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Initial Conditions as Predictors of New Venture Performance: A Replication and Extension of the Cooper *et al.* study

Jonas Dahlqvist¹, Per Davidsson and Johan Wiklund
Jönköping International Business School

Abstract

In the words of Hubbard, Vetter and Little (1998, p. 252), ‘systematic replication replaces piecemeal, untested results with useful findings that address practical problems.’ We agree with this. We further hold that for empirical relationships to be really interesting and meaningful one should be able to make a strong case that they represent causal and generalizable relationships. In addition, they should allow a meaningful theoretical interpretation. In this study we try to adhere to such ideals by replicating and extending a theory-driven study of the effects of initial conditions on new venture performance (Cooper, Gimeno-Gascon & Woo, 1994) using a very large (7000+ cases) and high quality, longitudinal data set. Data on initial conditions were collected in 1995 (within a year after first registration) and outcomes were assessed in 1998. On a conceptual level, our results confirm those obtained by Cooper *et al.* (1994) regarding how general human capital, management know-how and industry affect marginal survival probability, as well as concerning the effects of financial and general human capability on the likelihood of becoming a high performance venture. The results sometimes coincide also on a very detailed level, such as the differential effect of gender on marginal survival vs. its effect on high performance. Other parts of Cooper *et al.’s* (1994) result could not be replicated. To some extent this may be due to weak operationalizations of certain constructs, but real sample and/or country differences may also play a role.

1. Introduction

The ability to predict new venture performance based on observable initial factors is something that seems to intrigue many researchers in entrepreneurship, and rightly so. The economy of such a faculty would benefit society at large as well as its individual entrepreneurs, since it could prevent resources from being used in vain or with a less than optimal allocation. However, all forms of forecasting have their limitations and in this case the chief obstacle is the inherently stochastic nature of business venturing. No matter how well the individual is prepared, the unforeseeable is bound to happen sooner or later. Adverse events are often overcome by the enterprise but eventually some of the new ventures will come to a point where resources available just don’t match the requirements. The idea of picking the winners among new businesses solely based on initial factors seems too much to hope for, but if we are to find explanations for systematic variation in young enterprises’ ability to survive, the first place to look would be the initial resource endowment. Resources, in the form of financial and human capital, could be viewed as means to overcome adverse shocks to the infant business. Several researchers have looked into this area, most notably

¹ The authors contributed equally to this paper and are listed alphabetically.

Cooper and associates (Cooper, 1995; Cooper & Gimeno-Gascon, 1992; Cooper, Gimeno-Gascon, & Woo, 1994; Dunkelberg, Cooper, Woo, & Dendor Jr, 1987; Woo, Cooper, & Dunkelberg, 1988; Woo, Cooper, & Dunkelberg, 1991; Woo, Cooper, Dunkelberg, Daellenbach, & Dennis, 1989).

As noted by several authors, entrepreneurship studies are largely incompatible (Cooper *et al.*, 1994; Low & MacMillan, 1988; Storey, 1994; Wiklund, Davidsson, Delmar, & Aronsson, 1997). As a consequence, our knowledge about entrepreneurship is fragmented and incoherent. The lack of replication is one aspect of this problem that entrepreneurship research shares with the broader domain of business studies (Hubbard, Vetter & Little, 1998). We agree with these authors that ‘The goal of science is empirical generalizations or knowledge development. Systematically conducted replications with extensions facilitate this goal.’ (Hubbard *et al.*, 1998, Abstract). The present study attempts to avoid fragmentation and contribute to cumulative knowledge by replicating – to the extent possible – the study carried out by Cooper, Gimeno-Gascon & Woo (1994). To the extent results are replicated, this validates the findings in both studies. Like them, we use a very large random sample with data collection from different points in time. Our study also constitutes an extension of Cooper *et al.*’s (1994). The study is carried out in a new empirical context (Sweden as opposed to the US), at a different point in time and utilizing different measures.

2. Theory Development and Hypotheses

In their original paper, Cooper *et al.* (1994) specify initial conditions in terms of four groups of initial capital. The first, *general human capital* concerns knowledge that could lead to higher productivity and access to network resources due to the general background of the entrepreneur. The second, *management know-how*, focuses on the entrepreneur’s previous experience with general management tasks. This is mainly a question of tacit knowledge acquired through vicarious learning or by actually performing management tasks. The third factor, *industry-specific know-how*, may play an important role in the understanding of “how business is done” in a specific context of suppliers, competitors and customers. This knowledge is mostly tacit and costly to build up if the entrepreneur has no previous experience from the industry where the new business is established. The fourth group, *financial capital*, is probably the most tangible form of capital, acting as a buffer and giving greater freedom in exploring different strategies.

In our replication we use indicators for those four categories, although we do not always have access to exactly the same measures or variables as those used by Cooper *et al.* (1994). The fact that we do not always have access to the same variables is, of course, a drawback from a strict replication perspective. It might be argued, however, that if we are able to replicate results with slightly different indicators of the theoretical variables, then the basis for generalization becomes even stronger on the conceptual level (Hubbard *et al.*, 1998). Hence, the use of other specific indicators may be regarded an extension of Cooper *et al.*’s (1994) analysis.

We also extend our study by adding a fifth category, which Cooper *et al.* (1994) did not capture, *access to market and resources*. Like them we also investigate industry differences. While industry is considered a control variable in the sense that it is not conceived of as representing a particular type of ‘initial capital’, directional hypotheses are nevertheless formulated for the effect of industry affiliation.

In developing hypotheses for our replication we could choose either of two routes. One alternative is to model our hypotheses on the *results* of the Cooper *et al.* (1994) study and the other alternative would be to use their original *hypotheses* as our model. We have chosen the latter alternative. The main reason for this is that we in most cases regard the total backing of

a hypothesis as heavier evidence than the results of a single empirical study. We will, of course, comment on our results also in relation to the results obtained by Cooper *et al.* (1994). We would argue that results where both studies either support the original hypotheses or deviate in the same way have the highest level of credibility.

2.1 General human capital

In their original study, Cooper *et al.* (1994) included education, gender and ethnic minority to represent this category. Due to data constraints, the present study replicates only gender and replaces ethnicity with immigrant status. The conceptual argument about the difficulties of ethnic minorities in the U.S. applies fully to immigrants in the Swedish setting. Gender and ethnicity are demographic variables that are expected to determine the opportunities for the individual to gain relevant experience and develop valuable network contacts. It is expected that women have less such opportunities than men do. Further, having a non-Swedish background is believed to lower the access to situations where relevant knowledge could be acquired. Thus, we propose the following:

H1: Probabilities of marginal survival and high performance are lower for female entrepreneurs

H2: Probabilities of marginal survival and high performance are lower for immigrant entrepreneurs

2.2 Management know-how

To test this factor, Cooper *et al.* (1994) included presence of a parental role model, entering from outside the workforce or from non-profit organization background, level of management experience, use of professional advisors, and the presence of partners (team vs. solo start-up). We lack exact parallels to these specific measures. The second category largely overlaps entering start-up from unemployment status, on which we have data. Unemployment in itself could lead to a loss of resources in professional networks as well as a general deterioration of professional skills. It is therefore reasonable to conclude that enterprises started by individuals indicating unemployment as their primary start-up motive would be less likely to achieve high performance.

We also have two other strong indicators, i.e. variables that clearly belong conceptually to this category. These are previous start-up experience and participation in start-up training prior to start-up. Start-up courses are aimed at providing management know-how for the start-up phase and should therefore be expected to improve performance. Experience from previous start-ups provides the entrepreneur with tacit knowledge about the processes involved in getting a business up and running. This is not necessarily specific to the actual industry but rather to the managerial situation of start-ups. This knowledge should improve the odds of “getting things right”. The preceding discussion leads to the following hypotheses:

H3: Probabilities of marginal survival and high performance are lower for entrepreneurs who started their business for unemployment reasons

H4: Probabilities of marginal survival and high performance are higher for entrepreneurs who participated in start-up training prior to start-up

H5: Probabilities of marginal survival and high performance are higher for entrepreneurs who have prior start-up experience

2.3 *Specific industry know-how*

For this dimension Cooper *et al.* tested but one hypothesis, based on an index variable reflecting the similarity between the start-up business and the organization in which the founder worked prior to start-up. We do not have access to the items in that index, nor to a direct measure of in what industry the founder worked prior to start-up. It may therefore be the case that our indicators for this factor are particularly weak.

The insights gained through experience in a specific industry should lead to a greater ability to develop business ideas relevant to that specific industry as a response to a market need or market opportunity. We therefore argue that entrepreneurs who start their business primarily motivated by the possibility of realizing a specific business idea, or as a response to a perceived market need, have greater specific industry know-how than those who start their business for other reasons such as unemployment, a quest for independence, or a desire to make more money. We consequently hypothesize a positive relationship between these two start-up motivations and performance.

H6: Probabilities of marginal survival and high performance are higher for entrepreneurs who started their business in response to a market need

H7: Probabilities of marginal survival and high performance are higher for entrepreneurs who have started their business to realize a business idea

2.4 *Financial Capital*

The amount of capital raised at start-up could be expected to increase the chances for the new business to survive and prosper. Financial capital provides a buffer against unforeseen difficulties which may arise from environmental changes, poor management etc. (Castrogiovanni, 1996; Cooper *et al.*, 1994). Financial capital also provides organizational financial slack, facilitating necessary changes in response to changing conditions and increasing the willingness of the firm to innovate and change (Castrogiovanni, 1996; Zahra, 1991). Thus, the access to more financial capital at start-up should have positive performance implications.

There are many possible indicators of initial financial capital. Cooper *et al.* (1994) used the reported amount of capital invested by the time of the first sale to investigate the effect of initial financial capital. For our study we choose instead to use the firm's legal form at entry, and whether or not it has received an 'enterprise allowance'. Incorporation reflects more of financial commitment since Swedish entrepreneurs need to raise a minimum of 100 000 SEK (app. 12 500 USD) to start a corporation (i.e., the only existing legal form with limited personal liability). Receiving an enterprise allowance means that the founder receives a steady income (equal to unemployment allowance) during the first six months. This effectively means an increase in the amount of capital available to the entrepreneur. Following the previous discussion, we hypothesize that incorporation and enterprise allowance are factors that are positively related to performance.

H8: Probabilities of marginal survival and high performance are higher for entrepreneurs who received public, financial start-up aid (enterprise allowance)

H9: Probabilities of marginal survival and high performance are higher for entrepreneurs who started incorporated companies

It should be noted, however, that as enterprise allowances are given to unemployed founders only, one cannot expect H8 and H3 to be simultaneously supported by the data.

2.5 Access to market and resources

Indicators pertaining to financial and human capital are specific to the individual or the firm. However, the environmental context at start-up is also likely to affect the subsequent performance of the new venture. The geographic area where the business is launched has implications for its access to markets and resources. Venturing in a metropolitan area could be an obvious advantage when doing business in specialized services or retailing, since such businesses require a large absolute population base in order to reach a sufficient local market sharing the specialized interest or need. Agglomeration may also increase availability of labor and sub-contractors in any industry. Further, we know from previous studies that variables such as the size, density and growth of the human population tend to be positively related to both gross and net new firm formation rates (Davidsson, Lindmark & Olofsson, 1996). Hence the following hypotheses:

H10: Probabilities of marginal survival and high performance are higher for firms in metropolitan areas

H11: Probabilities of marginal survival and high performance are lower for firms in rural areas

While these hypotheses may seem intuitively appealing, it should be noted that a valid counter-argument, at least regarding survival, is that if business founders' expectations are rational and reality-based, there is no reason to expect higher failure rates in relatively deprived regions, as their relative deprivation would affect *gross* start-ups already. As regards growth it may be argued that agglomeration does imply markets and resources, but also increased competition for those. Only empirical analysis can decide what line of argumentation is the more valid.

2.6 Control variable: industry

With regard to industry, Cooper *et al.* (1994) hypothesize, mainly on the basis of previous empirical results, that probabilities of survival and growth are lower in retailing and personal services. We agree that these are plausible assumptions. Hence:

H12: Probabilities of marginal survival and high performance are lower for firms in the retail and personal service sectors

3. Method

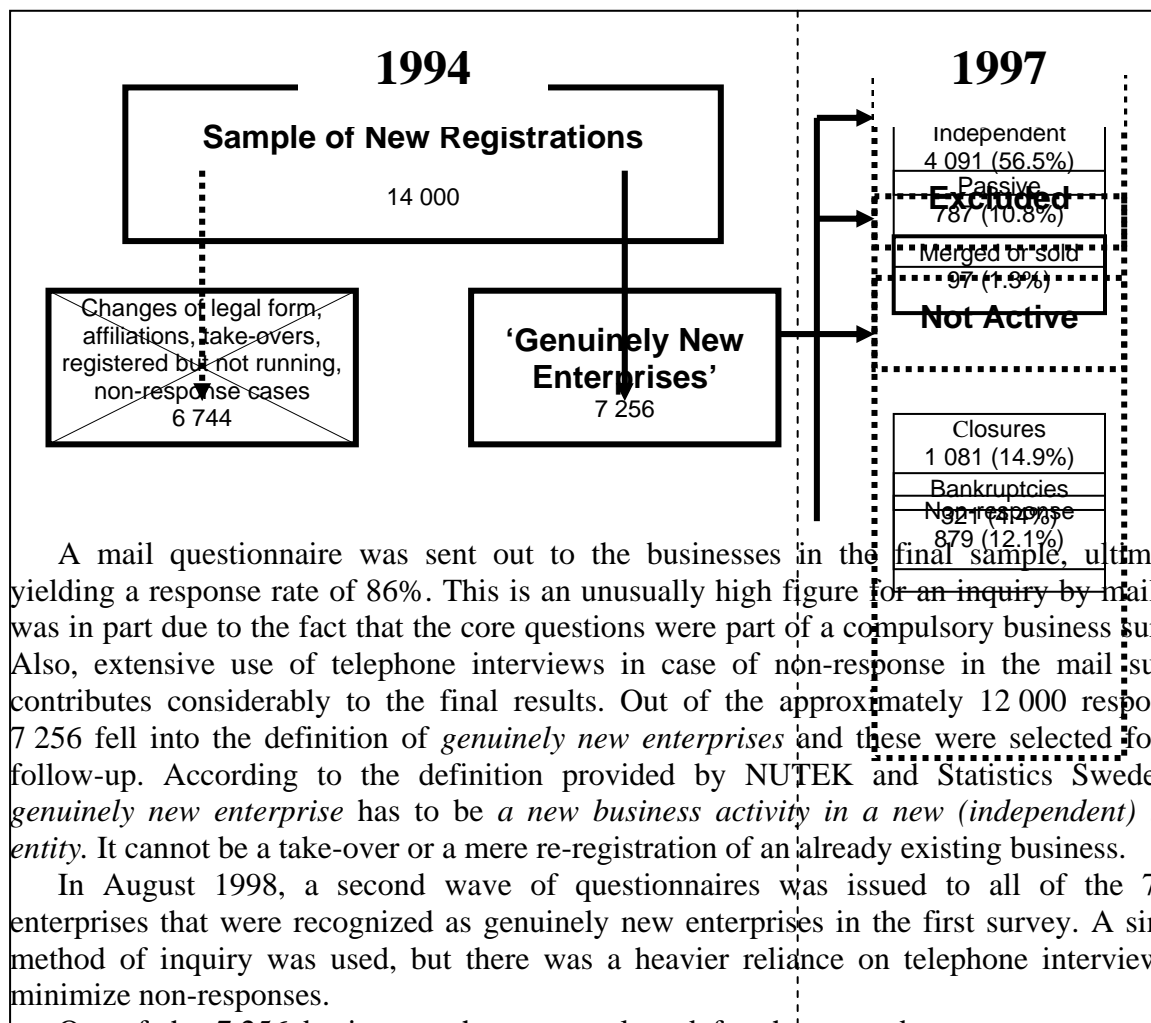
3.1 The Sample

The sample of 7 256 new enterprises used in this paper was obtained through collaboration with The Swedish National Board for Industrial and Technical Development (NUTEK) and Statistics Sweden. The sample has been surveyed twice, with measurement of initial conditions in the first survey and the basis for performance classification in the second, see Figure 1.

In more detail, the sample was created in the following way. In February 1995, a sampling frame was constructed by Statistics Sweden, covering all legal forms of business activities registered during 1994. To be considered a registered business activity (or enterprise) in this sample, the business founders do not have to make any *formal* registration

with a business register. Reporting VAT (moms) or income from a business activity in the personal income statement is sufficient. Using extensive cross-referencing across four different registers, 74 600 new business registrations were made in Sweden during 1994. From this first sampling frame, 14 500 businesses in agriculture, forestry, hunting, fishery and real estate were excluded. Another 2 700 business registrations in various industries were also excluded since it could be clearly established that they were take-overs. Consequently, the final sampling frame consisted of 57 400 newly registered enterprises, from which a proportional stratified sample of 14 000 was drawn. Strata were constructed according to industry, legal form and geographical location (county).

Figure 1 Survey Method and Time Frame



A mail questionnaire was sent out to the businesses in the final sample, ultimately yielding a response rate of 86%. This is an unusually high figure for an inquiry by mail and was in part due to the fact that the core questions were part of a compulsory business survey. Also, extensive use of telephone interviews in case of non-response in the mail survey contributes considerably to the final results. Out of the approximately 12 000 responses, 7 256 fell into the definition of *genuinely new enterprises* and these were selected for the follow-up. According to the definition provided by NUTEK and Statistics Sweden, a *genuinely new enterprise* has to be a new business activity in a new (independent) legal entity. It cannot be a take-over or a mere re-registration of an already existing business.

In August 1998, a second wave of questionnaires was issued to all of the 7 256 enterprises that were recognized as genuinely new enterprises in the first survey. A similar method of inquiry was used, but there was a heavier reliance on telephone interviews to minimize non-responses.

Out of the 7 256 businesses that were selected for the second wave, responses were obtained from 6 377, resulting in a response rate of 87.9%. However, in 97 cases the original business had been sold or merged with another firm. Although these firms were obviously surviving at the time of sale, they were excluded from further analysis since it would be difficult to assess the performance of the original activity, both conceptually and empirically. It should be noted that only 0.8% of the firms in this sample had actually been sold. This is less than 1/5 of the share registered in the study of Cooper *et al.* (1994).

Businesses that were non-response cases in the mail survey became the objects of intense investigation to try to contact individuals connected to these businesses. Since some of the questions in the follow-up were compulsory, simple refusal to answer was extremely rare. The final non-response cases are those businesses that could not be contacted by any means (telephone or mail). Since access to register information on the non-response businesses was

not an issue, a common characteristic of the final non-responses was a protected telephone number or no listing. It would be very difficult to do business under such circumstances and it is likely that these businesses have suspended operations, be it temporarily or definitely. The non-response cases in the follow-up survey are therefore considered as failures (not active) and these cases are therefore included in the analysis.

The method used to produce this sample has the advantage of excluding businesses that are not new. In Sweden, no less than 48% of all new business registrations are not new business *activities*, but merely existing business activities put into a new legal entity. Consequently these firms do not fit into the conceptual description of new enterprises. If questions concerning the impact of founding conditions should apply, these businesses must be excluded through a selection process similar to the one used for the present paper.

Our sample is reasonably similar to that used by Cooper *et al.* (1994). Their original sample consisted of 13 000 NFIB members, out of whom 4 814 responded and 2 994 qualified as having 'become business owners in the last 17 months'. Hence, the Cooper *et al.* (1994) study started with a sampling frame that had a greater risk of bias. Further, their study had a lower response rate and was less restrictive in demands that the start-ups were 'genuinely new'.

3.2 Variables and measures

Independent variables. All independent variables are dichotomous (zero/one) category variables. They were all measured during the first wave in 1994 or were taken from data registers from 1994. The gender (female), enterprise allowance and 'prior start-up experience' variables are straightforward and self-explanatory. The standard Swedish classification of immigrant background was applied (i.e., self, one or both parents born in other country). To measure start-up training, respondents were asked if they had participated in any start-up course in conjunction with the start-up of their firm.

Respondents were asked about their most important motive for starting their business. Five alternatives were predefined, and respondents were asked to choose one of these or to specify their own motive. One alternative was unemployment (chosen by 24% of the respondents), another realization of ideas (24%), and a third was the identification of a market need (6%). Dichotomous (zero/one) variables were computed for these response categories.

Register data from the sampling frame were used for legal form of the company (incorporated/limited liability vs. all other), its principal industry (one dummy for retailing and personal services combined) and location. The latter variable was re-coded into two dichotomous variables. The variable 'metropolitan' was coded one (1) for greater Stockholm and zero (0) for all others. The 'rural' variable was coded one for the inland regions in the northern two thirds of the country, and zero for all others.

Dependent Variable. Following Cooper *et al.* (1994), new venture performance was classified into three mutually exclusive and collectively exhaustive categories. We use the labels *failure*, *marginal survival* and *high performance* for these, although 'not active' may be more correct than 'failure' and people may have different opinions about what is 'marginal' and 'high', respectively.

There is an ongoing discussion on suitable indicators of new venture performance (cf. Brush & Vanderwerf, 1992; Wiklund, 1998). Generally speaking, broad measures reflecting multiple aspects of both growth and economic performance are preferable (Wiklund, 1998; Zahra & Covin, 1995). Most notably, it is important to consider that firms may deliberately trade off long-term growth for short-term profits (Zahra, 1991). Hence, three different indicators reflecting growth and economic performance were chosen: sales growth, employment growth and profitability. In order to be classified as a high performance new

venture, the firms had to meet either of three minimum requirements. Either the firm had to employ 2 full-time equivalents in the beginning of 1998, or have reached sales during 1997 of a minimum of 1 MSEK (app. 125kUSD), or be perceived by the entrepreneur as having “very high performance” and “providing well for me”. This means that we employ a more comprehensive assessment of ‘high performance’ than did Cooper *et al.* (1994) who relied solely on an employment growth indicator. With these definitions, 43% of the cases are classified as failures (not active), 36% as the marginal survival, and 21% as high performance.

4. Results

4.1 Bivariate Analyses

We will start our presentation with bivariate analyses. We will then turn to a multivariate analysis estimating a multinomial logit model. This is the same technique as used by Cooper *et al.* (1994), who also provide a more elaborate description of it.

Owing to the categorical nature of the variables, the hypotheses were tested using contingency tables and Chi-square test of significance. Due to the large sample size (7000+ cases), very small effect sizes yield highly significant chi-square statistics. Consequently, stricter criteria than the conventional $p < .05$ are called for. However, effect size rather than significance should be the first concern (Oakes, 1986). To give a relatively neutral measure for the effect sizes, the observed counts in all cells are subtracted and divided by the expected count. This yields a figure of the relative under- or over-representation in all cells, making results from different analyses more easily comparable. For example, a cell count of 60 and an expected count of 50 yields an over-representation of 20%. Contingency tables testing dichotomous variables contain two rows. For ease of reading, only the rows corresponding to the tested hypotheses are presented in the tables below. For example, the relative under- or over-representation figures of females but not males are presented in Table 1.

The results from the tests of the two first hypotheses concerning access to general human capital at start-up are displayed in Table 1. Both hypotheses get partial support. These two strands of general human capital seem important for high performance but not for marginal survival. Females start high-performance firms to considerably less extent, as do immigrants.

Table 1. The impact of general human capital on new venture marginal survival and high performance

<i>Hypothesis tested</i>	<i>Relative under- or over-representation</i>			<i>Significance</i>
	<i>Failure</i>	<i>Marginal survival</i>	<i>High performance</i>	
H1: Female	+10	+10	-37	$p < .0005$
H2: Immigrant	+11	0	-21	$p < .0005$

Note: Relative over- or under-representation is calculated as $(\text{cell count} - \text{expected cell count}) * 100 / \text{expected cell count}$. Column-wise percentages do not cancel out perfectly due to unequal base rates.

Table 2 displays the results from the tests of the three hypotheses related to management know-how. Hypotheses 3 and 4 are clearly not supported, since no significant differences were found. The start-up of a firm for unemployment reasons does not seem to affect either the survival or the performance level of the firm. This runs counter to widespread beliefs that firms started as a response to unemployment are lower-potential ventures. Start-up training

does not have the hypothesized positive impact on future survival and performance. The bivariate analysis test of the fifth hypothesis is more difficult to interpret. The bivariate results partly confirm and partly run counter to our hypothesis. It appears that start-up experience is associated with lower probability of marginal survival but higher probability of high performance.”

Table 2. The impact of management know-how on new venture marginal survival and high performance

	<i>Relative under- or over-representation</i>			
<i>Hypothesis tested</i>	<i>Failure</i>	<i>Marginal survival</i>	<i>High performance</i>	<i>Significance</i>
H3: Unemployment	-3	-2	+9	p=.084
H4: Start-up training	-3	+4	-1	p=.483
H5: Start-up experience	-2	-17	+35	p<.0005

Note: Relative over- or under-representation is calculated as (cell count – expected cell count)*100/expected cell count. Column-wise percentages do not cancel out perfectly due to unequal base rates.

In the next step of the analysis, the two hypotheses relating to industry specific knowledge are tested. These hypotheses state that the start-up of a firm in response to a market need or to realize a business idea should be positively associated with survival and high performance. Neither of the analyses yielded significant results, as can be seen in Table 3. Thus, neither hypothesis related to industry specific know-how is supported. It may come as a surprise that the 17% over-representation in the high performance group for ‘market need’ does not yield a significant result with such a large sample as this. The explanation is the low absolute number of respondents choosing ‘market need’ as the most important start-up reason. The group differences seem less impressive when expressed differently: while 5.2% of the marginal survival group has market need as the primary motivation, the corresponding figure in the high performance group is 6.7%.

Table 3. The impact of industry specific knowledge on new venture marginal survival and high performance

	<i>Relative under- or over-representation</i>			
<i>Hypothesis tested</i>	<i>Failure</i>	<i>Marginal survival</i>	<i>High performance</i>	<i>Significance</i>
H6: Market need	-2	-9	+17	p=.135
H7: Realize idea	+1	+5	-10	p=.033

Note: Relative over- or under-representation is calculated as (cell count – expected cell count)*100/expected cell count. Column-wise percentages do not cancel out perfectly due to unequal base rates.

Hypothesis 8 states that governmental enterprise allowance has a positive influence on survival and performance, see Table 4. Indeed, the result of the analysis indicates that there is a small but statistically significant positive association between firms supported by this scheme and high performance, and no association with marginal survival. This gives partial support to hypothesis 8. Incorporated companies are heavily over-represented in the high performance category while under-represented in the marginal survival category. As was the case concerning management know-how, the variable is important for high performance but not for marginal survival. This gives partial support for hypothesis 9.

Table 4. The impact of financial capital on new venture marginal survival and high performance

<i>Hypothesis tested</i>	<i>Relative under- or over-representation</i>			<i>Significance</i>
	<i>Failure</i>	<i>Marginal survival</i>	<i>High performance</i>	
H8: Enterprise allowance	-2	-2	+8	p<.0005
H9: Incorporation	-31	-33	+119	p<.0005

Note: Relative over- or under-representation is calculated as (cell count – expected cell count)*100/expected cell count. Column-wise percentages do not cancel out perfectly due to unequal base rates.

Hypotheses 10 and 11 are concerned with access to market and resources. The results of these bivariate analyses indicate that there are no statistically significant differences of the chance of marginal survival or high performance between firms established in metropolitan, rural or other areas of the country, see Table 5. In other words, in this bivariate analysis there is no support for hypotheses 10 and 11.

Table 5. The impact of access to market on new venture marginal survival and high performance

<i>Hypothesis tested</i>	<i>Relative under- or over-representation</i>			<i>Significance</i>
	<i>Failure</i>	<i>Marginal survival</i>	<i>High performance</i>	
H10: Metropolitan	-2	+5	-4	p=.150
H11: Rural	+6	-3	-8	p=.119
H12: Retail & private service	+7	-4	-8	p<.0005

Note: Relative over- or under-representation is calculated as (cell count – expected cell count)*100/expected cell count. Column-wise percentages do not cancel out perfectly due to unequal base rates.

We include in Table 5 also the control variable ‘industry’. The sector of entry does seem to matter, both for survival and high performance. There is a substantial under-representation of retail and private service sector firms in the high performance category while at the same time ventures in these industries are clearly over-represented among the failures. This gives support for hypothesis 12.

4.2 Multivariate Analyses

Following Cooper *et al.* (1994), we applied multinomial logit analysis. This is an extension of binomial logit analysis, appropriate when the dependent variable is represented by more than two categories. In our case, the performance variable is represented by the categories: failure, marginal survival and high performance. Table 6 displays the results of t-tests of significance when the marginal survival and high performance categories are compared to the failure category.

Table 6. Multivariate resource-based model of new venture marginal survival and high performance

<i>Independent variables</i>	<i>Vector of coefficients associated with failure (normalized to zero)</i>	<i>Vector of coefficients associated with marginal survival</i>	<i>Vector of coefficients associated with high performance</i>

H1: Female	0	.02	-.39***
H2: Immigrant	0	-.17*	-.28**
H3: Unemployment	0	-.03	.01
H4: Start-up training	0	.09	-.02
H5: Start-up experience	0	-.22**	.03
H6: Market need	0	-.08	-.09
H7: Realize idea	0	.06	-.12
H8: Enterprise allowance	0	-.00	.55***
H9: Incorporation	0	.06	1.93***
H10: Metropolitan	0	.15*	-.03
H11: Rural	0	-.05	-.28*
H12: Retail & private service	0	-.15*	-.21**

Note: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

This analysis largely confirms the bivariate analyses. Interestingly, while no significant location effects were detected in the bivariate analyses such effects in the expected direction do appear in this multivariate model. The analysis also clarifies that start-up experience has a negative effect on marginal survival rather than a positive effect on high performance. This unexpected negative relationship may be due to two different forms of self-selection. Firstly, among individuals equally determined to pursue a career as self-employed those with less initial skill are more likely to fail at their first attempt *and* have more reason to try again than have those who were able to make a living out of their firms firm. If the failure experience did not fully make up for the initially lesser skills our ‘experience’ variable would represent lower rather than higher human capital, explaining the negative relationship with survival. Alternatively, experienced founders are better at judging at an early stage whether an idea will bear fruit or not, and therefore faster to terminate unsuccessful efforts. This latter interpretation is perhaps more compatible with the simultaneous over-representation among both failures and high-performing ventures that was revealed in the bivariate analysis..

Few variables are significant in the marginal survival category, and only one variable is significant beyond $p < .01$. With a sample this large this means that the estimated effects are very small and a weak basis for making predictions. Among high performance firms, incorporation stands out head and shoulders above the other variables. Relatively substantial effects are estimated also for gender and enterprise allowance. Significant effects are estimated also for immigrant status, sector and location, but these effects are small.

To compare the high performance and marginal survival categories, Wald chi-square analysis was carried out, see Table 7.

Table 6. Wald Tests of Differences Between High Performance and Marginal Survival

<i>Variables</i>	<i>Chi²</i>	<i>p</i>
H1: Female	20.17	.000***
H2: Immigrant	9.44	.001**

H3: Unemployment	.28	.870
H4: Start-up training	1.81	.404
H5: Start-up experience	13.26	.001**
H6: Market need	.52	.772
H7: Realize idea	3.18	.204
H8: Enterprise allowance	39.29	.000***
H9: Incorporation	691.64	.000***
H10: Metropolitan	5.57	.062
H11: Rural	6.72	.035*
H12: Retail & private service	9.27	.010*

Note: *= p< 0.05; **= p< 0.01; ***= p< 0.001

This analysis reveals that the differences between high performance and marginal survival are almost as pronounced as those between high performance and failure.

How do these results compare with those obtained by Cooper *et al.* (1994)? There are similarities as well as differences. The following *similarities* may be noted:

- Both studies fail to get support for many of the hypotheses. In multivariate analysis Cooper *et al.* (1994) got full support for four out of eleven hypotheses, and partial support for another two. In the present study, we get full support for two hypotheses out of twelve, and partial support for another six.
- In both studies, indicators of general human capital are associated in the expected fashion with marginal survival and growth.
- In both studies, indicators of financial capital are associated with high performance in the expected fashion.
- In both studies, ventures in retailing and personal services have lower probabilities of marginal survival and high performance.
- In both studies, the predictors of high performance are in part different from the predictors of marginal survival. One similarity in this regard is that according to both studies ventures run by women a lower probability of high performance, but not a higher probability of failure.

The following *differences* between the studies stand out relatively clearly:

- While our model is clearly much stronger in predicting high performance than marginal survival, the Cooper *et al.* (1994) results appear more balanced in this regard.
- While Cooper *et al.* (1994) find effects of industry-specific knowledge on both survival and high growth, our analysis yields neither of those effects.
- Cooper *et al.* (1994) find that presence of a parental role model (vicarious learning) increases the probability of marginal survival but not of high performance. Quite contrary, we find our indicator previous start-up experience (experiential learning) to be *negatively* associated with survival, while it is insignificant for high performance.
- Our study also lacks the following effects obtained by Cooper *et al.* (1994): a) the positive effect of management know-how on marginal survival and high performance, b) the positive effect of financial capital on marginal survival.
- While we find weak but statistically significant effects in the expected direction for indicators of access to market and resources, no such variables were tested by Cooper *et al.* (1994).

5. Discussion

For empirical relationship to be really interesting and meaningful they need to fulfil certain criteria. Firstly, we would argue, they are of more value if a strong case can be made that they are causal in nature. In addition to providing theoretical bases for causal interpretation this study used a data set where outcome variables were collected several years after the explanatory variables were collected, leaving us in a better position than cross-sectional studies. Secondly, empirical relationships are of more interest if a strong case can be made that they are generalizable, i.e., non-random and unbiased. In order to achieve this, we have performed our analyses on a very large, representative sample with very high response rates. In addition, we have pursued our analysis as a theory-driven replication with extension rather than as shotgun hunting for ‘statistically significant’ associations of any kind. On these two criteria, then, our empirical study stands the test rather well.

A third requirement for empirical relationships to be of high value is that they are given a conceptually adequate interpretation. While regarding our manifest variables as indicators of more aggregate theoretical categories such as ‘management know-how’ is a step in that direction, we would argue that for the present purpose the limitations of our study lie mainly in the operationalization of some of the investigated constructs. This limitation also reduces the possibility of direct comparison with the Cooper *et al.* (1994) study and hence the possibility of drawing far-reaching conclusions on the basis of similarities and differences compared with their results.

Let us mention a few particular problems concerning how our results should be interpreted. Our strongest effect by far is the effect of ‘Incorporation’ on the probability of being a high performance venture. There are at least two problems with the interpretation of this relationship. Firstly, we included this variable as an indicator of initial capital. While incorporation requires a considerably higher initial investment than does starting as a partnership or sole trader, starting as an incorporation may also capture a higher general level of commitment. Larger financial investment implies larger financial risk and probably also more consideration and planning before launching the firm. There may well be part-time partnership start-ups that had had access to more initial financial capital than most incorporations if only they wanted. Hence, incorporation reflects more than just financial capital. Secondly, we operationalize ‘high performance’ as absolute status in 1997 rather than as 1997 status relative to 1994 status. This means that we may confound ‘high start’ with ‘high growth’ (cf. Reynolds, 1986). Nonetheless, given its theoretical appeal and its support by Cooper *et al.’s* (1994) results, we believe that our interpretation that larger initial financial capital increases the probability of high performance is valid, even if our estimated coefficient may exaggerate the strength of that effect.

Our second indicator of financial capital is the receipt of an enterprise allowance. Here we also arrive at a positive effect on the probability of being ‘high performance’, clearly in line with our hypothesis. However, there are several opposing factors captured in this measure which complicates the interpretation. Obviously, the enterprise allowance adds financial capital to the new venture, but it also indicates that the recipient was *de facto* unemployed prior to start-up and could consequently be regarded as an *objective* measure of unemployment. A further complication in the form of a positive bias effect also comes into play, since the applicants had to provide a ‘viable’ business idea to be eligible for the enterprise allowance. What we get in the end is a compound measure of factors working in opposing directions. All said, the positive *net* effect on ‘high performance’ in our opinion supports hypothesis 8, also on the conceptual level. As discussed above, self-selection effects may also explain the unexpected negative relationship between prior start-up experience and marginal survival.

Also for industry-specific know-how is the interpretation problematic. It may be argued that our indicators – the self-reported start-up motivations ‘identified market need’ and ‘realizing an idea’ – are very weak indicators of ‘industry-specific knowledge’. In addition, previous research suggests that stated start-up motivations may generally be poor predictors of subsequent performance (Birley & Westhead, 1994). On the other hand, while Cooper *et al.* (1994) obtained results that are in line with their hypothesis, some classical studies, theoretical as well as empirical, suggest that deep industry experience can be a mixed blessing (Schumpeter, 1934; Smith, 1967).

This study shares with many of its predecessors the experience that arriving at very strong predictive models for new venture performance is a very difficult task indeed (Cooper, 1995; Birley & Westhead, 1994). In spite of that, and in spite of the uncertainty discussed above concerning some of our operationalizations, we would argue that we have been reasonably successful in what we set out to do. According to Hubbard *et al.* (1998, p. 252) ‘Replications and extensions are vital to knowledge development. Replication allows us to demonstrate that something really is there, with extensions to show how broadly and in what instances it exists and can be used.’ In this study, we have replicated Cooper *et al.* (1994) to the extent possible. We have also extended their study by testing their suggested relationship in a different country and sometimes with different indicators of the theoretical variables, and by adding one more category of ‘initial conditions’. By doing so we have been able to show that some of Cooper *et al.*’s (1994) results tend to be robust. Examples of this are how gender and industry are related to outcome category. Other results appear less robust to changing contexts and measurements. This applies to, e.g., how management know-how and specific industry know-how relate to subsequent performance.

Implications

Our models were generally much better at differentiating high performance firms from marginal survivors and failures than discriminating marginal survivors from failures. This may however not be a major problem. Firms with similar levels of objective economic performance levels exhibit different closure rates (Gimeno, Folta, Cooper, & Woo, 1997). One major reason for this is that some founders may find more attractive options than continuing inventing in their firms, e.g., taking a job or studying (Gimeno, Folta, Cooper, & Woo, 1997; McGrath, 1999). If the firm is barely providing an income for the founder (i.e. marginal survival) at least some founders are likely to choose such alternatives when present, or to terminate this particular start-up effort in favour of yet another one. We have suggested above that such may be the case with experienced founders, who may have developed higher subjective criteria for acceptable performance. Therefore, the term failure may be ill-suited in describing what really happens when a business founder exercises another option than continuing inventing in his or her firm. Closure or exit generally appear more appropriate and attractive than failure to describe business closures. We would recommend these terms to be used in future research.

Further, from a societal viewpoint discriminating between marginal survival and closure may not be very important. For the sake of economic development and creation of employment, being able to identify those firms that meet our (relatively liberal) definition of high performance may be more valuable. The same holds for potential investors who are likely to be more interested in the high potential new firms.

Access to financial capital, i.e. legal form and enterprise allowance, are by far the most important variables predicting high performance. We have previously discussed the adequate interpretation of these findings. Financial capital and the commitment that comes along with it have substantial effects on the subsequent performance of the new firm. The message that

comes across is that for business founders who aim for more than marginal survival it pays off to be committed from the very start.

Finally, according to our findings the enterprise allowance scheme appears to be a feasible political instrument promoting the establishment of viable new firms.

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About the Authors

Jonas Dahlgvist, M. Sc., Doctoral Student, Jönköping International Business School (JIBS).
Per Davidsson, Professor in Business Administration/Entrepreneurship, Director of JIBS Research Program on Entrepreneurship and Growth (PEG), Jönköping International Business School (JIBS).

Johan Wiklund, Ph.D., Research Fellow, Jönköping International Business School (JIBS).

Contact person:

Jonas Dahlgvist

JIBS

P.O. Box 1026

SE-551 11 JÖNKÖPING

Tel: +46 36 157547

Fax: +46 36 161069

E-mail: jonas.dahlgvist@ihh.hj.se