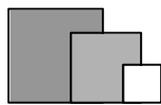


RESEARCH REPORT 0002/E

Determinants of Successful Entrepreneurship



SCALES

SCientific AnaLysis of Entrepreneurship and SMEs

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Summary

Introduction

In the past decades, the views on entrepreneurship developed towards a common agreement with respect to its importance for (economic) society. Entrepreneurship receives substantial interest from both scientists and policy makers. Entrepreneurship, however, has many aspects. This diversion can be seen in literature - when exploring the views of the classic contributors to entrepreneurship theory - as well as in the real world.

By stimulating entrepreneurship, the actual goal is especially to stimulate the people who will be successful after starting up their businesses. Considering the great variety within the group of (potential) entrepreneurs, there is need for specific insight in the factors that determine the success of starting entrepreneurs. This is investigated in the present study for the Netherlands.

Approach

We have access to the EIM firm founders survey, a large Dutch data panel consisting of people who started a business in 1994. The first survey was held in the period of the start-up. The respondents gave detailed information on themselves, on their environment and on their strategies. The firm founders were followed in the years after, in which they provided information on their achievements annually. Success could be measured by the profits of the entrepreneur, employment created by the entrepreneur, and the survival period of the firm.

The determinants identified from the survey are classified in a framework that distinguishes the different resources from which the starting entrepreneur can draw. These relate to human capital, financial capital and social capital. Additionally, the strategies of the entrepreneur to keep up with business as well as some control variables are identified.

To investigate the influences of potential determinants (resulting from the 1994 survey) on success (resulting from the surveys until 1997), multiple regression analysis was used. This approach measures the influence of each determinant on success, while controlling for the other determinants identified. For each success measure, the relations between determinants and success are estimated.

Results

General results are that the amount of human capital is especially important for determining duration and profit, while financial capital is especially related to employment. Social capital and strategies for retrieving relevant information seem to be about equally important for all success measures. The specific determinants are dealt with below.

Human capital

Entrepreneurs at higher age (age is used as a proxy to 'knowledge of the world') seem to make less profit and to create less employment than younger entrepreneurs do. However, the average duration of the founded firm is higher: younger entrepreneurs have higher probabilities to quit the business early. The educational level of the entrepreneur also matters for success, though only when profits are considered.

Experience is also important in determining success. Having had experience in the same sector as the newly founded business increases the probabilities of success in making profits and in surviving. Having experience as an employee has a positive impact on the duration of the firm, not on profits or employment. Experience in self-employment only matters for achieving higher profits. Financial experience is seen to be less favourable for the duration of the firm, while it is positively associated with employment.

Financial capital

The amount of income, other than the income generated from the founded firm, has a negative effect on profitability and generated employment. A firm that is financed with own capital also leads to less employment. Employment achievements are found to be high when a business partner made some financial contribution. No significant effects were found for any of these determinants relating to duration.

Social capital

The influence of other entrepreneurs in the family is negatively related to profit making. Having contact with other entrepreneurs in networks is positively related to the amount of employment created. Emotional support from the spouse influences profitability and duration in a positive way. If the entrepreneur boards out activities to other parties, this can be seen as an indication of success regarding generated employment.

Strategies for keeping up with business

When the entrepreneur focuses on commercial relations in retrieving relevant information that will help to keep up with business, this indicates success for all three measures. Focus on the branch in general is only associated with duration, while the focus on direct business relations (customers and suppliers) is linked to profitability. Informal contact with fellow-entrepreneurs has a slight influence on generated employment.

Control variables

Our investigations suggest that male entrepreneurs perform better than female entrepreneurs, though only when survival of the firm is addressed. For profitability and employment, no significant effect for gender is found. Entrepreneurs who indicated to have employment growth as a goal indeed created

significantly more employment than the others did. However, they did not make higher profits. Being part-time entrepreneur is also important for determining success. Entrepreneurs who are 100 percent self-employed score especially higher on duration. Remarkably, a strong negative relation was found in relation to generated employment for full-time entrepreneurs. An entrepreneur who is active in the business services sector, or an entrepreneur who considers the (expected) higher income as an important motivation to start the business, does not seem to have more success than his counterparts.

1 Introduction

In the past decades, the views on entrepreneurship developed towards a common agreement with respect to its importance for (economic) society. Entrepreneurship receives substantial interest from both scientists and policy makers. Extensive studies are useful as entrepreneurship has many facets; the related aspects are also diverse. This diversion can be seen in literature - when exploring the views of the classic contributors to entrepreneurship theory - as well as in the real world.

By stimulating entrepreneurship, the actual goal is especially to stimulate the people who will be successful after starting up their businesses. These firm founders are believed to play a key role in the economic progress. Considering the great variety within the group of (potential) entrepreneurs, there is need for specific insight in the factors that determine the success of starting entrepreneurs. This is investigated in the present study using a longitudinal panel data set consisting of Dutch firm founders.

2 Theories of entrepreneurship

2.1 Introduction

Although it is almost unanimously accepted that entrepreneurship plays a major role in economic development, the evidence of this relation is remarkably limited. This may very well be caused by the fact that this relation requires the acknowledgement of intermediate processes. Entrepreneurship is closely related to small businesses and technological change. There is empirical evidence of the positive influence of the presence of small businesses on economic growth. In order to improve allocation efficiently, potentially successful entrepreneurs should be stimulated in their activities. To be able to distinguish between high- and low-potential entrepreneurs, the success determinants of the entrepreneur will be identified in the following chapters.

2.2 Classic views on entrepreneurship

Economic theories attribute a great variety of functions to the entrepreneur. A number of function aspects appear in many different theories as a part of the total construct of the entrepreneur. In order to gain insight in the importance of these recurring function aspects, the role played by these aspects in the theories of the major contributors to entrepreneurship research is summarised in table 1. Of course, this representation abstracts from many aspects of these theories. This representation is chosen for reasons of comparability and clarity. The conceivers of the theories summarised in table 1 are widely accepted as major contributors to theoretical knowledge about the entrepreneur (see e.g. Hébert and Link, 1982, or van Praag, 1999).

Table 1 Aspects of the entrepreneurial function in theories of the entrepreneur*

	period	risktaker	arbitrageur	capitalist	manager	innovator
Cantillon	1680-1734	+++**	++	+	o	o
Say	1767-1832	++	o	-	+++	++
Marshall	1842-1924	+	++	+++	+++	o
Menger	1840-1921	-	+	-	++	o
Knight	1885-1972	+++	o	-	-	+
Schumpeter	1883-1950	-	+	-	-	+++
Kirzner	1930-	-***	+++	-	o	o

* This summary is based on Cantillon [1931], Say [1845], Marshall [1961], Menger [1950], Knight [1921], Schumpeter [1934], Schumpeter [1942], Kirzner [1979] and Kirzner [1981].

** The meaning of the symbols used to summarise the function aspects is:

- : aspect explicitly excluded
- o : aspect not included
- + : aspect implicitly included
- ++ : aspect explicitly included
- +++ : aspect is essential to the theory.

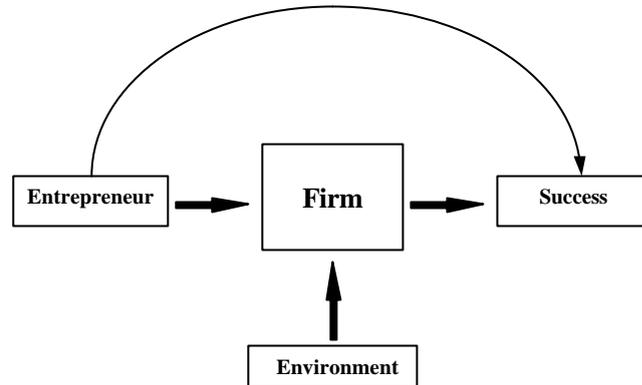
*** This denial of the risktaking function by Kirzner refers to the concepts presented in Kirzner [1979]. In a later paper (Kirzner [1981]) risktaking is introduced in his vision on the entrepreneurial function.

Table 1 shows that risktaking is often thought to be included in the entrepreneurial function. Menger, Schumpeter and Kirzner explicitly state that the function of their entrepreneur does not involve taking risks. According to Cantillon and Knight, risktaking is the key function of the entrepreneur. Cantillon, Marshall, Menger, Schumpeter and Kirzner identify their entrepreneur as an arbitrageur. Kirzner considers arbitrage activities to be of principal importance to the entrepreneur. The question whether or not the entrepreneur is a capitalist is one of the major issues in entrepreneurship theories. The association of the entrepreneur with the capitalist receives strong support (Marshall and Cantillon) as well as strong opposition (Say, Menger, Knight, Schumpeter and Kirzner). Marshall even considers the capitalist function to be an essential aspect of the activities of the entrepreneur. The managerial function of the entrepreneur is stressed by Say, Marshall and Menger. Knight and Schumpeter explicitly deny the association of the entrepreneurial and managerial function. Both Say's and Marshall's entrepreneur are predominantly involved in management activities. There is no opposition against the inclusion of the innovator function aspect in the activities of the entrepreneur. The innovator function is, of course, essential in the entrepreneurship theory of Schumpeter. For a more detailed description of the function of the entrepreneur in economic theories see Hébert and Link (1982), Van Dijk and Thurik (1995) or van Praag (1996, 1999).

2.3 Three measures of entrepreneurial success

The entrepreneur does not exclusively determine the structure of a firm. The environment also plays an important role in determining the structure of the firm. In academic literature a great deal of attention is paid to the influence of the environment on the firm. Figure 1 shows the relation between the entrepreneur and success when the impact of the environment on the firm is acknowledged.

Figure 1 The relation between the entrepreneur and success when the role of the environment is acknowledged



The entrepreneur and the environment determine the structure of the firm. Success of the entrepreneur is measured by success of the firm. The objective of this study is to identify the success determinants of the entrepreneur. To correct for the influence of the environment a number of variables characterising the environment should be included.

Profit

The association between the successful entrepreneur and profit making is almost undisputed in literature. Table 2 is taken from van Dijk (1996) and summarises the importance attributed to profit making in different entrepreneurship theories in a manner similar to the summary of function aspects of the entrepreneur in Table 1.

Table 2 Importance of profit making in the theories of the entrepreneur*.

	Cantillon	Say	Marshall	Menger	Knight	Schumpeter	Kirzner
Importance of profit	++**	+	++	++	+++	++	+++

* This summary is based on Cantillon (1931), Say (1845), Marshall (1961), Menger (1950), Knight (1921), Schumpeter (1934), Schumpeter (1942), Kirzner (1979) and Kirzner (1981).

** The meaning of the symbols used to summarise the importance of profit is:

- + : profit making is associated with the entrepreneur
- ++ : profit making is considered to be an important result of entrepreneurial act
- +++ : profit making is the central issue of the theory.

The emphasis on profit making as an indicator of success for the entrepreneur motivates the use of profit making as a performance indicator in this study.

Generated employment, survival time

Profit making relates to individual success. However, we are also interested in 'success for society'. Therefore, profit making will not be the only indicator of entrepreneurial success taken into consideration. This study will also analyse

generated employment and the survival period of the firm founded by the entrepreneur as a measure of performance.

2.4 Determinants of success

In this section we explore the determinants of successful entrepreneurship that arise from literature. The classic views on entrepreneurship produce possible success determinants for starting entrepreneurs. These are summarised in Table 3, which is taken from van Praag (1999)¹. In this study we shall empirically test proposed determinants that stem from these classical views, as well as some other determinants proposed in literature. Some general classification of the determinants will be clarifying. We make a distinction between determinants that are related to human capital, financial capital, social capital and other (control) determinants.

Table 3 Determinants of successful entrepreneurship discussed by the classic authors (taken from van Praag, 1999)

	Having success as entrepreneur	Start and be a successful entrepreneur
Cantillon		Alertness and foresight Bear risk
Say	Judgement, perseverance, knowledge of the world, business and occupation	Bear risk
Marshall	Intelligence, general ability (dependent on family background and education) Knowledge of the trade Bear Risk Leadership Own capital	Good fortune Father entrepreneur
Schumpeter		Leadership
Knight	Ability to deal with uncertainty: self-confidence, foresight, intellectual capacity	Good luck
Kirzner	Creativeness and leadership to exploit profit opportunities	

2.5 Linking determinants to success

To study the impact of possible determinants of successful entrepreneurship empirically, the obvious approach is to make use of a panel data set of entrepreneurs. Determinant variables are constructed from the characteristics of the entrepreneurs, and success variables are constructed from the firm's achieve-

¹ Van Praag also listed the determinants for starting a firm. This is not relevant in the present study, as we work with a data panel of entrepreneurs who already started their businesses. Details of this panel will be discussed in section 3.2.

ments as reported by the entrepreneur. When the number of entrepreneurs is considerable, the analysis will lead to useful insights.

We have a suitable dataset for the Netherlands at our disposal, which is discussed in chapter 3. In chapter 4, the models that are used for linking the determinants to success are described.

3 Entrepreneurship data for the Netherlands

3.1 Introduction

In the Netherlands, there has been increased attention for entrepreneurship. This is illustrated by publication of the government White Paper (1999), describing the importance of entrepreneurship for society. The Dutch government policy is to stimulate people to start a firm and to create an environment that has no unnecessary barriers that would prevent the entrepreneurs to perform well. To achieve this, it is of interest to have some knowledge of the typical characteristics of entrepreneurship in the Netherlands. The construction of the EIM firm founders survey in 1994 has been one of the instruments to achieve this knowledge. A description of this survey is provided in section 3.2. From the survey, we are able to construct the variables as discussed in the previous chapter: measures of success (section 3.3) and possible determinants of success (section 3.4).

3.2 EIM firm founders survey

EIM Business & Policy Research started a firm founders survey in 1994, partly on request of the Netherlands Ministry of Economic Affairs. This survey was constructed to be able to observe positive and negative developments in the Dutch firm population. It consists of information of annual interviews conducted among a sample of starting entrepreneurs in the Netherlands. The initial sample was taken from the database of the Dutch Chamber of Commerce. The sample was taken from all newly registered firms in the first quarter of 1994. The initial sample consisted of 10,627 firms. Firms included in this sample had to satisfy a number of specifications.

- The firms had to be founded in the first quarter of 1994.
- Firms that re-registered because of a change in Chamber of Commerce district were excluded.
- Firms that re-registered because of some other change in location were excluded.
- Firms that re-registered because of a change in activities or a change in legal status were excluded.
- Firms that were parts of previously existing companies were excluded.
- Parts of existing firms that registered separately were excluded.
- Agricultural firms and firms in the mineral sector were excluded.

To make sure that the firms were reasonably distributed among the different sectors, the fraction of new firms selected from the services sector was limited to one half. Normally, a larger fraction of all newly registered firms belongs to this sector. This approach caused the other sectors to be represented in the sample with a higher fraction than in the population.

The initial 10,627 firms were contacted by telephone. A total of 3,000 firm founders agreed to participate in the survey. Approximately 2,000 firm founders finally completed the 1994 questionnaire. The 2,000 firm founders who completed the June 1994 questionnaire were sent the 1995 questionnaire, which was completed by over 1,100 respondents. The firm size and sector distribution of the 1994 and 1997 respondents were comparable to those of the initial sample.

The first questionnaire consisted of 90 questions divided in the categories general, firm, work experience, motives, founding situation, capital and investments, problems encountered, control and subcontracting, environment and market, sales and vulnerability, targets and strategy, performance and expectation, and age and education. The questions were based on relevant aspects of new venture creation as described in recent literature. The questionnaire in 1997 contained a total of 44 questions, in approximately the same categories.

The information from the first questionnaire is used to construct the entrepreneurial function variables and the variables that measure the success determinants. Entrepreneurial success is exclusively measured by variables constructed from the questionnaires in 1995-1997.

3.3 Entrepreneurial success: operational variables

In chapter 2 we stated our intended success measures. These three measures can be created from the dataset with information on performance in the period 1994-1997.

Profit

Profit is equated to the profit made in 1997. The entrepreneur has then been active for three years. The profit may especially in the first two years be somewhat misleading, as initial (sunk) costs often have to be gained back, which reduces profit. For entrepreneurs who are known to have ended their businesses the profit variable is equated to zero.

Employment

Where the profit measure is mainly an individual success measure, total employment created can especially be seen as success for society. The employment measure used is the cumulative employment created in the period 1994-1997¹.

¹ Other employment measures have also been investigated. These include employment growth, the employment in 1997. Both measures produced similar results. This could be expected, as high correlations existed between these employment measures. We therefore chose to focus on the measure that reflects the cumulative employment.

Duration

Another interesting success measure is the simple matter of survival. Is the firm still in business in 1997? And if not, how many months has it taken before the entrepreneur quit? In the firm founders panel, information is available on the duration of the firms. We have constructed a variable measuring the number of months that a firm has been active. A duration model will be applied to this variable in chapter 4.

Table 4 Descriptive statistics of success measures

Variable	Mean	Std. Dev.	Min.	Max.
profit in 10 000 guilders	4.3	8.5	0	50
cumulated employment in FTE	3.1	15.1	0	312
duration in months	33.6	14.2	0	42

Table 5 Correlations of success measures

Variable	profit	employment	duration
profit in 10 000 guilders	1		
cumulated employment in FTE	0.44	1	
duration in months	0.27	0.11	1

3.4 Determinants of success: operational variables

A large number of possible determinants came along in exploring literature in chapter 2. Obviously, not all determinants can be included in our analysis. Some items can simply not be measured, like 'good luck'. Others may not be included in the dataset. Moreover, some determinants could be constructed but were excluded in the process of estimation. In the following subsections, the variables included are described in the framework of our classification. For each determinant some brief explanation and the definition are provided. Most determinants become operational as dummy variables.

3.4.1 Human capital

Human capital relates to the intrinsic qualities and is thought to have a positive influence on the success of starting entrepreneurs. Knowledge is an important factor in this respect, which may be acquired through general education or through time. Particular entrepreneurial capabilities are generally not taught in the education programmes. Knowledge of the world, knowledge of business and finance, and educational level may contribute to entrepreneurial success. The following variables that relate to human capital could be derived from the firm founders survey and are included in our analysis.

Age

The age of the entrepreneur can be considered as a measure for knowledge of the world. In the survey, the respondents were asked to state the age category they were in (intervals of 5 years). The age variable takes on the value of the mean of the age interval divided by 10. For example, if an entrepreneur is in the category 20-25, the age variable takes on the value of 2.25.

Education

If an entrepreneur has experienced a high level of education (university or high-level vocational training), the dummy variable for education attains the value one (and zero otherwise). In the survey, people were asked to choose the highest education level they have completed.

Experience in the sector

This dummy variable indicates whether the respondent has experience in working in the same sector as he started the firm.

Experience in trade

If the entrepreneur is already familiar with trade, this may enhance his results. The dummy variable attains the value of one if there is some experience in trade, and of zero otherwise.

Experience as an employee

Having experience as an employee may be beneficial to the starting entrepreneur, as it will enhance knowledge of business. The dummy variable equals one if the respondent has been an employee and zero if this is not the case.

Experience in self-employment

Firm founders with experience in self-employment may have better prospects for achieving success. The variable equals one if the firm founder comes from self-employment, and zero otherwise.

Financial experience

Finance is an important aspect of entrepreneurship. Some knowledge on financing the business is almost a necessity. If the entrepreneur has some financial experience himself, the variable equals one (and zero otherwise).

Table 6 Descriptive statistics of determinants considering human capital

Variable	Mean	Std. Dev.	Min.	Max.
age	2.40	0.89	2.25	6.75
high education	0.29	0.45	0	1
experience in the sector	0.63	0.48	0	1
experience in trade	0.70	0.46	0	1
experience as an employee	0.94	0.23	0	1
experience in self-employment	0.08	0.27	0	1
financial experience	0.08	0.28	0	1

3.4.2 Financial capital

Almost every firm needs a substantial financial input. The financial resources of the starting entrepreneur are therefore important. Many questions regarding this topic are posed in the firm founders survey. We will use the following determinants.

Amount other income

If the firm founder receives income outside the income from self-employment, this reduces the risks for the firm founder. The amount of other income could be indicated in six categories, ranging from zero to five (50 000 Dutch guilders).

Own capital

This variable measures the share - that can be classified in 12 categories, ranging from 0 to 1 (100 percent) - of own capital in the total amount of initial capital that is needed by the entrepreneur.

Contribution by business partner(s)

Maybe a business partner makes some financial contribution. This partner will (possibly) benefit from the new firm. This will again be indicated using a dummy variable.

Received loan from family

If the family comes to help in the financing part of starting the firm, this is indicated by another dummy variable.

Wage income received by spouse

For determining the success of households that have double income, a variable is included that determines whether the spouse receives an income (variable equals one) or not (variable equals zero).

Table 7 Descriptive statistics of determinants considering financial capital

Variable	Mean	Std. Dev.	Min.	Max.
amount other income	2.83	1.97	0	5
financed with own capital	0.67	0.40	0	1
contribution by business partner(s)	0.11	0.31	0	1
received loan from family	0.17	0.38	0	1
wage income received by spouse	0.44	0.50	0	1

3.4.3 Social capital

In order to have success as an entrepreneur, the importance of communicating with relations seems to be growing and growing. Having capabilities in this respect can be indicated as owning social capital¹. Also in literature, increased attention is paid on the relation between social capital and entrepreneurship². The following items dealing with social capital could be derived from the firm founders survey.

Entrepreneurs in the family

Being influenced by self-employed members of the family can be a determining factor for success. For this, a variable is constructed that has value one if the firm founder reported considerable influence of self-employed family members, value 0.5 if there is some influence and zero if this is not the case.

Contact with entrepreneurs in networks

This variable indicates whether the firm founder has often (value equals one), sometimes (value equals 0.5) or never (value equals zero) contacts with other entrepreneurs.

Emotional support from spouse

This determinant relates to the emotional support from the spouse. If this is present, the variable equals one, and zero otherwise.

Boarding out of activities to others

Does the entrepreneur board out activities? This suggests at least a strategic choice made by the entrepreneur. Often, this boarding out is to a relationship already known to the entrepreneur before the start-up. If the entrepreneur does board out, this variable is equal to one, and it is zero otherwise.

¹ Jacobs (1961) introduced this as a term. Since then, there have been several interpretations regarding social capital. We will use the one proposed by Loury (1977), who defined it as naturally occurring relationships to promote or aid the development of valued skills or characteristics.

² See for example Brüderl and Preisendorfer (1998), Cooke and Wills (1999).

Table 8 Descriptive statistics of determinants considering social capital

Variable	Mean	Std. Dev.	Min.	Max.
influenced by entrepr. in the family	0.26	0.35	0	1
contact with entrepr. in networks	0.28	0.36	0	1
emotional support from spouse	0.73	0.44	0	1
boarding out of activities to others	0.45	0.50	0	1

3.4.4 Keeping up with developments relevant for the businesses

How do the entrepreneurs get their information on the developments that are important for their particular businesses? A number of questions regarding this topic have been posed to the entrepreneurs. These were the following:

- Do you
 - visit congresses
 - take part in courses
 - keep up with literature
 - get information from customers
 - get information from suppliers
 - get information from banks
 - get information from commercial cooperation
 - get information from branch organisation
 - get information from fellow-entrepreneurs?

Each respondent answered 1 (often), 2 (sometimes) or 3 (never). A factor analysis on the answers to the questions revealed the following¹. Three factors were found with loadings greater than 1 (cumulative accounting for 52.5% of the variance). A fourth factor (loading 0.9) is added such that 61.5% of the variance is accounted for. These four factors can be given the following interpretations as given in Table 9. The factors can be seen as potential success determinants and will be included in our analysis in chapter 4.

The subject of keeping up with business is closely related to social capital. However, it cannot be considered as a component of social capital. It reflects the strategy used to retrieve relevant information from relationships. These relationships do not occur naturally.

Table 9 Factor analysis regarding questions referring to 'keeping up with business'

Direction of focus to keep up	Variables with loadings greater than 0.5
1. Focus on branch in general	Branch, congress, courses, literature
2. Focus on direct business relations	Customer, supplier
3. Focus on commercial relations	Banks, commercial cooperation
4. Focus on fellow-entrepreneurs	Contact with fellow-entrepreneurs

3.4.5 Controls

¹ Principal components with varimax rotation, missing values are set to mean (excluding these does not lead to significant changes).

In this section we deal with potential determinants that could be important in determining entrepreneurial success, that do not fit in the classification. Inclusion is necessary, as neglecting these variables could result in biased estimations.

Gender

Gender is known for all entrepreneurs in the survey. The dummy variable equals one if the respondent is male, and zero if the respondent is female.

Goal: employment growth

Some entrepreneurs simply do not want to hire employees. These entrepreneurs are appointed a value of zero, while the others have values one to three, depending on the reported determination to hire employees.

Full self-employment

If the entrepreneur is not fully employed, this can have its effects on performance of the firm. A dummy variable is created that attains a value of one if the respondent indicates that he is self-employed for 100 percent.

Sector dummy business services

Business services may need special attention. Entrepreneurs who are active in the business services are given a value of one, while all other entrepreneurs have a value of zero.

Pull motive to become self-employed: higher income than wages

A variable is constructed to study the influence of the motive based on higher expected gains on performance. The variable attains a value of one if this is strongly the case, of 0.5 if this is moderately the case and of zero if this is not the case.

Table 10 Descriptive statistics of determinants considering the control variables

Variable	Mean	Std. Dev.	Min.	Max.
gender	0.72	0.45	0	1
goal: employment growth	0.40	0.35	0	1
100 percent self-employed	0.93	0.26	0	1
sector dummy: business services	0.19	0.39	0	1
motive to become self-empl.: higher income	0.39	0.39	0	1

3.5 Discussion

This chapter provided a description of the dataset and a classification of the constructed determinant variables. Unfortunately, some possible determinants (such as ‘good luck’) simply cannot be modelled. At the same time, choices have to be made: the dataset contains many more opportunities for construct-

ing other, different determinants. The approach of the underlying study has a general character. Therefore, using the classification applied, the most appealing determinants were considered. When focussing on specific topics, it will be possible to study the influences of other, more specific determinants.

4 Empirical results

4.1 Introduction

In order to test the impact of a number of determinants on entrepreneurial success some models are constructed that incorporate all general effects of the success determinants¹. The concept of non-response may be important in determining the relationships between determinants and success. This matter is dealt with in section 4.2. The models, as well as their results, are described in the next three sections for the success measures profit, employment and duration. Whereas the models for profit and employment are estimated using ordinary least squares, a survival model is constructed for duration.

4.2 Non-response

The percentage of firms reporting failure in 1995 is only 6 percent, and 20 percent in 1997. Earlier research - conducted in the Netherlands - showed failure rates of 10 percent in the first year and of 26 percent in the first three years, see EIM (1994). This suggests that the percentage of failing firms in the group that did not respond to the later questionnaires is substantially higher than the percentage of failing firms that did provide performance information. The probability distribution of performance for the respondents with complete data is different from the probability distribution of performance in the population. This causes a complete data sample selection bias.

Financial performance may influence the ability or willingness of a respondent to fill out a questionnaire. When a firm has stopped all activities it is often not possible to contact the firm to conduct a poll. Keasey and Watson (1991) mention this problem as the major hindrance for gathering small firm performance data. Even if a failed firm is reached by the conductors of the survey, it may be that the respondent does not see the use of filling out the questionnaire since the firm does not exist any more. Another possibility is that the respondent simply does not feel like reporting failure.

Besides the models that are dealt with in the next sections, models were constructed that allow for a relationship between response to the questionnaire in 1997 and performance. It was hypothesised that the willingness to respond was positively related to performance. These models did not outperform the models without non-response.

¹ The effects of the determinants for the different function aspects (as mentioned in chapter 2) did not differ significantly. Therefore, we only discuss the results of the general model that does not distinguish the entrepreneurial functions.

4.3 Profit

Let π_i be the profit for respondent i in 1997, and x_{ij} respondent i 's value of determinant j in 1994. The model to be estimated is the following:

$$\ln p_i = \mathbf{a} + \sum_{j=1}^J \mathbf{b}_j x_{ij} + \mathbf{e}_i, \quad \text{where } \mathbf{e}_i \sim N(0, \mathbf{s}_p^2).$$

We have specified the logarithm of profit as the dependent variable rather than profit itself, because we think changes in the determinants influence relative profit (in percentages) rather than absolute profit (in guilders). The equation above can be estimated using ordinary least squares. Results are shown in Table 11.

Human capital variables appear important determinants of the profit of an entrepreneur. Four variables appear to be significant. Having experience in the sector appears to have the largest influence: entrepreneurs with experience in the sector earn about thrice as much compared to entrepreneurs lacking this experience. Also, the influence of high education and experience in self-employment is substantial: having a high education approximately doubles profit, the same holding true for having experience in self-employment, although the uncertainty about the right value of this latter influence is larger. Age appears to have a negative influence on profit: an entrepreneur that is 10 years older at the start of his business earns about 25% less than his younger equivalent.

As regards financial capital variables, if the entrepreneur receives another income beside the profits derived from self-employment, this reduces profitability. Every 10 thousand guilders he gets from other sources comes together with about 15% lower profits. The other financial capital variables appear to have no significant influence.

As regards social capital determinants, the emotional support of the spouse appears important: entrepreneurs having this support make about 80% more profit than their counterparts having to do without this support. However, contrary to what one would expect, getting help and feedback from self-employed members of the family influences profits strongly negative. Those who get this help make about a third of the profits made by their counterparts doing without this help and feedback.

Strategies for keeping up with business that are linked to profits are the strategies that focus on direct business and commercial relations.

Finally, neither of the control variables appears to have a significant influence on profits.

Table 11 Estimation results for profit (logarithm)

	estimate ^a	standard error	
human capital			
age	-0.264	0.135	**
high education	0.721	0.258	**
experience in the sector	1.059	0.254	**
experience in trade	0.196	0.268	
experience as an employee	-0.204	0.407	
experience in self-employment	0.752	0.426	*
financial experience	0.144	0.392	
financial capital			
amount other income	-0.183	0.069	**
financed with own capital	-0.265	0.297	
contribution by business partner(s)	0.560	0.365	
received loan from family	0.174	0.303	
wage income received by spouse	0.041	0.263	
social capital			
influenced by entrepr. in the family	-1.024	0.318	**
contact with entrepr. in networks	-0.053	0.317	
emotional support from spouse	0.582	0.259	**
boarding out of activities to others	0.150	0.228	
keep up strategy variables			
focus on branch in general	-0.162	0.116	
focus on direct business relations	0.234	0.112	**
focus on commercial relations	0.213	0.116	*
focus on fellow-entrepreneurs	0.187	0.112	
control variables			
gender	0.323	0.259	
goal: employment growth	0.443	0.331	
100 percent self-employed	0.467	0.380	
sector dummy: business services	0.171	0.292	
motive to become self-empl.: higher income	0.397	0.293	
number of observations	998		
log likelihood	-1728.60		

a As the logarithm of profit is modelled, an estimate with value β , means that if the determining (dummy) variable changes from 0 to 1, the profit changes with a factor $\exp(\beta)$.

** Significant at 5% level.

* Significant at 10% level.

4.4 Employment

The model for employment is analogous to the model for profit. Let L_i be the cumulated employment generated by respondent i between 1994 and 1997, and x_{ij} respondent i 's value of determinant j in 1994. The model to be estimated is the following:

$$\ln L_i = \mathbf{a} + \sum_{j=1}^J \mathbf{b}_j x_{ij} + \mathbf{e}_i^e, \quad \text{where } \mathbf{e}_i^e \sim N(0, \mathbf{s}_e^2).$$

Results are depicted in Table 12.

Contrary to what was the case when analysing the determinants of profits, human capital variables appear to be not dominant in explaining the employment generated by entrepreneurs. Only two variables have significant influence. Having financial experience seems to have a positive influence: entrepreneurs having this experience generate nearly twice the employment compared to their counterparts lacking this experience. Age, on the contrary, leads to less employment: if an entrepreneur is 10 years older at the start he generates about 40% less employment.

As regards financial capital variables, it appears that the more is done with outside capital the higher the generated employment is. If business has been started with 10% point more outside capital this leads on average to 7% more employment. Furthermore, entrepreneurs benefiting from a financial contribution by a business partner generate about two and a half as much employment as their counterparts doing without such a contribution. If the entrepreneur has other income available besides what he earns from his business, this has a negative impact on the employment generated.

As regards social capital variables, entrepreneurs having contacts with other entrepreneurs in networks, generate about twice as much employment as their counterparts lacking these networks. Furthermore, entrepreneurs boarding out activities generate about 50% more employment.

Strategies for keeping up with business that are linked to generating employment are the strategies that focus on commercial relations and fellow-entrepreneurs.

Two control variables appear to be significant. As was to be expected, entrepreneurs who had as goal right from the start to generate employment growth appear to have succeeded in this respect when compared to their fellow-entrepreneurs who did not have this intention. On average, they appear to have created eight times as much employment. Curiously, those who are full-time self-employed, generate less employment than their part-time counterparts: about 60% less.

Table 12 Estimation results for cumulated employment (logarithm)

	estimate ^a	standard error	
human capital			
age	-0.533	0.107	**
high education	0.105	0.211	
experience in the sector	0.045	0.208	
experience in trade	-0.298	0.219	
experience as an employee	-0.127	0.338	
experience in self-employment	0.525	0.336	
financial experience	0.614	0.331	*
financial capital			
amount other income	-0.162	0.055	**
financed with own capital	-0.729	0.236	**
contribution by business partner(s)	0.884	0.286	**
received loan from family	0.134	0.242	
wage income received by spouse	0.344	0.212	
social capital			
influenced by entrepr. in the family	-0.174	0.252	
contact with entrepr. in networks	0.815	0.254	**
emotional support from spouse	0.022	0.206	
boarding out of activities to others	0.425	0.183	**
keep up strategy variables			
focus on branch in general	0.031	0.093	
focus on direct business relations	0.112	0.089	
focus on commercial relations	0.197	0.091	**
focus on fellow-entrepreneurs	-0.154	0.088	*
control variables			
gender	-0.121	0.208	
goal: employment growth	2.064	0.266	**
100 percent self-employed	-0.975	0.299	**
sector dummy: business services	-0.199	0.236	
motive to become self-empl.: higher income	0.070	0.235	
number of observations	847		
log likelihood	-1209.31		

a As the logarithm of generated employment is modelled, an estimate with value β , means that if the determining (dummy) variable changes from 0 to 1, the generated employment changes with a factor $\exp(\beta)$.

** Significant at 5% level.

* Significant at 10% level.

4.5 Duration

For duration, we apply a different model than for profit and employment, viz. a survival model. In such a model the (logarithm of the) expected survival time is modelled as a function of the characteristics of the entrepreneurs. A description of this model is provided in the appendix. Results are shown in Table 13.

Possessing human capital appears to be important for the duration of the business. Three human capital-related determinants appear to have a significant positive influence on duration. Starting at an age ten years higher increases the expected duration by about one third. Having experience in the sector or as an employee increases the expected duration by about 70 percent. The influence of financial experience has the unexpected sign: it seems to affect survival negatively. Having financial experience decreases the expected duration by approximately 40 percent.

Financial capital does not seem to play any role in explaining the duration of a firm.

Social capital affects survival through the emotional support of the spouse (the presence of this aspect raises expected survival time by around 50 percent), and through the boarding out of activities to others (which is expected to increase survival time by about one third as compared with entrepreneurs who do not board out).

Strategies of keeping up with business seem to be of importance, with effects coming from the focus on the branch in general and commercial relations.

In contrast to the measures of success dealt with before, gender does make a difference: male entrepreneurs have significantly lower hazard rates and are thus considered to be more successful as far as duration of the firm is concerned. The associated advantage expressed in relative expected survival time is estimated rather high at about 50 percent. Whether the entrepreneur is self-employed full-time is the only other control variable that is of significance for explaining the duration of the firm. An entrepreneur who is self-employed for 100 percent has lower probabilities to quit (lower hazard rates) and is expected to have a survival time that is approximately 1.5 times higher than that of part-time entrepreneurs.

Table 13 Estimation results for duration (logarithm)

	estimate ^a	standard error	
human capital			
age	0.273	0.097	**
high education	0.085	0.190	
experience in the sector	0.547	0.177	**
experience in trade	0.295	0.183	
experience as an employee	0.525	0.265	**
experience in self-employment	-0.454	0.288	
financial experience	-0.525	0.289	*
financial capital			
amount other income	-0.034	0.050	
financed with own capital	-0.076	0.207	
contribution by business partner(s)	0.146	0.258	
received loan from family	-0.003	0.215	
wage income received by spouse	-0.239	0.189	
social capital			
influenced by entrepr. in the family	-0.078	0.220	
contact with entrepr. in networks	-0.169	0.228	
emotional support from spouse	0.407	0.177	**
boarding out of activities to others	0.295	0.163	*
keep up strategy variables			
focus on branch in general	0.237	0.081	**
focus on direct business relations	-0.027	0.079	
focus on commercial relations	0.228	0.091	**
focus on fellow-entrepreneurs	0.085	0.079	
control variables			
gender	0.409	0.177	**
goal: employment growth	0.080	0.231	
100 percent self-employed	0.928	0.250	**
sector dummy: business services	-0.198	0.208	
motive to become self-empl.: higher income	-0.228	0.208	
number of observations	961		
log likelihood	-1141.30		

a As the logarithm of expected survival time is modelled, an estimate with value β , means that if the determining (dummy) variable changes from 0 to 1, the expected survival time changes with a factor $\exp(\beta)$.

** Significant at 5% level.

* Significant at 10% level.

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Appendix The survival model

In the survival model, firm founders start their business at time $t=0$. Exits are described by a random process governed by a probability density function $f(t)$ and adjoining distribution function $F(T)$. Thus, the probability of a firm exiting between t and $t+dt$ is denoted by $f(t)dt$, and the likelihood that a firm exits in the first T months is denoted by $F(T)$.

Consequently, the survivor function $S(T)$, defined as the probability that a firm survives the first T months, is equivalent to $1-F(T)$. Also, the hazard rate $q(t)$, specifying the conditional probability that a firm that has remained in business for a period from 0 to t , exits in the short interval $[t, t+dt]$, is equivalent to:

$$(1) \quad q(t) = \frac{f(t)}{S(t)}.$$

The hazard function is modelled as a function of a set of exogenous person-specific regressors, the vector x , and of time t to permit duration dependence. Assuming the absence of regressors, the hazard is a non-monotonic function of t . The assumption was shown to hold by a first inspection of the duration data. A simple hazard specification that permits non-monotonic behaviour is the log-logistic (see Lancaster, 1992, p. 44),

$$(2) \quad q(t, x) = \frac{k(x)a t^{a-1}}{1 + k(x)t^a}.$$

Let $k(x) = \exp(\mathbf{b}'x)$. Then, it can be demonstrated that

$$(3) \quad E[\ln t \mid x_i] = -\mathbf{b}'x_i^{-1}.$$

These are the coefficients (i.e. $-\mathbf{b}$) that are shown in Table 13. The likelihood function to be maximized is the following:

$$(4) \quad L_i = S(t_i)q_i(t_i)^{d_i},$$

where $d_i=1$ if individual i 's exit is observed at t_i and $d_i=0$ if i 's length of time in business is right censored. As equation (1) can be rewritten as

$$q(t) = \frac{-d \ln S(t)}{d(t)}, \text{ it follows that } S(t) = \exp\left(-\int_0^t q(u)du\right).$$

The logarithm of the likelihood function can thus be written in terms of the hazard function as:

$$(5) \quad \ln L_i = -\int_0^{t_i} q_i(u)du + d_i \ln q_i(t_i).$$

¹ See Greene (1997), page 993.

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