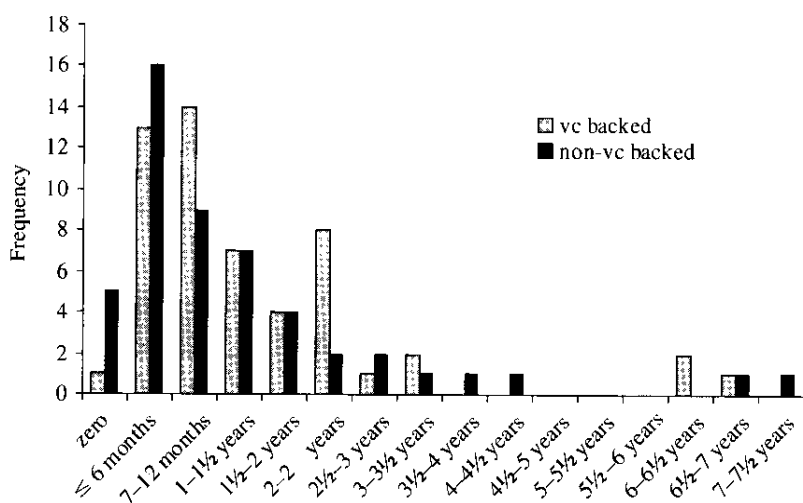


Figure 7.3 Product lead time

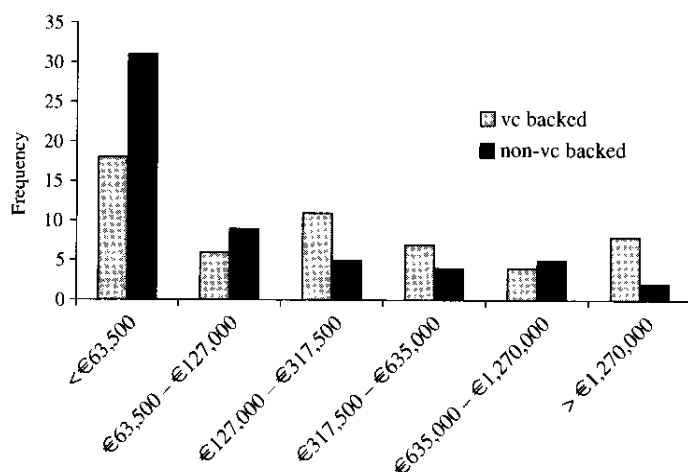


Figure 7.4 Start-up costs

shows very little variability in lead times across the start-up cost categories. The median product lead time for small firms (with start-up costs of less than €63,500) of 13.5 months is slightly higher than that for larger firms (10 months), but this difference is not significant. Our research indicates that Oakey's (1984) finding that firms with longer product lead times need more

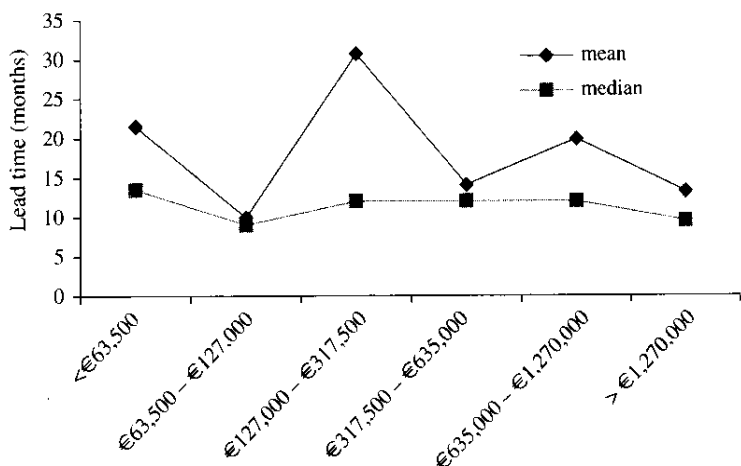


Figure 7.5 Product lead times versus start-up costs

access to external finance does not hold in the software product sector. The software product sector is unique among high-technology industries in that it has very short lead times – a median of 12 months in our sample. Software firms may not, therefore, need substantial outside finance for the product development phase of their life cycle.

If the positive relation between venture capital funding and start-up costs cannot be traced to differences in product lead times, how can it be explained? It is well understood that the venture capital industry tends to avoid very small new firms. Gompers and Lerner (2003) argue that this is because venture capitalists are under pressure to raise large fund pools, and small investments are not worth their while. We test this explanation by assessing whether the proportion of venture capital-backed firms is greater among larger firms (those with more than €63,500 initial capital) versus small firms (those with less than €63,500 initial capital). The proportion of large firms using venture capital – 36/61 or 59 per cent – is significantly greater than the proportion of small venture capital recipients (18/48 or 38 per cent). Assuming that this fact is well known among high-technology entrepreneurs, small-time founders would be unlikely to seek venture capital.

3.5 The Willingness of Founders to Cede Control

One of the strongest stylized facts from the entrepreneurship literature is that independence is the primary objective of owner-managers in small firms (LeCornu et al., 1996). The unwillingness of owner-managers to relinquish

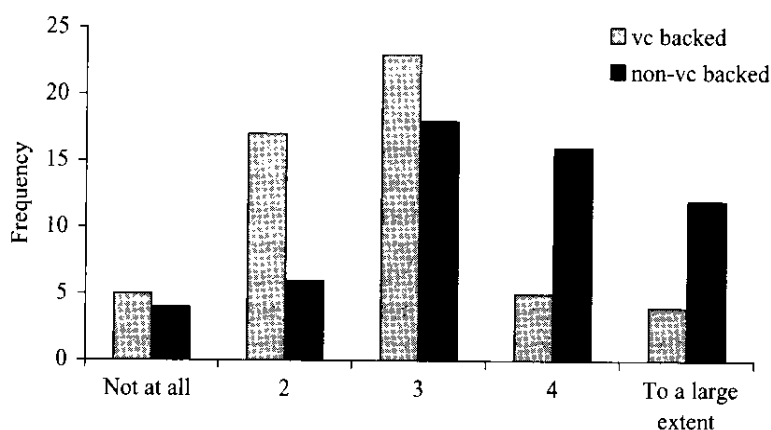


Figure 7.6 Willingness of founders to cede control

control will, of course, predispose them to self-funding. To obtain venture capital support, owner-managers must give up a substantial equity stake; typically 50 per cent. If owner-managers accept venture capital finance, they must be willing to give up a considerable degree of decision-making flexibility and managerial freedom. The variable *control* measures the extent to which the founders expressed a preference to maintain ownership of 50 per cent or more of the shares of their companies, and a higher value for the response implies less willingness to relinquish control. Figure 7.6, which presents our findings on this issue, demonstrates a very strong relation between the founders' willingness to relinquish control and venture capital backing.

Figure 7.6 reports the response to the statement '[prefer to] retain a majority stake-holding (50 per cent or more) in the business for the founders', separated into venture and non-venture capital-backed firms. Survey participants were asked to respond on a scale from 1 to 5, where 1 is 'not at all' and 5 is 'to a large extent', implying that the higher the response number, the less willing is the respondent to relinquish control of the business.

The median response to this question is 3.0 for venture capital-backed firms, and this is significantly lower than the median 3.5 for those not venture capital backed. Founders who are willing to cede ownership are clearly more likely to use venture capital funding.

4. CONCLUSION AND IMPLICATIONS

Using survey data for 110 Irish indigenous software product firms, of which 54 are venture capital backed and 56 are not, we examined the extent

to which eight firm-specific factors affect the use of venture capital finance. The only human capital variable that has a significant effect on venture capital use is whether or not the lead founder is degree qualified. This finding is at variance with the venture capital literature, which demonstrates that venture capitalists tend to downplay formal qualifications, and emphasize 'track record' variables such as the strength of the team and prior experience in the industry. Education may not be considered important by venture capitalists, but it appears to be an important demand-side determinant of venture capital backing. There are several potential explanations for this finding. Owner-managers educated to degree level are more likely to expand their businesses, and to support this growth there would be a greater need for external funding. Alternatively, well-educated founders are better equipped to negotiate with potential providers of finance (Oakey, 1984), and degree qualified founders may be better able to understand the trade-offs involved in accepting venture capital finance.

Our other human capital variables – prior start-up experience, management experience in the software sector, and size of the founding team – are not significant determinants of venture capital backing. This is a rather curious result because it appears to be contrary to the findings in the venture capital appraisal literature. While venture capitalists claim to favour firms with strong, experienced teams, it would appear that many experienced teams eschew venture capitalists. Our findings question whether venture capitalists actually follow their own advice in appraising management teams, or whether they rely on more subjective approaches to appraisal – like 'gut instinct'.

We find a significantly positive relation between start-up costs and venture capital backing. But longer product lead times do not imply that venture capital use is more likely, suggesting that product lead time is not the main driver of start-up costs in software product companies. This is contrary to the evidence from the NTBF literature that the longer the product lead time, the greater the initial capital required, and the more likely it is that the firm will require external funding. However, prior studies compared lead times across industries, whereas we look at the issue within the software sector. Our findings that lead time is very short, and that external financing is at its maximum for 2–4 year-old firms – when it comprises 68 per cent of total funding – suggest that the greatest demand for finance in software product firms is during the commercialization phase.

The most significant explanatory variable in our modelling is the willingness of the founders to relinquish control of their businesses. Consistent with one of the best-understood stylized facts from the entrepreneurship literature, a substantial proportion of Irish indigenous software firm founders view independence and control as critical motivators. If independence is the

most important factor behind NTBF financing decisions, perhaps we can conclude that founders bring in venture capital partners reluctantly, or at least after very carefully weighing up the costs and benefits of venture capital finance. Our findings also suggest that founders may initiate ventures with others in order to reduce the requirement for external funding. We find that the bigger firms – those with start-up capital of more than €63,500 – had been started with significantly larger teams than the start-ups with less than €63,500. Not only does starting a business with a team increase access to 'internal' resources at start-up. Because software development is a labour- rather than a capital-intensive activity, the founding team, allowing the reduction or postponement of labour expense, can undertake it. Software firm founders may thus have considerably more financial flexibility than their counterparts in other NTBF sectors.

It is clear that the factors affecting the demand for venture capital financing differ from those affecting the supply. Venture capitalists minimize the risk of their portfolio of investments by choosing firms that they perceive are likely to prosper and grow. This manifests as client firms with teams of founders who have strong experience in the industry and in starting small businesses. However, it is clear from our findings that many NTBFs that may well meet venture capitalists' requirements do not make themselves available for venture capital funding. The implication for investors in venture capital funds is that they do not have access to the full population of young, high-technology firms.

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