SOURCES OF NEW VENTURE SUCCESS:
A COMPARISON OF UNITED STATES AND EUROPEAN EXPERIENCE

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Abstract

This study compares high-potential, technology-based new companies in the United States with those in Europe. Our hypothesis is that, in spite of cultural differences, competitive forces will impose similar requirements on a firm regardless of its location.

We compare are sample of 68 United States ventures with 24 from Europe. Measures of management characteristics, industry structure and business strategy are obtained from the original business plans of the firms. The measures are selected to minimize the potential bias introduced by the researcher. Performance is derived from the firm's value in successive financing transactions.

We find that the European and United States firms are similar across all three areas: management, industry, and strategy. The United States sample has better overall performance, but the difference is substantially narrowed when allowances are made for the different times at which the businesses were started.

The relationship between the companies' characteristics and their performance is broadly similar between the European companies and the American ones. According to our regression analyses, one particular difference – the tendency of European firms to start with less complete management teams than their American counterparts – may explain a large part of the gap in performance.

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Introduction

During the 1980's investors, business people and policymakers in the United States all recognized the importance of high-growth, technology-based new companies. Such companies are variously seen as creators of jobs, of new industries, of wealth, and of national competitiveness. Only a handful of the thousand of firms started each year will grow to over $20 million in sales, and the figures are unclear whether the main source of jobs is the mass of smaller firms or the few who grow rapidly into important forces in their industries. However, everyone acknowledges the effect of that handful in transforming industries such as semiconductors, supercomputers, data communications, personal computers, medical equipment, and biotechnology – industries in which most developed countries hope to participate.

This is part of an ongoing study of high-potential new ventures. Our earlier papers have focused on a sample of United States-based companies financed with venture capital (Roure and Keeley, 1989a, b; Keeley and Roure, 1989a, b). Such firms have received relatively little direct attention from researchers. Instead a number of studies have asked venture capitalists about their perceptions of their investees (e.g., MacMillan, Zemann, and Narasimha, 1987; Tybejee and Bruno, 1984; Khan, 1987). Other studies have examined smaller technology-based firms (Stuart and Abetti, 1987; Van de Ven, Hudson, and Schroeder, 1984) which were not funded by venture capital. Our purpose has been to fill in a missing element of the research by using *ex ante* data from archival sources to understand how a decision maker – a founder of a company or an investor – could assess the company's chance for success.

Three important reasons exist for such studies:

1. Economic efficiency: by understanding the ingredients of a successful venture, one may avoid needless waste of financial, real and human resources on projects which were ill advised to begin with.

2. Learning: in a competitive economy new knowledge can drive returns downward. This is in society's interest, and it increases the knowledge from which society builds in the future.

3. Research methods: new ventures challenge the researcher to capture elements of market evolution, competitive strategy and organizational development in a highly dynamic environment.

Although a great deal of lore exists about what produces a successful new venture (see, for example, the front section of any edition of the Pratt's Guide to Venture Capital), there has been minimal empirical testing using the data which existed at the time of a firm's formation. Sandberg and Hofer (1987) examine 17 new firms, representing a variety of technologies. Not all were funded by venture capital sources; some were not funded at all and failed for that reason.

We have previously reported on a sample of 36 technology-based ventures funded by major venture sources (Roure and Keeley, 1989a, b). The sample represents essentially all of the startup investments of one fund during the period 1974-1983. By using all the investments we avoid the selection biases which are endemic in management research. By using only firms which obtained funding, we avoid the inherent uncertainty of a 'stillborn' company, i.e., we can never know how it would have fared.

With the assistance of additional venture capital firms, we extended the dataset to 68 new ventures divided into two blocks of 34 which respectively represent founding dates prior to and after October 1981 (Keeley and Roure, 1989a, b). Late 1981 approximately marks the midpoint of a rapid buildup in the number of new companies started by venture capital. Later periods have been characterized by direct competition among new ventures and low financial returns (see Bygrave, Fast, Khouylian, Vincent, and Yue, 1989, for a summary of financial returns).

In this study we examine a sample of 24 European startups funded by venture capitalists. We hope to understand whether lessons learned by American entrepreneurs and venture capitalists have value in the European context and vice versa. Similarities between the two clearly exist. For example, the knowledge of venture capitalists is broadly similar in the United States and Europe. Europeans have invested in United States ventures, and some American venture capitalists have offices in Europe. The practice of syndicating investments means that venture capitalists work with each other on boards of directors. Know-how can be readily absorbed in that setting and, through networks of board memberships, a reasonably common understanding can develop (Bygrave, 1987, discusses the nature of such networks in the United States).

A second force arguing for similarity between the United States and Europe is the nature of competitive forces and of technologies. These are not constrained by national boundaries, and should be broadly similar.

On the other hand, the differences may be important. Indeed, until recently the paucity of venture capital in Europe was an important institutional difference. In 1980 Piatier cited it as a major impediment to innovation in Europe. However, the pool of European venture capital has grown rapidly, and by 1988 reached 13 billion ECU – about 60% of the amount in the United States pool. Similarly, the absence of public stock markets for young companies in Europe has recently been remedied. Nonetheless, differences remain, among them the higher stigma which Europeans attach to failure. Additionally, centers of technology such as "Silicon Valley" in California or "Route 128" in Massachusetts require far more than a local source of venture capital, and those additional elements may be difficult to establish. For these and other reasons (summarized, for example, in Roure and Keeley, 1989c), European venture capitalists have invested relatively little in startups with the emphasis instead on "buyouts" of established stable firms and expansion financing.

Though high-potential technology-based ventures are started in Europe at relatively low rates, the requirements for success may be similar to those in the United States. An analogy might be made with new ventures started in Texas (especially appropriate because many Texans consider themselves to be separate from the United States). Although the number of such ventures is low by comparison with "Route 128", the requirements for success are essentially the same. Our working hypothesis will be that European startups funded by venture capitalists are the same as their counterparts in the United States.

The next section of this paper will briefly review a theory of the sources of success in new ventures. As mentioned above, this combines elements of market evolution, competitive strategy and organizational development – all in a dynamic setting far removed from the implicitly static world of most strategic management research.

The third section compares the European and United States samples, including the relationships between attributes and performance.

A final section discusses the implications for both groups of investors.

A Model of New Venture Performance

Recent studies of new firms (e.g., Sandberg and Hofer, 1987) have evolved the view that performance depends on management, business strategy and industry. In principle they are related as shown in Figure 1, a model which we have tested previously (Keeley and Roure, 1989b). Although limitations of the data, discussed later, will prevent testing the full model, it highlights the roles of the founders and is worth reviewing. The founders/managers begin by selecting an industry to enter and a business strategy for building a successful company. We refer to this as their "planning" role. Before proceeding very far they must obtain funding which means that venture capital sources will review their business plan. In this screening role the venture capitalists help determine the industry and strategy: sometimes through questions and suggestions which lead to changes; usually through refusal to back the venture, in which case that particular combination of founders, industry and strategy do not get started.

In the "planning" role many possibilities are compatible with eventual high performance. At one extreme, typified by accounts of new ventures in the popular press, the most talented managers may recognize unusually attractive industries and strategies, and the venture capitalists will readily underwrite their plan. At the other, typified by organizational ecologists (e.g., Hannan and Freeman, 1989), managers who find themselves in an attractive emerging market niche will generate plans based on their bounded view of the opportunity. Venture capitalists may exercise a screening role, but the quality of the founders (measured by something other than the quality of their plan or the subsequent success of this venture) may very well bear little relation to the quality of the industry and strategy.[1] It is a matter of being in the right place at the right time.

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[1] In the context of large, established firms, Mueller (1986) has found that abnormal performance can persist for decades; the question is whether such performance results from unusually skilled management or from structural conditions of the particular industry. Schmalensee (1985) finds an absence of management effects across divisions of multi-business companies. In combination these studies imply that managers in large firms may not actively change their firms' strategic positions very much. "Being in the right place at the right time" is the entrepreneurial equivalent.

Once the venture is funded, the founders/managers will have an ongoing role of making further strategic adjustments and carrying out the plan (referred to as "implementing" in Figure 1). The developing structure of the industry, and the company's strategy for attacking it, will affect the company's performance, as will the ability of the managers to operate more efficiently than their competitors and to make the right adjustments to their strategy.

We hypothesize that the dominant need of any new high-potential venture is to move with the utmost speed to establish itself in its perceived niche. Thus we hope to avoid the need for several "contingent" or situation specific variables, and to explain a company's performance from a small set of variables. As will be seen, some of the variables are ordinal in nature; however, we hope to transform them such that they will fit in a multivariate linear model. This approach allows direct comparisons of diverse measures of industry, strategy and management, and measurement of their influences on success. Such comparisons are a vital part of decision making. To borrow the vernacular of venture capitalists, everyone knows that an "A" management team and an "A" product idea are very likely to succeed. The problem is to set a value on such a venture, or more realistically to set a value on a "B+" management team and a "B+" idea.

To discover the causes of performance we need to identify potentially relevant qualities of founders/managers, industries and strategies, and to test them against subsequent performance. This was done for our United States sample of 36 companies in Roure and Keeley (1989b); it reviews prior literature in competitive strategy, organizational theory and entrepreneurship which suggests useful measures.

The difficult step was balancing conceptual elegance, such as the potential "dynamism" of a new market, against measurability – such as "number of potential customers" – all in the context of 36 heterogeneous business plans. We leaned toward measurability for a few reasons. First, we wanted to minimize the judgment required of the researcher, because it is a source of hindsight bias and other biases. Second, we hoped to make the sample easy to expand across time periods and industries. Complex measures are difficult to define in a way that cover a broad set of situations. Third, most other studies had used complex measures based on *ex post* management judgments with their potential for hindsight bias, so we chose a method which would be complementary to those.

Altogether we developed 21 potentially useful measures. They are described in Appendix A. Of those, seven have proven useful for our initial United States sample. They are summarized below with a tentative explanation of their influence on success:

Management Characteristics

1. *Team completeness* influences "implementation;" a complete founding team gives a company the ability to expand the organization rapidly, and to incorporate each functional discipline in the initial structure of the company.

2. *Prior joint experience* of the founders influences the initial strategic choices. A reason may be that founders who have worked together can immediately coalesce as a team, and mutually contribute to the choices of an industry niche and a strategy.

Industry Characteristics

3. *Competitiveness*, as measured by the number and size of competitors, helps indicate the amount of active opposition a new company will face.

4. *Buyer concentration* combines two forces: high concentration implies powerful customers, which can be detrimental for a firm; low concentration means that marketing expenses are likely to be high from the outset. Therefore, a medium level of concentration (30 to 100 customers) seems desirable.

5. *Market stage* describes the growth rate and the rate of change in product designs. The "growth" stage, in which the market is expanding rapidly and is narrowing down to a few dominant designs, proved more attractive than earlier stages for our initial United States sample.

Business Strategy

6. *Product superiority*, as measured by technical features, indicates whether proprietary technology will be an important part of a company's strategy.

7. *Development time* combines two concerns. A short development time suggests that a product may be easily copied; a very long period means that markets may shift in the interim or that high risks are attached to the project. Thus a time of about 10 months proved optimal for our initial United States sample.

Some other potentially useful measures, such as the size of the market, were not uniformly available or tended to have widely varying definitions across business plans.

To measure performance we use the internal rate of return realized by a firm's owners (founders, investors and employee shareholders). As discussed in every text on finance (e.g., Ross and Westerfield, 1988) such discounted returns on investment are the true measures of value. However, they are almost never available, because the value of new investments and existing ones cannot be separated. Thus we are accustomed to relying on indicators of value such as the return on the book value of assets. Such indicators of value are conceptually inferior to direct measures such as ours.[2] This is particularly true of new ventures in which returns on book value may be negative for several years (MacMillan and Day, 1987, report negative returns on the average in the fourth year of a sample of corporate ventures).

The European data do not include full financial histories, though the American data do. For most of the analysis we will use the return on the startup financing. We will consider the return to the venture capital investors and the composite return to the founders and the venture capitalists. We will compare these against the composite returns on all financing rounds for the American companies to determine how closely the two series correspond.

The rate of return is calculated by viewing the amount invested in the first financing as a cash outflow. This provides the investors (and founders) with a known number of shares. The value of the company at the time of its first public offering or when it is acquired allows calculation of a terminal value per share. When multiplied by the number of shares initially acquired (appropriately adjusted for stock splits and the like), this provides a value for the investment. The internal rate of return is easily calculated once the initial outflow and the later inflow are known. If the company was still privately held, the value at its last round of private financing was treated as a cash inflow on the date of that financing.

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[2] Benston (1985) and Beaver (1981) discuss in detail the drawbacks of accounting measures. Beaver covers the advantages of measures based on the firm's value.

The Samples

Four United States venture capital firms allowed us access to their business plan files from which we obtained data on a sample of new companies. In all cases we sampled a contiguous block of investments in order to avoid selection biases. We obtained complete data on 72 firms; one firm provided 34 plans, and the others about 13 each. We eliminated 4 firms from the sample because of very early public offerings, or a prior operating history.

The United States sample was divided into two groups of 34: those which started before October 1981 and those which started between October 1981 and December 1984. The two groups appear very similar in industry characteristics, strategic choice and managerial characteristics. However, the latter group has much lower performance and a much weaker relationship exists between performance and the explanatory variables. The number of startups funded by venture capital exploded in 1981 to 223 from an average of 66 per year in the previous three years; and has remained above 300 thereafter. Thus 1981 may represent a time at which the competitive forces facing new ventures shifted dramatically. This in turn may explain the changes in performance noted above.

Seven European venture capital firms – five from Britain, one from Belgium, and one from The Netherlands – agreed to provide data from business plans of their investments in startup firms. We asked them to provide data for a contiguous block of investments. We would have preferred ventures of the same vintage as our American sample, i.e., the early 1980's, but European venture capitalists made relatively few startup investments then. Accordingly, our European sample turned out to be more recent than its American counterpart. In all we received 27 sets of data. One British venture capitalist supplied data on 14 companies, and the others provided from one to three each. A statistical comparison of the data, treating the 13 from six different firms as one set, indicated that all plans could be treated as a homogeneous sample. However, three plans came from the early 1980's, whereas the others were from 1984-1986. We decided only to retain the 24 more recent startups.

Table 1

Industry Groupings: United States and European Samples

| | UNITED STATES | | EUROPE | |
	pre-82 (N=34)	82-84 (N=34)	(N=24)	Test [1,2]
Electronic-Misc.	4	3	3	C
Computer Systems	9	9	3	C
Computer Equip.	3	8	1*	K
Communications	3	2	1	K
Software	4	7	2	K
Semiconductors	3	3	1	K
Medical/Bio	5	1	6*	K
Other	3	1	7*	K

Notes:

1. Statistical significance is $p<0.01$ (**), $p<0.05$ (*).

Indicators of significance refer to test of all three samples.

2. Statistical tests: C= Chi Square test, K= Kruskal-Wallis test.

The resulting sample of 92 companies has three parts: two American and one European. It was divided into eight industry groups, as shown in Table 1. In many respects the samples are quite similar. The European sample is heavily oriented toward technological firms, and the American one is exclusively so. All eight industry groups are represented in all sub-samples.

The groupings are not identical, however. The American firms are primarily in electronics, whereas over half of the European firms are in medical/biotechnology or "other" (i.e., non-electronic).

Results

We begin with a comparison of the three sub-samples in Tables 2 through 5. The purpose is to understand whether the European investments closely match the characteristics of the American samples, as we have hypothesized. We will be concerned with whether the samples are significantly different in a statistical sense; whether the differences are large in the sense that they imply different types of business profiles; and whether the differences are important.

Table 2 summarizes the financing histories of the three samples. The European sample represents a more recent group of startups, as shown by the top line of Table 2.

Table 2

Financing and Performance Comparison: United States and European Samples

		MEAN VALUE (STD. DEV.)				
		UNITED STATES		EUROPE		
		pre-82	82-84			
	Units	(N=34)	(N-34)	(N=24)		Test
Ave. Starting Date[4]	mo/yr	3/80	1/83	1/86		
Amt of First Financing	($,000)	1,199	2,416	1,847		F
		(1,184)	(1,844)	(4,425)	**	B
Time in Portfolio	yrs.	4.9	4.1	2.2	**	F
		(2.2)	(1.0)	(0.8)	**	B
Rounds of Financing[4]	#	5.3	4.1	1.8	**	F
		(1.8)	(1.7)	(1.0)	**	B
Company Became Public?	# yes	13	8	1	*	C
Last Price/First Price[4]	#	18.62	6.5	0.9	**	F
		(25.9)	(15.6)	(0.9)	**	F
IRR-All $ (Y1) [4]	%/yr	101.2	44.1	1.6	**	F
		(172)	(102)	(77)	**	B
IRR to Investors[4]	%/yr	74.7	18.2	-22.0	**	F
		(144)	(74.5)	(53.0)	**	B
IRR to Investors	%/yr	117.8	82.1	-22.0	**	F
(adjusted to 2.lyr. hold)		(95.3)	(130.2)	(53.0)	**	B

Notes:

1. Variables which are regressors in equations 1 and 2 are identified as X1, X2, etc.
2. Statistical significance is $p<0.01$ (**), $p<0.05$ (*).
    Reference is to a test of all three samples.
3. Statistical tests: B= Bartlett's test (of variance)
    C= Chi Square test
    F= F test
4. Starting dates and time in portfolio influence the return. A sample of 23 new United States firms with an average starting date of 6/85 and an average time in portfolio of 2.0 years showed an average multiple of last price to first price of 1.546 with a standard deviation of 1.17. The average IRR to investors is 38.6 percent per year with a standard deviation of 80.7. These averages are statistically significant compared with the European sample at $p>0.01$, but the differences are much smaller than those between the European sample and the earlier United States samples.

The size of the startup financing is similar in the three samples. The European sample has been held for a shorter time, no doubt because it is more recent. The number of financing rounds is proportionately lower, averaging one round per year in all three samples. Fewer European companies have become public, in part because they are younger.

Performance varies dramatically among the three. The pre-1982 American sample has by far the best performance with an average multiple on the founding investment of 18.62, and correspondingly high rates of return, whether measured against all funds (from founders and investors) or for investors only. The risk is also very high. The standard deviation on the return to investors, at 144% per year, is about five times the standard deviation on a typical large public company.

The returns are considerably lower for those United States firms started in 1982-1984, and lower still for the European firms whose prices have fallen on average from their startup levels. Two forces are at work. First, returns on venture capital investments have been dropping (Bygrave, et al., 1989). The European investments are the most recent so their timing is adverse. Second, their performance is based on a shorter holding period.

To understand these forces better, we obtained a sample of 23 United States startups which closely match the timing of the European sample. They represent all of the startup investments of two United States venture capital firms during that period. The two are not part of our original group, though they are of similar size, and have similar investment policies. As discussed in note 4 to Table 1, these showed an average multiple on the original investment of 1.55 (with a standard deviation of 1.17). This is higher than the European sample, but the difference is far less than occurred in the earlier samples.

As a final comparison we adjusted the two United States samples to match the European holding period as closely as possible, by using, as final prices, the prices from the financing which occurred the closest to 2.2 years after startup. The results of this adjusted sample are shown on the bottom line of Table 2. They show even higher returns than are reported for the longer holding periods. When compared with the United States sample, whose average starting date is mid-85, described in note 4 to the table, they emphasize the extent to which initial returns appear to have declined since the early 1980's.

The United States returns based on a 2.1 year holding period will serve a second purpose, beyond the simple comparison with European returns. They provide a set of performance measures which can be used in regressions and compared with our earlier studies whose regressions used the longer holding period. They also allow derivation of a delayed return (based on price changes after the second year), which can be used in the regressions to determine whether characteristics of the firm at inception can influence later returns.

Turning to the characteristics of the founding management groups, Table 3 indicates that the European founding teams are broadly similar to those in the United States sample. The largest difference is in the proportion of founders with prior experience in a high growth (sales growth exceeding 25% per year) company, and this was not an important explanatory variable in our earlier studies. The difference in team completeness is probably of some importance, because it was an important influence on success for the pre-1982 sample.

Table 3

Comparison of Managerial Characteristics: United States and European Samples

| | | MEAN VALUE (STD. DEV.) | | | | |
| | | UNITED STATES | | EUROPE | | |
	Units	pre-82, (N=34)	82-84 (N=34)	(N=24)		Test
Team Completeness (X1)	%	69.7	68.7	50.0	**	F
		(21.4)	(25.4)	(19.6)		B
Similar Experience	%	83.3	72.1	82.7		F
		(22.2)	(27.8)	(28.0)		B
High Growth Experience	%	83.6	66.8	41.3	**	F
		(28.0)	(35.6)	(38.6)	**	B
Joint Experience	%	51.9	37.9	38.5	**	F
		(28.9)	(29.1)	(28.5)	**	B
Founders' Share of Stock	%	45.4	48.6	44.6		F
		(18.7)	(15.6)	(18.6)		B

Notes:

1. Variables which are regressors in equations 1 and 2 are identified as X1, X2, etc.
2. Statistical significance is $p<0.01$(**), $p<0.05$(*).
   Reference is to a test of all three samples.
3. Statistical tests: B=Bartlett's test   (of variance)
   F= F test

Table 4 compares the characteristics of the industries which the new firms entered. There is little difference among the three samples, except that some European companies entered geographically segmented markets.

Table 4

Comparison of Industry Characteristics: United States and European Samples

| | | MEAN VALUE (STD. DEV.) | | | | |
| | | UNITED STATES | | EUROPE | | |
	Units	pre-82 (N=34)	82-84 (N=34)	(N=24)		Test
Stage(X2=1 if stage=3)	1-5	2.5	2.4	2.5		K
		(0.9)	(0.7)	(1.0)		
Competition (X3)	1-5	3.0	3.6	3.2	*	K
		(1.1)	(1.3)	(1.3)		
Growth	%/yr	37.4	53.6	40.2	**	F
		(17.8)	(32.5)	(29.2)	**	B
Future Barriers	1-5	2.6	2.7	2.7		K
		(0.8)	(0.7)	(0.9)		
Buyer Concentration	1-5	2.9	3.0	3.1		K
		(1.1)	(1.5)	(1.4)		
Segmented by- Geography		0	0	5 **		K
Features		9	11	5		C
Customers		11	3	2	*	C
Both		11	14	6		C

Notes:

1. Variables which are regressors in equations 1 and 2 are identified as X1, X2, etc.
2. Statistical significance is $p<0.01$ (**), $p<0.05$ (*).
   Reference is to a test of all three samples.
3. Statistical tests: B= Bartlett's test (of variance)
   C= Chi Square test
   F= F test
   K= Kruskal-Wallis test

Table 5 presents attributes of the companies' strategies. Once again the three samples are generally similar. The Europeans have a higher fraction of new products, implying a somewhat greater use of a "first mover" approach, and they anticipate higher market shares on the average. In addition they make somewhat greater use of "entry wedges," special conditions which may enhance a company's chances of establishing itself in a market. Finally, more frequently than the Americans, they move into new markets with new products. Ansoff and others have suggested that a better strategy is that only the product or the market should be new, not both.

Table 5

Comparison of Strategy Characteristics: United States and European Samples

		MEAN VALUE (STD. DEV.)			
		UNITED STATES		EUROPE	
		pre-82	82-84		
	Units	(N=34)	(N=34)	(N=241	Test
Product-Superiority?(X4)	1-5	3.4	3.5	3.5	K
		(1.1)	(1.0)	(1.5)	
- New vs. Imitative	# of New	13	17	17 *	C
- Development Time (X5)	Mo.	11.5	13.5	9.8	F
		(5.7)	(6.9)	(7.6)	B
Plan Quality	1-5	3.3	2.9	3.3 *	C
		(1.3)	(1.2)	(1.1)	
Projected Mkt. Share	%	14.5	14.5	20.8	F
		(16.8)	(14.6)	(21.6) **	B
Entry Wedges	#/co.	0.5	0.7	1.2 *	C
Second Source	#	2	6	2	C
Cust. Sponsor	#	2	6	6	C
Govt. Regs.	#	1	0	4	K
Supply Shortage	#	7	4	4	C
New Mkt.Channel	#	5	7	9	C
New Market and New Product?	#	6	12	12 *	C

Notes:
1. Variables which are regressors in equations 1 and 2 are identified as X1, X2, etc.
2. Statistical significance is p<0.01 (**), p<0.05 (*).
    Reference is to a test of all three samples.
3. Statistical tests: B= Bartlett's test (of variance)
    C= Chi Square test
    F= F test
    K= Kruskal-Wallis test

The strategy variables which have influenced performance in our earlier studies are Product Superiority and Development Time. These are relatively similar across the three samples. On the whole, the differences which exist in Table 5 among the samples have not had much empirical importance, and the empirically important variables seem roughly equivalent for the three groups.

Ignoring performance for the moment, the management, industry and strategy characteristics of our United States and European samples seem very much alike. This supports our hypothesis that European and United States market dynamics are sufficiently similar that their new high-potential firms will be similar as well. However, an alternative explanation could be that venture capitalists in Europe have chosen to emulate United States practices and therefore forced this similarity, perhaps at the expense of performance.

The next issue is whether the influences of management, industry and strategy on performance are similar between the United States and Europe. In our earlier studies we found strong relationships for the pre-1982 United States sample. However, the return series for the European sample is based on a shorter time span, and lacks data on some interim financing rounds. As discussed earlier, we modified our United States return data to achieve holding periods comparable to those of the European sample, i.e., about two years. In the process we dropped four cases from the pre-1982 sample and three from the 1982-1984 samples because they had public offering after about two years. The European sample did not have any early public offerings and we felt the high returns of the United States public companies might diminish the comparability of the samples.

We begin by presenting regressions from an earlier study (Keeley and Roure, 1989a) for the pre-1982 United States sample using returns to all shareholders based on complete financial histories (we will use $Y1$ to represent IRR's of varying definitions in the expressions which follow). The results, as shown in equations (1) and (2), reveal a strong relationship between performance and the independent variables. In both expressions, the explanatory variables represent the three areas of management quality, business strategy, and industry structure.

Regressions based on complete financial histories (United States pre-82)

$$Y1= \quad -117.5 \quad +3.09\ X1 \quad +86.0\ X2 \quad -58.4\ X3 \quad +35.4\ X5 \quad -1.73\ X52 \qquad\qquad (1)$$
$$\quad (-0.83) \quad (2.64^*) \quad (1.75+) \quad (-2.36^*) \qquad\qquad (F[2,28]=2.79+)$$
$$\quad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad adj\ R2=0.50^{**}$$

$$Y1= \quad -446.0 \quad +3.76\ X1 \quad +85.1\ X2 \quad +66.7\ X4 \qquad adj\ R2=0.55^{**} \qquad\qquad (2)$$
$$\quad (-5.24) \quad (3.64") \quad (2.19^*) \quad (3.48^{*"})$$

Note: t statistics are in (). $p<0.10$ (+); $p<0.05$ (*) $p<0.01$ (**).

When we shift to rates of return based on the initial investment only, but still using the full time period, and we delete the cases which make the sample not comparable to the European one, the adjusted R2 values for equations (1) and (2) drop to 0.329 and 0.38 respectively. In equation (1) the coefficients of the market stage variable (X2) and development time (X5) fall to significance levels of $p>0.20$. The others remain below $p<0.10$. In equation (2) only the market stage variable loses its significance, dropping to $p<0.16$.

When we further shift to returns based on the shorter holding period, the explanatory power drops even further as shown below in equations (1') and (2').

Regressions based on incomplete financial histories (United States pre-82) and average holding periods of 2.1 years.

Y1= 97.3   +0.71 X1   +80.9 X2   -31.8 X3   +1.0 X5   +0.10 X52   (1')
     (0.91)   (0.78)   (2.08")   (-1.66)   (F[2,28]=0.72)
                                                    adj R2=0.10

Y1= -74.3   +0.83 X1   +54.4 X2   +32.7 X4   adj R2=0.15+   (2')
    (-1.03)   (1.00)   (1.63)   (2.08*)

Note: t statistics are in (). p<0.10 (+); p<0.05 (*) p<0.01 (**).

A comparison of the two sets of equations reveals the loss in explanatory power caused by the a lack of long, complete financial histories.[3]

In view of the problems caused by short price histories, the results for the European sample are surprisingly good, as shown in equation (3):

Regression on European Sample

Y1= -94.7   +1.2 X1   +42.0 X2   adj R2=0.27**   (3)
   (-3.55**) (2.42*)   (2.14*)

Note: t statistics are in (). p<0.10 (+); p<0.05 (*) p<0.01 (**).

These suggest that new technology-based ventures in Europe may have similar requirements for success as United States ventures, and that if performance measures existed for longer time periods, the similarities between equations (2) and (3) would increase.

Concluding Comments

The similarities between the European and United States companies in our sample suggest that their performance is driven by similar forces. The regressions of company characteristics on performance support this, despite the limited period for which European data are available. These findings suggest that European and United States entrepreneurs and venture capitalists can benefit from each other's experience.

A complete founding team is important in Europe, just as it is in America. However, the European teams were less complete, perhaps because European tradition may favor the single founder over a team approach. Using the European regression, equation (3), the difference in completeness between the United States firms in our sample and the European firms should penalize the European firms 25 percent per year in their return on original investment. This is a sizeable incentive to increase the emphasis on management teams in European startups.

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[3] Using returns based on the later part of the holding periods provides better explanatory power. Adjusted R2 values are 0.35 and 0.31 for (1') and (2') respectively. For the 1982-1984 sample, the return based on the later part of the holding period shows an R2 value of 0.20, using marketing measures as independent variables, and 0.12 using an expression similar to equation (2). In contrast, returns based on the first two years or on the whole period have almost no relationship to management, industry and strategy. The period in which the 1982-1984 firms started was one of great price volatility. Perhaps the early volatility masks any underlying relationships.

Figure 1

Sources of Performance of a New Venture
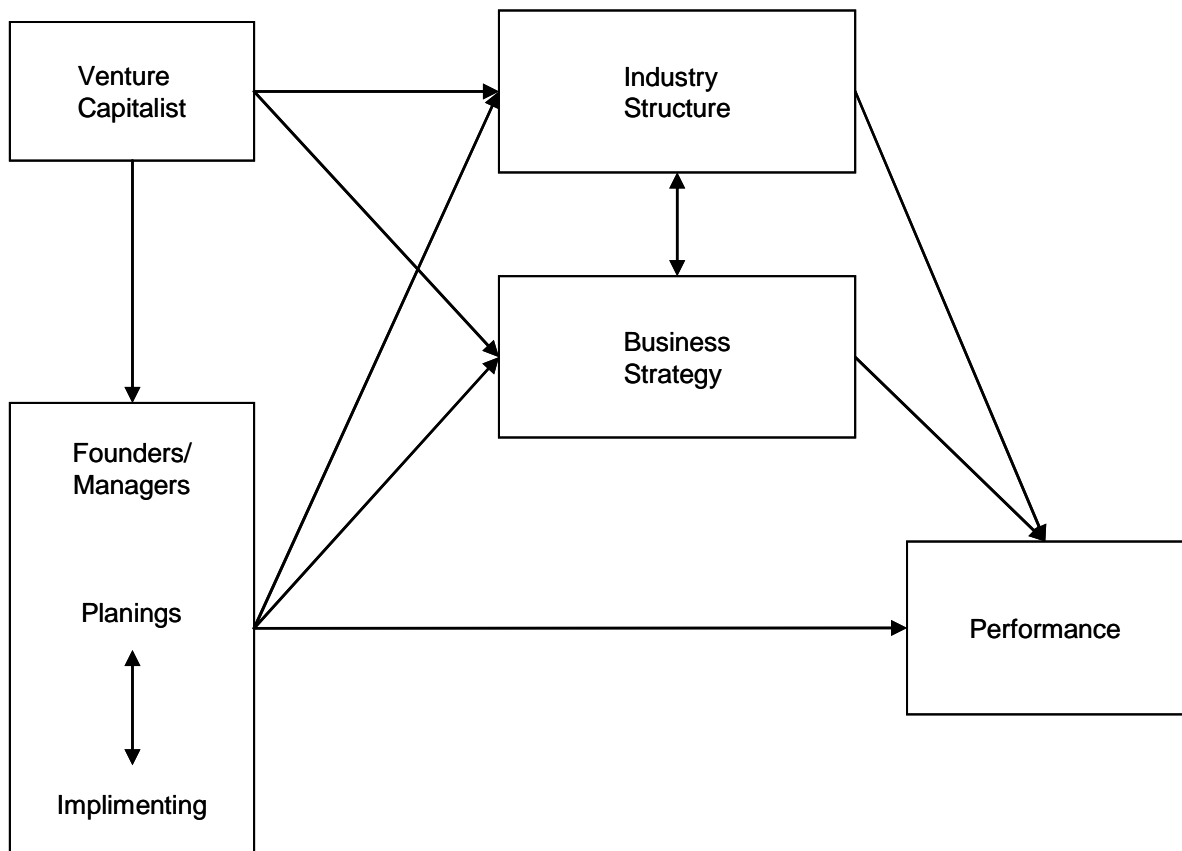
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Appendix A

Description of Independent Variables

Management Team Variables

Similar experience: the percentage of founders[4] with experience in a position similar to the one to be assumed.

High growth experience: the percentage of founders with experience in rapidly growing (over 25 percent annual growth in sales) companies.

Team completeness: the percentage of key positions which were filled at the time of the first major (over $300,000) outside funding. Key positions are the president and functional managers for marketing, engineering, operations, finance (or a second technical manager in place of one of the latter two if the venture involved two technologies, such as electronic and mechanical design).

Prior joint experience: This reflects the extent to which founders had previously worked in the same organization for at least six months. Several measures were tested; the one used here considers the leader (usually the CEO) and the three other founders with the greatest joint experience. For each prior relation between the leader and another founder a value of 20 is given. For each prior relationship among the three other founders a value of 10 is given. The combination produces a range of 90 points which is arbitrarily set from 10 to 100.

Founders' Equity Share: the share of the company retained by the founders after the first financing.

Industry Characteristics

Competitor strength: assessed on a 5 point scale (using information in the business plans).

> 1 = no existing competition.
> 2 = one competitor exists, or a few may enter.
> 3 = a few (2-4) competitors exist, but are either small or not attentive to the market niche.
> 4 = several small, or a few large, competitors exist, but no clear leader has emerged.
> 5 = several companies are serving the market and a clear leader exists.

Buyer concentration: a measure of the number of potential customers in the target market during the first two years of sales. It is rated on a five point scale.

> 1 = very low concentration (over 300 customers).
> 2 = low concentration (100 to 300 customers).
> 3 = medium concentration (30 to 99 customers).
> 4 = high concentration (10 to 29 customers).
> 5 = very high concentration (fewer than 10 customers).

Market Stage: a measure of the market's state of organization and growth.

> 1 = pre-commercial. If products are being sold, volumes are low.
> 2 = developmental. Variety of offerings has increased. Sales growing.
> 3 = growth. Standards are emerging. Market growing at >15%/yr. Sale exceed several million dollars per year.
> 4 = shakeout. Growth slowing. Exodus of several competitors.
> 5 = maturity. Growth has slowed to under 10%/yr. Products stable.
> 6 = decline. Sales declining. Little product innovation.

Growth: the anticipated growth rate of the market over the next few years.

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[4] Founders are those employees, who, as indicated by the business plan, are expected to: 1) play a key role in the development of the firm, 2) become employees of the company within the first year after the initial funding date, and 3) share in the ownership of the company in a significant manner.

Future Barriers: may influence the attractiveness of current entry.

> 1 = none. Expect many new competitors over the next 5 years.
> 2 = limited. Expect several new competitors over the next 5 years.
> 3 = significant. Expect a few new competitors.
> 4 = strong. Expect only one or two new competitors.
> 5 = very strong. Expect no new competitors.

Segmentation (several of the following may apply):

> a) None
> b) Geographically
> c) By product features/prices
> d) By customer groups (including captive customers)

Strategy Variables

Quality of the technical development plan: The technical plan is selected as a variable rather than the business plan because almost every firm in this sample has a complete, high quality business plan. The approach to technical development plans varies considerably, allowing the following measures:

> 1 = no mention of how the venture will develop its technology.
> 2 = general statement how the technology will be developed without milestones or schedules.
> 3 = milestones, schedules and tasks are described in a general way.
> 4 = a detailed development program has quarterly schedules with an outline of the more important tasks.
> 5 = a monthly development program includes details of important tasks.

Product development time: the number of months from the initiation of development to the initial sale as forecast in the business plan.

Product superiority: measured on a five point scale:

> 1 = a product's benefits match those of its competitors or potential substitutes.
> 2 = a product incorporates minor improvements.
> 3 = it incorporates significant improvements in performance.
> 4 = it represents a major improvement.
> 5 = it will clearly be the industry leader.

Forecast market share in the fifth year: an indirect measure of the aggressiveness of the company's plan.

New (first entry) vs. Imitative (Follower) Product

New vs. Established Market (Segment)

Entry "Wedges" (Which of the following special conditions apply?):

> a) Company will be a second source.
> b) A large customer (or supplier) is sponsoring the company.
> c) A shift has occurred in the regulatory climate.
> d) A shortage of supply exists.
> e) The company will exploit a new marketing channel.

Note: 1. Founders are those employees, who, as indicated by the business plan, are expected: 1) to play a key role in the development of the firm; 2) to become employees of the company within the first year after the initial funding date, and 3) to share in the ownership of the company in a significant manner.